

United States Virgin Islands

CDBG-Mitigation Action Plan

Virgin Islands Housing Finance Authority

Honorable Governor Albert Bryan Jr. **JUNE 14, 2021**

Approved by HUD:	7/12/2021
Modified Version:	6/14/2021
Submitted to HUD:	1/4/2021
Public Comment Period:	2/15/2020 – 12/22/2020

For Community Development Block Grant Mitigation (CDBG-MIT) funds for the Territory in response to major 2017 disasters, as appropriated under the Supplemental Appropriations for Disaster Relief Act, Public Law (P.L.) 115-123, published in the below federal notices:

Federal Register / Vol. 84, No. 169, August 30, 2019
Federal Register / Vol. 84, No. 175, September 10, 2019

ACTION PLAN REVISION HISTORY

For Substantial and Non-substantial Changes

Version	Date	Description
Version 1.0	November 4, 2020	Initial CDBG MIT Action Plan
Version 2.0	January 4, 2021	CDBG MIT Action Plan HUD Submission
Version 3.0	February 25, 2021	CDBG MIT Action Plan with HUD requested Revisions
Version 4.0	June 14, 2021	CDBG MIT Action Plan with HUD requested Revisions

Substantial Amendments will be available on the U.S. Virgin Islands CDBG-MIT Action Plan website (https://cdbgdr.vihfa.gov/programs/cdbg-mitigation/) for public review and comment for at least 30 days. More details about substantial and non-substantial changes are provided in Appendix B.

This page intentionally left blank

TABLE OF CONTENTS

Action Plan Revision History 2

Action Plan Executive Summary 11

1.0 Mitigation Needs Assessment (MNA) 19

1.1 Background 19

1.2 General Methodology 20

1.3 Territorial Hazard Mitigation Plan 22

1.4 USVI Mitigation and Needs Assessment (MNA) 23

1.5 USVI History and Geography 24

1.5.1 Recent Hurricane Impacts 26

1.6 USVI Social Vulnerability and Distress Indicators 29

1.7 Hazard Context 35

1.7.1 Hazards of Concern 35

1.7.2 Methodology for Hazard Analysis 36

1.8 Critical Facilities and Lifelines 37

1.8.1 Safety and Security 38

1.8.2 Lifeline Locations 39

1.9 Risk Assessment Summary 43

1.9.1 Drought 43

1.9.2 Earthquakes 49

1.9.3 Flooding 55

1.9.4 Hurricane Winds 66

1.9.5 Rain-Induced Landslides 70

1.9.6 Tsunami 73

1.9.7 Wildfire 77

1.9.8 Disease Outbreak/Pandemic 80

1.10 Unmet Mitigation Needs 82

1.11 Risk Assessment Summary 82
1.12 CDBG-DR Considerations 85
1.12.1 Analysis of the Mitigation Housing and Public Facilities Needs 85
2.0 Long-Term Planning and Risk Mitigation Assessments 90
2.1 Building Code Standards 90
2.1.1 Vertical Flood Elevation Protection 91
2.2 Land Use and Zoning Policies 91
2.2.1 Coastal Zone Management 92
2.2.2 Land Development Regulations 92
2.3 Flood Mitigation Efforts 93
2.3.1 Elevation 93
2.3.2 Stormwater Management 94
2.3.3 Unified Watershed Assessment and Restoration Priorities 94
2.3.4 High Wind 95
2.3.5 Sea Level Rise 95
2.4 Local and Regional Planning Coordination 95
2.5 Flood Insurance Coverage 96
2.5.1 National Flood Insurance Program, Floodplain Management, and Building Codes 97
3.0 Connection of Mitigation Programs to Identified Risks 100
3.1 Infrastructure & Public Facilities 101
3.2 Housing 102
3.2.1 New Construction for Homeownership Opportunity and First Time Home Buyer Assistance 102
3.2.2 Public and Affordable Housing Development 103
3.2.3 Homeless and Supportive Housing 104
4.0 Low- and Moderate-Income Priority 106
4.1 Vulnerable Populations 106
4.2 Specific Impact on Vulnerable Populations and Protected Classes 107

4.2.1 Seniors 107
4.2.2 Special Needs 107
4.2.3 Homelessness 107
4.2.4 Natural Infrastructure 112
4.2 How Programs or Projects Increase Resiliency for Housing Serving Vulnerable Populations 113
4.3 Minimizing Displacement 114
5.0 Coordination of Mitigation Projects Leverage 116
6.0 Minimizing Displacement and Ensuring Accessibility 118
7.0 Allocation and Maximum Award Amounts, Necessary and Reasonable Assistance 120
7.0.1 Projected LMI Benefit 121
7.1 Program Allocations 121
7.2 Overall Method of Distribution and Delivery 123
7.3 Infrastructure and Public Facilities 123
7.3.1 Community Resilience Centers & Public Facilities Construction 124
7.3.2 Critical & Natural Infrastructure Resilience 126
7.4 Economic Resilience & Revitalization 130
7.4.1 Commercial Hardening & Financing Program 131
7.4.2 Small Business Mitigation Improvements 134
7.5 Resilient Housing Programs 135
7.5.1 Single Family Resilient New Home Construction Program 136
7.5.2 Resilient Multifamily Housing Program 137
7.5.3 Homeless Housing Initiative--Permanent Supportive Housing Development 138
7.5.4 Innovative Resilient Housing 139
7.6 Public Services 140
7.6.1 Improved Access to Healthcare 141
7.6.2 Allocation and Maximum Award 141
7.6.3 Eligible Applicants 141

7.6.4 Eligible Activities....141
7.6.5 Priorities....141
7.6.6 Projected Start and End Dates....141
7.7 Territory Planning Program....141
7.7.1 Allocation and Maximum Award....142
7.7.2 Eligible Applicants....142
7.7.3 Eligible Activities....142
7.7.4 Priorities....142
7.7.5 Projected Start and End Date....143
7.8 VIHFA Administration....143
7.9 Timely Information on Application Status and Confidentiality....143
7.9.1 Confidentiality/Personally Identifiable Information (PII)....144
7.10 Exceptions to Maximum Award Amounts....145
7.11 Long-term Operation and Maintenance....145
7.12 Subrecipient Expenses, Program Income, and Timely Payment....146
8.0 Natural Infrastructure....148
9.0 Construction Standards....150
9.1 Sustainability....150
9.2 Accessibility....150
9.3 Green Building Standards....150
9.4 Broadband Infrastructure....150
10.0 Operation and Maintenance Plans....153
11.0 Cost Verification....155
12.0 Building Code and Hazard Mitigation Planning....157
Appendix A: Schedule of Expenditures and Outcomes....158
Appendix B: Amendments to the Action Plan....160
Appendix C: Certifications....161

Appendix D: Community Participation and Public Comment 164
D-1 Community Engagement 165
D-2 Links to Websites and PowerPoint Presentations 169
D-3 Links to Websites for Screenshots of Chats and other Transcript Data 169
D-4 Survey and Summary Data 169
D-5 Citizen Advisory Committee 170
D-6 Response to Citizen Complaints, and Appeals & Website Information 170
D-7 Summary of Comments 173
D-8 Copies/ Screenshots of Citizen Participation/Public Notice 307
Appendix E: References 321
Appendix F: Summary of VIHFA Outreach with Stakeholders to Align and Coordinate Efforts 326
Appendix G: Proposed Projects list for potential consideration under CDBG-MIT funding 337
Appendix H: Acronyms and Agencies 347
Appendix I: *Construction Information for a Stronger Home* 350

This page intentionally left blank



Action Plan Introduction and Executive Summary

ACTION PLAN EXECUTIVE SUMMARY

The United States Virgin Islands (USVI or the Territory) are gems of the Caribbean with a rich culture influenced by hundreds of years of African, Danish, and French heritage. The Territory suffered the impacts of back-to-back category five Hurricanes— Irma and Maria. The resulting aftermath can be briefly summarized as catastrophic destruction that resulted in the Territory experiencing the longest blackout in U.S. history according to the United States Government Accountability Office (United States Government Accountability Office, 2019); and in HUD qualifying the entire United States Virgin Islands, as a "Most Impacted and Distressed" (MID) area. Under Public Law 115-123 (The Appropriations Act), approved on February 9, 2018, Congress appropriated $28 billion in Community Development Block Grant disaster recovery (CDBG-DR) funds, and directed the United States Department of Housing and Urban Development (HUD) to allocate not less than $12 billion for mitigation activities proportional to the amounts that CDBG-DR grantees received for qualifying disasters in 2015, 2016, and 2017. The Unmet Recovery Needs Assessments and corresponding Action Plans for the Hurricanes Irma and Maria recoveries present the details of ongoing projects, programs, and restoration efforts specific to the CDBG-DR allocations for those disasters. Individuals seeking information on the recovery efforts from those disasters should refer to the Action Plans that are posted on the Virgin Island Housing Finance Authority's (the VIHFA) website (www.vihfa.gov) to review details of the full breadth of the ongoing recovery of the Territory.

HUD published 84 FR 45838 on August 30, 2019 (CDBG-MIT Main Notice) which allocated $6.875 billion in Community Development Block Grant – Mitigation (CDBG-MIT) funds, consistent with the Appropriations Act. No funding for the USVI was included in that allocation. Subsequently, HUD published 84 FR 47528 (USVI Supplemental Notice) which allocated **$774,188,000** in CDBG-MIT funds to the USVI. The USVI Supplemental Notice provides specific guidance to the USVI that supplements the requirements outlined in the CDBG-MIT Main Notice.

The CDBG-MIT Main Notice describes an expanded CDBG disaster mitigation initiative referred to as CDBG-MIT. CDBG-MIT presents a new funding approach from Congress and HUD intended to protect lives and property through development of greater resilience to natural disasters. Thus, the CDBG-MIT Main Notice provides details on what is the required by federal law to carry out such mitigation activities, including the requirements and expectations that HUD places on grantees that will administer CDBG-MIT funds. The CDBG-MIT Main Notice also provides an overview of the grant processes and requirements that are vital components to a CDBG-MIT Action Plan (Action Plan or "MIT-AP"). An Action Plan must be presented to HUD to obtain approval of such allocated amounts, which is the purpose of this document.

This CDBG-MIT Action Plan (MIT-AP) has been prepared by the Government of the U.S. Virgin Islands in consultation with local territorial government agencies, semi-autonomous agencies, authorities, and community stakeholders, plus US governmental representatives. The U.S. Virgin Islands has a Territorial Government that has organized various autonomous and semi-autonomous entities, including the Virgin Islands Housing Finance Authority (VIHFA), as these agencies and authorities perform vital roles within the Territory.

CDBG-MIT funds represent a unique and significant opportunity for the Territory to carry out strategic and high-impact activities to minimize, mitigate or eliminate risks and reduce losses from future disasters. In addition to mitigating disaster risks, the funds provide an opportunity to increase resilience through improved local planning protocols and procedures, within the parameters and guidelines required by HUD. In following federal guidance, this CDBG-MIT Action Plan will review existing data

to identify risks posed by natural hazards to identify the mitigation needs that can and should be addressed within the Territory, building on work done previously. In this way, the MIT-AP aligns with the Territory Hazard Mitigation Plan (THMP), which meets Federal Emergency Management Agency (FEMA) requirements. While this MIT-AP takes into account decisions made and analysis done in the THMP, HUD requirements for this plan are distinct.



Pictured: Discussion with the public on mitigation planning at UVI on St. Croix.

This Action Plan details the Territory's strategy and proposed uses of the $774,188,000 in CDBG-MIT funding allocated in accordance with the USVI Supplemental Notice. The grantee agency, the Virgin Islands Housing Finance Authority (VIHFA), will be administering the grant on behalf of the USVI. References to the HUD grantee and to the Territory as a decision-making entity are construed to mean the VIHFA in all instances. The Action Plan includes the Mitigation Needs Assessment (MNA), which provides an analysis of the specific conditions that are present in USVI and presents weaknesses in the disaster recovery cycle. These mitigation needs are placed in context with "Community Lifelines critical parts of communities, that when damaged present a major obstacle to full recovery. The MNA explains the risks that are present in the Territory and identifies the Community Lifeline(s) which face the greatest risks. Further, the MNA provides a framework within which the Territory may determine projects that would be most effective in mitigating such risks.

This CDBG-MIT Action Plan's Mitigation Needs Assessment is intended to extract relevant data and information that has been previously analyzed in order to identify priority projects for HUD mitigation funding. During the course of this process, and based on available information, the data utilized in the THMP may be enhanced to further quantify the risk of the most significant hazards. However, in accordance with federal guidance, while the MNA may identify further opportunities to improve the risk and vulnerability assessment for inclusion in updates of the THMP, HUD expects the basis of MIT-AP analysis in the MNA to build primarily on the data and work done previously in the most recent THMP, In this way the MIT-AP focuses on how to apply these prior efforts and analysis to examine potential mitigation activities for the Territory based on risk, as well as input from the community.

The MNA is followed by a review of the long-term planning and risk mitigation considerations, to ensure that the forward-looking aspect of the CDBG-MIT allocation is not lost on temporary solutions to permanent problems. This review precedes a discussion on leveraging CDBG-MIT funds with other funds, the role of natural infrastructure in the mitigation plan, construction monitoring, and controlling costs in context with the MNA. The Mitigation Needs Assessment is based on the hazard analysis included in the current THMP, enhanced with newly available data to address key high-ranking hazards for the Territory. For other hazards identified within the MIT-AP, new and updated data will benefit the analysis now being done that will be included in the updated THMP now in progress that will provide an even better provide a tool for looking at continuing mitigation needs for the USVI.

In addition to completing the MNA, this Action Plan (MIT-AP) has been developed through a strategic collaboration process with multiple federal agencies committed and actively involved in the territory's resiliency efforts, as well as with significant input from local agencies, local community members and key stakeholders to determine the territories most critical disaster mitigation needs. The VIHFA hosted three (3) separate "virtual" public engagements prior to publishing the MIT-AP and three (3) virtual public hearings following publication of the draft MIT-AP, using the most innovative technology available and the territory's most commonly used social media platforms, the details of which are captured later in this Action Plan. After the draft MIT-AP was published, the public had more than forty-five (45) days of review time in which to submit public comments to the VIHFA. The VIHFA reviewed data and feedback from several sources and stakeholders on the proposed uses of the funds. Separately, impacted agencies and individuals participated in a stakeholder survey and provided feedback that has informed this Action Plan as well, with additional coordination meetings held to ensure alignment with the Territory's most recent Federal Emergency Management Agency Hazard Mitigation Grant Program (HMGP).

Due to its unique location, the Territory is at risk of experiencing a variety of hazards including tropical winds, storm surge, flash flooding, sea level rise, coastal erosion, extreme heat, drought, earthquakes, wildfires, tsunamis, and pandemics. As the direct HUD recipient of CDBG-MIT funds, the VIHFA is committed to maximizing the impact of available funds for the Territory by encouraging and leveraging public-private partnerships and coordinating with other Federal and local programs. This is based on the understanding that CDBG-MIT recipients are expected to take steps to set in place policies and fund projects that will enhance the impact of HUD investments in the territory.

The VIHFA is focused on implementing data-informed investments through high-impact projects that will reduce risks, suffering and hardship attributable to natural disasters, with particular attention to repetitive loss of property, critical infrastructure, and economic hardening in the Territory. The USVI also supports funding of projects and the adoption of policies that reflect local priorities that will have long-lasting effects on community risk reduction.

The USVI CDBG-MIT Action Plan document will clearly specify the proposed hazard mitigation projects and budget estimates. To truly realize the potential of this "once in a generation" funding opportunity it is important to understand the meaning of hazard mitigation, and examples of mitigation measures and their benefits. Hazard mitigation is defined as any action taken to reduce or eliminate the long-term risk to human life and property from man-made or natural hazards. A hazard is any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption or other structural or financial losses.

Hazard mitigation seeks to make human development and the natural environment safer and more resilient. The mitigation process generally enhances resiliency to significantly reduce risks and vulnerability to hazards. Mitigation can also include removing the built environment from disaster prone areas and maintaining natural mitigating features, such as wetlands or floodplains. Hazard mitigation makes it easier and less expensive to respond to, and recover from, disasters by breaking the damage and repair cycle.

Examples of hazard mitigation measures include, but are not limited to, the following:

- Development of mitigation standards, regulations, policies, and programs;
- Land use/zoning policies;
- Strong building code and floodplain management regulations;
- Dam safety programs, seawalls, and levee systems;
- Acquisition of flood prone and environmentally sensitive lands;
- Retrofitting/hardening/elevating structures, roadways, and critical facilities;
- Public awareness/education campaigns;
- Improvement of warning and evacuation systems; and
- Other measures that may prove to be effective means of mitigation.

Benefits of hazard mitigation include, but are not limited to, the following:

- Saving lives and protecting public health and the environment in the Territory;
- Preventing or minimizing property damage;
- Minimizing social dislocation and stress;
- Reducing economic losses;
- Protecting and preserving infrastructure;
- Reducing legal liability of government and public officials; and
- Protection of the environment and green infrastructure.

In final consideration of available data from the MNA, ongoing disaster recovery needs, community and stakeholder input, and regulatory requirements, the VIHFA has determined that several key investments in long-term hazard mitigation will be required.

Based on conversations with local communities, selected CDBG-MIT projects will be paired, to the greatest extent possible and feasible, with resilient affordable housing solutions to ensure that individuals have a safer place within which to live and thrive. Funding will be allowed for planning activities and other pre-award costs, which will include necessary plans and studies that will provide data to inform the building of a more resilient community. The VIHFA will also continue to partner and coordinate with the territorial entities in its planning activities; and will execute continued public engagement to drive a planning process that is both strategic and responsive to the needs of impacted communities.

Due to limitations placed upon the CDBG-MIT funds, it will be crucial to understand the relevant data and analyses which reflect narratives that clearly support and justify any long-term mitigation approaches that will be sourced with this funding within the Territory. The VIHFA will ensure that all programs will be chosen and implemented based on proven data and analysis to ensure that the optimum actions are undertaken to increase resilience in the Territory. Should additional CDBG-MIT funds become available, the Territory will consider other infrastructure mitigation projects outlined on its project list that have been ranked according to priority but would be eclipsed by lack of funding considerations hereunder. A summary of the allocations is found on the following page:

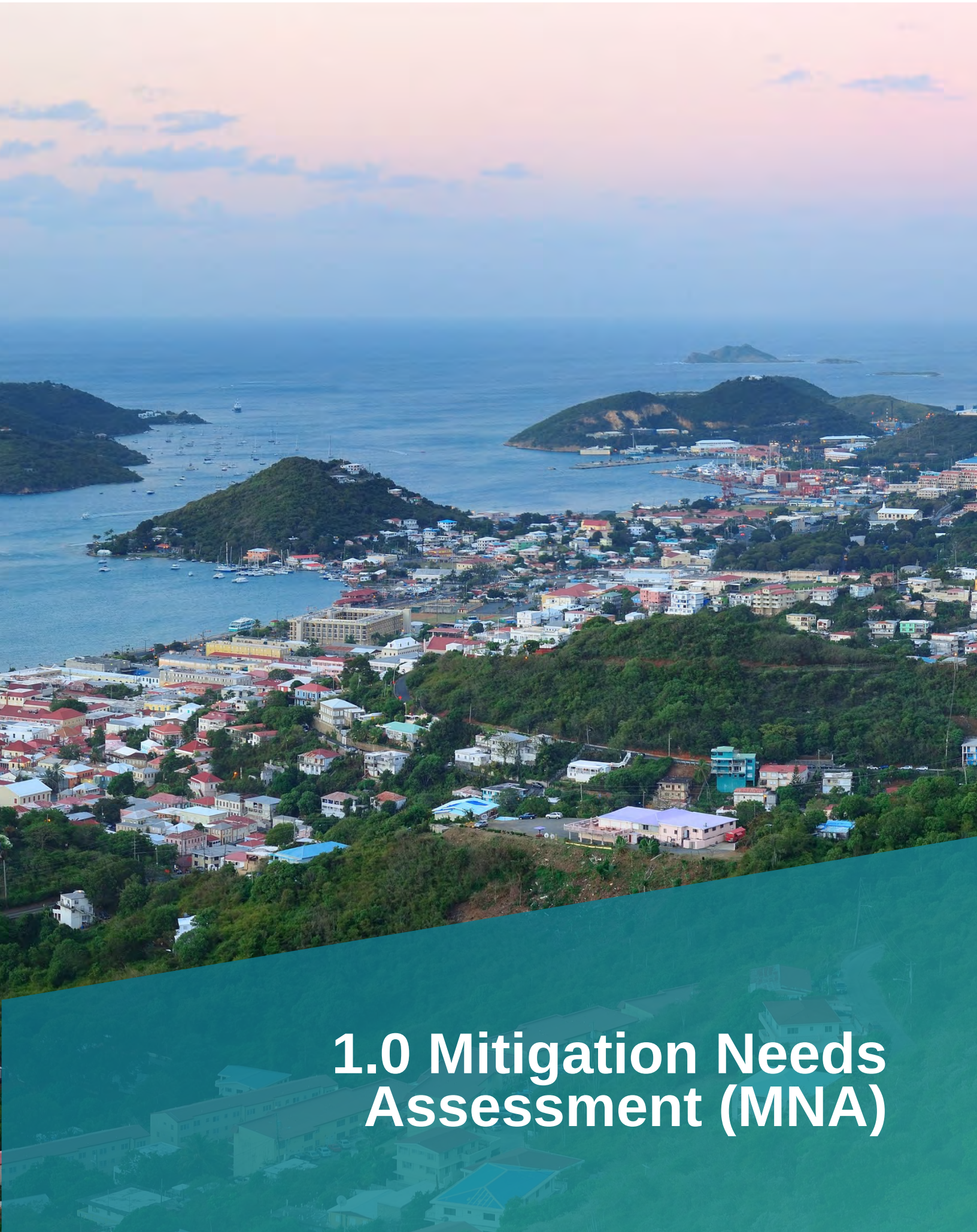
Table 1: CDBG-MIT Allocations

Activity Category	Project/Program	Project Costs	VIHFA Project Delivery Costs	Total Allocations	% of Total	% LMI Projection
Infrastructure & Public Facilities	Community Resilience & Public Facilities	$100,000,000	$2,500,000	$102,500,000		
	Resilient Critical & Natural Infrastructure	$308,000,000	$7,700,000	$315,700,000		
	Total Allocation	$408,000,000	$10,200,000	$418,200,000	54%	70%
Economic Resilience & Revitalization	Commercial Hardening & Financing	$40,000,000	$962,500	$40,962,500		
	Small Business Mitigation	$35,000,000	$787,500	$35,787,500		
	Total Allocation	$75,000,000	$1,750,000	$76,750,000	10%	70%
Housing	Multifamily Housing	$100,000,000	$2,500,000	$102,500,000		
	VIHFA New Home Construction (Home Ownership)	$60,000,000	$1,500,000	$61,500,000		
	Homeless Housing Initiative	$23,000,000	$575,000	$23,575,000		
	Innovative Resilient Housing	$5,000,000	$125,000	$5,125,000		
	Total Allocation	$188,000,000	$4,700,000	$192,700,000	25%	80%
Public Services		$15,000,000	$400,000	$15,400,000	2%	100%
Planning		$29,750,000	$2,678,600	$32,428,600	4%	70%
Administration		$38,709,400	$0	$38,709,400	5%	
Totals		$754,459,400	$19,728,600	$774,188,000	100%	≥70%

Finally, the affordable housing component of the Action Plan will empower the Virgin Islands Housing Finance Authority (VIHFA) to assist in hardening, rehabilitating, and developing new resilient affordable housing stock, creating homeownership opportunities and first-time home buyer assistance. For new construction, building in the floodplain is never a first consideration; however, if there is insufficient land available in the Territory that is outside of floodplain areas, then in an effort to mitigate the cost of satisfying the eight-step approach that allows floodway building, the Territory would conduct a land survey/plan (or use one that may already be in existence) to determine availability, including instances where eminent domain may be an option. If the results of the survey/plan were to support the perceived limitation, VIHFA would then consider other available options and plan for specific floodplain mitigation, among its proposed activities. VIHFA will also continue to review and consider options to mitigate risks to existing developments or to perform one-for-one replacement for units outside of the floodplain, as necessary, and as may be available.

The U.S. Virgin Islands will use established criteria to prioritize funds to initiatives that benefit LMI individuals and households. All CDBG-MIT activities will be routinely monitored for benefit to LMI individuals and communities. At all times, it is the VIHFA's primary objective to serve the greatest identified mitigation need of residents and protect low-and-moderate income individuals, while building a more resilient Territory.

This page intentionally left blank.



1.0 Mitigation Needs Assessment (MNA)

1.0 Mitigation Needs Assessment (MNA)

1.1 Background

According to HUD guidance in the CDBG-MIT Main Notice, the CDBG-MIT funds represent a unique and significant opportunity for grantees to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses. HUD guidance further specifies that CDBG-MIT funds should be closely aligned with the current Federal Emergency Management Agency (FEMA) approved local or state Hazard Mitigation Plan, which for the USVI is called the Territorial Hazard Mitigation Plan (THMP). To align closely with FEMA guidance and best practices, as well as the CDBG-MIT specific requirements, the Territory has reviewed the following resources required by HUD in the CDBG-MIT Main Notice:

- The Federal Emergency Management Agency Local Mitigation Planning Handbook
- The Department of Homeland Security Office of Infrastructure Protection Fact Sheet
- The U.S. Department of Housing and Urban Development CPD Mapping Tool

The approximate $6.875 billion dollars in CDBG-MIT funds allocated in the CDBG-MIT Main Notice after appropriations made in Public Law 115-123 are specifically associated with Hurricanes Irma and Maria. However, Section V.A.5.b of the USVI Supplemental Notice permits the United States Virgin Islands (USVI) to use CDBG–MIT funds for the same activities, consistent with the requirements of the CDBG–MIT grant, in the most impacted and distressed areas related to Hurricanes Irma and Maria in the USVI. The entire Territory of the USVI has been declared a most impacted and distressed area or most impacted and distressed (MID) area under 84 FR 47528.

At the time of the 2010 Census 106,405 people,[1] all of which fall within the HUD-designated MID area for the Territory, as detailed further in Table 2 below.

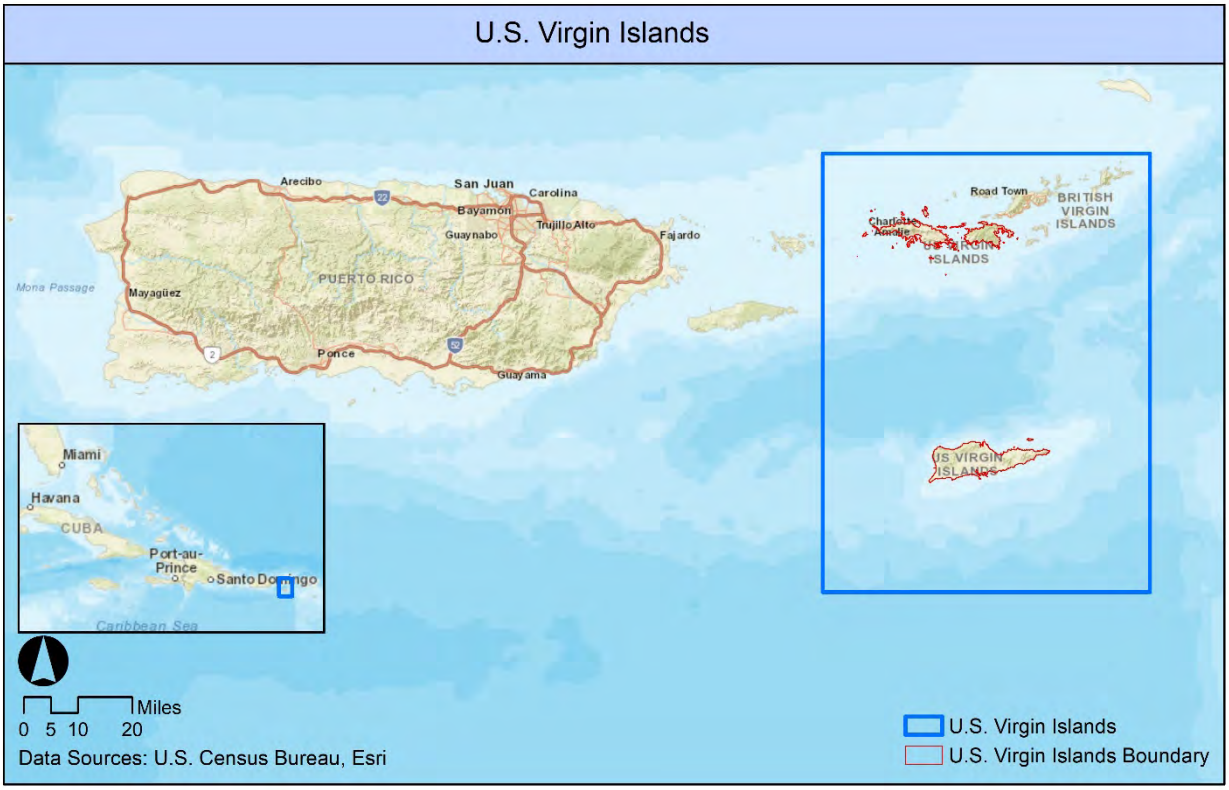
Table 2. Population of USVI MID Areas for Hurricanes Irma, and Maria per 2010 Census

MID Areas - Hurricanes Irma,	Population
St. John	4,170
St. Thomas	51,634
Water Island	182
St. Croix	50,601
Total	106,405

Figure 1 shows the location of the US Virgin Islands, which was directly impacted by both Hurricane Irma and Hurricane Maria, leading to the HUD MID designation for the entire Territory. The Territory's entire population of over 100,000 residents was impacted by the devastation brought on by these storms.

[1] *2010 Census: https://www2.census.gov/programs-surveys/decennial/tables/cph/cph-t/cph-t-8/table4a.pdf*

Figure 1. US Virgin Islands Location



Although the funding allocation from HUD is specific to hurricane recovery, the CDBG-MIT Main Notice requires CDBG-MIT funding be used to address many types of risks, based on a risk-based mitigation needs assessment, which begins in the next section. The assessment that follows addresses current and future risks, including hazards, vulnerability, and impacts of disasters to identify appropriate mitigation actions to reduce the highest risks faced in the Territory.

1.2 General Methodology

The risk assessment methodology utilized in this Mitigation Needs Assessment (MNA) builds on the approach that was utilized in the 2019 Territorial Hazard Mitigation Plan (THMP), enhanced by incorporating some additional risk data in key areas. For example, additional data for certain prioritized hazards (i.e. flooding and sea level rise) that have been indicated in the THMP and in documented impacts of recent disaster events to provide the most significant risk are included within the MNA analysis. This approach is consistent with the process and steps presented in FEMA Publication 386-2 (Federal Emergency Management Agency, 2001), and utilizes a risk assessment methodology that is similar to FEMA's Hazards U.S. Multi-Hazard (HAZUSMH) to ensure that the MNA aligns with the current THMP for the Territory while also taking into account HUD requirements for a CDBG-MIT Action Plan.

The below MNA aligns with the prior hazard identification and work done previously for the 2019 THMP, which was compiled by investigating the various natural hazard occurrences and building further on analysis done in the 2014 THMP. As hazards that occurred previously in the Territory may be experienced in the future, the hazard identification process in the prior THMP documents involved extensive discussions with Virgin Islands Territorial Emergency Management Agency (VITEMA), its

Hazard Mitigation Steering Committee, experts with the University of the Virgin Islands (UVI), the Long Term Recovery Group (LTRG) and the general public. Approved in 2019, the most recent HMP identifies hazards that could potentially affect the Territory. The THMP also identifies actions to potentially reduce the loss of life and property from a disaster across the Territory. Past hazards information came from historical hazard assessment documents, plus hazard specific plans and reports developed by experts over the past two decades. The most recent THMP also considered the frequency of occurrence and/or estimated the magnitude of historical events to accurately determine vulnerability and losses (i.e. future impacts).

Guidance issued in the CDBG-MIT Main Notice specifies how to approach the MNA for this Action Plan, with the goal of taking existing data and information and looking at it with a goal of identifying how to better prepare the Territory for future disaster events. Mitigation needs identified in the prior THMP have been supplemented by an analysis of the impacts of current and future hazards, as well as available data developed in the analysis of impacts of Hurricane Irma and Hurricane Maria. This MNA's approach focuses on providing a current understanding of the actual risks to the Territory and its people that are created by hazard events. In this MNA some revised hazard models or maps have been developed to align the present analysis with prior work done in preparing the most recent THMP and what is needed under HUD regulations for CDBG-MIT. However, per 84 FR 45840 and 86 FR 561 the MNA shall use the most current risk assessment completed or currently being updated though FEMA's own Hazard Mitigation Planning (HMP) process. Specifically, "grantees are …required to reference the applicable FEMA HMP in their action plan and describe how the HMP has informed the CDBG–MIT action plan." Therefore, in alignment with the intent of this MNA to use the current approved THMP and to ensure the best available data is used for ongoing mitigation analysis, the plan includes enhanced analysis for flood and sea level rise using available information and incudes inherent recommendations regarding the use of improved available data for the current THMP update to more accurately quantify the magnitude of potential risk and impacts of hazards affecting the Territory.

As outlined below, this MNA seeks to combine the institutional knowledge contained in the THMP, lessons learned from previous disaster recovery (specifically Hurricane Irma and Maria recovery efforts), and the local knowledge from citizens and stakeholders in disaster-impacted areas. These three sources are the primary source of hazard, risk, and mitigation information for the MNA. For each of the three primary sources contributing to the MNA, the risks are quantitatively assessed according to their potential impacts on seven critical service areas, also known as the Community Lifelines, identified in V.A.2.a.(1) of the CDBG-MIT Main Notice, as outlined below:

1. Safety and Security
2. Communications
3. Food, Water, Sheltering
4. Transportation
5. Health and Medical
6. Hazardous Material (Management)
7. Energy (Power and Fuel)

Analyzing relative risk and how it likely will impact the seven critical service areas by hazard type informs a mitigation approach to most effectively use CDBG-MIT funds. An important product of this exercise is a risk assessment that assigns values to risks to inform decisions on prioritizing potential activities and projects. By assessing the risks to the Community Lifelines and looking at the likely impact of each potential risk based on current data, will then inform decision making in the CDBG-MIT

context so that funds can be used on activities that mitigate the risks that are identified as most troublesome.

The foundation of the MNA is the THMP drafted by The U.S. Virgin Islands Territory Emergency Management Agency (VITEMA). The THMP includes the following components as mandated in the Disaster Mitigation Act of 2000: Planning Process, Risk Assessment, Mitigation Strategies, Coordination of Local Plans, Plan Maintenance, and Plan Adoption and Assurances. Requirements for each component are further defined in 44 CFR §201.4, the FEMA Territory Plan Review Guide and the FEMA Territory Plan Review Tool and can be leveraged to provide a roadmap for mitigating hazards of concern to increase the resiliency of the Territory.

The MNA is a snapshot in time of the current mitigation needs, and subject to change as shifting priorities and risks are discovered by the Territory. As new risks are identified, or as previously identified risks are sufficiently mitigated, the Territory will update the MNA as necessary, using the mandated format and tools. The Mitigation Needs Assessment section of this Action Plan is incorporated hereunder in its entirety.

1.3 Territorial Hazard Mitigation Plan

This CDBG-MIT Action Plan ("Action Plan" or "MIT-AP") is a functionally separate document informed by the Territory's Disaster Mitigation Act of 2000-compliant Hazard Mitigation Plan. The US Virgin Islands has an adopted Territorial Hazard Mitigation Plan that was last updated in 2019, which identifies strategies and actions that can be taken before a disaster strikes and that can greatly reduce the human suffering, damage to property, and the long-term economic impact of natural hazards.

An assessment of the most recent hurricane events in context adds perspective to the THMP. In September 2017, an unprecedented event occurred where two catastrophic Category 5 hurricanes tore through the Territory within 14 days of each other. The storms crippled the Territory, impacting communications systems, both USVI power grids, numerous roads, the drinking water, and wastewater facilities. They disrupted the food supply, compromising medical services, contributed to surpassing landfill capacity, and caused significant detriment to the environment and public health in various routes such as the release of waste and hazardous material into oceans and watersheds. Analysis shows that safety and security; food, water, shelter; health and medical; energy; communications systems; and the transportation lifelines were all impacted. The destruction of USVI lifelines following the storms hampered response after the storm and the Islands' recovery. Many homes and business were demolished beyond repair. As the Territory rebuilds, hazard and risk assessments have been analyzed to determine the adequate mitigative efforts to prevent similar destruction from happening again with future storms. Capacity building and collaborative community efforts have also been incorporated into the THMP update to facilitate initiatives where the Territory can ultimately become self-sustainable (USVI Office of Disaster Recovery, 2019).

This MNA considers the THMP as it relates to the entire Territory, as it has been declared in its entirety a MID area under the implementing authority. While the MNA acknowledges the many hazards faced by the residents and property in the Territory, the focus will remain on risks which can be mitigated using CDBG-MIT funding in order to align the Action Plan with existing activities planned through the THMP.

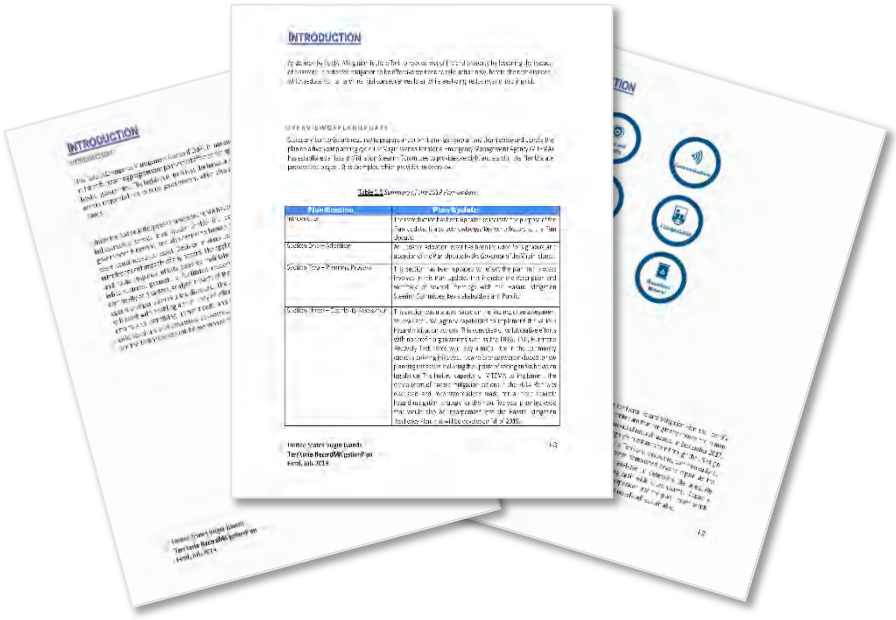
1.4 USVI Mitigation and Needs Assessment (MNA)

This MNA has been prepared pursuant to 84 FR 47528 to support the development of a Community Development Block Grant Mitigation (CDBG-MIT) Action Plan for the USVI. The Federal Register notice dated 9/10/2019 allocated $774,188,000 to the USVI for mitigation activities. Use of the appropriated funds is to be informed by this MNA. This document informs the identification of mitigation actions to be funded by the CDBG-MIT funds by:

- Identifying and analyzing all significant current and future disaster risks
- Providing a substantive basis for activities proposed in the Action Plan
- Consulting with jurisdictions and stakeholders for FEMA mitigation funding alignment
- Using the most recent adopted THMP to inform hazard mitigation actions

This wide-reaching and inclusive planning process has yielded both the MNA and this Action Plan reflects the range of hazards impacting the Territory, and the needs of residents most vulnerable to these hazards. This plan seeks to advance actions that reduce or eliminate human casualties and mitigate damage to the Territory's infrastructure, property, and economy.

Figure 2. 2019 Hazard Mitigation Plan



The MNA builds upon the foundation of the USVI's 2019 THMP Plan. The THMP was updated in 2019 for the following purposes:

- Promote interagency coordination of programs, policies, and practices regarding hazard mitigation opportunities;
- Enhance public awareness and understanding of hazards that affect communities and actions the public can take to make themselves safe;
- Identify, evaluate, and prioritize a range of mitigation actions that are specific to St. Thomas, St. Croix, and St. John;
- Comply with federal program requirements regarding eligibility for disaster recovery and mitigation grant funding;
- Incorporate assessment findings to incorporated post disaster data to identify capability deficiencies and risks that were not identified prior to Hurricane Irma and Maria; and
- Expand on Mitigation efforts which would be crucial in the implementation of mitigation efforts for the Territory

Upon a review of the full range of natural hazards suggested under the FEMA planning guidance, it was necessary to generate some supplementary risk assessment analysis to incorporate best available data for drought and flood hazards. Other resources reviewed in developing this assessment included the USVI CDBG-DR Action Plan, "Conducting a Mitigation Needs Assessment for CDBG-

MIT" webinar materials, FEMA Local Mitigation Plan Handbook, and supplementary HUD materials, with invaluable input from many experts who are intimately familiar with the THMP.

1.5 USVI History and Geography

The U.S. Virgin Islands, previously inhabited by Taino and Island-Carib indigenous groups prior to European settlement, were under control by various European powers until 1672. By 1733, the Danes also controlled St. Croix and St. John, having established control of St. Thomas in 1672. The United States first agreed to buy the islands from Denmark in 1867, though the United States did not assume control over the islands until 1917. Since that time, the economy in the Territory has shifted, with tourism as an industry assuming a larger role (Austin, 2018). The Territory's location continues to attract many visitors tourists who contribute to the local economy.

The USVI is an archipelago located in the Greater Antilles east of Puerto Rico as shown in **Figure 1**. With many islands and cays, the three largest islands – St. Croix, St. John, and St. Thomas – are home to approximately 105,000 people. St. Thomas is comprised of approximately 27 square miles in area, St. John is 19 square miles in area, and St. Croix is approximately 82 square miles in area. St. John and St. Thomas are separated by three miles of Pillsbury Sound, whereas St. Croix is approximately 35 miles south of both St. John and St. Thomas.

The Territory consists of three districts and 20 sub-districts for Census purposes. The three districts (county equivalents) are comprised of the three largest islands: St. Croix, St. Thomas, and St. John. Subdistricts on each island are treated like county subdivisions for the Census, even though the Territory is also divided into estates. These estates are typically smaller than Census subdistricts and are derived from boundaries of agricultural plantations in existence when the United States received the islands from Denmark in 1917 (United States Census Bureau 2019). Groups of adjacent estates comprise Census Tracts. However, meaning that the estates do not nest within subdistricts.

As of the 2010 Census, the Territory is home for well over 100,000 people, comprising 134.3 square miles of land area, with over 55,900 housing units (United States Census Bureau 2013). Approximately three percent of the Islands' for-sale housing stock and 15 percent of its rental housing stock is vacant (U.S. Department of Housing and Urban Development, 2017), of which much of the vacant housing stock is intended for higher-priced single-family vacation rentals for tourists or temporary visitors, as outlined in the 2015 Housing Demand Study. Indeed, given HUD definitions that extend up to 80 percent of Area Median Income, the totals shown for current single family homes for sale that would fall within the affordability range on each of the major islands were inadequate to service the low-income to moderate-income segment that may seek a homeownership alternative, with St. Croix at 18%, St. John at 0%, and St. Thomas at 30% (Community Research Services, LLC, 2015). Figure 3 through Figure 5 shows the US Virgin Islands planning area.

Figure 3. St. Thomas Planning Area

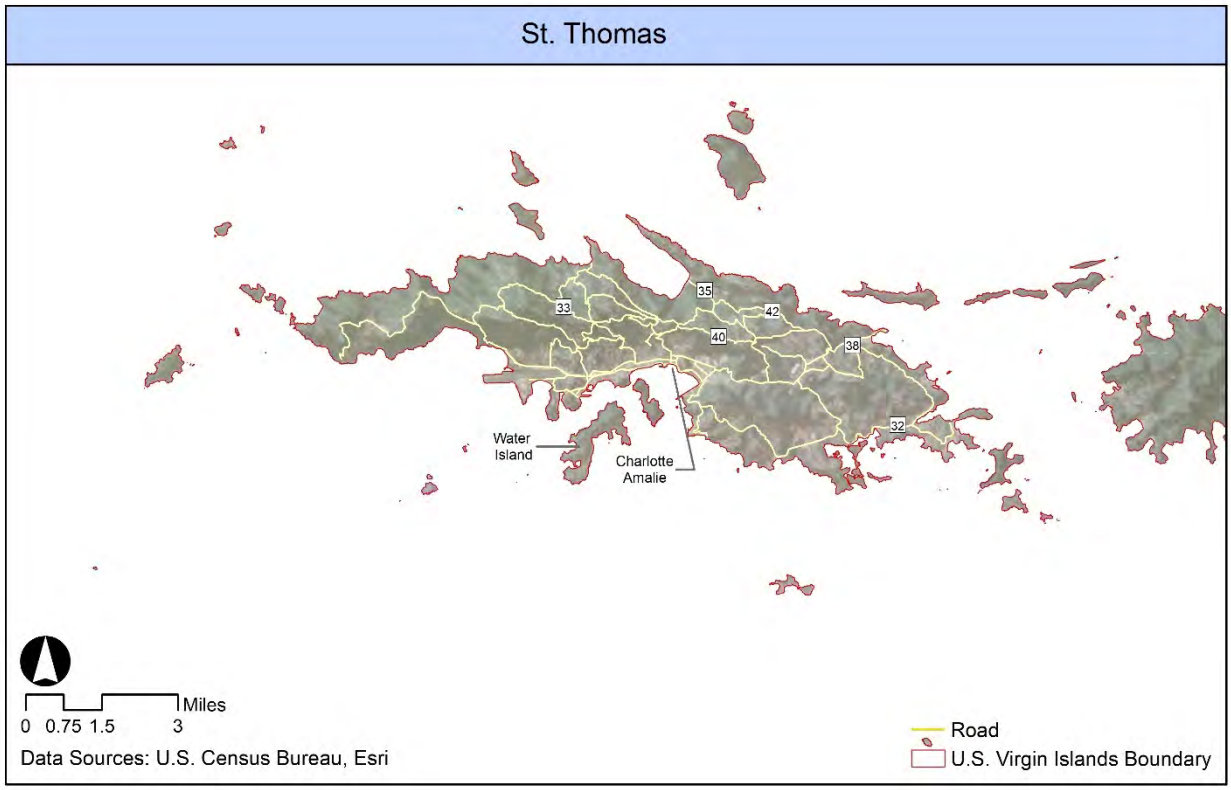


Figure 4. St. Croix Planning Area

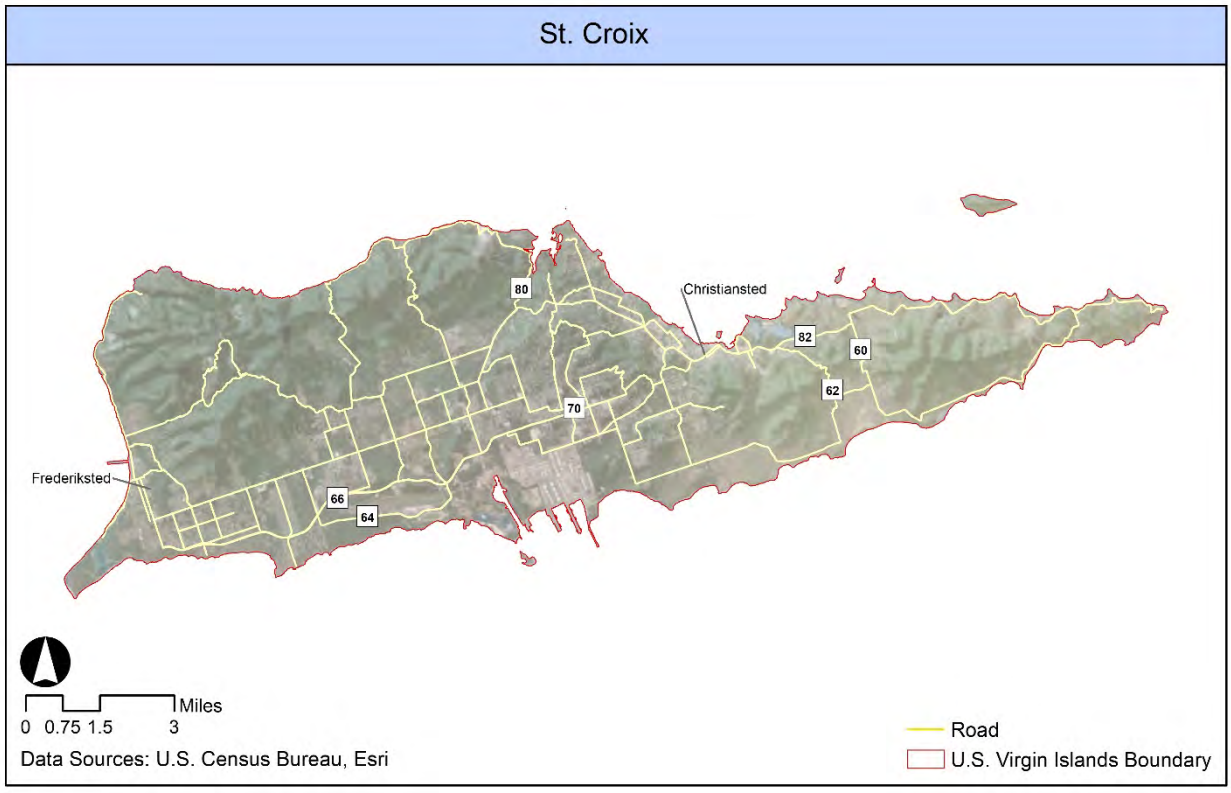
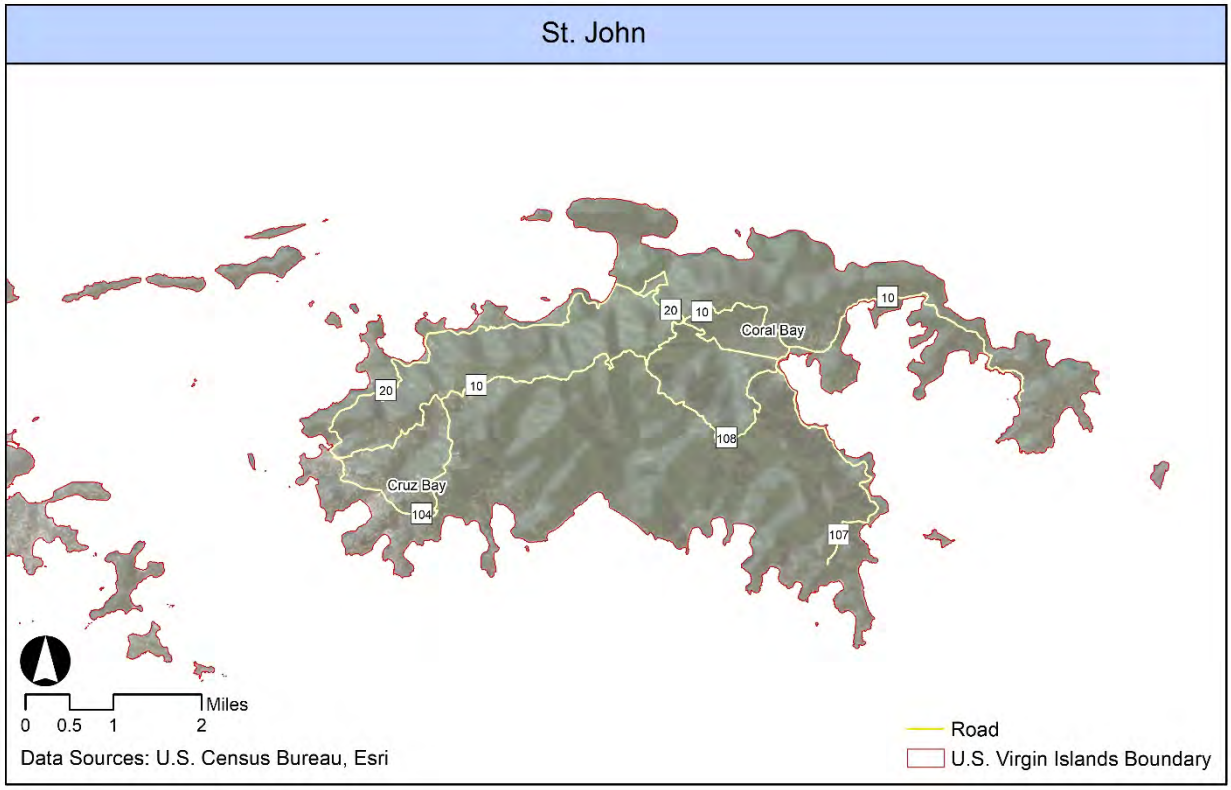


Figure 5. St. John Planning Area



1.5.1 Recent Hurricane Impacts

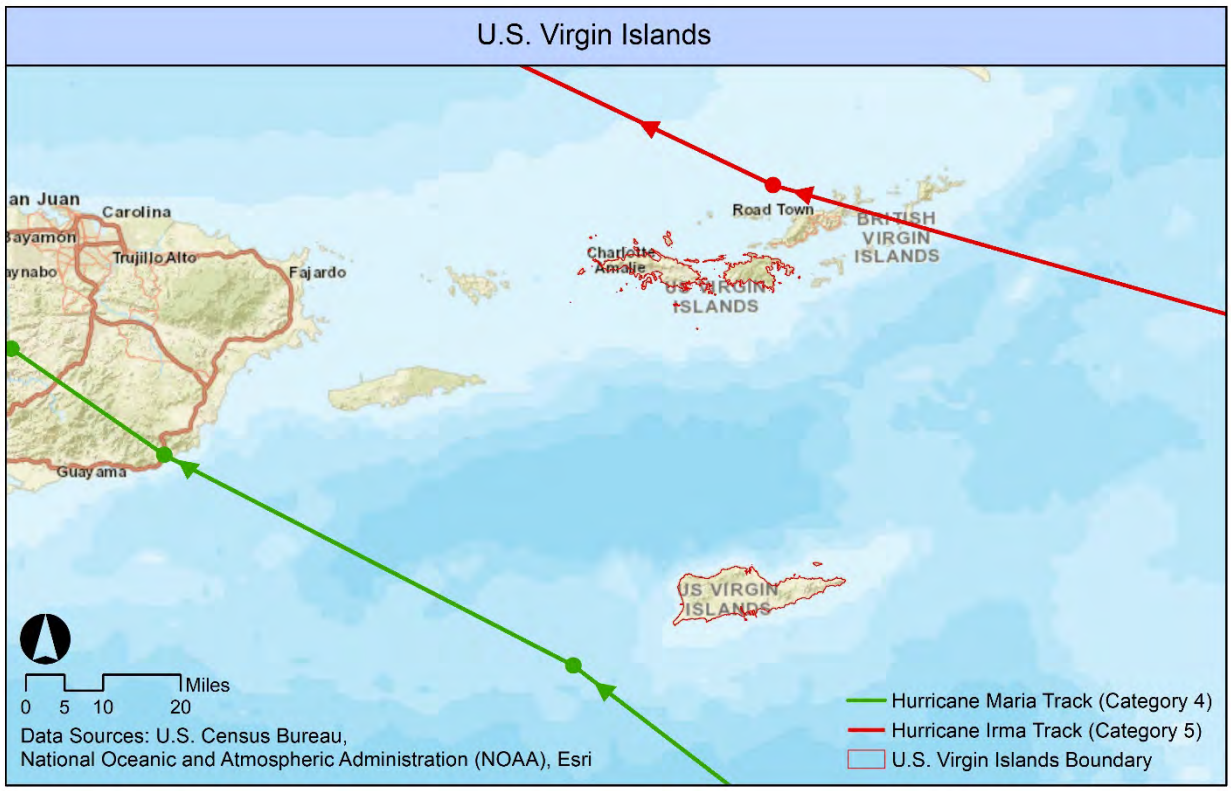
Although the Territory has long been exceptionally vulnerable to natural hazards such as hurricanes and tropical storms, the Islands' readiness and resilience were tested during the 2017 hurricane season. This Mitigation Needs Assessment arises from the unprecedented damage and lasting impacts of Hurricanes Irma and Maria. The impacts from these storms, which made landfall in late September 2017, continue to be felt to this day both in the Virgin Islands and other islands in those hurricanes' path.

On September 6th, 2017, Hurricane Irma passed just north of St. Thomas and St. John as a Category 5 storm, yielding 4-10 inches of rainfall and wind gusts up to 160 mph in St. Thomas and St. John. Hurricane winds extended more than 50 miles from the eye, with tropical storm force winds extending up to 185 miles from Irma's eye. On September 20th, just two weeks later, Hurricane Maria passed south of St. Croix as a Category 5 storm and struck Puerto Rico. Hurricane Maria brought 8-12 inches of rain to the islands and directly impacted Hurricane Irma. Hurricane Irma resulted in wind gusts up to 140 mph, and hurricane-force winds extended 60 miles from the eye. Tropical storm-force winds were experienced up to 150 miles from Hurricane Maria's eye, meaning that the Territory encountered extremely high winds as both storms passed. Storm surges were relatively minor (up to three feet) owing in part to the presence of the Territory's geography, though higher localized flooding may still have occurred in many locations (National Centers for Environmental Information, 2019). **Figure 6** indicates the hurricane tracks of these events. **Table 3** compares the impacts of the two hurricanes.

Hurricanes Irma and Maria together are currently regarded as the second-most costly storms in American history, totaling $147 billion in damage. Individually, the storms ranked third and fifth most

damaging in terms of cost. Hurricane Maria was the deadlier of the storms, causing 2,981 deaths in its path (National Centers for Environmental Information, 2019).

Figure 6. Hurricane Irma and Hurricane Maria Tracks





Pictured: Storm destruction on St. John near the school in Cruz Bay.

Table 3. Comparative Hurricane Impacts.

	Hurricane Irma	Hurricane Maria
Category	5	5
Landfall date	September 6	September 20
Landfall location	St. Thomas / St. John	St. Croix
Worst affected areas	St. Thomas / St. John District	St. Croix District
Maximum measured sustained wind speeds	106 mph*	107 mph*
Maximum measured wind gusts in the USVI	137 mph*	137 mph*
Rainfall	Data not available*	5 in.+*
Storm surge	0.60 – 2.28 ft.+*	1.48 – 2.85 ft.+*
Storm tide	0.50 – 1.7 ft.+*	1.61 – 3.17 ft.+*
Direct deaths	3	2

*Precipitation and tide measuring instruments were knocked off-line or destroyed

Source: USVI Hurricane Recovery and Resilience Task Force

Enormous devastation resulted from the impact of these two hurricane events. In 2018 the total damage to the Territory from both storms was estimated to be $10.8 billion, including $6.9 billion in damage to infrastructure, $2.3 billion in damage to housing, and $1.5 billion in economic damage. Five direct deaths were attributed to the Hurricanes, though a December 2019 article published in the *American Journal of Public Health* reports that there may be several hundred excess deaths not reflected in official counts (Chowdhury, 2019).

Hurricane damage to the Territory was crippling and wide-reaching for many sectors on the island. The USVI Hurricane Recovery and Resilience Task Force reported the following damages:

- More than 90% of above-ground power lines were damaged and more than half of all poles were knocked down. Power outages persisted for months after the storm. By January 2018, more than three months after the storm, power was restored to most customers.
- The hurricanes disabled cell service on St. John and took 80% of cell sites out of service in St. Croix and St. Thomas. Government telecommunications, radio, and television stations were knocked out of service.
- The airports on St. Croix and St. Thomas were closed for over two weeks after the storms.
- Ports were closed for more than three weeks and more than 400 vessels were sunken or grounded with over 300 containing hazardous substances.
- The storms disabled reverse osmosis water facilities for two days in St. Croix and 10 days in St. Thomas, reducing potable water reserves to a three-day volume. Storage tanks and pumping stations were severely damage. Raw sewage was discharged into streets and coastal waterways, and the Islands' landfill exceeded full capacity
- More than half (52%) of housing stock was damaged. 12% of homes were damaged severely.

- The territory's hospitals were rendered non-operational for most services, with inpatient capacity reduced by 50% and resulting in evacuations of patients from the Islands.
- More than half of the territory's schools were damaged by more than 50%.
- The territory lost 8% of jobs in the aftermath of the two Hurricanes (USVI Hurricane Recovery and Resilience Task Force, 2018).

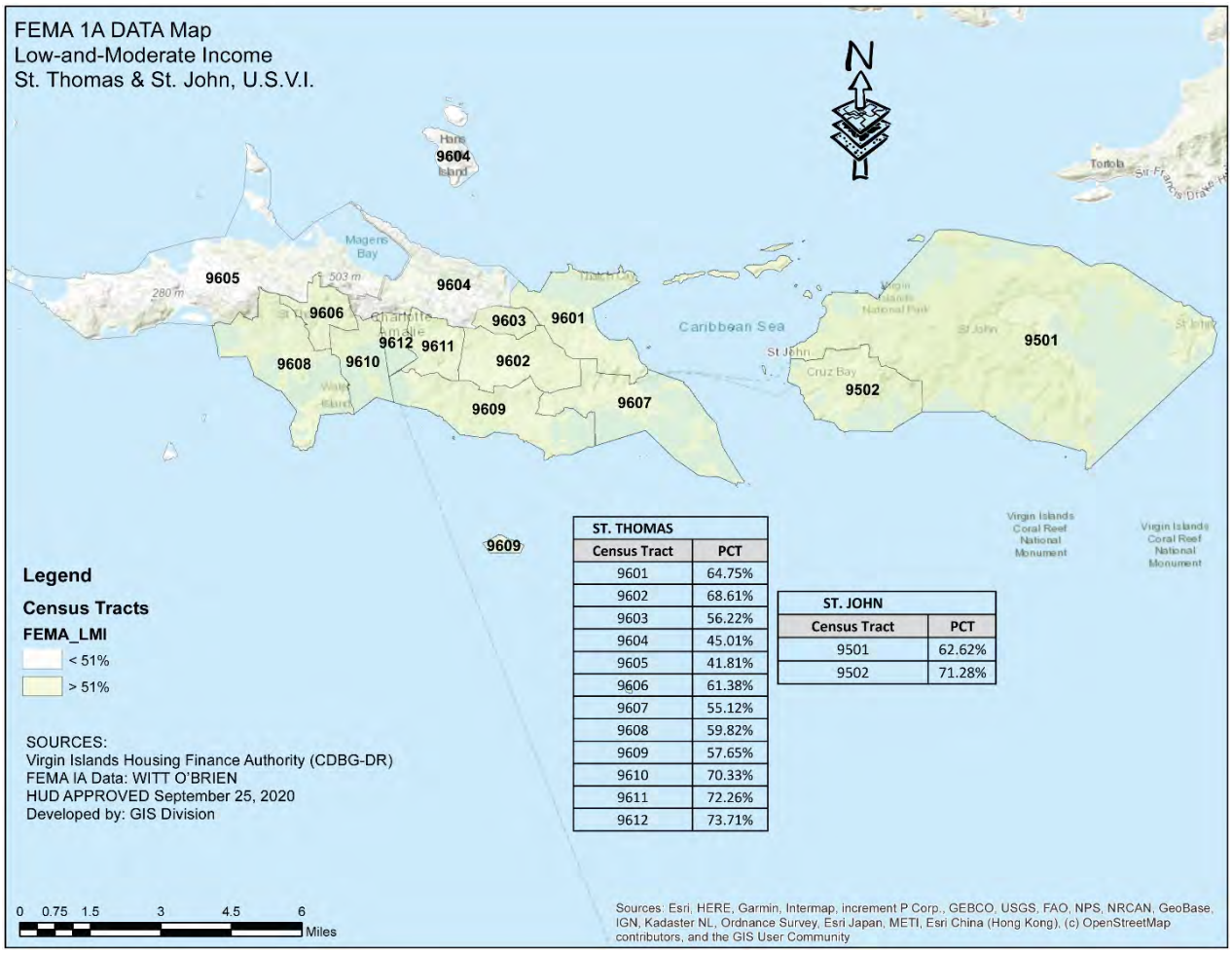
The US Virgin Islands' recovery from these devasting storm events continues to the present day. The intention of the Mitigation Needs Assessment and Mitigation Action Plan is to reduce vulnerability and mitigate damages and losses to future hazard events by looking at the impact of prior events, including hurricanes.

1.6 USVI Social Vulnerability and Distress Indicators

The anticipated benefits from the projects and activities described in this CDBG-MIT Action Plan will accrue to LMI residents in the Territory, as mandated by HUD regulations. Data from the 2010 U.S. Census provides the dataset used for analyzing the demographic profile for the Territory, as the census tract level given that the American Community Survey is not conducted in the Territory. However, to ensure a more accurate and comprehensive view of the socioeconomic characteristics of the U.S. Virgin Islands' population, 2010 data were supplemented with insights from the most recent U.S. Virgin Islands Community Survey conducted by the University of the Virgin Islands (available at the island level) and various U.S. Virgin Islands government agencies, including the Bureau of Economic Research and the Department of Labor, including the most recently available FEMA Data Maps, which are included below. Taken together, the three main islands show a relatively similar demographic profile, with high percentages of Low to Moderate Income (LMI) Individuals. In 2020 HUD approved the USVI use of FEMA IA data to determine LMI residents on an area basis under a survey methodology as set forth in the CDBG regulations under 24 CFR 570.483(b)(1)(i).

The anticipated benefits from the projects and activities described in this CDBG-MIT Action Plan will accrue to LMI residents in the Territory, as mandated by HUD regulations. The median household income in the Territory is 25% lower than the national median ($37,254 compared to $51,914), and 22% of the population is below the poverty level (compared to 14.4% nationally). Of the three principal islands, St. Croix faces the more severe economic vulnerability with 26% of residents living below the poverty line, with an island-wide median household income of $36,042. The poverty rate is 7% higher than in St. Thomas and 11% higher than in St. John (United States Virgin Islands Housing Finance Authority, 2018). According to the US Virgin Islands Community Survey, approximately 25% of all persons in the Islands live in poverty, and income per capita is $20,156. The following table shows the percent of low and moderate income (LMI) households for each Census Tract based on 2010 Census data. Just over half (52%) of households in the Virgin Islands are LMI households, though this figure varies slightly between the Islands and more significantly between Census Tracts. In the process of analyzing prior census data, the VIHFA previously encountered findings that did not align with pre-storm and current conditions within the Territory. Specifically, the data utilized for income designation of households was not indicative of the current economic and income profile of residents of the U.S. Virgin Islands. Given discrepancies between the high costs of living in the U.S. Virgin Islands (including the fair market rents that do not align with the wages, the higher construction costs, and the exceptionally high average costs of electricity paid by Territory residents, and the income limits set by HUD), the VIHFA developed an alternative method of documenting income using information from the FEMA Individual Assistance income data that more accurately represents incomes in the Territory. The VIHFA received a waiver from HUD in 2020 that permitted use of that more recent data to more accurately capture Virgin Island residents' income status, which is reflected in Figure 7 and Figure 8 on the following pages.

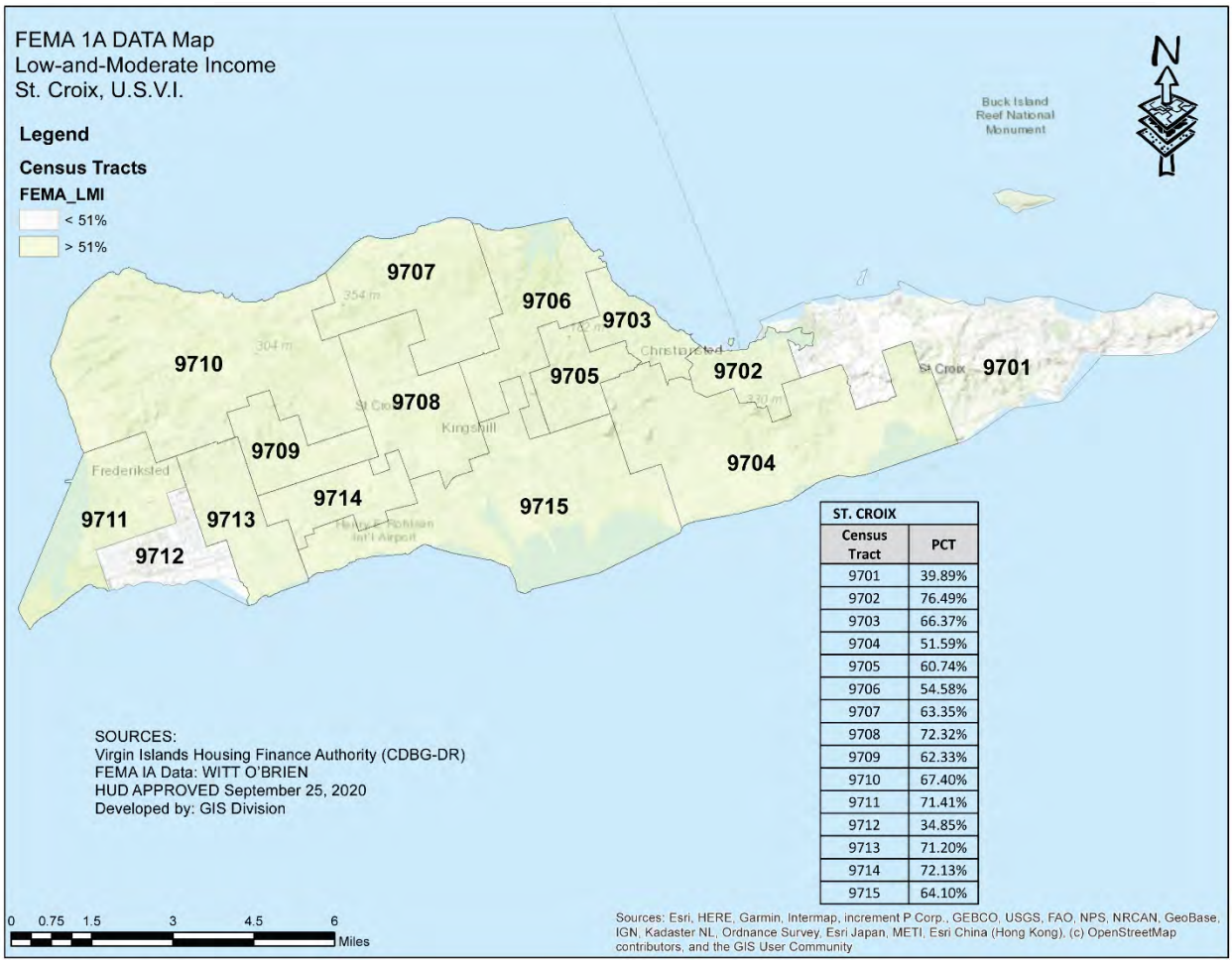
Figure 7. St. Thomas & St. John LMI



ST. THOMAS	
Census Tract	PCT
9601	64.75%
9602	68.61%
9603	56.22%
9604	45.01%
9605	41.81%
9606	61.38%
9607	55.12%
9608	59.82%
9609	57.65%
9610	70.33%
9611	72.26%
9612	73.71%

ST. JOHN	
Census Tract	PCT
9501	62.62%
9502	71.28%

Figure 8 St. Croix LMI



ST. CROIX	
Census Tract	PCT
9701	39.89%
9702	76.49%
9703	66.37%
9704	51.59%
9705	60.74%
9706	54.58%
9707	63.35%
9708	72.32%
9709	62.33%
9710	67.40%
9711	71.41%
9712	34.85%
9713	71.20%
9714	72.13%
9715	64.10%

While the use of 2010 Census Bureau data for evaluating the projected income status of the beneficiaries within the existing established geographical boundaries unfairly represents the pre-storm and current community characteristics of the U.S. Virgin Islands, utilizing the FEMA IA data collected immediately after the storm provides a more comprehensive and representative income data set. To address the extent of U.S. the storms' impact, it is necessary to examine their effects first on LMI populations and the most vulnerable households, given the planned scope of the MIT-AP, with a high LMI population existing in the Territory even before the two storms made landfall, as shown in the 2010 Census data and reflected below:

Table 4. Percent of Low- and Moderate-Income Households in the USVI

Census Tract (Subdistrict)	% of LMI Households	Census Tract	% LMI Households
USVI	**52%**		
St. Croix	**46%**		
9701 (East End)	29%	9709 (Northwest)	69%
9702 (Christiansted)	59%	9710 (Northwest)	42%
9703 (Sion Farm)	58%	9711 (Frederiksted)	56%
9704 (Anna's Hope Village)	32%	9712 (Southwest)	44%
9705 (Sion Farm)	37%	9713 (Southwest)	50%
9706 (Sion Farm)	31%	9714 (Southcentral)	48%
9707 (Northcentral)	42%	9715 (Southcentral)	40%
9708 (Southcentral/Northcentral)	59%		
St. John	**55%**		
9501 (Central/Coral Bay)	54%	9502 (Cruz Bay)	55%
St. Thomas	**58%**		
9601 (East End)	59%	9607 (East End/Red Hook)	55%
9602 (East End)	59%	9608 (Charlotte Amalie West)	60%
9603 (Tutu)	56%	9609 (Southside)	58%
9604 (Northside)	42%	9610 (Charlotte Amalie)	70%
9605 (Northside/West End)	38%	9611 (Charlotte Amalie East)	72%
9606 (Northside/Charlotte Amalie)	61%	9612 (Charlotte Amalie)	74%

Source: US Census – 2010. Cited in 2018 CDBG-DR Action Plan.

Figure 9 illustrates the distribution of low-income households (those earning less than $30,000 per year) across the islands. Both Frederiksted and Christiansted on St. Croix see higher proportions of low-income households. Charlotte Amalie on St. Thomas is similarly comprised of low-income households, with approximately one-third earning less than $30,000.

Figure 9. St. Croix Low-Income Household Percentages

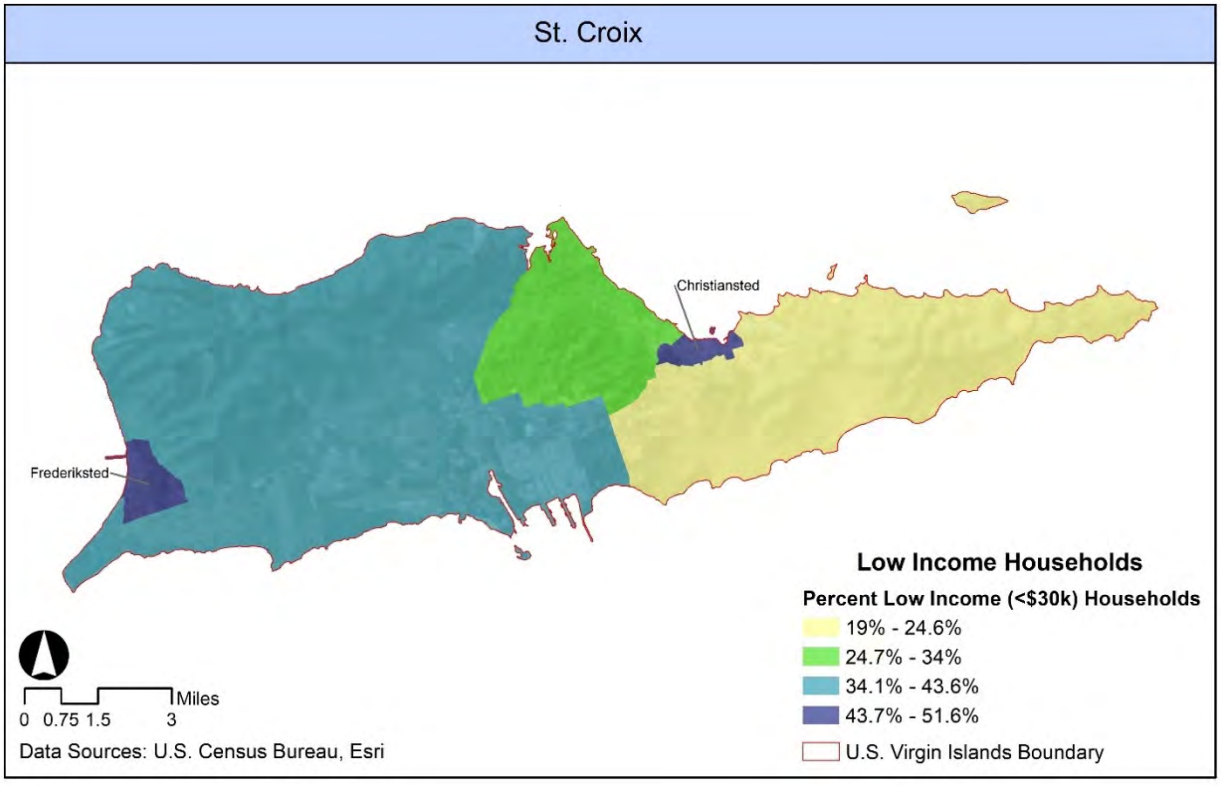


Figure 10. St. Thomas Low-Income Household Percentages

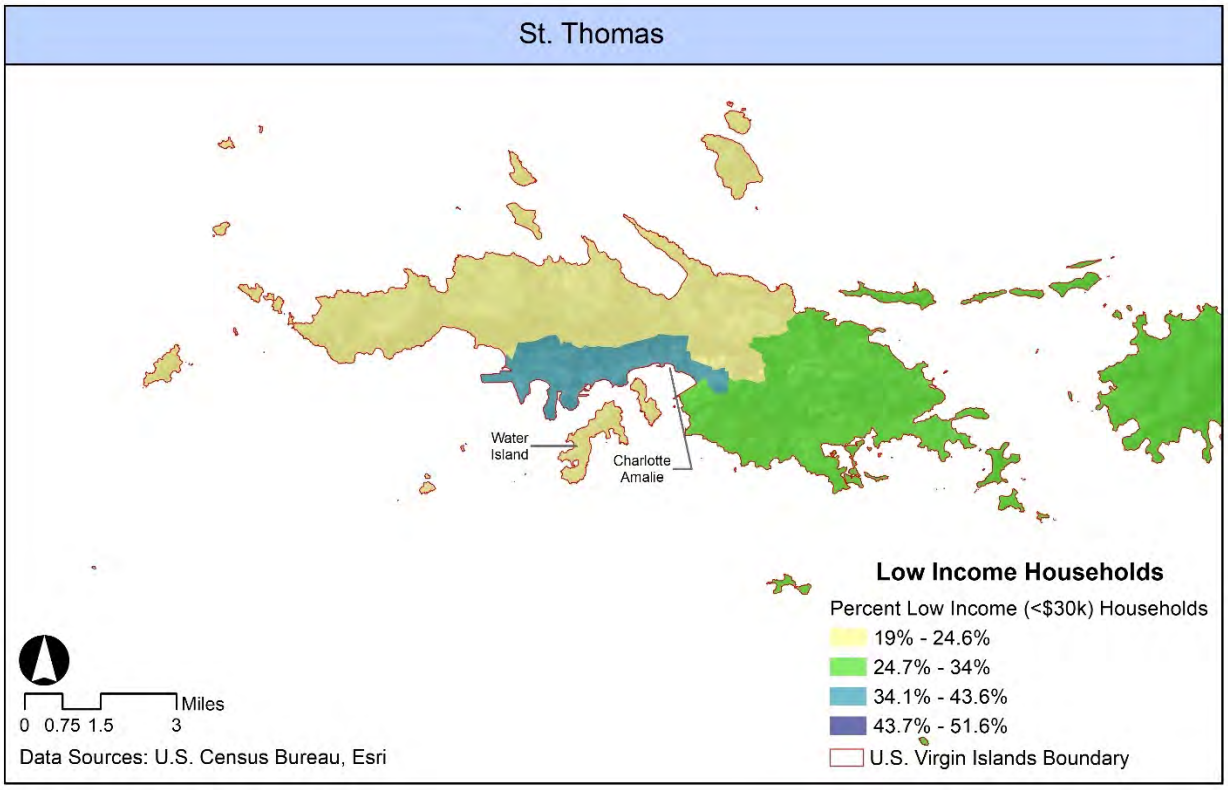
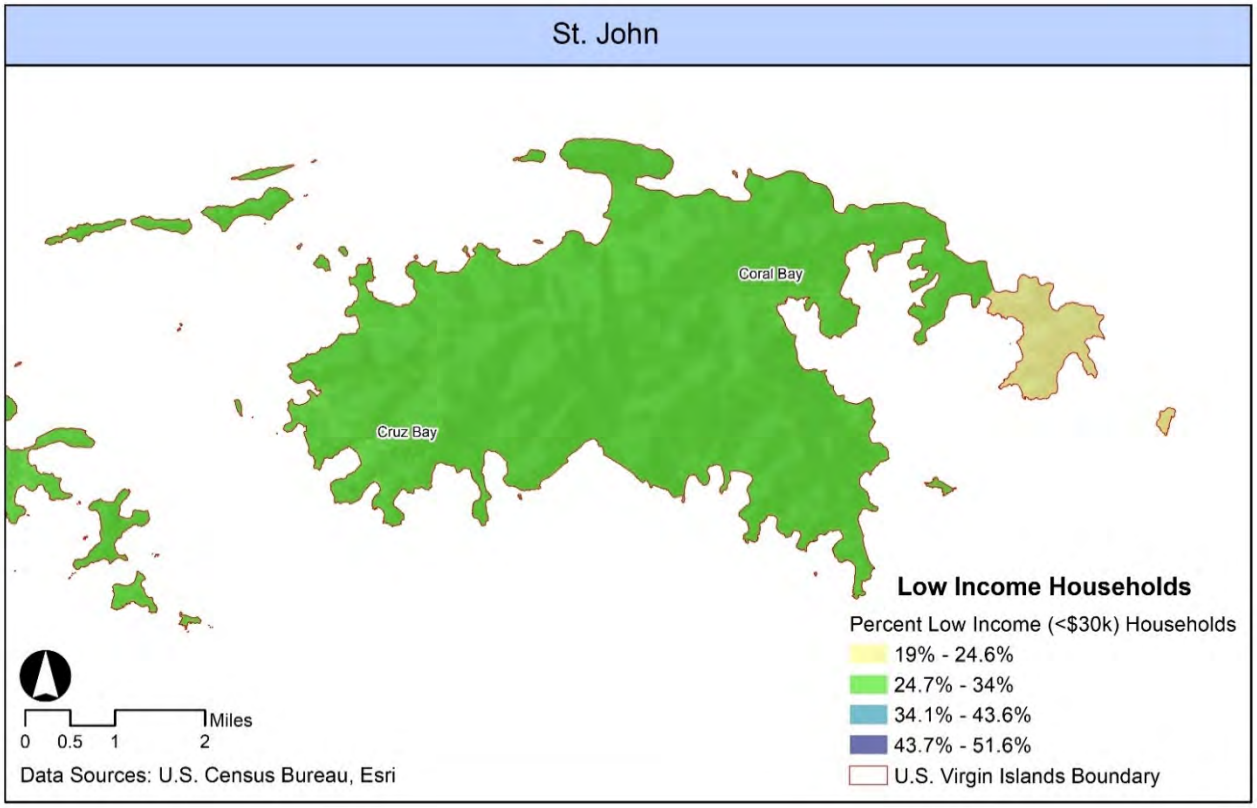


Figure 11. St. John Low-Income Household Percentages



Pursuant to Federal Register Notice 83 FR 40314, all subdivisions of the territory are considered "most impacted and distressed" (MID) for Community Development Block Grant-Disaster Recovery allocations (United States Government Publishing Office, 2018). Pursuant to Appendix A of the CDBG-MIT Main Notice, "most impacted and distressed" are those that meet three standards:

> *(1) Individual Assistance/IHP designation. HUD has limited allocations to those disasters where FEMA had determined the damage was enough to declare the disaster as eligible to receive Individual and Households Program (IHP) funding.*
>
> *(2) Concentrated damage. HUD has limited its estimate of serious unmet housing need to counties and Zip Codes with high levels of damage, collectively referred to as "most impacted areas". For this allocation, HUD is defining most impacted areas as either most impacted counties—counties exceeding $10 million in serious unmet housing needs—and most impacted Zip Codes—Zip Codes with $2 million or more of serious unmet housing needs. The calculation of serious unmet housing needs is described below.*
>
> *(3) Disasters meeting the most impacted threshold. Only 2017 disasters that meet this requirement for most impacted damage are funded:*
>
> *a. One or more most impacted county*
>
> *b. An aggregate of most impacted Zip Codes of $10 million or greater*

The 2019 THMP, as noted in the prior section, analyzed hazards for potential dollar loss for the given facility as well as the social impact in terms of the population of those under the age of 18 and over the age of 65 in the hazard area.

Vulnerability Classifications for MNA derive from the THMP. The THMP ranked vulnerability for structures and critical facilities on the following scale:

- Very Low, (no, or negligible damage)
- Low, (easily repairable damage mainly to part of components and/or contents)
- Moderate, (considerable, yet repairable damage to mainly non-structural components)
- High (considerable damage to both structural and non-structural components), and
- Very High (the extent of damage is too much to be repaired; the facility must be demolished and replaced)

1.7 Hazard Context

1.7.1 Hazards of Concern

The 2019 THMP Plan identified eight hazards of concern for the Territory for which vulnerability assessments were conducted. Following the vulnerability assessment, these hazards were ranked by potential dollar loss in the table below, with 1 being the highest. Although vulnerability estimates were not previously conducted for rain-induced landslides or wildfires within the most recent THMP, current analysis showed that hurricane and riverine flooding were top-ranked hazards for the Territory. In preparing the MNA, the Project Team examined recent disaster data and undertook new risk assessments for flooding as described in the subsequent section while also bringing pandemic into the mix because of recent world events related to the spread of the coronavirus commonly called

COVID-19. The results from these analyses resulted in the ordinal re-ranking of hazards. Table 5 shows the new results of the hazard ranking for each of the major three islands within the Territory.

Table 5. Adjusted 2020 Hazard Ranking by Dollar Loss

Hazard	St. Thomas	St. Croix	St. John
Hurricane	1	1	1
Riverine Flooding	2	2	2
Earthquake	3	3	4
Tsunami	4	4	7
Drought	5	5	5
Coastal Flooding	6	6	3
Rain-Induced Landslide	7	7	6
Wildfire	8	8	8
Pandemic/Disease Outbreak	*Unranked*	*Unranked*	*Unranked*

Source: 2019 Territorial THMP – Includes adjusted 2020 vulnerability assessment results

1.7.2 Methodology for Hazard Analysis

This MNA was developed with data and findings from the 2019 Territorial Hazard Mitigation Plan (THMP), which while in the process of being updated is the most recently adopted plan. As noted within the prior section, the 2019 Plan examined each hazard of concern and analyzed hazards for potential dollar loss for community lifelines, plus residential and commercial structures. The Plan also examined the social impact in terms of affected population of residents under the age of 18 and over the age of 65. Explanations of the methodologies used to conduct the risk assessment and vulnerability can be found in the 2019 Territorial Hazard Mitigation Plan (THMP). For the Mitigation Needs Assessment, which is to build on the most recent THMP, hazard exposure and consequence have been reclassified by also factoring in the risk to lifelines and structures in the Territory. For these hazards, the most recent Hazard Mitigation Plan classified relative risk to specific hazards.

Consequence classification components are adapted from the 2019 Territorial Hazard Mitigation Plan, which had classified risk exposure into five categories rather than three. Lifelines and structures consequence classifications were classified based on high, moderate, or low impacts, building on data analysis and work done in developing prior THMP analysis, with Table 6 below showing impact classification.

Table 6. Exposure Classification and Consequence

Consequence Classification	Classification Definition	Hazard
High Impact	Hazard impacts result in substantial damage to structural and non-structural components and/or building destruction.	Earthquake; Hurricane Wind
Moderate Impact	Hazard impacts result in apparent structural damage to both structural and non-structural components.	Drought; Tsunami; Coastal Flooding; Riverine Flooding
Low Impact	Hazard impacts result in no or negligible damage to non-structural components and no damage to structural components. Damage, if any, is easily repairable with minimum resources.	Rain-Induced Landslide; Wildfire

During the development of the Mitigation Needs Assessment (MNA), the need to update the assessments of the flood and drought hazards was identified by the Project Team. The Project Team re-assessed impacts for lifelines and general building stock for the Flood, Sea Level Rise, and Storm Surge hazards using best available data[2] and HAZUS analysis. This will account for discrepancies in the buildings and lifelines for which risk was assessed. The 2019 Territorial Hazard Mitigation Plan utilized a list of critical facilities developed by VITEMA with updates identified through site visits and assessments. Lifeline consequences for all hazards except flooding were determined by damage ratios calculated for the 2014 and 2019 Territorial THMP. Consequence classifications for lifelines impacted by flooding-related hazards (including sea level rise and storm surge) were determined by a lifeline's location in the hazard zone.

General building stock and community lifeline exposure and vulnerability analyses for the 1%-annual-chance (100-year) flood hazard were also conducted using GIS and HAZUS software. The flood hazard was represented by Advisory Flood Zone data provided by the Federal Emergency Management Agency (FEMA), which represents the best available data for this hazard. Exposure analyses for the storm surge and sea level rise hazards were conducted using GIS software. The storm surge hazard was represented by the inundation area modeled by the National Oceanic and Atmospheric Administration (NOAA) utilizing the hydrodynamic Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model. The sea level rise hazard was represented by mapping the inundation area (including low-lying, hydrologically "unconnected" areas that may flood) from a 2 foot and 4 foot of sea level rise as modeled by NOAA, representing the projected 2050 high and 2100 high scenarios, respectively. The general building stock data is the individual structure inventory used by FEMA to update the HAZUS default data in 2019. The community lifeline data is the HAZUS (version 4.2) critical facilities default data, which was also recently updated by FEMA.

The drought risk and vulnerability assessment from the 2019 Hazard Mitigation Plan was not retained for the MNA due to the Project Team's concerns that the Islands' vulnerability to the drought hazard was not adequately captured by the assessments undertaken in the 2019 Plan Update. Additionally, recent drought events were not described in the 2019 plan. This Mitigation Needs Assessment does not include spatial analyses and damage assessments owing to the nature of the drought hazard. The findings from the drought re-assessment elevated the hazard's ranking.

1.8 Critical Facilities and Lifelines

FEMA has defined Community Lifelines for incident response, to provide the federal government a better understanding of the impacts of hazards and disasters in local jurisdictions. The 2019 THMP identified three types of critical facilities and infrastructure: Critical Facilities, Transportation Infrastructure, and Utilities. For the purposes of this Mitigation Needs Assessment, these facilities have been cross-referenced with FEMA lifelines to assess vulnerability based on lifeline categories. A matrix describing this crosswalk is found in **Table 7** . Lifeline exposure to each hazard is described in subsequent sections.

[2] 8/2018 Advisory Base Flood Elevation dataset provided by FEMA/STARR II (2018 Advisory Base Flood Elevation data).

Table 7. FEMA Lifelines and Identified Critical Facility Crosswalks

USVI-THMP Critical Facility	FEMA Lifeline Category	USVI THMP-Transportation Infrastructure	FEMA Lifeline Category	USVI THMP – Utilities	FEMA Lifeline Category
Police Stations	Safety & Security	Marine Ports	Transportation	Electrical Power Generating Plants	Energy
Fire Stations	Safety & Security	Airport	Transportation	Water System	Food, Water, Shelter
Hospital/Medical Clinic	Health and Medical			Desalinization Plant	Food, Water, Shelter
Government Buildings	Safety and Security			Desalination Plant	Food, Water, Shelter
Shelters/Special Needs	Food, Water, Shelter			Water Distribution System	Food, Water, Shelter

For this MNA, the Territory's impacted lifelines were assessed on a hazard-by-hazard basis. Each lifeline category was classified with a Consequence Classification as shown in Table 4. The classification is informed by damage assessments and modeled damage estimates calculated for the 2019 Territorial Hazard Mitigation Plan and the Mitigation Needs Assessment.

1.8.1 Safety and Security

Safety and Security lifelines include various law enforcement, emergency services, and government services facilities. Disruption to these services can significantly hamper the territorial government's ability to provide public safety services and critical government functions. In the wake of Hurricanes Maria and Irma, these lifelines saw major impacts, and facilities saw significant damage. In the Islands, schools, police stations, US Coast Guard facilities, the Readiness Center, fire stations, libraries, and daycares are all considered Safety and Security Lifelines.

Food, Water, Shelter

Food, water, and shelter lifelines provide basic needs such as housing, the commercial food supply chain and programs, and water systems. These lifelines are critical for sustaining life prior to, during, and following storm events. In the US Virgin Islands, these facilities include wastewater facilities, potable water facilities, desalinization facilities, shelters, and some residential buildings. Shelter facilities



Pictured: Innovative model shelter on St. Thomas owned by the VIHFA.

were stressed and damaged during and following the hurricanes as residents stayed at the shelters due to damages to homes. WAPA water facilities were damaged and impacts to the food supply chain resulted in delays to residents receiving food.

Health/Medical

Health and medical lifelines include facilities that comprise the medical supply chain, perform public health services, fatality management, patient movement, and medical care. This includes home care, pharmacies, and raw materials needed to produce medicine. Impacts to medical facilities were profound during the hurricanes of 2017, necessitating the evacuation of 800 patients from the Territory to facilities in Puerto Rico and the American mainland. Medical facilities in the Territory also suffer from workforce shortages, inadequate funding, and infrastructure limitations (USVI Hurricane Recovery and Resilience Task Force, 2018).

Energy

Energy lifelines power the US Virgin Islands and include facilities that produce and distribute electric power, with two separate electricity grids managed by the Water and Power Authority (WAPA). The residential sector consumes over one-third of WAPA's electricity, and just under one-third is consumed by large power users that each use more than 25 kilowatts (U.S. Energy Information Administration, 2020). Primary WAPA generating facilities include the Harley Generating Station near Charlotte Amalie on St. Thomas and the generating facility at Estate Richmond near Christiansted on St. Croix.

Communications

Communications lifelines include communications infrastructure such as data centers and cell towers, in addition to LMR networks, payment-processing systems, 911/emergency dispatch facilities, and emergency alert systems. The 2017 hurricanes substantially damaged cellular, landline, and radio-based telecommunications systems. Following the storms, cell phone availability decreased by between 80 to 90 percent for several weeks. The loss of cell phone coverage disrupted communications among residents as well as to responding agencies. St. John was noted to have been hard-hit, with landline and public safety radio communications destroyed between Coral Bay and Cruz Bay. Following the storm, amateur radio resources were used to relay information.

Transportation

Transportation lifelines facilitate the movement of people and goods throughout the Islands. Following the 2017 hurricanes, seaports in the Territory did not open for three weeks and both major airports remained closed for approximately two weeks as well (USVI Hurricane Recovery and Resilience Task Force, 2018). As relatively remote landmasses, the Islands rely on imports for many goods. The Islands' port facilities are particularly important for this reason, as well as due to their connection to the regional economy. Throughout the islands, ferry terminals, airports, and heliports connect the Islands to each other and to the global economy.

1.8.2 Lifeline Locations

The maps on the following page show the location and distribution of lifeline locations across the three islands. Note that the lifelines shown on these maps are those identified in the most recent Hazus dataset. This dataset was used for the risk assessment of flood-related hazards. Vulnerability assessments for other hazards used a separate critical facilities dataset developed for the Territorial THMP. The following maps show the distribution of community lifelines in St. Croix. Safety and Security lifelines are most prevalent, and are found near the population centers of Frederiksted, Christiansted, and Golden Grove. Energy and transportation lifelines are heavily concentrated in the

vicinity of the former Hovensa refinery (now Limetree Bay), where petroleum storage, refining, and transportation facilities are located. WAPA water facilities were damaged and impacts to the food supply chain resulted in delays to residents receiving food.

On St. Thomas, safety, and security lifelines (mostly school facilities) are predominately clustered near Charlotte Amalie and at the University of the Virgin Islands, located west of Charlotte Amalie. Transportation facilities can be found clustered along the shore, including at the cruise ship ports, ferry terminals, and at the Cyrus King Airport. Energy lifelines are found south of the airport near the WAPA desalinization plant.

St. John is the smallest in both population and population density of the three main islands of the USVI. Most of the safety and security and transportation lifelines are clustered near Cruz Bay with a few scattered across the Island.

Figure 12. St. Croix Community Lifelines (Map 1 of 2)

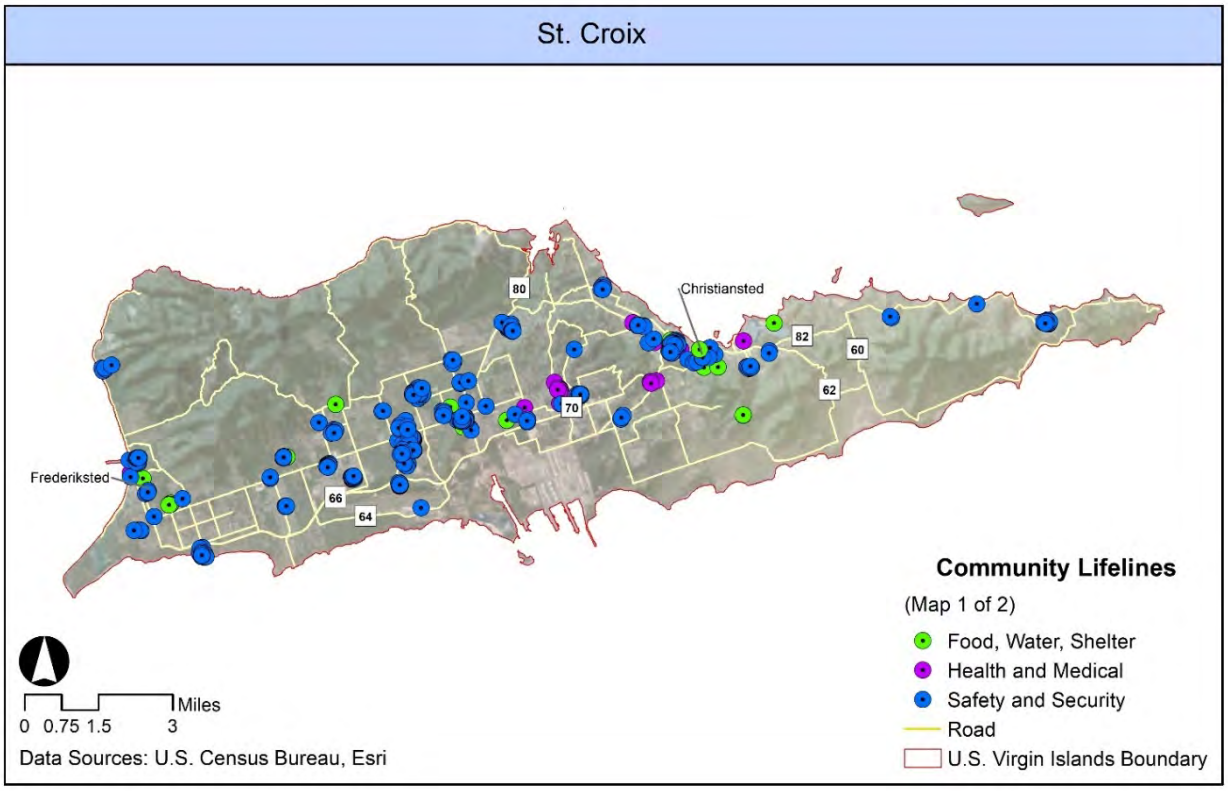


Figure 13. St. Croix Community Lifelines (Map 2 of 2)

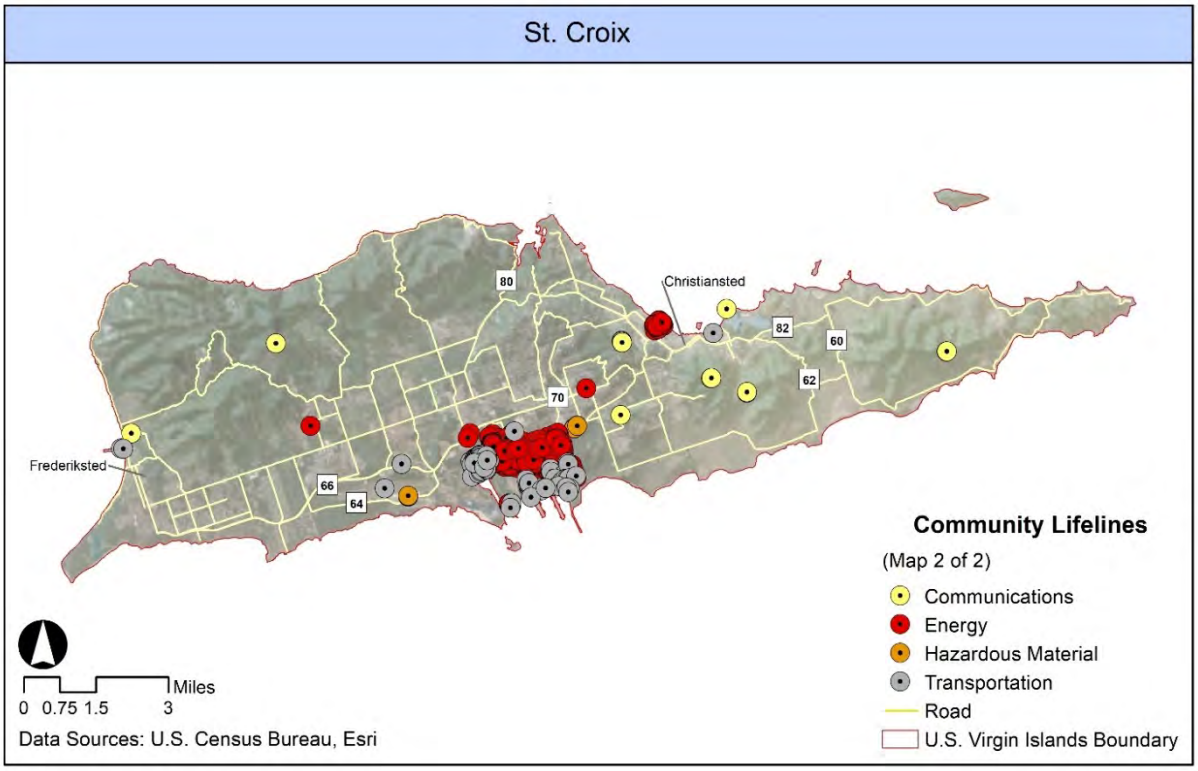


Figure 14. St. Thomas Community Lifelines (Map 1 of 2)

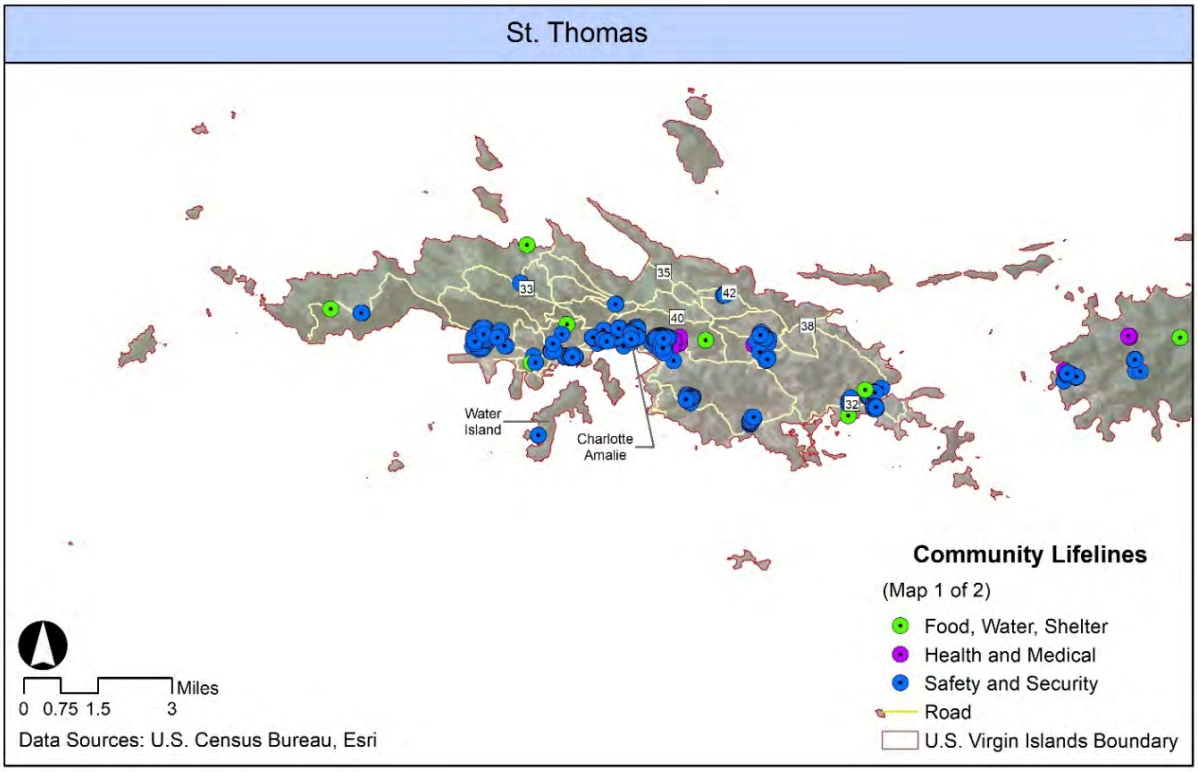


Figure 15. St. Thomas Community Lifelines (Map 2 of 2)

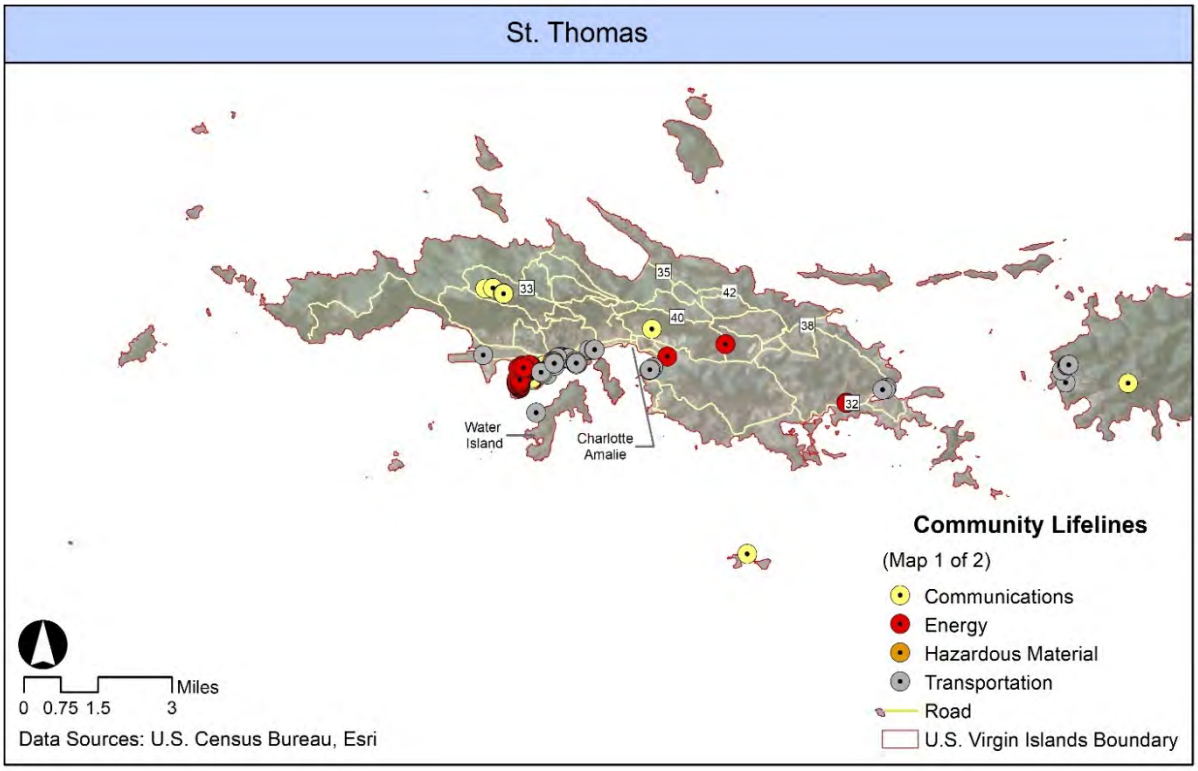


Figure 16. St. John Community Lifelines (Map 1 of 2)

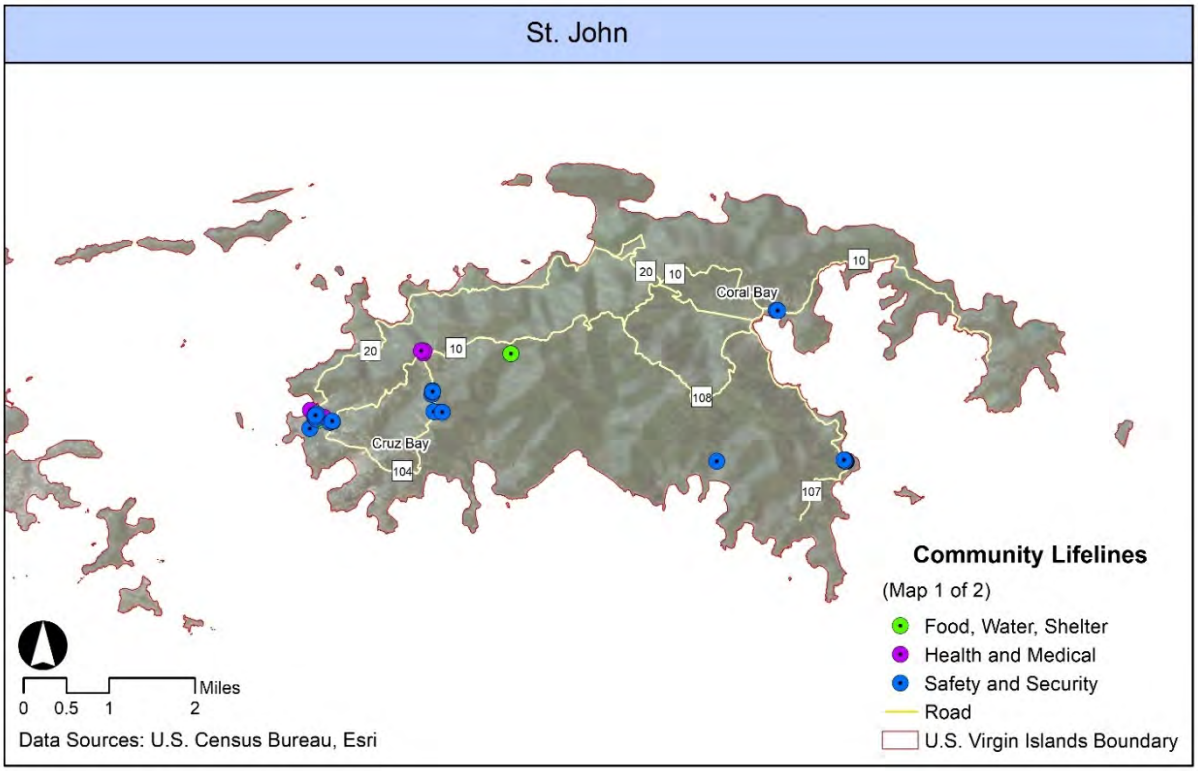
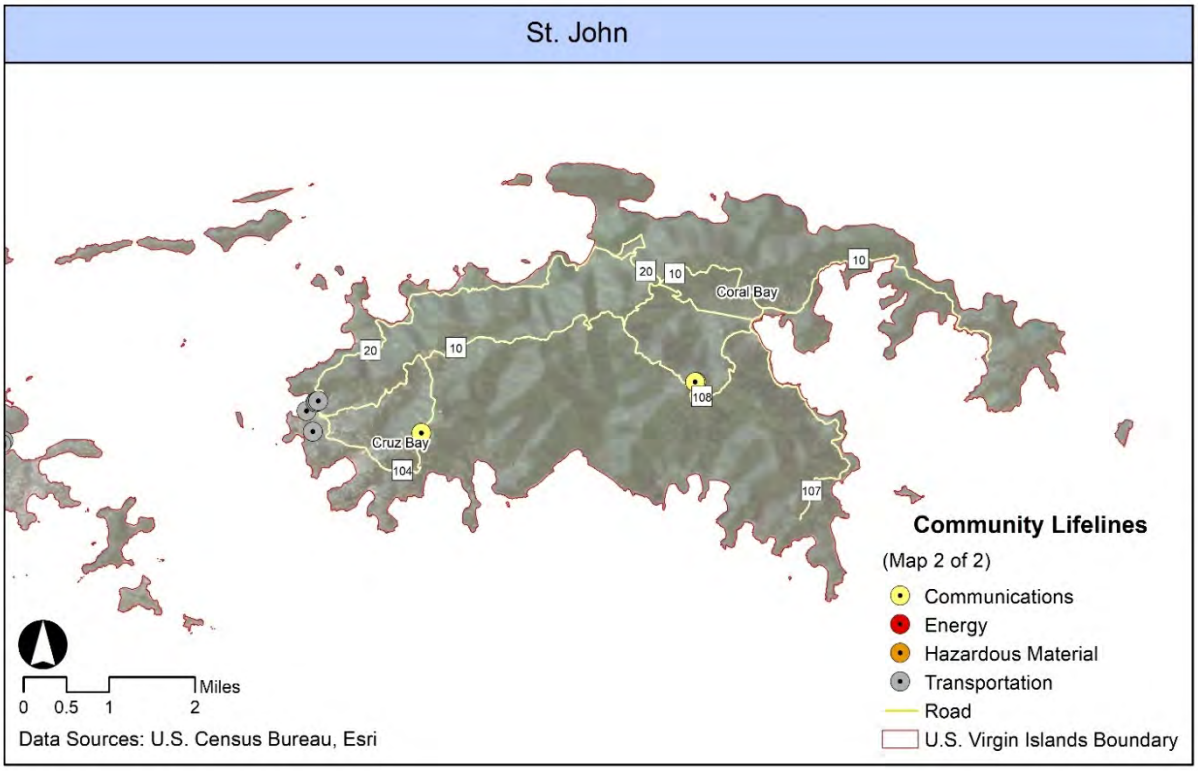


Figure 17. St. John Community Lifelines (Map 2 of 2)



1.9 Risk Assessment Summary

1.9.1 Drought

A drought is a period of abnormally dry weather. Drought diminishes natural stream flow and depletes soil moisture, causing social, environmental, and economic impacts. The term “drought” typically refers to periods of moisture deficiency that are relatively extensive in both space and time. Droughts originate from decreased precipitation amounts relative to normal weather patterns. They can be both short-term (lasting over the course of weeks or a month) or long-term (lasting the course of a season or years). Droughts can impact an array of economic, environmental, and social activities. The demand that society places on water systems and supplies – such as expanding populations, irrigation, and environmental needs – also contributes to drought impacts.

Droughts can be categorized as follows:

- Meteorological drought (degree of departure from expected precipitation),
- Hydrologic drought (Effects of precipitation shortfalls on waterbodies and groundwater),
- Agricultural drought (Soil moisture relative to agricultural/plant needs), and
- Socioeconomic drought (Demand of water exceeding supply due to a weather-related shortfall).

How vulnerable an activity may be to the effects of drought is usually linked on its water demand, how the demand is met, and what water supplies are available to meet the demand. The impacts of drought vary between sectors of the community in both timing and severity:

- Water supply—The water supply sector encompasses urban and rural drinking water systems that are affected when a drought depletes ground water supplies due to reduced recharge from rainfall.
- Agriculture and commerce—The impact of drought on the agriculture and commerce sector includes the reduction of crop yield and livestock sizes due to insufficient water supply for crop irrigation and maintenance of ground cover for grazing, absent purchase of water to supplement water derived from rainfall.
- Environment, public health, and safety—The environmental, public health, and safety sector focuses on wildfires that are both detrimental to the forest ecosystem and hazardous to the public. It also includes the impact of desiccating streams, such as the reduction of in-stream habitats for native species.

The four types of drought would likely have disparate impacts throughout the Territory. Although cisterns are common for USVI residents, the territory experiences a dry season that typically lasts from January to April. There is often a shorter dry season in June and July. Only one quarter to under a half of residents in the Territory are connected to the Territory's public water system that the Water and Power Authority (WAPA) operates, which means that many residents rely heavily on collected rainfall for water.[3] For those connected to the central water system, WAPA's water derives from reverse osmosis desalinization processes. Most residents in the Territory rely on cisterns for water supplies, with some households also attached to WAPA water. Households attached to WAPA water are less impacted by periods when less rain falls as they have access to water from WAPA to readily meet water needs. For those who are not connected to WAPA water droughts can lead to empty cisterns, requiring residents to purchase water for essential daily use. While potential drought impact in the Territory lends itself to further study, the LMI population in the Territory would be more adversely affected by the need to purchase water to fill empty cisterns.

Droughts have been experienced throughout the Territory's history but have only have been documented by United States Drought Monitor system (https://droughtmonitor.unl.edu/) since June, 2019. Although records are limited, historic droughts have been noted in 1733, the 1920s, 1964, early 1970s, and 2002. According to the 2019 THMP, the National Climate Data Center reports no new drought events since 2002. However, a review of records indicated the presence of a historic drought in 2015, causing a water deficit in 86% of Puerto Rico and the US Virgin Islands (NRCS). In 2016, the US Department of Agriculture reported that Puerto Rico and the US Virgin Islands had experienced uncommonly dry weather over the course of the previous three to five years (NRCS). The 2015 drought caused major agricultural impacts for the region, resulting in the declaration of agricultural disaster S3874 for St. Croix. The Islands also received 53 payments totaling nearly $30,000 between 2014-2015 from the USDA Livestock Forage Program owing to drought-related losses to livestock (United States Department of Agriculture).

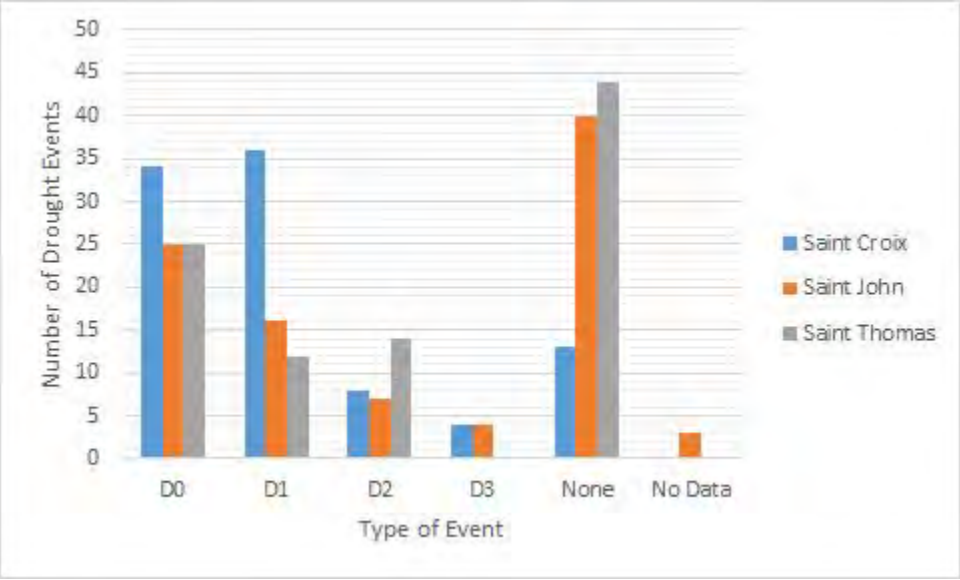
In July 2020, St. Thomas recorded a severe drought and St. John and St. Croix recorded extreme droughts. On St. Croix, this drought was characterized by year-to-date rainfall that is 3.2 inches below normal and year-to-date rainfall approximately one inch below normal on St. Thomas and St. John (Southeast Climate Adaptation Science Center, 2020). In August 2020, the Territory received a

[3] A 2019 RA Briefing indicates that WAPA provides drinking water service to nearly half of the population of the Territory.

“severe drought” designation that was lifted in early September. At the time of this report’s drafting, the Territory remains under abnormally dry conditions (Virgin Islands Source, 2020).

In June 2019, the National Oceanic and Atmospheric Administration added the US Virgin Islands to the United States Drought Monitor. The Virgin Islands’ participation in the program is expected to enhance data collection and build a better understanding of drought and precipitation changes in the Virgin Islands. Limited drought data available for analysis at the time of this Mitigation Needs Assessment included weekly island wide drought classification as summarized in Figure 18. Climate change is expected to decrease the amount of annual precipitation in the region by between five and fifteen percent, with much of the change occurring between June and August. This is expected to increase the frequency of drought conditions in the future.

Figure 18. Weekly Drought Category Data for USVI (June 4, 2018 through 3/23/2021)



Source: US Drought Monitor

Drought Categories as well as correlation with related indices is provided in Figure 19.

Figure 19. Description of Drought and Related Indices

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Source: US Drought Monitor

Due to a lack of spatial data for drought on the Islands, drought impacts to lifelines and general building stock were not calculated and maps from the 2019 THMP were not used to inform this assessment. Structures typically are not directly affected by drought conditions, although certain structures can become vulnerable to wildfires, which become more likely following prolonged droughts. Droughts can also have significant impacts on landscapes, which could cause a financial burden to property owners and certain businesses. However, these impacts alone are not considered critical in planning for impacts from the drought hazard. Economic impact will be largely associated with industries that use water or depend on water for their business Most residents in the territory reside in places with a cistern that is filled via rainwater, and some are connected to WAPA water as well. Private companies in the Territory sell water to fill cisterns and also support farmers' water needs in periods with little to no rain. The following map shows areas in the US Virgin Islands with prime agricultural soil, with most prime farmland located on St. Croix.

Figure 20. Farmland Classification Map for St. Croix

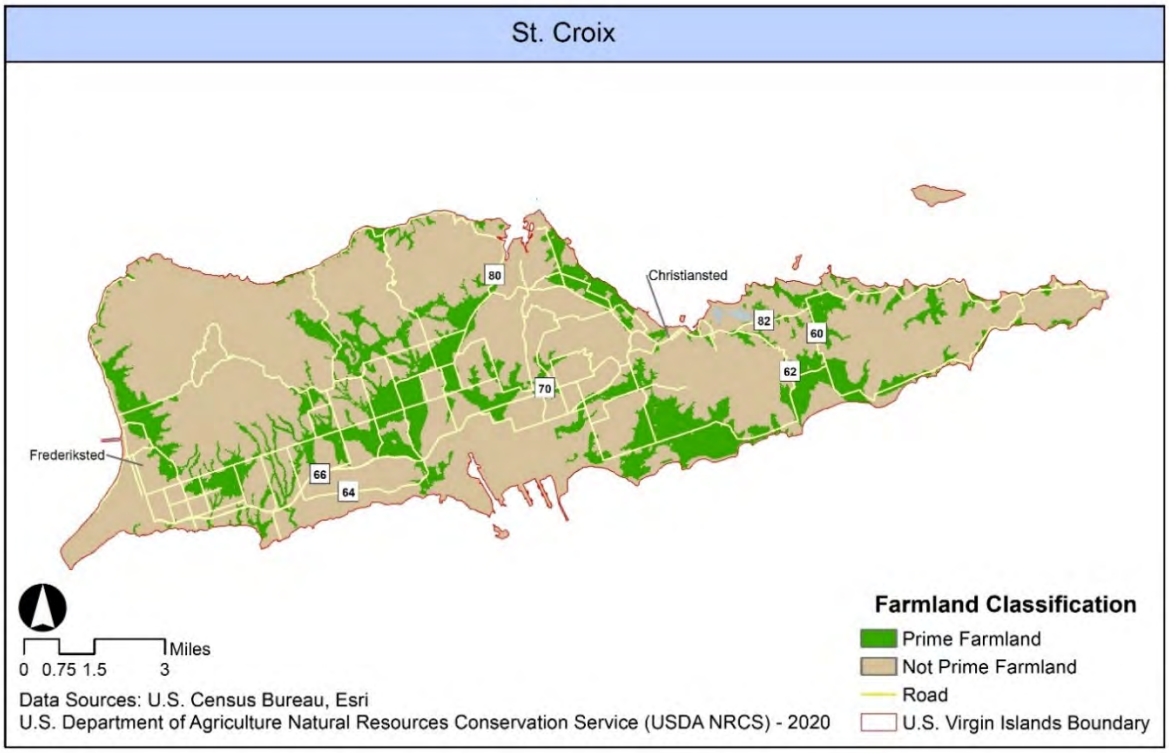


Figure 21. Farmland Classification Map for St. Thomas

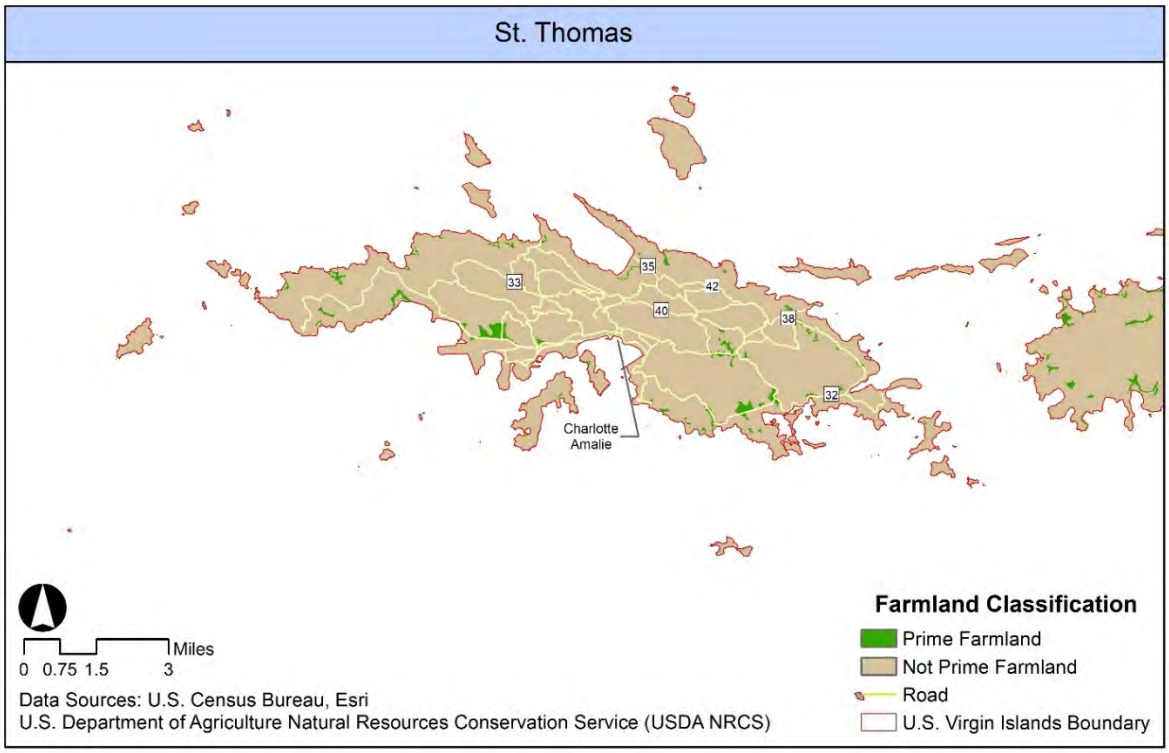
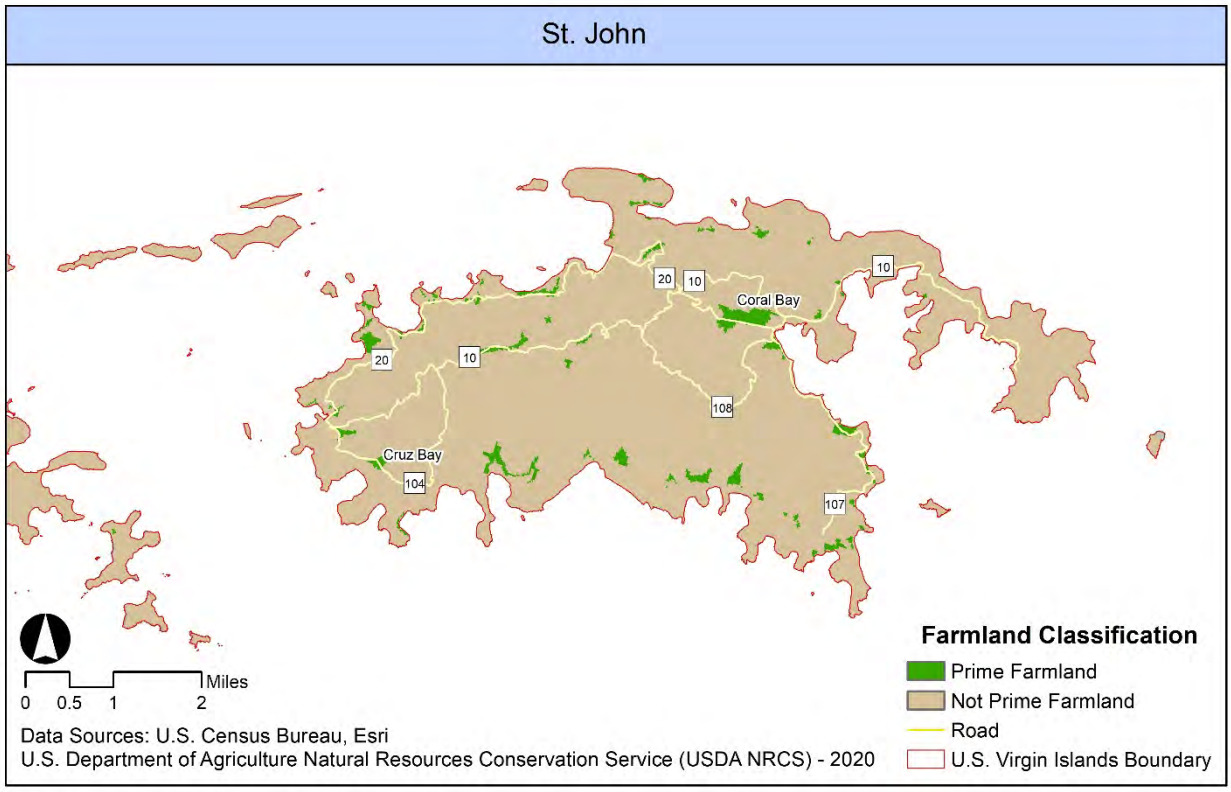


Figure 22. Farmland Classification Map for St. John



Lifelines as defined for this plan will continue to be operational during a drought, but for LMI individuals the cost of purchasing water to fill cisterns and support agriculture has an impact that would benefit from additional study. For the many residents who are not also connected to WAPA water, purchasing water in periods of drought is part of providing food, water, and shelter Given the economic stress that the COVID-19 pandemic has already caused within the Territory, having a reliable and inexpensive water source is a key priority that impacts day-to-day life and potentially even health as well, given the necessity of good water to healthy individuals.

Table 8. Consequence Classification for Lifelines Impacted by Droughts

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	Moderate Impact	Moderate Impact	Moderate Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	Low Impact	Low Impact	Low Impact
Safety and Security	Low Impact	Low Impact	Low Impact
Transportation	Low Impact	Low Impact	Low Impact

Based on the data examined in this Mitigation Needs Assessment and in consideration of the low to moderate consequence risk ranks of lifelines, the drought hazard is considered a moderate risk. This is predominantly due to the reliance on rainwater collection in cisterns by the majority of residents and impacts to water services following the 2017 hurricanes, but careful analysis of future data will be important too as many LMI individuals work to ensure continued access to food, water, and shelter in

the territory, especially if global environmental trends indeed lead to less rain and more drought in the Territory.

1.9.2 Earthquakes

Earthquakes are caused by the sudden release of stored energy of shifting blocks of earth. Several Caribbean Islands have a significant vulnerability to earthquake hazards. These Islands are located on the northeastern edge of the Caribbean Plate, which is considered a seismically active region with an active plate boundary. The North American tectonic plate and the Caribbean tectonic plate are converging, resulting in the potential for significant and frequent ground movements and associated impacts. The seismic region in the vicinity of Puerto Rico and the US Virgin Islands is complex and poorly understood (US Geological Survey, 2020).

Despite these vulnerabilities, the US Virgin Islands has not experienced major earthquakes in recent history and none that have produced a federal disaster declaration. However, the US Virgin Islands have been significantly impacted by earthquakes in the longer-term. This includes more than 200 events experienced since 1530, and 170 individual events between the first recorded incident on the islands in 1777 and 1977. The most significant earthquake on record occurred on St. Thomas and St. Croix in 1867, which had an intensity of VIII on the Modified Mercalli Intensity (MMI) scale, with VIII constituting severe.

As described in the 2019 Hazard Mitigation Plan, earthquake risk is varied throughout the Territory's islands and data from this plan provides the basis for the exposure and vulnerability analysis. Future THMP updates will benefit from including Hazus-MH v5.0, which recently has included modelling and datasets for the USVI and can provide and updated impact assessment. Additionally, to illustrate the earthquake risk, for this plan a series of ShakeMaps are for the Territory are provided below. Figure 23 to Figure 25 indicate the intensities of an M.7 scenario earthquake event in the USVI based on the MMI scale of VII and VIII based on a range of I to X where categorized VII and VII are defined as follows:

- VII - Very Strong is defined to be an event whereby damage is negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; and considerable in poorly built structures, and
- VIII - Severe is defined as slight damage in specially designed structures; considerable in ordinary substantial buildings with partial collapse; and great in poorly built structures. (US Geological Survey, 2020)

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at that place.

The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage (US Geological Survey, 2020).

Figure 23. Earthquake Intensity Shake Map for St. Croix

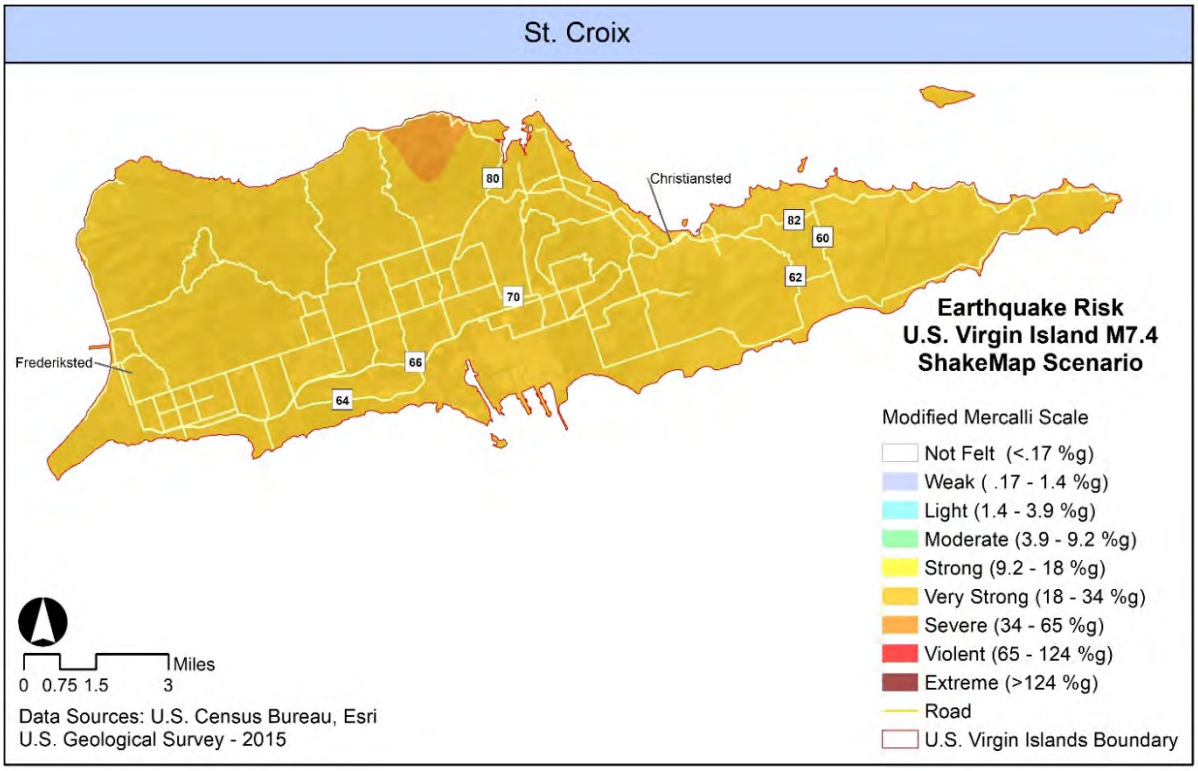


Figure 24. Earthquake Intensity Shake Map for St. Thomas

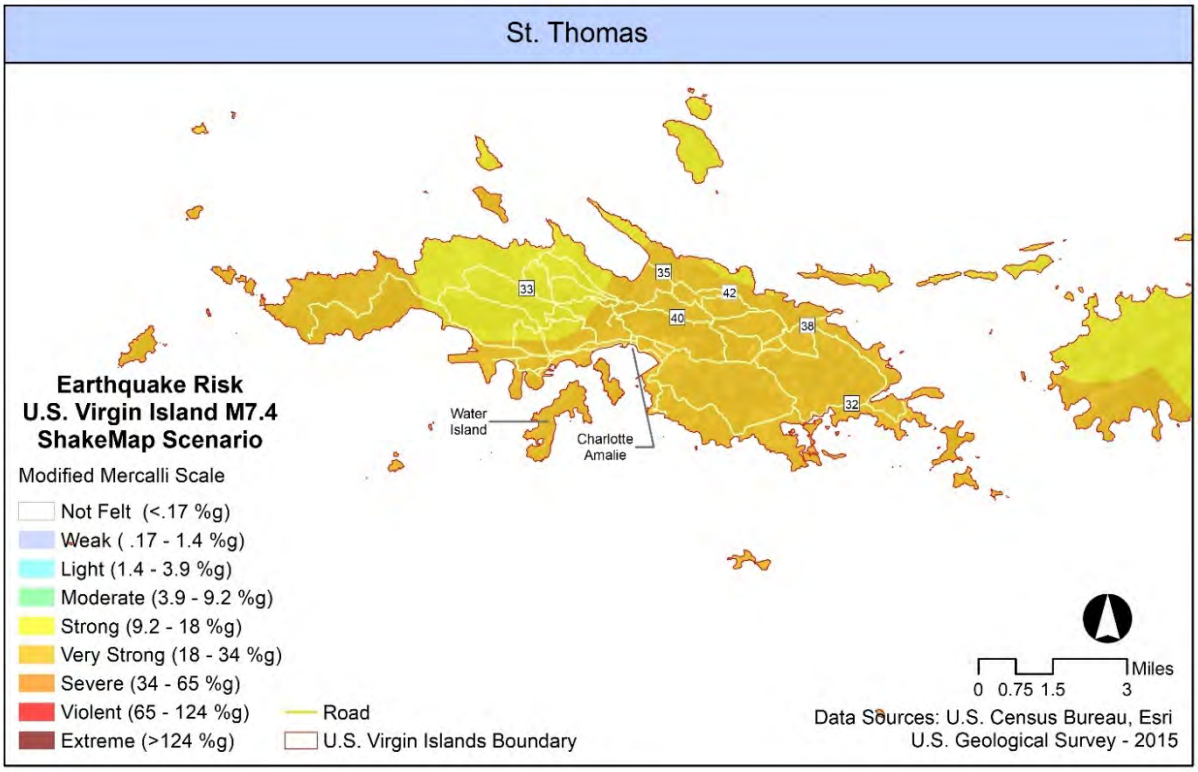
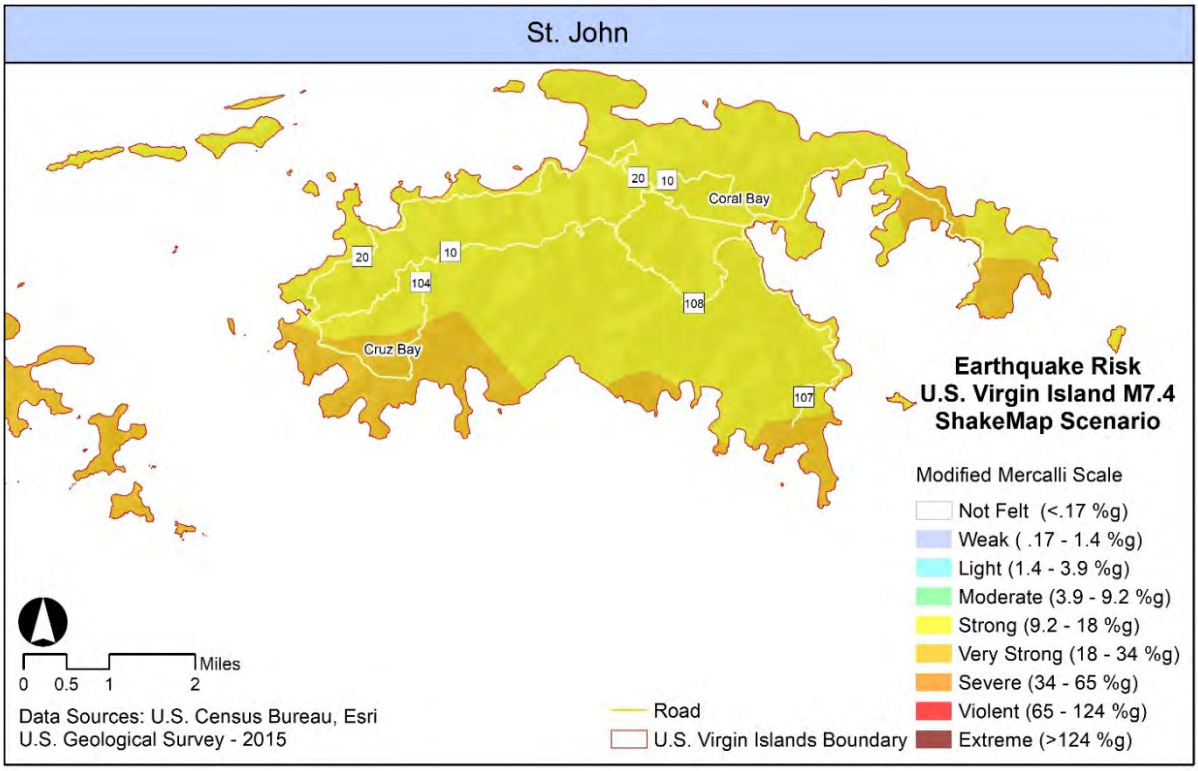


Figure 25. Earthquake Intensity Shake Map for St. John



To indicate assets exposed to this hazard, results from the 2019 THMP are provided, which indicate the results of an analysis of a designed earthquake based on the 1,000-year probabilistic ground shaking map. This indicates that the Territory has a 0.1% annual probability of experiencing the losses shown in the 2019 Hazard Mitigation Plan.

An exposure analysis indicates that the vast majority of structures on St. Croix have a moderate consequence classification for earthquakes, and most structures on St. Thomas have a high exposure to earthquakes. On St. John, most commercial buildings have a high exposure whereas most residential buildings have exposure characterized as Moderate. According to the 2019 Territorial Hazard Mitigation Plan, St. Thomas has a wider distribution of soil types at higher risk for earthquake compared to St. Croix and St. John.

Table 9. Building Exposure to Earthquake

Island		Type	Percent of Total Buildings in Category Exposed	High Exposed Buildings Impact Percentage	Moderate Exposed Buildings Impact Percentage	Low Exposed Buildings Impact Percentage
St. Croix	Commercial	84%	27%	73%	0	0
	Residential	70%	25%	75%	0	0
St. John	Commercial	85%	68%	32%	0	0
	Residential	71%	30%	71%	0	0
St. Thomas	Commercial	96%	100%	0	0	0
	Residential	91%	100%	0	0	0

Source: 2019 Territorial Hazard Mitigation Plan

The results of an analysis of the location of identified lifeline facilities with the earthquake hazard location mapping is provided in Table 10 which shows lifeline exposure to the earthquake hazard. Most lifeline facilities across the islands (including all energy lifelines) have high exposure to earthquakes. St. Thomas, where there is a wider breadth of exposure, has the highest percentage of lifelines with a higher exposure, followed closely by St. John.

Table 10. Lifeline Exposure to Earthquake Hazards

	High	Moderate	Low
St. Croix	**28**	**26**	**15**
Energy	1	0	0
Food, Water, Shelter	14	13	8
Health and Medical	1	3	0
Safety and Security	12	9	2
Transportation	0	1	5
St. John	**15**	**4**	**4**
Energy	1	0	0
Food, Water, Shelter	7	2	0
Health and Medical	3	1	1
Safety and Security	4	1	2
Transportation	0	0	1
St. Thomas	**30**	**7**	**5**
Energy	1	0	0
Food, Water, Shelter	7	1	1
Health and Medical	5	1	0
Safety and Security	15	4	2
Transportation	2	1	2

Source: 2019 Territorial Hazard Mitigation Plan

Table 11. Consequence Classification for Lifelines Impacted by Earthquakes

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	High Impact	High Impact	High Impact
Food, Water, Shelter	High Impact	High Impact	High Impact
Hazardous Material	High Impact	High Impact	High Impact
Health and Medical	High Impact	High Impact	High Impact
Safety and Security	High Impact	High Impact	High Impact
Transportation	Low Impact	Low Impact	Low Impact

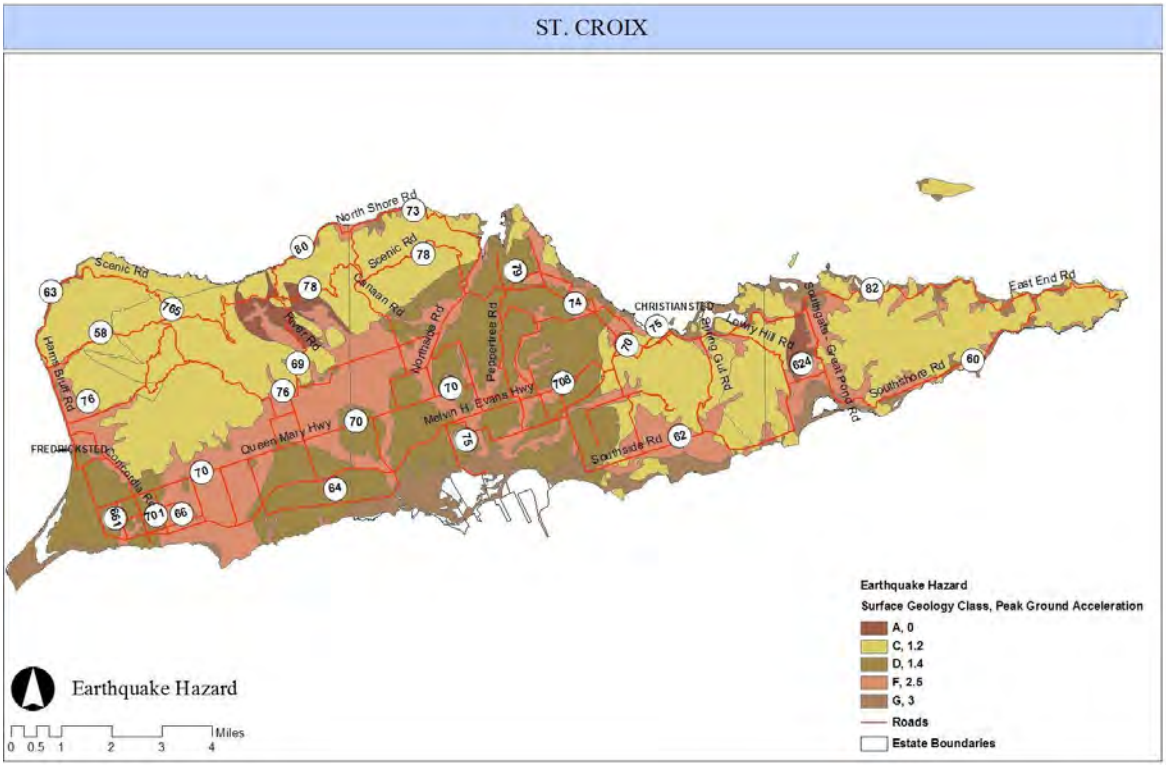
Figure 26 displays earthquake exposure indicating the relative seismic design categories for the Islands. St. John and St. Thomas, of volcanic origin, have variable earthquake risk that is more pronounced along steep slopes. St. Croix, formed by sedimentary processes, is at particular risk for liquification due to alluvial soils in Frederiksted and Christiansted.

Figure 26. Earthquake Exposure



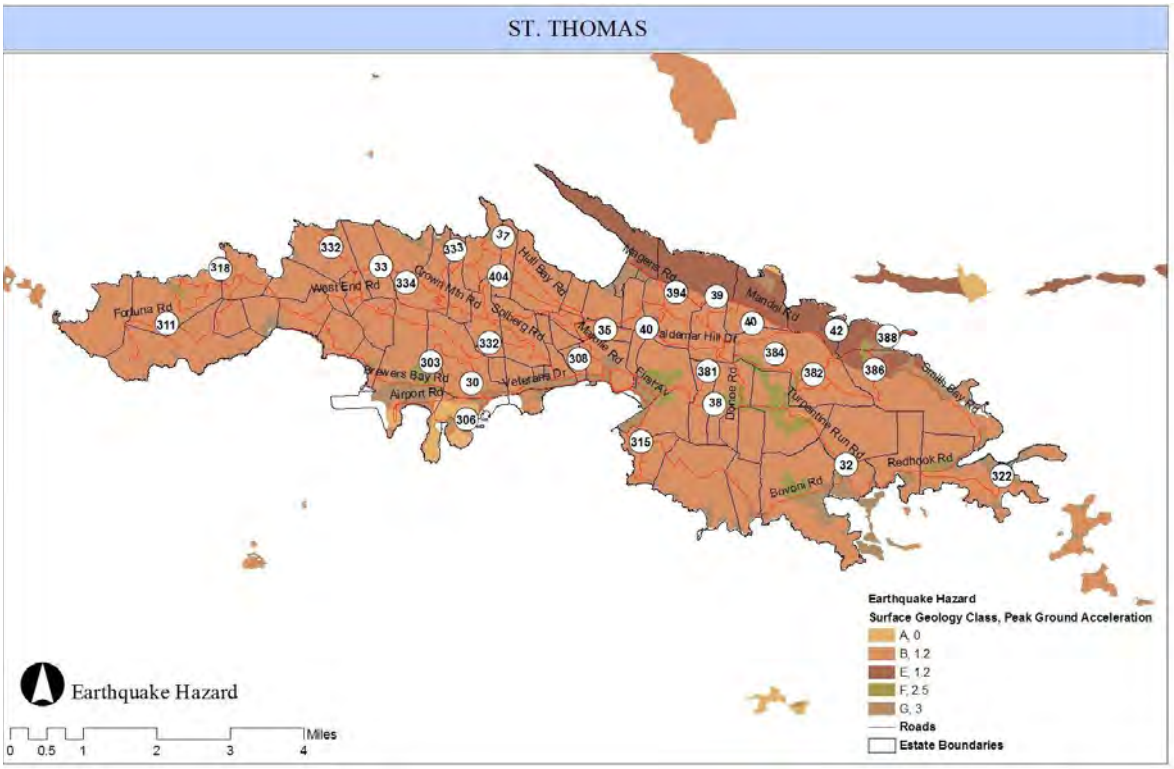
Source: 2019 Territorial Hazard Mitigation Plan

Figure 27. Extent of Earthquake Hazard in St. Croix



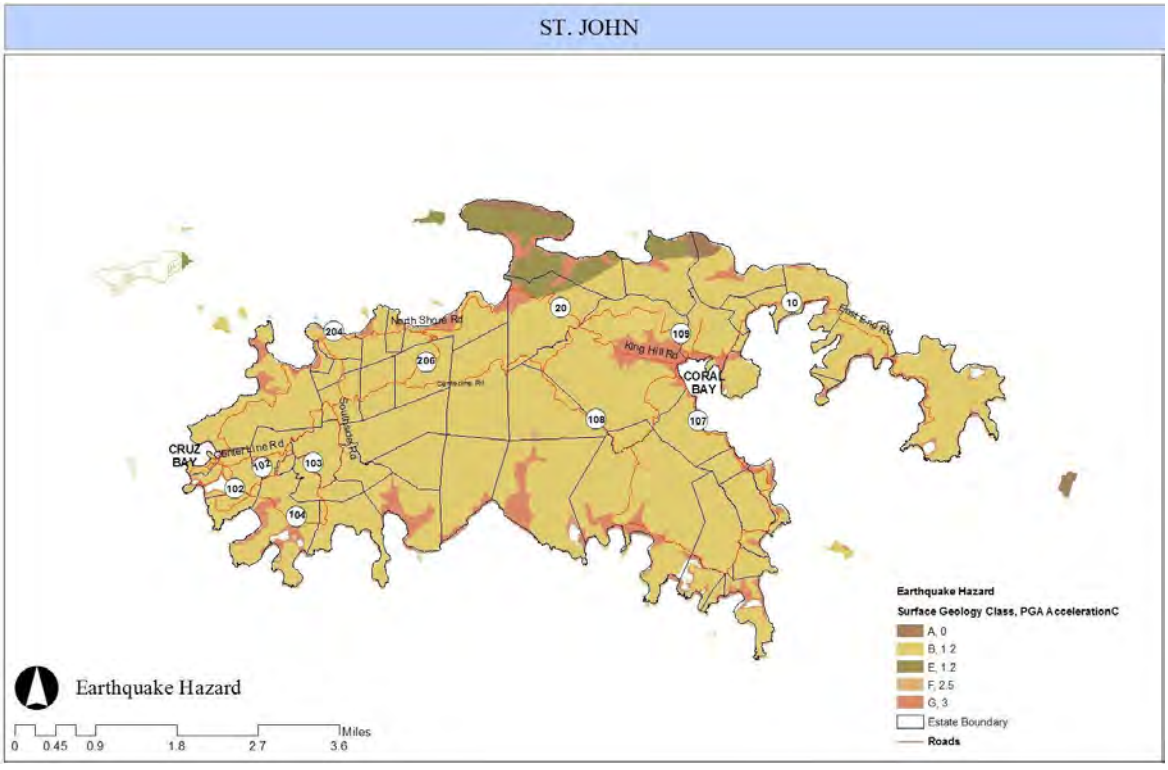
Source: 2019 Territorial Hazard Mitigation Plan

Figure 28. Extent of Earthquake Hazard in St. Thomas



Source: 2019 Territorial Hazard Mitigation Plan

Figure 29. Extent of Earthquake Hazard in St. John



Source: 2019 Territorial Hazard Mitigation Plan

1.9.3 Flooding

The 2019 Territorial Hazard Mitigation Plan (THMP) examined riverine flooding and coastal flooding and erosion as separate hazards. For the purposes of this Mitigation Needs Assessment, riverine flooding and coastal flooding and erosion risks will be examined together. The term Riverine Flooding refers to flooding that occurs from excess precipitation or other factors that cause water to be displaced onto floodplains, as explained further herein.

According to data cited in the 2019 Territorial THMP, no significant change in frequency of hurricanes and associated storm surge due to climate change is anticipated in the near future. Coastal flooding is a year-round concern in the Territory, with impacts expected during hurricane season as well as between October and April when swell waves from mid-latitude storms in the North Atlantic can cause storm surge. The 2019 Territorial THMP also explored the coastal erosion hazard, whereby erosive wave forces cause decreases in land area. Erosive forces can be impacted by coastal storm events, beach replenishment and construction, and geological changes. Coastal erosion can be measured by assessing rates of shoreline loss and can be highly variable from year-to-year or from season-to-season. The 2019 Territorial THMP did not independently assess the impact of sea level rise upon the Islands.

As a likely worst-case scenario and to inform this report, potential exposure, and damages to structures due the following conditions were considered.

- Category 5 storm surge event
- 2100 high scenario sea level rise (4 feet), to consider long-term implications,
    - 2050 high scenario sea level rise mapping provided for information
- Advisory Base Flood Elevation (ABFE) base flood elevation (STARRII, 2018)

Again, Riverine Flooding occurs from excess precipitation or other factors that cause water to be displaced onto floodplains. Such flooding can be caused by a combination of human and natural factors, including intense precipitation events or modifications to the passage of water due to encroachments, the installation of impervious surface, or debris blockage, for example. The 2019 THMP reports that tropical weather patterns (including hurricane seasons) create heavy rainfall conditions that cause flooding in the Territory, particularly outside of urban areas. The steep topography in the Virgin Islands and non-porous substrata can exacerbate runoff conditions that cause flooding. Although the Territory lacks the rivers, the technical term used riverine flooding that is frequently used in evaluating risk is a fit for the most common form of flooding seen in the USVI, especially during severe rain.

Although the USVI Flood Insurance Study maps flood zones for both inland and coastal areas, the 2019 THMP notes that the principal flooding cause is stormwater run-off. The runoff flooding can exceed delineated flood zones on flood insurance rate maps or may not be mapped at all. According to the FEMA Mitigation Assessment Team Report issued in the wake of Hurricanes Irma and Maria, flood damage from the Hurricanes was predominantly caused by localized ponding and runoff. Over the years, encroachments into historic flood zone have displaced flood water to unanticipated locations. Increased development, undersized culverts, impervious surface installation following development, combined sewer systems for stormwater and wastewater, insufficient preventative maintenance of sewer infrastructure, improper engineering design for drainage of constructed surfaces, inadequate use of green infrastructure, and functionally obsolete stormwater management infrastructure contribute to the pervasiveness of runoff and riverine flooding in the Territory.

Exposure to riverine flooding varies throughout the Virgin Islands. St. John generally experiences less pervasive flooding owing in part to the comparative lack of development, when compared to the other major islands. Flooding does occur in Cruz Bay and Coral Bay near the bottom of steeper hills, for example. St. Thomas is more heavily developed with documented, more serious flooding in certain areas, sometimes due to ineffective draining that causes localized flood damage to nearby structures. This phenomenon has been documented in Charlotte Amalie on St Thomas, for example, resulting in shallow flooding to its business district. St. Croix is somewhat less susceptible to sudden riverine flooding although certain developments experience shallow flooding due to the inadequacy of existing drainage infrastructure, but flood risk impacts the residents on all three major islands in the Territory.

Coastal Flooding, Storm Surge, and Erosion

Coastal flooding is a significant aspect of hurricanes and tropical storms. Coastal flooding during a storm event is characterized by storm surge, whereby displaced water from winds and barometric pressure "piles up" and increases in height as it approaches land. This causes local water levels to rise, resulting in overland inundation that can be exacerbated by wind conditions that cause waves, sea level rise, or by astronomical tidal patterns (National Oceanic and Atmospheric Administration, 2013). The storm surge data shows potential storm surge vulnerability for all areas and incorporates varying landfall locations, local bathymetry and topography, varying storm sizes, forward speeds, tracks, approach angles, and tide levels. This is accomplished by performing thousands of different SLOSH simulations for a given area and then compositing the results into a worst case snapshot, by Saffir-Simpson Category, indicating storm surge vulnerability.[4] In the 2019 Territorial THMP, the SLOSH (Sea, Lake, and Overland Surges from Hurricane) model was used to determine the extent of coastal flooding in the US Virgin Islands from a variety of storm scenarios. These scenarios are classified by the SLOSH categories, which is reproduced in the table below.

Table 12. SLOSH Categories for Storm Surge

Category	Storm Surge (feet above sea level)
1	4-5 feet
2	6-8 feet
3	9-12 feet
4	13-18 feet
5	> 18 feet

Source: Blake, et al.

Hurricanes Irma and Maria caused small or moderate recorded storm surges (up to three feet) despite the intensity of the storms. This may be attributed to the bathymetry of the waters surrounding the Virgin Islands as not conducive to the generation of significant storm surges. Puerto Rico and the Virgin Islands are surrounded by a narrow and steep shelf that diminishes storm surge effects (USVI Office of Disaster Recovery, 2019). Though coastal flooding from these storms caused minor structural damage, wave action and surge destroyed beaches due to erosion by powerful waves and surges. The Territorial THMP associates erosion with hurricane systems but did not include an independent assessment of the erosion risk.

[4] To help reduce public confusion about the impacts associated with the SLOSH and various hurricane categories as well as to provide a more scientifically defensible scale, the storm surge ranges have been removed from the Saffir-Simpson *Wind* Scale and only peak winds are employed in that scale (National Oceanic and Atmospheric Administration, 2013).

Sea Level Rise

Sea level rise is the increase in relative sea level and was discussed as an ancillary to the coastal flooding and erosion hazard in the 2019 Territorial THMP. Long-term sea level rise has been observed in the US Virgin Islands at an annualized average rate of 0.08 inches per year. According to the 2018 National Climate Assessment, these rates have been slowly accelerating since the early 2000s, with the rate tripling in 2010-2011. Future sea level rise will be dependent on the discharge of greenhouse gas emissions that contribute to sea ice melting and thermal expansion. Intermediate-low, intermediate, and extreme emissions scenarios are anticipated to cause 0.8 feet, 1.2 feet, and 2.8 feet (respectively) of relative sea level rise in the US Virgin Islands compared to 2000 levels by 2050. By 2100, the rise is anticipated to be 1.6 feet, 3.6 feet, and 10.2 respectively (U.S. Global Change Research Program). For the purposes of this Mitigation Needs Assessment, four feet of sea level rise is modeled which aligns with the 2100 scenario presented in the 2018 USVI Hurricane Recovery and Resilience Task Force Report (USVI Hurricane Recovery and Resilience Task Force, 2018).

According to the 2018 Task Force Report, the continued rise of sea levels around the Territory will cause inundation and coastal erosion on all three primary islands. This might have consequences for tourism at popular places like Magens Bay and Smith Bay on St. Thomas, Sandy Point on St. Croix, or Maho Bay on St. John. The built environment will also suffer consequences, as Charlotte Amalie, Red Hook, Bovoni, Coral Bay, Christiansted, Salt River area, and Limetree Bay area will experience significant flooding.

Sea level rise will increase the impact on flooding. In addition to aggravating nuisance flooding and causing inundation of low-lying areas, the relative sea level rise will increase the impact of storm surges and coastal flooding events, resulting in inundation of areas that historically have not been inundated with flood waters.

Exposure Impacts

The following tables describe impacts to buildings resulting from flood hazards. Approximately 20 percent of the Islands' residents of St. Croix and St. Thomas are in the Special Flood Hazard Area, compared to approximately seven percent of residents of St. John. Only a fraction of Island residents exposed to flooding are also exposed to Storm Surge and Sea Level Rise, indicating that the preponderance of flood hazard and exposure is due to inland/riverine flooding. However, building exposure values in St. Thomas for storm surge and sea level rise are significantly higher than those on St. Croix and St. John, and similarly higher than exposure values for the Special Flood Hazard Area. For more detailed data, please see the attached Appendix and the maps at the end of this section.

The tables below show flood-related exposures for US Virgin Islands lifelines. This Mitigation Needs Assessment used an updated critical facilities and lifelines dataset from the dataset used for the 2019 Territorial THMP.

There is significant flood exposure for the US Virgin Islands' lifelines. The Islands' energy lifelines are particularly exposed owing to vulnerabilities to refinery operations on St. Croix. Transportation lifelines are exposed to flooding owing to their waterfront locations. On St. Croix, Health and Medical lifelines such as the VA Clinic and Nesbitt Clinic are also exposed, alongside various Safety and Security lifelines such as police substations and educational facilities. The Ann E. Abramson Marine Facility is also exposed, in addition to the Anguilla Wastewater Treatment Facility. On St. John, various marine facilities, the deCastro Clinic, and VIERS Eco Education facility are in the Special Flood Hazard Area. On St. Thomas, marina facilities, the Airport, WAPA Power Plant, and various schools and police

stations are also within the Special Flood Hazard Area. Excepting the seaports, in most cases the impacted lifelines are in riverine or inland flood zones.

Table 13. Lifeline Exposure due to the Flood Hazard

	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
St. Croix	1	193	5	0	2	31	20	252
St. John	0	0	0	0	1	1	5	7
St. Thomas	0	5	0	2	1	83	37	128

Source: HAZUS

Table 14. Consequence Classification for Lifelines Impacted by Flooding (Designated Special Flood Hazard Area)

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	High Impact	Low Impact	Low Impact
Energy	High Impact	Low Impact	High Impact
Food, Water, Shelter	High Impact	Low Impact	Low Impact
Hazardous Material	Low Impact	Low Impact	High Impact
Health and Medical	High Impact	High Impact	High Impact
Safety and Security	High Impact	High Impact	High Impact
Transportation	High Impact	High Impact	High Impact

Looking ahead projected sea level rise inundation, sea level rise flooding will eventually impact a subset of lifelines in the Special Flood Hazard Area or regulatory floodplain in the territory. Impact to beaches is not documented as they are not included as lifeline facilities, although economically these locations are significant assets that attract tourists who contribute significantly to local economy. Many lifelines subject to coastal flooding will be exposed to sea level rise (such as waterfront Transportation lifelines) in the future. On St. Croix, impacted lifelines include the Army National Guard compound in Bethlehem, the Good Hope School, and the US Customs facility. On St. John, the deCastro Clinic and marine facilities will be inundated. On St. Thomas, Addelita Cancryn Junior High, the Moravian School, and the US Coast Guard facility will be inundated (in addition to various waterfront Transportation lifelines).

Table 15. Four-Foot Sea Level Rise Exposure by Lifeline

Census County Subdivision	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
St. Croix	0	0	2	0	0	2	3	7
St. John	0	0	0	0	1	0	5	6
St. Thomas	1	0	0	0	0	6	18	25

Table 16. Consequence Classification for Lifelines Impacted by Four Feet of Sea Level Rise

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	High Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	High Impact	Low Impact	Low Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	Low Impact	High Impact	Low Impact
Safety and Security	High Impact	Low Impact	High Impact
Transportation	High Impact	High Impact	High Impact

An exposure analysis shows that storm surge impacts from a SLOSH scenario would likely impact waterfront Transportation lifelines, especially as sea levels rise, given prior flood data and its current elevation. In addition to impacting critical facilities impacted by future sea level rise, on St. Croix five terminals at the Limetree Bay Refinery on St. Croix, the WAPA power facility, and the St. Patrick Catholic School would be impacted. On St. Thomas, two additional schools, the Police Headquarters, and liquefied petroleum gas facilities are expected to be inundated under this scenario.

Table 17. SLOSH Category 5 Flood Exposure by Lifeline

Census County Subdivision	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
St. Croix	0	6	0	0	0	12	6	24
St. John	0	0	0	0	1	0	4	5
St. Thomas	0	0	0	2	0	15	26	43

Source: HAZUS

Table 18. Consequence Classification for Lifelines Impacted by Storm Surge from a Category 5 Storm

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	High Impact	Low Impact	Low Impact
Food, Water, Shelter	Low Impact	Low Impact	Low Impact
Hazardous Material	Low Impact	Low Impact	High Impact
Health and Medical	Low Impact	High Impact	Low Impact
Safety and Security	High Impact	Low Impact	High Impact
Transportation	High Impact	High Impact	High Impact

Flooding Extent

Figures 30 through Figure **32** demonstrate the extent of the Special Flood Hazard Area in the US Virgin Islands. Due to the Islands' topography, coastal flood zones are relatively limited in geographic extent. However, large sections of the inland area are designated Zone A, which means that these locations have only a one percent annual chance of flooding over a 100-year period (USVI Office of Disaster Recovery, 2019). However, due to limited data, flood depths and base flood elevations are not presently available.

Special Flood Hazard Areas

St. Croix exhibits large Special Flood Hazard Areas or regulatory floodplains that stretch deep inland along expected drainageways. Impacts are anticipated near Frederiksted and throughout portions of

the Island's interior. On St. Thomas, coastal flood areas have been delineated along the Island's ocean shoreline and surrounding the Cas Cay Mangrove Lagoon Marine Reserve. Inland flood zones are less pronounced than on St. Croix but include large sections of inland area along Nadir Gut. On St. John, limited inland flood zones have been delineated northwest of Coral Harbor near King Hill Road and also extend north from the ocean along the Island's southern shore.

Figure 30. St. Croix Flood Hazard Zones

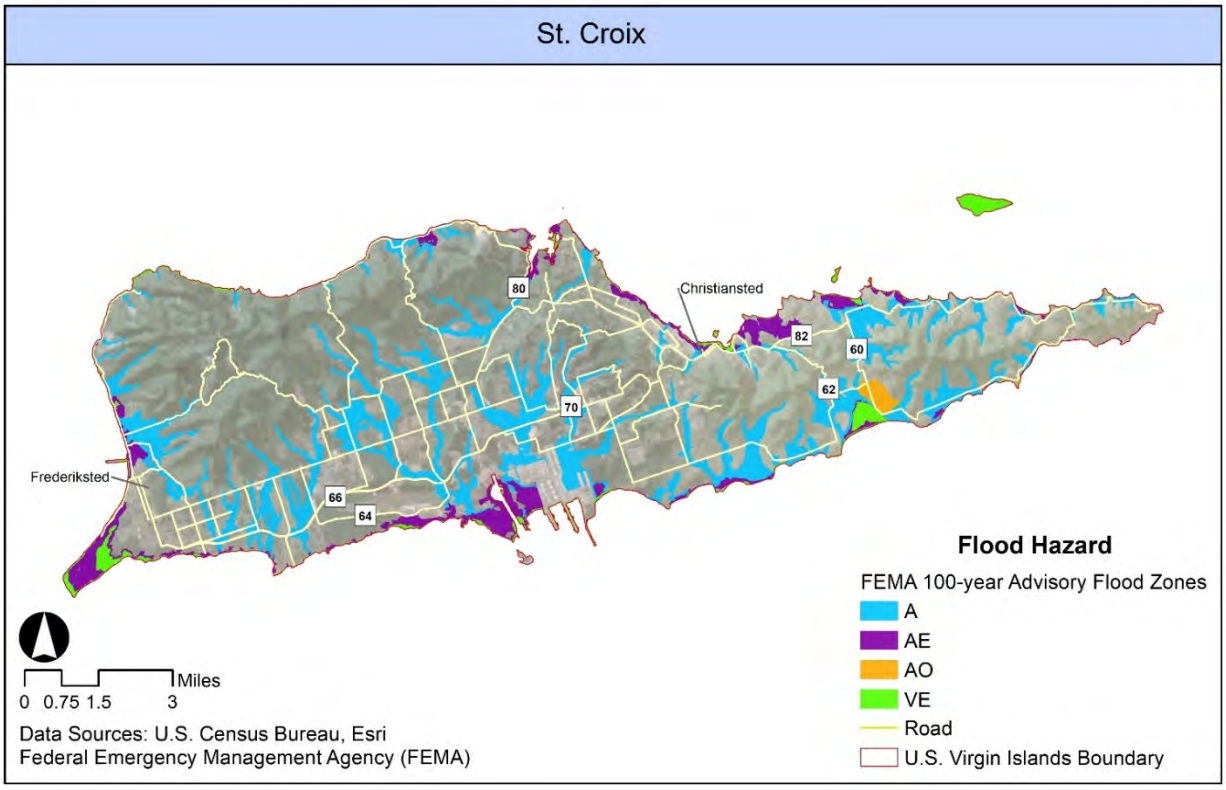


Figure 31. St. Thomas Flood Hazard Zones

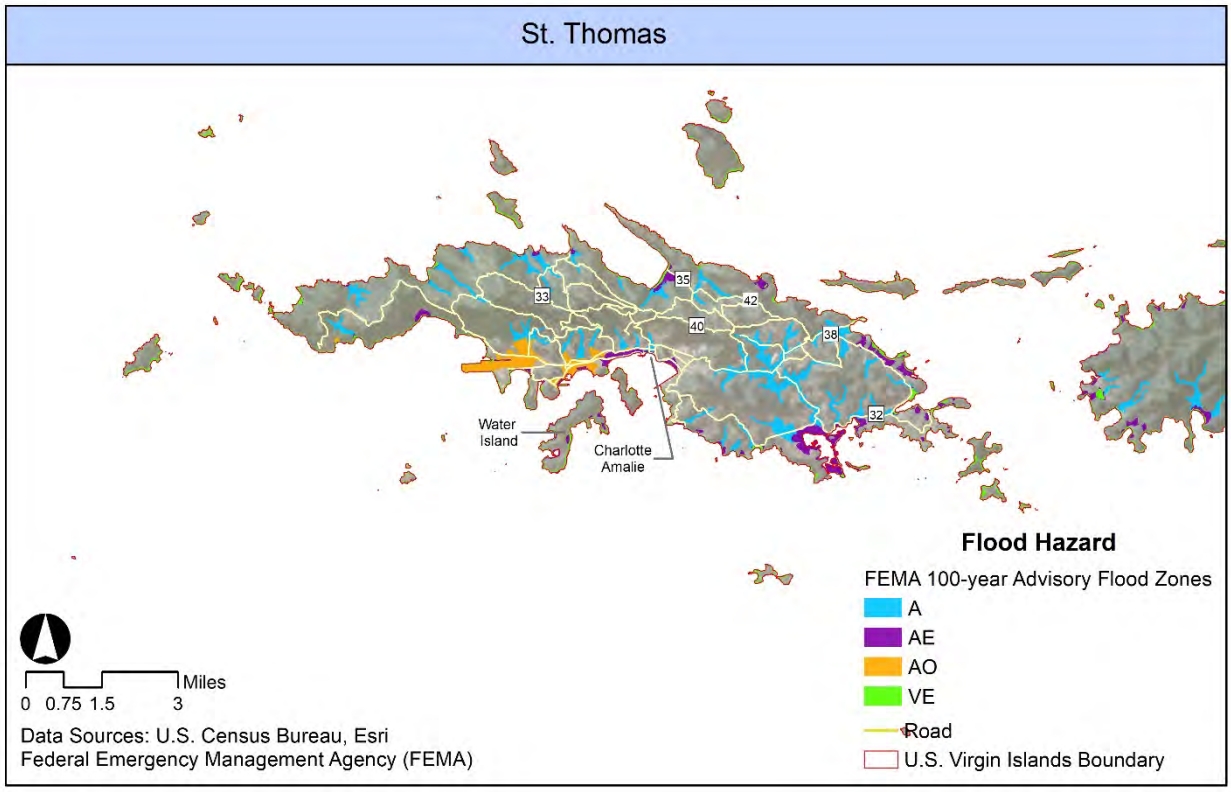
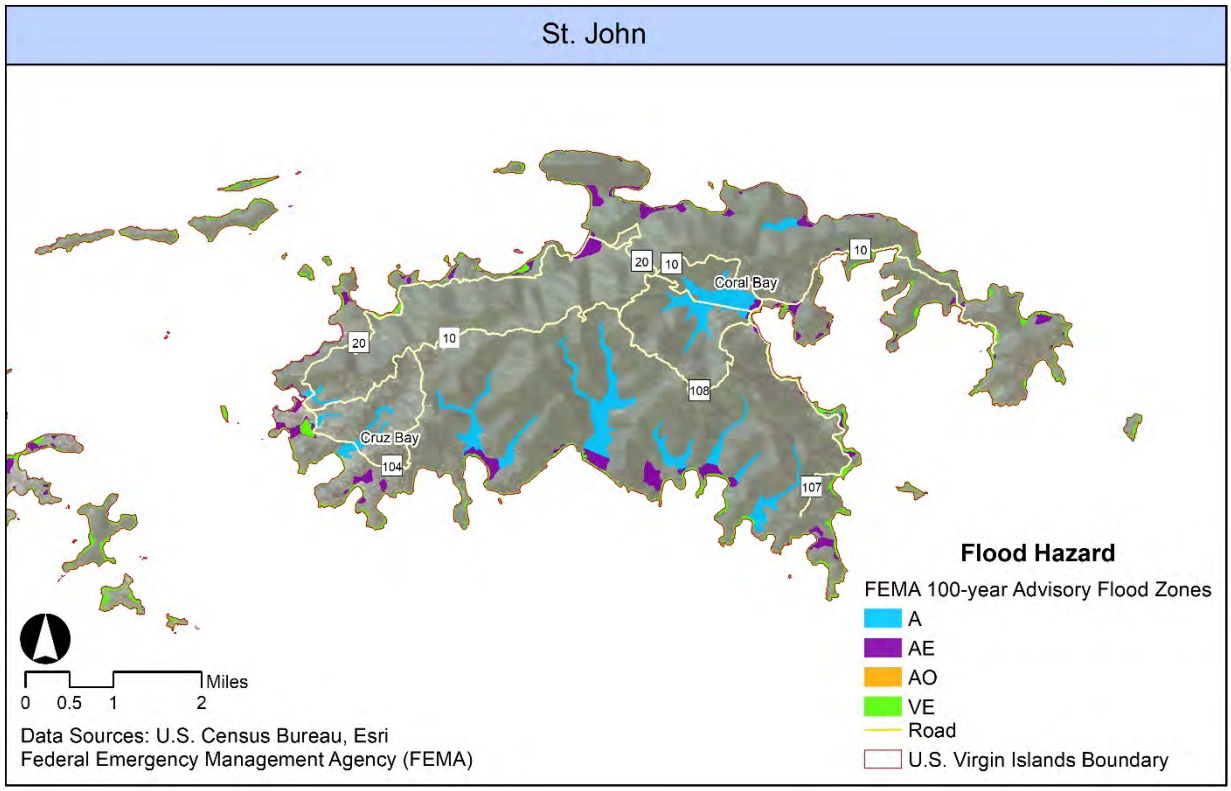


Figure 32. St. John Flood Hazard Zones



Storm Surge

The following maps show storm surge hazards impacting the three islands. On St. Croix, Sandy Point, portions of Christiansted, and portions of the St. Croix Renaissance Park are particularly vulnerable to storm surge. On St. Thomas, the inner harbor area of Charlotte Amalie is perhaps the most vulnerable owing to the density of development and potential depth of storm surge. The Veterans Drive Improvement Project is seeking to ameliorate storm surge hazards by enhancing the seawall along Veterans Drive in order to provide a higher level of protection. Storm surge flooding is also anticipated in Smith Bay, particularly near waterfront resorts along Water Bay. St. John has relatively limited storm surge exposure due to its topography, though localized impacts can be anticipated near Cruz Bay and along the Island's northern shore.

Storm surge impacts in St. John are more limited owing to topography and settlement patterns. Exposure is more pronounced near Cruz Bay where there is a greater concentration of waterfront development.

Figure 33. St. Croix Storm Surge Hazard

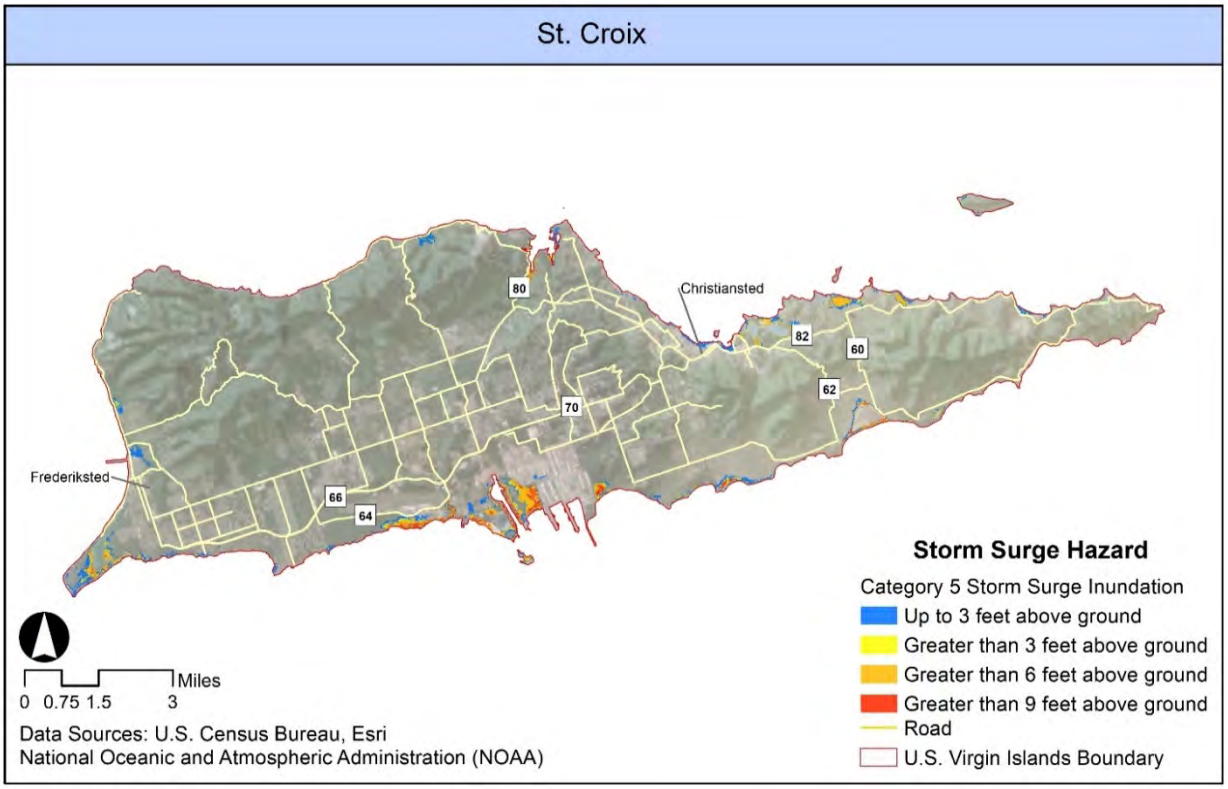
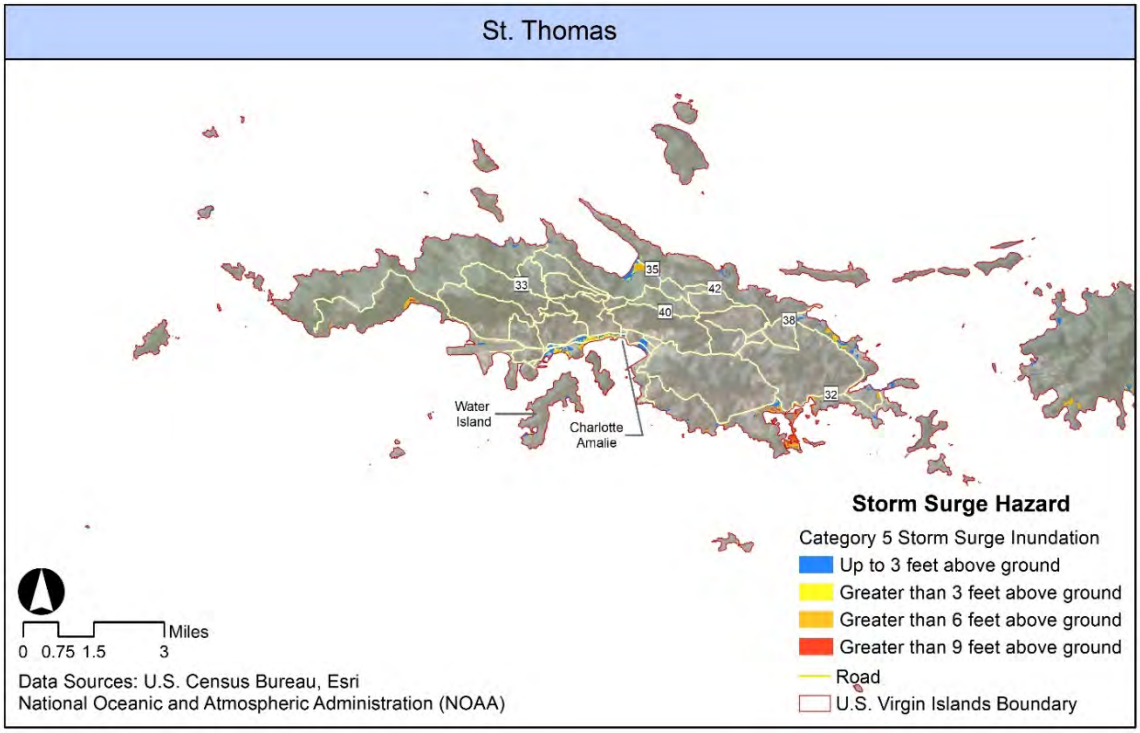
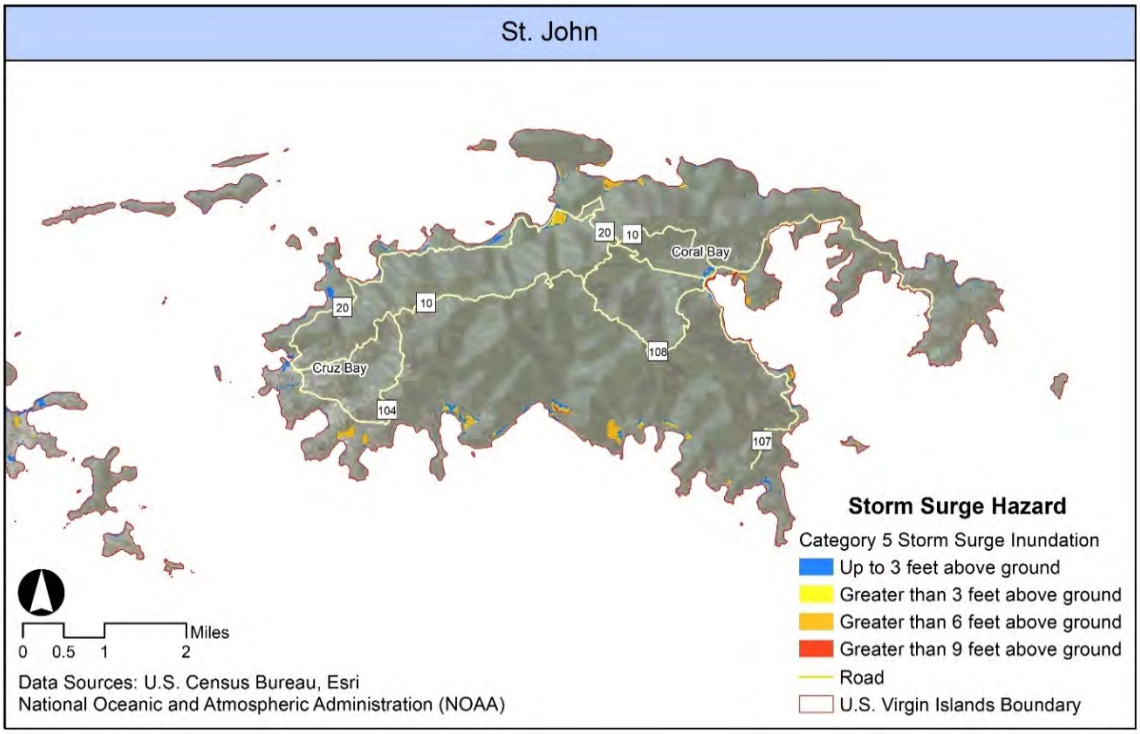


Figure 34. St Thomas Storm Surge Hazard



Storm surge impacts in St. John are more limited owing to topography and settlement patterns. Exposure is more pronounced near Cruz Bay where there is a greater concentration of waterfront development.

Figure 35. St John Storm Surge Hazard



Sea Level Rise

A four-foot sea level rise (anticipated by 2100, resulting from an intermediate emissions scenario) would have relatively limited impacts upon St. Croix, St. John, and St. Thomas due to the islands' topography. However, in combination with storm surge and coastal flooding conditions, sea level rise inundation will have a much broader and stronger exposure to areas that previously experienced coastal flooding and storm surge impacts. Under this scenario, on St. Croix, Sandy Point will likely be separated from the rest of the island and persistent shallow flooding may occur in the vicinity of the refinery and St. Croix Renaissance Park under current projections. The mangrove cays off St. Thomas will also be inundated, as will areas inland from Magen's Bay Beach, and waterfront areas of Charlotte Amalie. St. John will experience inundation along Coral Bay and along low-lying waterfront areas.

Figure 36. St Croix Sea Level Rise Hazard

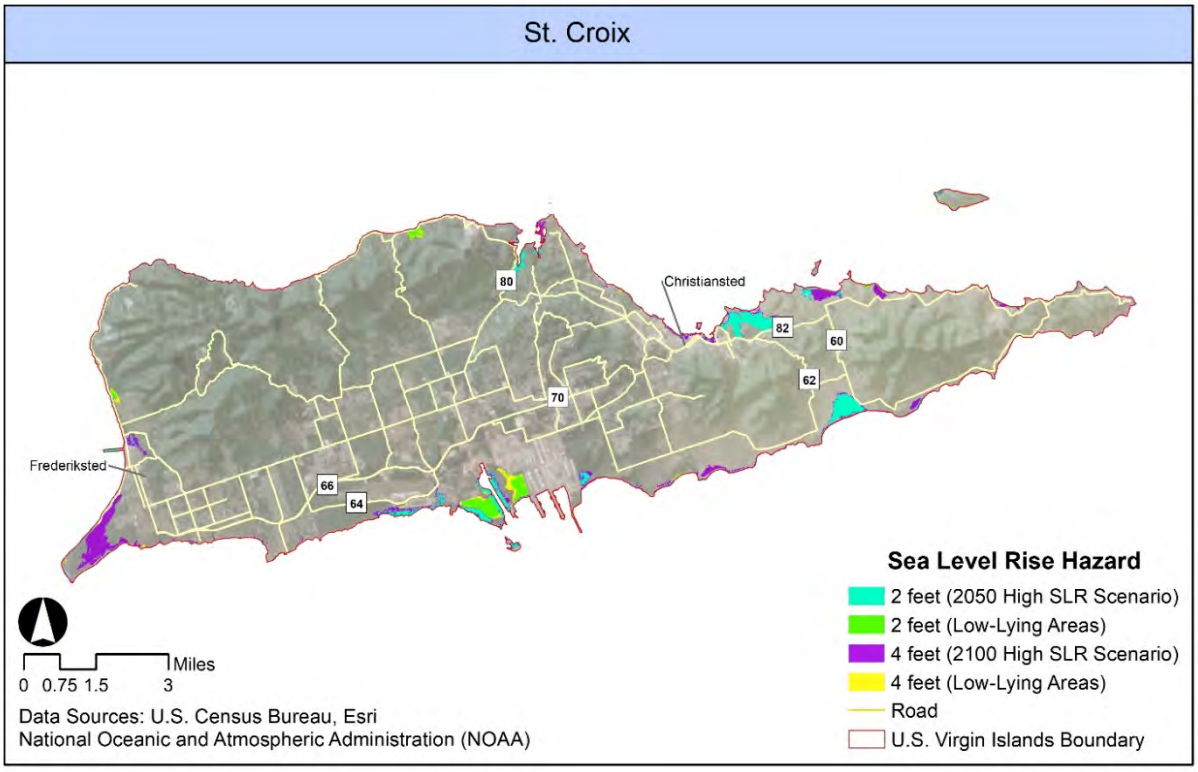


Figure 37. St Thomas Sea Level Rise Hazard

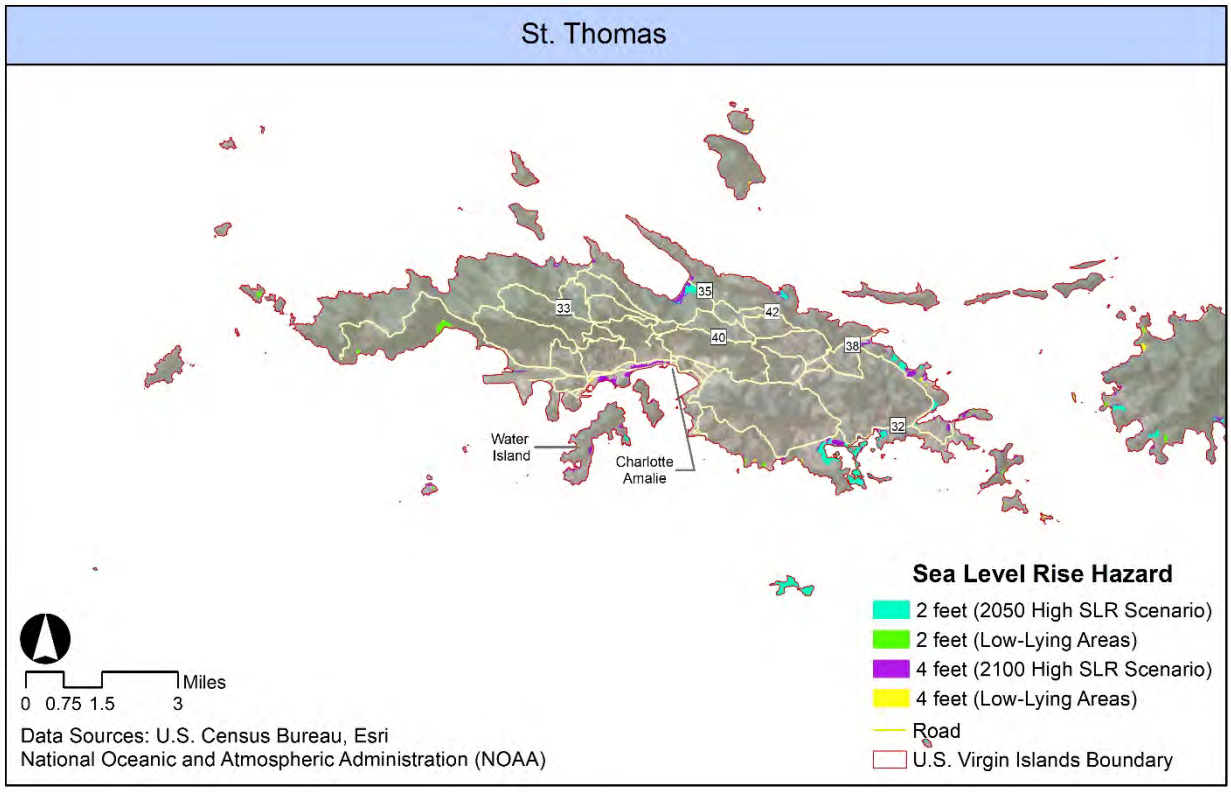
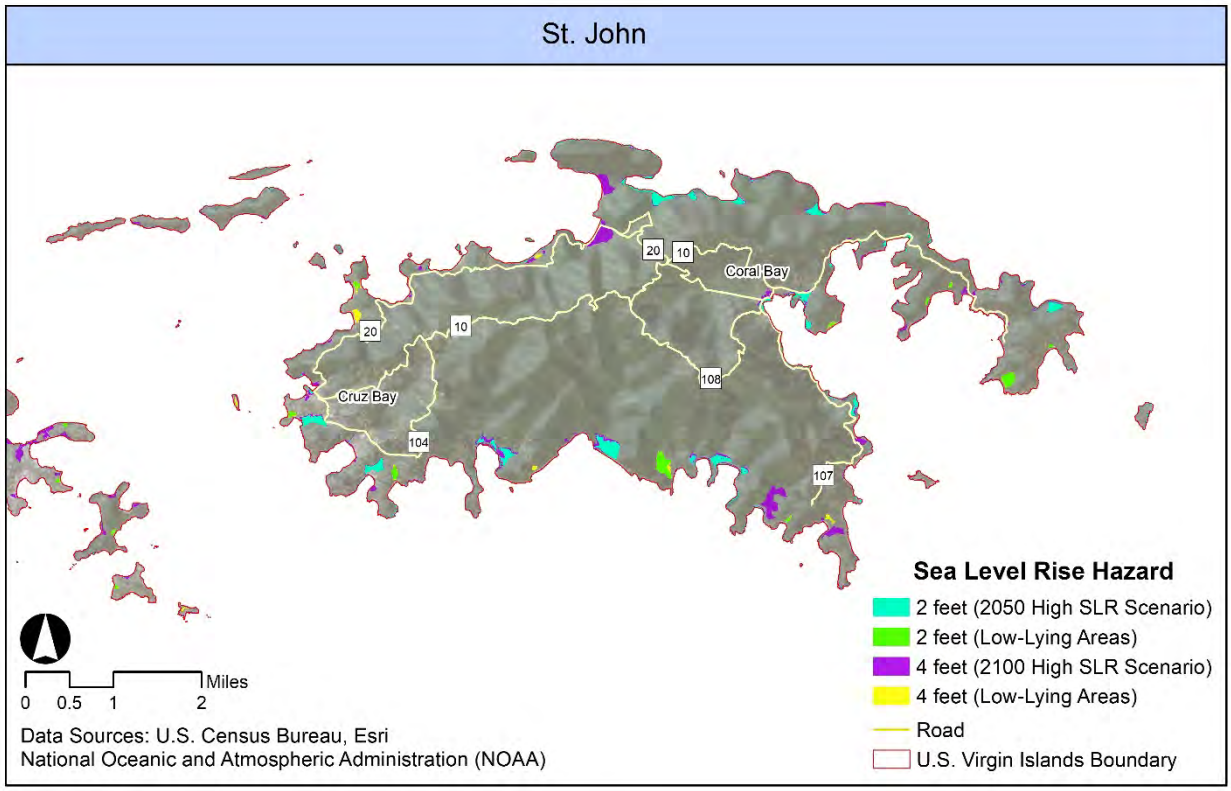


Figure 38. St John Sea Level Rise Hazard



1.9.4 Hurricane Winds

Hurricanes are categorized according to the strength and intensity of their winds using the Saffir-Simpson Hurricane Scale, as shown in Table 19. A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. Hurricane winds are a damaging aspect of the tropical systems that frequently impact the US Virgin Islands. These winds are measured on the Saffir-Simpson Hurricane Scale and are broken down into the following categories:

Table 19. Saffir-Simpson Hurricane Wind Categories

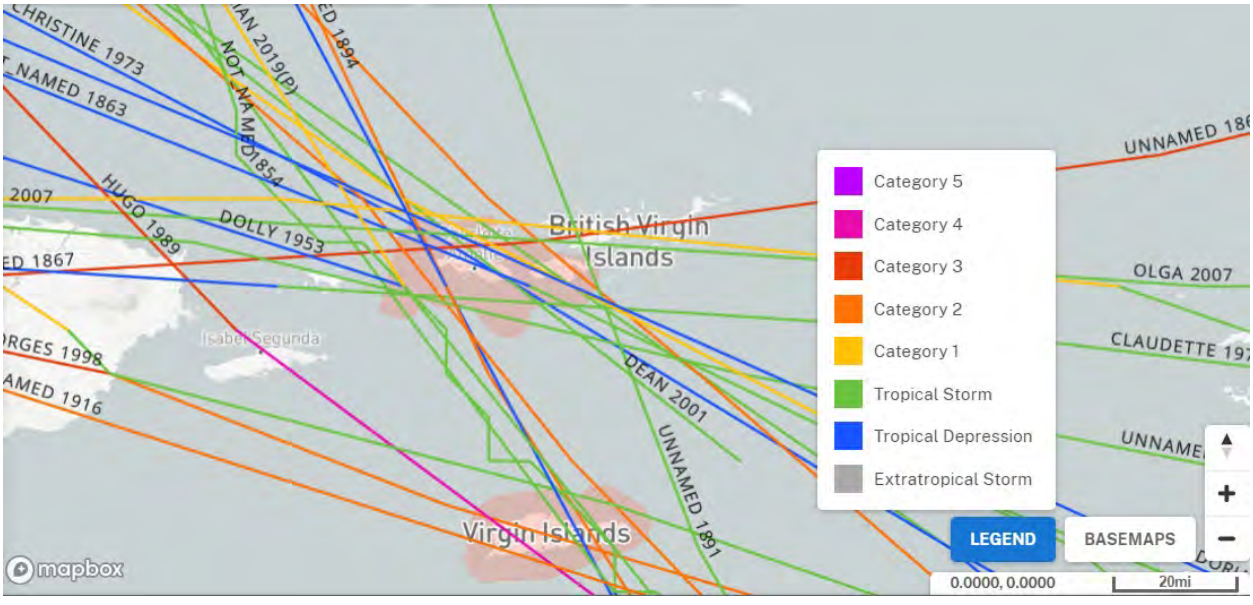
Category	Wind Speed
1	74-95 mph
2	96-110 mph
3	111-129 mph
4	130-156 mph
5	>157 mph

Source: National Hurricane Center

Hurricane winds have historically been a major source of damage in the US Virgin Islands, spawning two disaster declarations in 2017 and accounting for nine of the 22 deadliest, most expensive, and most intense hurricanes to strike outlying US territories and Hawaii in the past century (2019 Hazard Mitigation Plan). Since October 1984, Hurricanes Klaus, Hugo, Marilyn, Lenny, Omar, Earl, Irma, and Maria have had significant impacts to the islands Given its location and hurricane history, the US Virgin Islands are categorized in Wind Zone 4, where requirements for strength design wind speed are the highest at 145 mph (FEMA 2009, FEMA 2015, USVI 2019).

Since the 1850s, the US Virgin Islands have been impacted by 24 hurricanes or tropical storms that passed through the territory, the most recent of which was Hurricane Dorian in 2019. The following image shows the path and strength of storms impacting the US Virgin Islands.

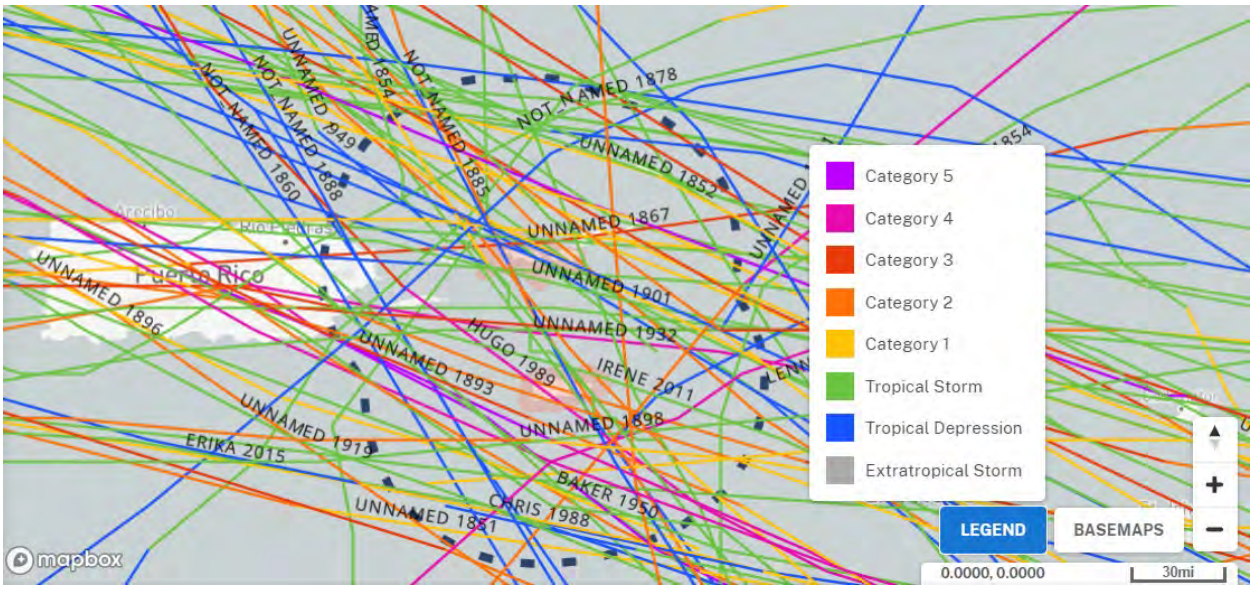
Figure 39. Hurricane Paths Impacting the US Virgin Islands (1850-2019)



Source: National Hurricane Center

In the same time period, 87 storms passed within 50 miles of the US Virgin Islands. The most significant and damaging of these were Hurricanes Maria and Irma, which occurred in 2017. The paths and strengths of these storms are shown in the following image. A 50-mile radius from the US Virgin Islands is outlined in a dashed black line.

Figure 40. Hurricane Paths Passing within 50 Miles of the US Virgin Islands (1850-2019)



Source: National Hurricane Center

For the purposes of this MNA, the 2019 THMP is utilized to provide an analysis of vulnerability related to hurricane wind events. This provides an indication of the magnitude of potential damages developed from the risk analysis in the THMP as aligned with the available data and provided in the tables below. The next THMP will benefit from the even more current available information regarding wind speeds to represent potential risk associated with this hazard in even greater detail.

The 2019 Hazard Mitigation Plan (THMP) cites data from the Atlantic Oceanographic and Meteorological Laboratory that calculates a 42% annual chance of a hurricane or tropical storm striking the US Virgin Islands. The impacts of climate change are expected to marginally increase the frequency and intensity of North Atlantic region (USVI Office of Disaster Recovery, 2019).

The vulnerability assessment of the 2019 THMP indicates that many residential and commercial properties in the Territory are vulnerable to hurricane winds, in part because of how close most buildings are to the coast and the nature of the winds the storms generate (USVI Hurricane Recovery and Resilience Task Force, 2018). On St. John, only one-third of both residential and commercial structures are considered vulnerable, almost all of which are classified as moderate or low consequence. On St. Thomas, the percentage of exposed buildings represents a majority, though also at moderate or low consequence. On St. Croix, just over half of commercial buildings and less than half of residential buildings are exposed, all of which are considered at moderate or low exposure.

Table 20. Building Exposure to Hurricane Winds

Island	Type	Percent of Total Buildings in Category Exposed	Exposed Buildings Impact		
			High	Moderate	Low
St. Croix	Commercial	58%	0%	31%	69%
	Residential	42%	5%	12%	83%
St. John	Commercial	35%	0%	27%	73%
	Residential	35%	5%	9%	86%
St. Thomas	Commercial	70%	0%	99%	1%
	Residential	54%	5%	94%	1%

Source: 2019 Territorial Hazard Mitigation Plan

Lifeline vulnerabilities to hurricane winds are variable across the islands, with lifelines on St. John at considerably less risk than that of St. Croix and St. Thomas. On those islands, lifeline facilities with pre-code structural components represent the most significant vulnerability. These facilities comprise Safety and Security lifelines.

Table 21. Lifeline Exposure to Hurricane Winds

Island/Lifeline	High	Moderate	Low
St. Croix	**28**	**20**	**33**
Energy	0	0	1
Food, Water, Shelter	17	9	21
Health and Medical	1	2	1
Safety and Security	10	8	5
Transportation	0	1	5
St. John	**7**	**2**	**12**
Energy	0	0	1
Food, Water, Shelter	3	2	4
Health and Medical	1	0	2
Safety and Security	3	0	4
Transportation	0	0	1
St. Thomas	**18**	**10**	**13**
Energy	0	0	1
Food, Water, Shelter	4	1	4
Health and Medical	2	2	2
Safety and Security	11	6	3
Transportation	1	1	3

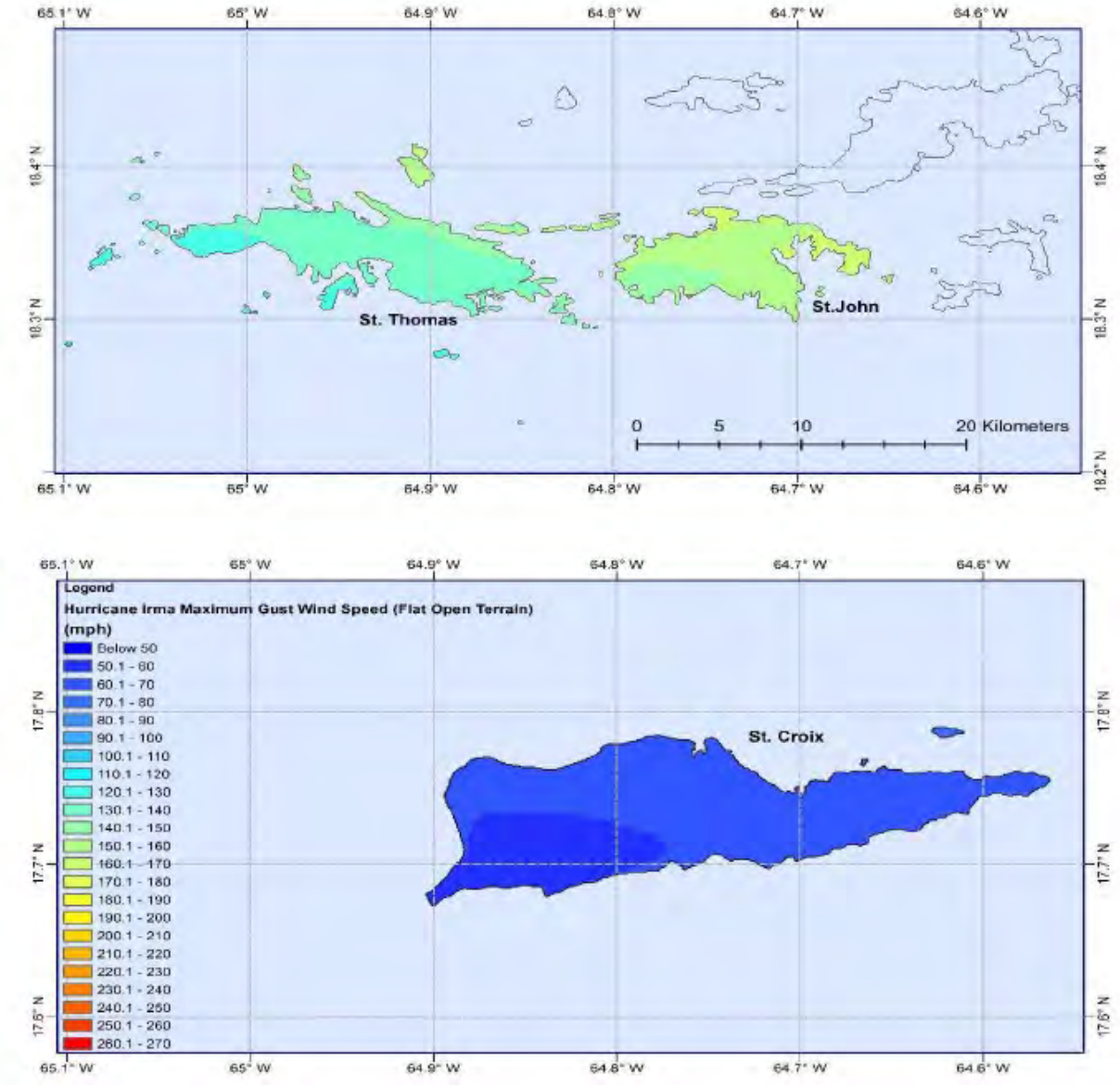
Source: 2019 Territorial Hazard Mitigation Plan

Table 22. Consequence Classification for Lifelines Impacted by Hurricane Winds

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	High Impact	High Impact	High Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	High Impact	High Impact	High Impact
Safety and Security	High Impact	High Impact	High Impact
Transportation	Low Impact	Low Impact	High Impact

Figure 41 displays observed wind gusts from Hurricane Irma. The Hazard Mitigation Plan did not utilize HAZUS wind speed modeling, but instead utilized observed wind speeds from the 2017 hurricanes upon terrain models. The results are shown in the following map and tables.

Figure 41. Extent of Hurricane Irma Observed Wind Gusts



Source: 2019 Territorial Hazard Mitigation Plan

1.9.5 Rain-Induced Landslides

Rain-induced landslides are a hazard of concern in the US Virgin Islands. The combination of heavy rainfall, development, and natural factors combine to create a significant vulnerability for threats to life, property, and critical facilities. The 2019 Hazard Mitigation Plan identifies the following conditions for landslides to occur:

- Location on or in proximity to steep hills
- Steep road-cuts or excavations
- Existing or historically occurring landslides
- Steep areas where surface runoff is channeled
- Unmaintained or adversely altered slopes

The Islands' susceptibility to landslides is acknowledged but not well understood. St. Croix has a more dispersed risk due to precipitation variation. St. John recently experienced landslide events in November 2010 in the vicinity of Centerline Road between Cruz Bay and Coral Bay. On St. Thomas, the northern facing slopes of the island's mountains are particularly prone to landslides. The largest landslide documented on St. Thomas occurred in 1979. St. John and St. Thomas experienced several landslides in 2010, and landslides were reported in 1983 in the vicinity of Dorothea Bay on St. Thomas.

The 2019 THMP noted difficulties (including a lack of available information) to determine the frequency and magnitude of landslides in the US Virgin Islands. The 2019 THMP produced landslide susceptibility maps that are reproduced below. The significant topographical relief evident in St. Thomas and St. John indicates a high hazard level, whereas the relatively lower topographic relief in St. Croix sees less overall risk. According to the 2019 Plan, IPCC projections for an increase in precipitation event will likely increase the likelihood of landslides occurring. These conditions may be exacerbated by continued hillside development.

According to the 2019 THMP, exposure to landslides varies throughout the islands. On St. Thomas, 50% of residential building stock and 38% of commercial building stock is considered vulnerable. This figure is 18% and 17% respectively for St. Croix and 39% and 37% respectively for St. John. The majority of residential buildings on St. Thomas that are vulnerable have a moderate or high consequence classification, whereas most vulnerable commercial buildings on both St. John and St. Thomas have a low consequence classification. St. Croix, with generally flatter topography, is significantly less vulnerable to rain-induced landslides.

Table 23. Building Exposure for Landslide Hazards

Island	Type	Percent of Total Buildings in Category Exposed	Exposed Buildings Impact		
			High	Moderate	Low
St. Croix	Commercial	18%	0%	0%	100%
	Residential	18%	18%	17%	66%
St. John	Commercial	37%	0%	0%	100%
	Residential	39%	39%	24%	37%
St. Thomas	Commercial	38%	0%	0%	100%
	Residential	50%	40%	22%	38%

Source: 2019 Territorial Hazard Mitigation Plan

All identified critical facilities expected to be impacted by rain-induced landslides in St. Croix and St. John have low consequence to exposure. St. Thomas has two critical facilities – both shelters – that have high or moderate consequence to exposure.

Table 24. Lifeline Exposure to Rain-Induced Landslides

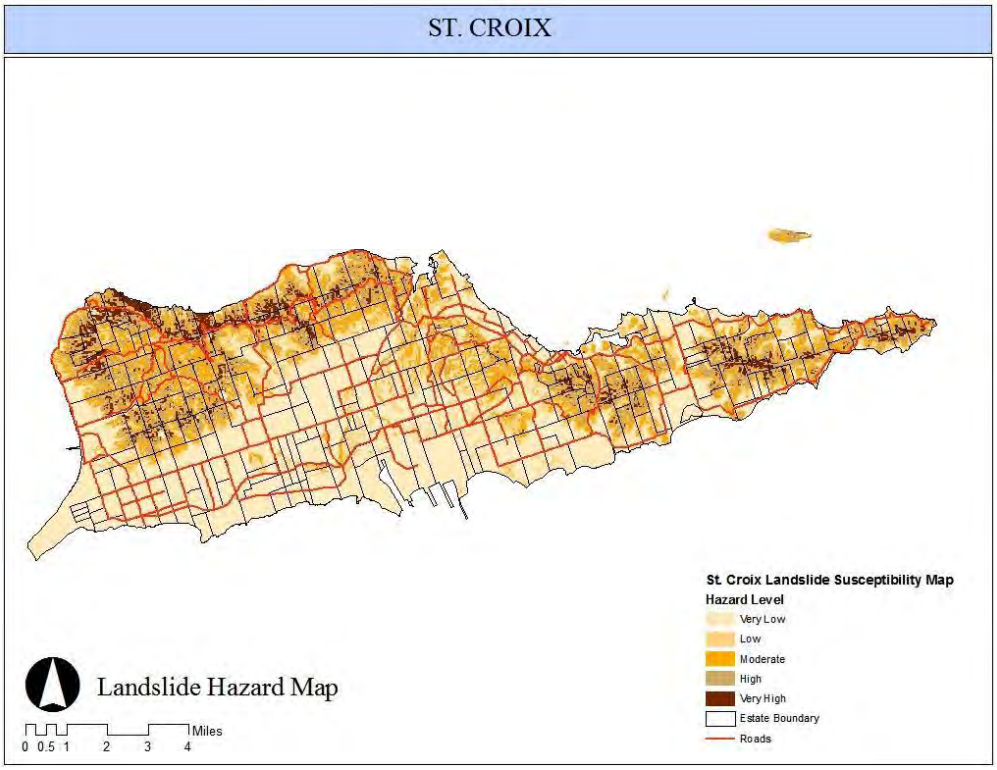
Island/Lifeline	High	Moderate	Low
St. Croix	**0**	**0**	**68**
Energy	0	0	1
Food, Water, Shelter	0	0	35
Health and Medical	0	0	3
Safety and Security	0	0	23
Transportation	0	0	6
St. John	**0**	**0**	**21**
Energy	0	0	1
Food, Water, Shelter	0	0	9
Health and Medical	0	0	3
Safety and Security	0	0	7
Transportation	0	0	1
St. Thomas	**1**	**1**	**40**
Energy	0	0	1
Food, Water, Shelter	1	1	7
Health and Medical	0	0	6
Safety and Security	0	0	21
Transportation	0	0	5

Source: 2019 Territorial Hazard Mitigation Plan

Table 25. Consequence Classification for Lifelines Impacted by Rain-Induced Landslides

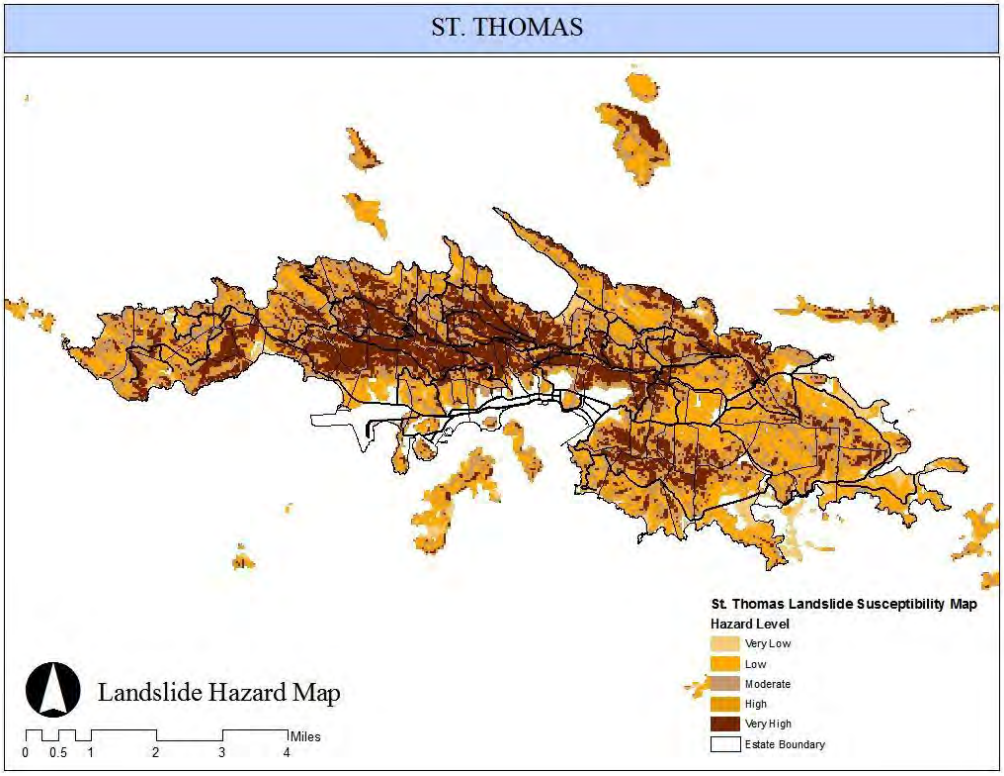
Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	Low Impact	Low Impact	High Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	Low Impact	Low Impact	Low Impact
Safety and Security	Low Impact	Low Impact	Low Impact
Transportation	Low Impact	Low Impact	Low Impact

Figure 42. Extent of Rain-Induced Landslide in St. Croix



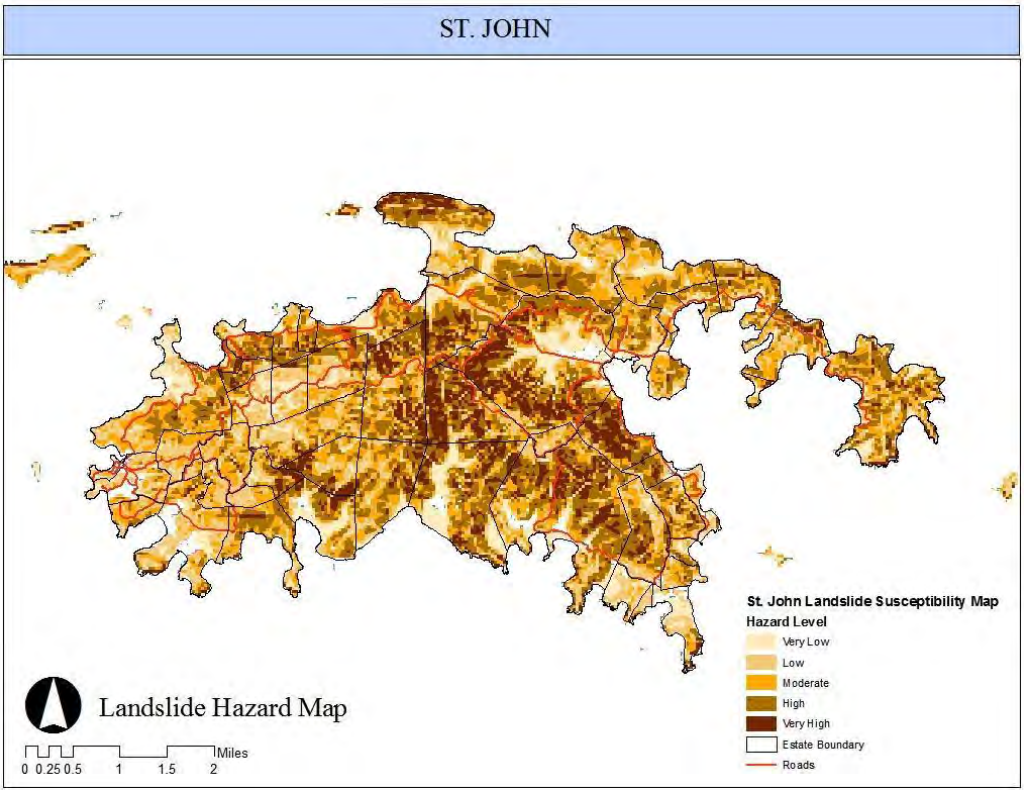
Source: 2019 Territorial Hazard Mitigation Plan

Figure 43. Extent of Rain-Induced Landslide in St. Thomas



Source: 2019 Territorial Hazard Mitigation Plan

Figure 44. Extent of Rain-Induced Landslide in St. John



Source: 2019 Territorial Hazard Mitigation Plan

1.9.6 Tsunami

The US Virgin Islands are susceptible to tsunamis owing to its history of earthquakes and its location in a seismically active region. Tsunamis can originate throughout the region and can quickly travel to adjacent coastlines at speeds between 450 to 600 miles per hour.

Vulnerability to tsunamis has increased throughout the region as populations and development have increased. A tsunami warning system for Puerto Rico and the Virgin Islands has been in place since 2000 and has an estimated response time of 20 minutes. However, the Islands' proximity to the Puerto Rican Trench and the Anegada Fault could result in a tsunami experienced on land before warnings can be issued.

The most recent and damaging tsunami impacting the Islands occurred following a magnitude 7.5 earthquake in 1867. The earthquake's epicenter was located in the Anegada Fault between St. Thomas and St. Croix. The resulting tsunami caused wave heights of up to 12.2 m near Water Island off St. Thomas, 7.8 meters at Frederiksted, and 6.1 meters at Charlotte Amalie. Since 1530, 116 tsunamis with run-ups exceeding 0.5 meters (1.6 feet) have been separately observed. Of these, 14 tsunamis were reported from Puerto Rico or the Virgin Islands.

Low-lying coastal areas are most vulnerable to tsunamis. Tsunamis pose a unique vulnerability to cruise ships and appurtenant waterfront/harbor developments, where exceptionally and strong waves can cripple crucial transportation vectors. The following table shows the percentage of residential and commercial buildings impacted by the tsunami hazard. Due to the location of many buildings on higher land away from the water, total percent of buildings impacted by a tsunami is relatively low. However,

buildings that are within an anticipated tsunami zone have a very high vulnerability to the hazard. On St. Thomas, an estimated 18% of residential buildings and 33% of commercial buildings are exposed to tsunamis. On St. Croix, this figure is 11% and 5% respectively and on St. John this figure is 13% for both residential and commercial buildings.

For the purposes of this MNA, the 2019 THMP is utilized to provide an analysis of vulnerability related to tsunami events. This provides an indication of the magnitude of potential damages developed from the risk analysis in the THMP as aligned with the previously available data and provided in the tables below. Current information from NOAA 2018 will be beneficial to the latest update of the THMP to represent potential risk associated with this hazard in even greater detail.

Table 26. Building Exposure to Tsunamis

Island	Type	Percent of Total Buildings in Category Exposed	Exposed Buildings Impact		
			High	Moderate	Low
St. Croix	Commercial	5%	100%	0%	0%
	Residential	11%	100%	0%	0%
St. John	Commercial	13%	100%	0%	0%
	Residential	13%	100%	0%	0%
St. Thomas	Commercial	33%	100%	0%	0%
	Residential	18%	100%	0%	0%

Source: 2019 Territorial Hazard Mitigation Plan

Tsunamis pose significant threats to lifeline facilities, with many identified lifeline facilities in the islands experiencing very high vulnerability to tsunami hazards. Across the Islands, ports are the most vulnerable transportation lifeline, nearly all of which have a high consequence classification for exposure. On St. Thomas, nearly half of Safety and Security lifelines have high consequence classifications for tsunamis.

Table 27. Lifeline Exposure to Tsunamis

Island/Lifeline	High	Moderate	Low
St. Croix	**8**	**0**	**60**
Energy	0	0	1
Food, Water, Shelter	1	0	33
Health and Medical	1	0	3
Safety and Security	1	0	22
Transportation	5	0	1
St. John	**7**	**0**	**11**
Energy	1	0	0
Food, Water, Shelter	3	0	3
Health and Medical	0	0	3
Safety and Security	2	0	5
Transportation	1	0	0
St. Thomas	**15**	**0**	**27**
Energy	1	0	0
Food, Water, Shelter	0	0	9
Health and Medical	1	0	5
Safety and Security	10	0	11
Transportation	3	0	2

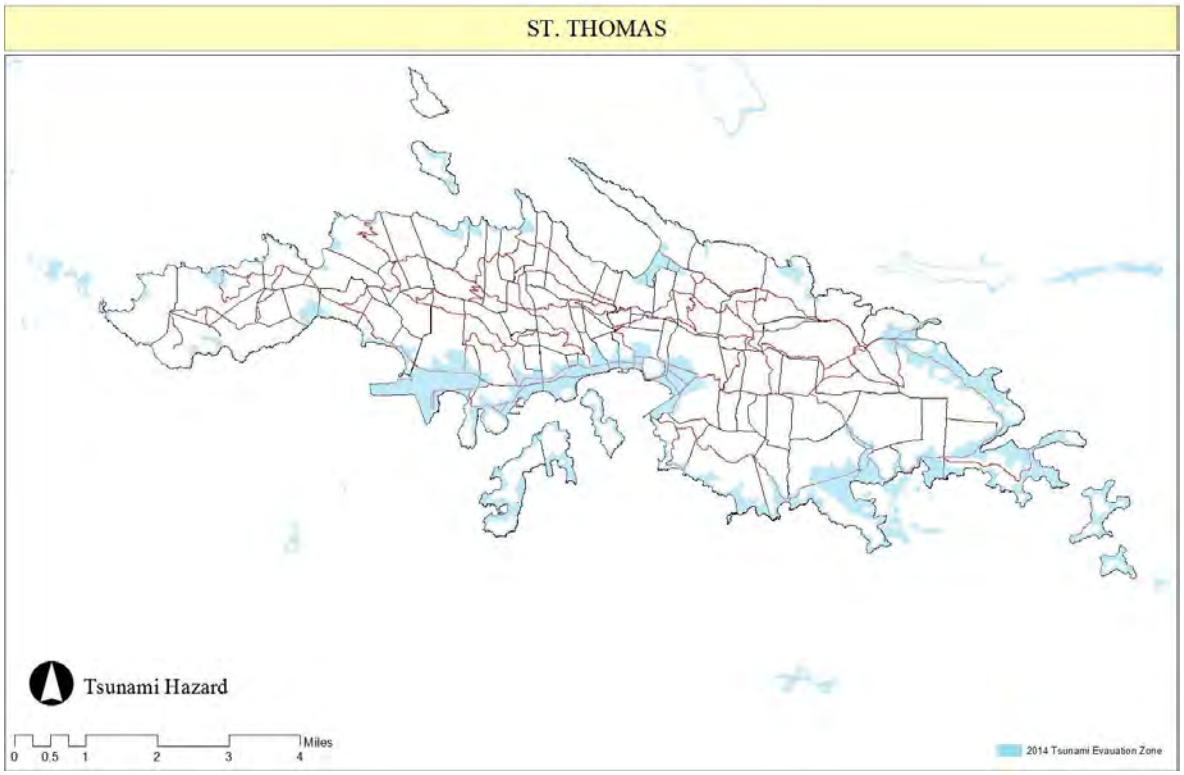
Source: 2019 Territorial Hazard Mitigation Plan

Table 28. Consequence Classification for Lifelines Impacted by Tsunami

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	Moderate Impact	High Impact	High Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	High Impact	High Impact	High Impact
Safety and Security	High Impact	High Impact	High Impact
Transportation	High Impact	High Impact	High Impact

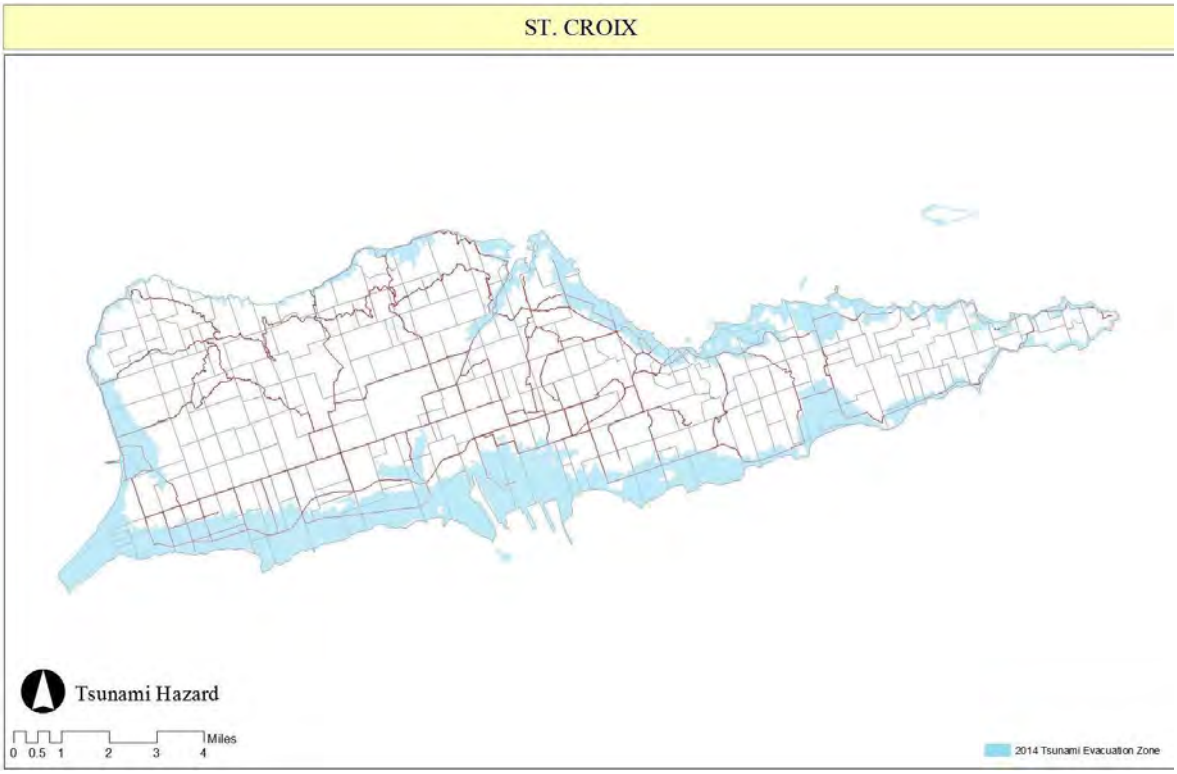
The following maps show tsunami-vulnerable areas on the three islands. The tsunami-impacted zone extends farther inland than the Coastal Flooding does, impacting a higher percentage of both buildings and lifeline facilities.

Figure 45. Extent of Tsunami Hazard for St. Thomas



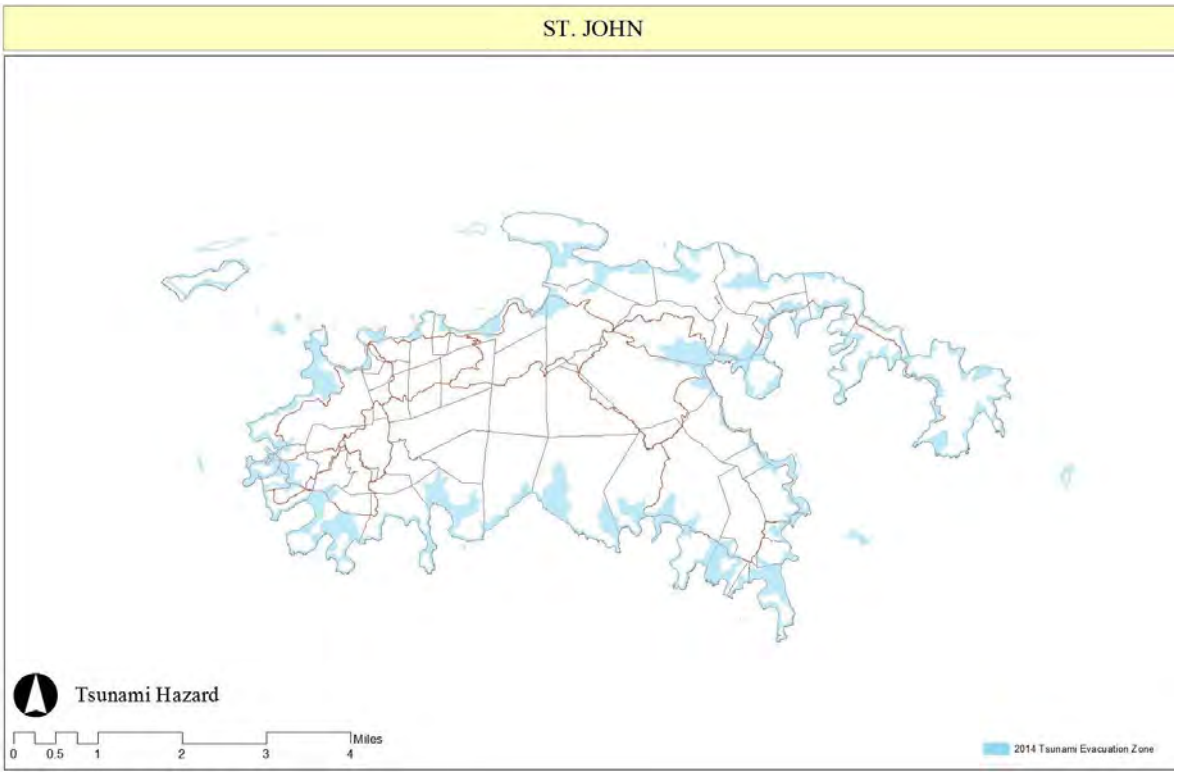
Source: 2019 Territorial Hazard Mitigation Plan

Figure 46. Extent of Tsunami Hazard for St. Croix



Source: 2019 Territorial Hazard Mitigation Plan

Figure 47. Extent of Tsunami Hazard for St. John



Source: 2019 Territorial Hazard Mitigation Plan

1.9.7 Wildfire

The dense vegetation and sprawling nature of development in the US Virgin Islands contributes to a significant wildfire risk in the communities. According to the 2019 THMP, the Islands have a mixed wildland/urban interface. Fire risk is compounded by this interface along with steep and narrow roadways on St. John and St. Thomas that make access difficult. On St. Croix, development alongside grasslands and scrublands along with trash and land-clearance fires create considerable risk. Between 2000 and 2010, all recorded wildfires on the Islands have occurred on St. Croix. The 2019 THMP estimates that the Islands can expect at least one wildfire per year. Data cited by the THMP points to warmer average temperatures (particularly in the dry months of the year) due to climate change. These changes are expected to exacerbate wildfire risk.

Wildfire risk impacts a significant percentage of residential and commercial properties across the Islands. On St. Thomas, vulnerabilities are present for 42% of residential properties and 35% of commercial properties. St. Croix's vulnerabilities are 47% and 27%, respectively. Vulnerabilities on St. John include 38% of residential properties and 44% of commercial properties.

Table 29. Building Exposure to Wildfire

Island	Type	Percent of Total Buildings in Category Exposed	Exposed Buildings Impact		
			High	Moderate	Low
St. Croix	Commercial	27%	0%	0%	100%
	Residential	47%	46%	26%	27%
St. John	Commercial	44%	0%	0%	100%
	Residential	38%	38%	18%	44%
St. Thomas	Commercial	35%	0%	0%	100%
	Residential	42%	43%	22%	35%

Source: 2019 Territorial Hazard Mitigation Plan

Table 30. Consequence Classification for Lifelines Impacted by Wildfire

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Moderate Impact
Food, Water, Shelter	Moderate Impact	Moderate Impact	Moderate Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	Moderate Impact	Low Impact	Low Impact
Safety and Security	Moderate Impact	Moderate Impact	Moderate Impact
Transportation	Low Impact	Low Impact	Low Impact

The following table describes wildfire exposure to lifelines in the US Virgin Islands. On St. Croix, Transportation and Energy lifelines have low exposure, whereas more than half of Food, Water, Shelter and Safety and Security lifelines have moderate or high exposure. On St. John, most Safety and Security and Food, Water, Shelter lifelines have high exposure. On St. Thomas, most lifelines have low or moderate exposure whereas the vast majority of Safety and Security lifelines are exposed.

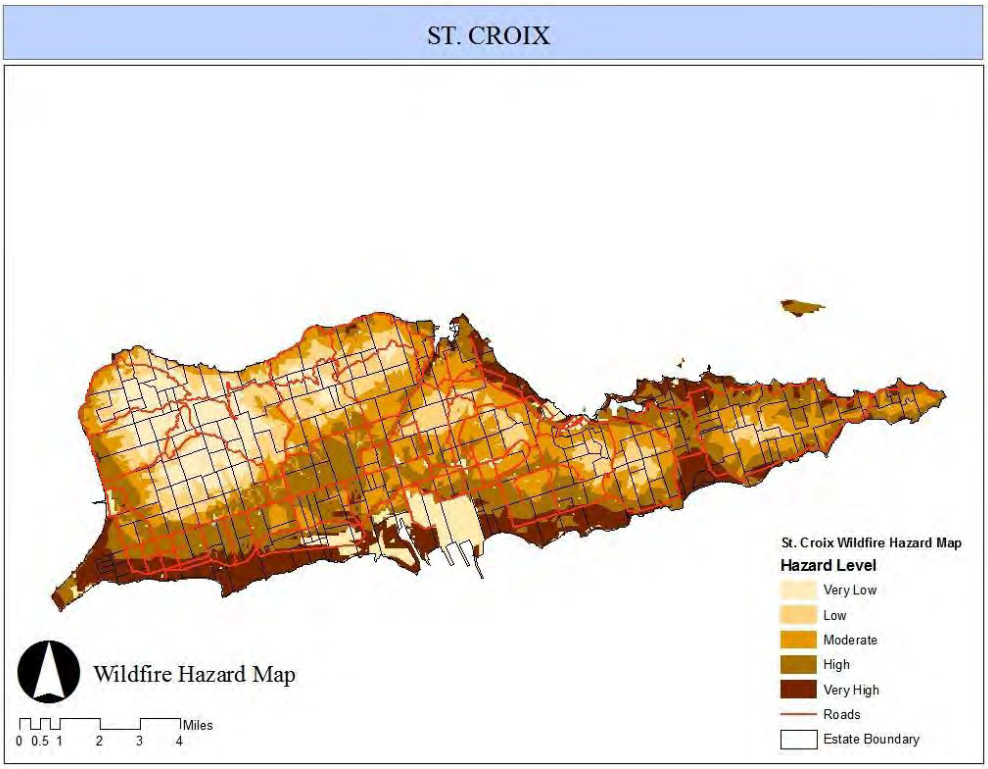
Table 31. Lifeline Exposure to Wildfire

Island/Lifeline	High	Moderate	Low
St. Croix	**30**	**12**	**45**
Energy	0	0	1
Food, Water, Shelter	19	9	25
Health and Medical	1	1	2
Safety and Security	10	2	11
Transportation	0	0	6
St. John	**13**	**0**	**7**
Energy	1	0	0
Food, Water, Shelter	6	0	3
Health and Medical	0	0	2
Safety and Security	6	0	1
Transportation	0	0	1
St. Thomas	**25**	**6**	**18**
Energy	0	0	1
Food, Water, Shelter	1	3	8
Health and Medical	1	0	6
Safety and Security	18	3	3
Transportation	5	0	0

Source: 2019 Territorial Hazard Mitigation Plan

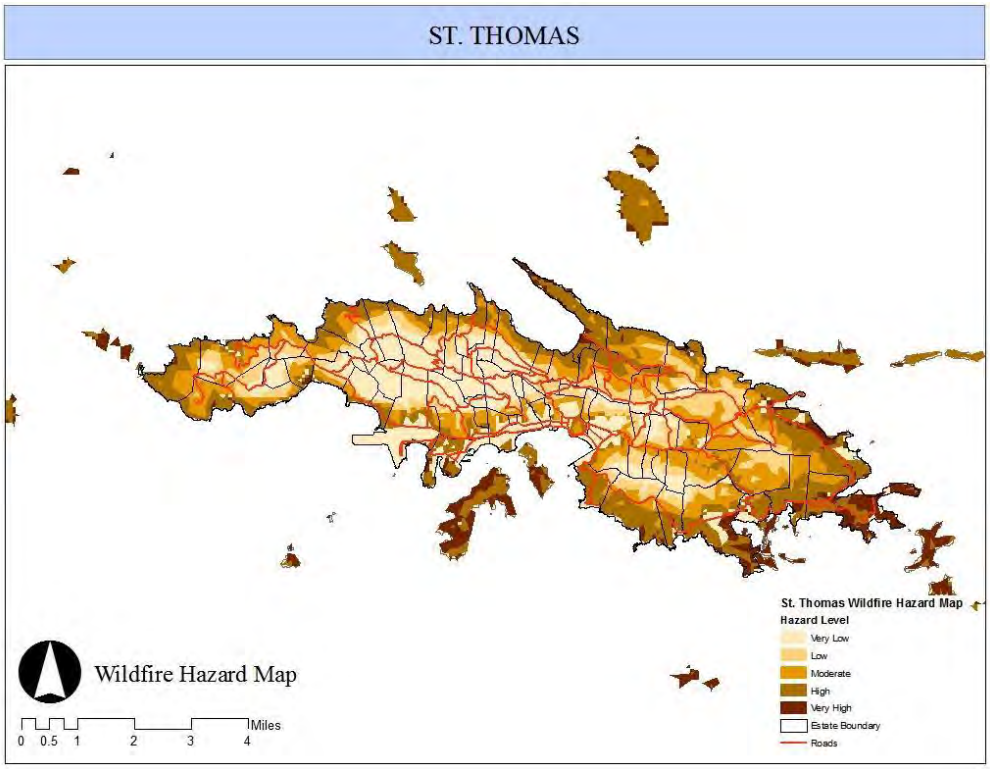
The following map shows wildfire-vulnerable areas on the three islands. Wildfire risk is relatively low in most of St. John and St. Thomas. Areas with higher vulnerability are found closer to the coastline. Acute areas of higher vulnerability are found in the southern section of St. Croix and the East End of St. John.

Figure 48. Extent of Wildfire Hazards in St. Croix



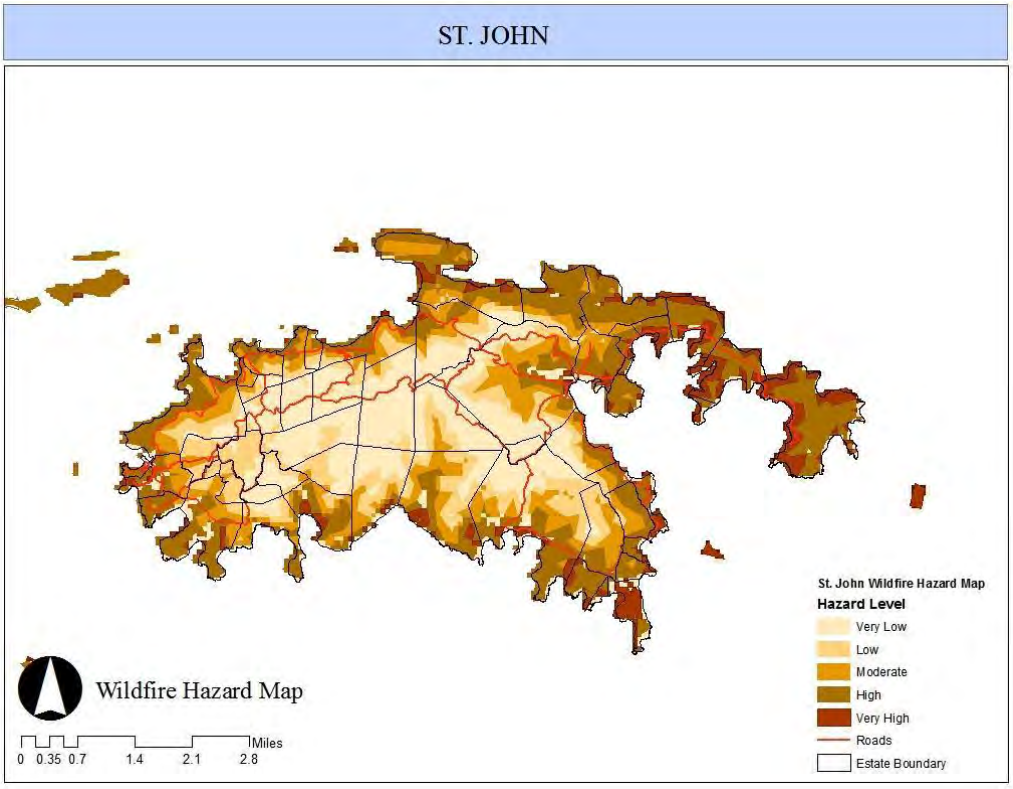
Source: 2019 Territorial Hazard Mitigation Plan

Figure 49. Extent of Wildfire Hazards in St. Thomas



Source: 2019 Territorial Hazard Mitigation Plan

Figure 50. Extent of Wildfire Hazards in St. Thomas



Source: 2019 Territorial Hazard Mitigation Plan

1.9.8 Disease Outbreak/Pandemic

An outbreak or an epidemic occurs when new cases of a certain disease substantially exceed what is expected. An epidemic may be restricted to one locale. When occurring globally, it is referred to as a pandemic. Pandemic is defined as a disease occurring over a wide geographic area and affecting a high proportion of the population. A pandemic can cause sudden, pervasive illness in all age groups on a local or global scale. A pandemic is a novel virus to which humans have no natural immunity that spreads from person-to-person. A pandemic will cause both widespread and sustained effects and is likely to stress the resources of the territorial and federal government (New Jersey Office of Emergency Management, 2019).

As an island territory with substantial tourist visitation and limited medical resources, disease outbreaks present a significant hazard for the US Virgin Islands. The hazard was not included in the 2019 Territorial HMP (THMP). However, the Islands' vulnerability was exposed during the 2020 COVID-19 pandemic.

Prior to COVID-19, isolated incidents of disease outbreak have occurred recently in the Territory. In June 2005, an outbreak of dengue virus was detected which resulted in 331 suspected cases, of which 54% resulted in hospitalizations (Mohammed, Ramos, Armstrong, & Muñoz-Jordán, 2010). In April 2012, an outbreak of acute gastroenteritis occurred sickened 51 guests and 38 employees of a hotel in St. Thomas (Leshem, et al., 2016). More recent disease outbreak control efforts in the Territory have focused on prevention of dengue and mosquito-borne illnesses (The St. John Source, 2020). Prior to 2020, the Virgin Islands had not experienced a dengue outbreak since 2012. Currently, the Centers for disease Control recognizes three non-vaccine-preventable diseases in the Territory that can be encountered, including African tick-bite fever, dengue, and zika (Centers for Disease Control and Prevention, 2021).

The table below shows the number of cases reported in the Islands in the USVI Department of Health – Epidemiology Division's 2014-2018 Report. In 2014, the USVI began to implement a National Electronics Disease Surveillance System. Of the diseases for which data were collected, Staphylococcal aureus (commonly known as a Staph infection), represented many of the reported cases, followed by influenza.

Table 32: Infectious Diseases in the US Virgin Islands, 2014-2018

Foodborne Diseases	**68**	**General Communicable Diseases**	**485**
Cryptosporidiosis	1	Staphylococcal aureus	477
Giardiasis	15	Enterococcus	6
Salmonellosis	45	Legionellosis	2
Shigellosis	4		
Staphylococcal enterotoxin	3	**Influenza**	**182**
		Influenza outbreak	6
Hepatitis	**80**	Influenza	175
Hep A- Acute	3	Novel Type A	1
Hep B- Prenatal	2		
Hep B- Acute	4	**Vectorborne and Environmental Diseases**	**22**
Hep C- Acute	2	Dengue	8
Hep B- Chronic	26	Leptospirosis	3
Hep C- Chronic	43	Lyme Disease	1
		Malaria	5
		Melioidosis	3
		West Nile	1
		Zika	1

The US Virgins Islands has been profoundly affected by novel coronavirus (COVID-19). COVID-19 is an infectious disease first identified in 2019. The virus rapidly spread into a global pandemic by spring of 2020. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (World Health Organization, 2021). With the virus being relatively new, information regarding transmission and symptoms of the virus is still new. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Reported symptoms include trouble breathing, persistent pain or pressure in the chest, new confusion or inability to arouse, and bluish lips or face. Symptoms may appear 2-14 days after exposure to the virus (based on the incubation period of MERS-CoV viruses) (Centers for Disease Control and Prevention, 2021).

In an effort to slow the spread of the virus, the federal government and states have urged the public to avoid touching of the face, properly wash hands often, and use various social distancing measures. On March 23rd, the Governor of the USVI issued a "stay-at-home" order for all non-essential businesses (Government of the United States Virgin Islands, 2021). In mid-March 2020, the Territory's first COVID-19 case was reported, with the number of cases growing gradually through June 2020. By July 1st, 2020, 90 cases of COVID-19 were reported in the Territory following the reopening of Territory's tourism industry (Giles & Rodriguez, 2020). However, by the end of July more than 400 cases would be reported. As of September 2020, the number of cases has continued to increase, though at a slower rate than what was seen in July and August 2020 (Johns Hopkins University & Medicine, 2021). At the time of this plan update, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments (World Health Organization, 2021).

As of September 21, 2020, the US Virgin Islands are on travel notice Level 3 – the CDC's highest – which recommends travelers avoid all nonessential travel to the US Virgin Islands (Centers for Disease Control and Prevention, 2021). The impact of COVID-19 upon the Territory is exacerbated by pre-existing health disparities experienced on the Island, as well as pressing health needs that were worsened by the 2017 hurricanes (Artiga, Hall, Rudowitz, & Lyons, 2018).

Table 33: COVID-19 Confirmed Cases and Deaths as of 9/9/21

Status	Count
Positive/Confirmed Infections (Cumulative)	3652
Active Cases	120
Recovered	3504

Source: USVI Department of Health - Health Data (vi.gov)

Lifelines will face considerable impacts due to disease outbreaks and pandemics, though the extent will vary based on the severity of the disease outbreak and the types of measures taken to prevent disease spread and respond to the disease. Communications, energy, and hazardous materials lifelines are anticipated to have low consequence impacts from the hazard owing to the types of operations present at those lifelines. Food, water, shelter lifelines are expected to be impacted due to disruptions to food supply chains as well as impacts to congregate/sheltering facilities and higher-density housing. Health and medical lifelines (present on each of the three largest islands) are expected to have high impacts owing to the need to treat patients and the potential for the lifelines to be overwhelmed during a large-scale event. Safety and Security and Transportation lifelines are expected to experience moderate impacts due to disruption of government services, and additional constraints or stressors placed on Transportation lifelines from transporting or evacuating disease casualties, importing supplies, and serving as a vector of disease.

Table 34: Consequence Classification for Lifelines Impacted by Pandemic

Lifeline	Consequence Classification St. Croix	Consequence Classification St. John	Consequence Classification St. Thomas
Communications	Low Impact	Low Impact	Low Impact
Energy	Low Impact	Low Impact	Low Impact
Food, Water, Shelter	Moderate Impact	Moderate Impact	Moderate Impact
Hazardous Material	Low Impact	Low Impact	Low Impact
Health and Medical	High Impact	High Impact	High Impact
Safety and Security	Moderate Impact	Moderate Impact	Moderate Impact
Transportation	Moderate Impact	Moderate Impact	Moderate Impact

Based on the data examined in this Mitigation Needs Assessment, the disease outbreak hazard has been identified as a hazard of concern for the US Virgin Islands. This assessment is due to the exceptional impacts that COVID-19 has had upon the Territory, the residents, and the economy. While the ongoing impact of COVID-19 continues to develop, its impact on the Territory cannot be overstated and must be a factor for consideration within the MNA.

1.10 Unmet Mitigation Needs

In order to address the unmet mitigation needs specified in this MIT-AP, CDBG-MIT funds will be allocated as described in Table 1: CDBG-MIT Allocations. Use of the one-time CDBG-MIT grant moneys will be used to fundamentally change resilience preparedness in the Territory, focusing on mitigation activities that will result in reduced need for recovery and mitigation resources in the future. The Territory recognizes that the perpetual cycle of disaster and recovery is not model that is socially, economically, environmentally, or fiscally sustainable, so activities and projects will be selected based on fact-based analysis and careful review toward increasing resilience in the Territory.

1.11 Risk Assessment Summary

The 2019 THMP assessed potential losses to residential and commercial buildings as well as lifelines. The THMP additionally identified social impacts to vulnerable populations. In the 2019 THMP, vulnerable populations included residents under the age of 18 and over the age of 65 at the time of the 2010 Census. The following tables display the vulnerabilities for each hazard. The Islands younger residents are proportionately more exposed to droughts, earthquakes, wildfires, and hurricane winds. On St. John there is a significant exposure to rain-induced landslides for younger residents.

Table 35. Social Impact for St. Thomas Hazards

Hazard	Residents <18 years	%	Residents >65	%
Coastal Flooding	1,128	2%	23	0.04%
Drought	8,271	15%	2,037	4%
Earthquake	8,461	15%	1,692	3%
Riverine Flooding	4,512	8%	1,128	2%
Hurricane Winds	14,101	25%	2,820	5%
Rain-Induced Landslide	3,462	6%	853	2%
Tsunami	2,440	5%	919	2%
Wildfire	7,111	13%	1,752	3.11%

Table 36. Social Impact for St. John Hazards

Hazard	Residents <18 years	%	Residents >65	%
Coastal Flooding	89	2%	2	0.04%
Drought	925	21%	228	5%
Earthquake	623	14%	178	4%
Riverine Flooding	267	6%	44	1%
Hurricane Winds	1,067	24%	267	6%
Rain-Induced Landslide	1,516	34%	146	3%
Tsunami	141	3%	71	2%
Wildfire	421	9%	104	2.33%

Table 37. Social Impact for St. Croix Hazards

Hazard	Residents <18 years	%	Residents >65	%
Coastal Flooding	1,128	2%	23	0.04%
Drought	8,271	15%	2,037	4%
Earthquake	8,461	15%	1,692	3%
Riverine Flooding	4,512	8%	1,128	2%
Hurricane Winds	14,101	25%	2,820	5%
Rain-Induced Landslide	3,462	6%	853	2%
Tsunami	2,758	5%	919	2%
Wildfire	7,111	13%	1,752	3.11%

The table below displays overall losses for critical facilities/lifelines, residential properties, and commercial properties for the hazard of concern and return period. St. Thomas and St. John experience a higher volume of losses owing to the density of development. In terms of total losses, earthquakes and hurricane winds have the potential to generate the highest losses in the Territory. However, the return period for an earthquake is considerably longer than that of other hazards. Tsunami events have a similar capability to generate significant losses for all facility types, though like earthquakes the return period is longer than it is for other hazards. Owing to the Islands' development patterns, there is considerably higher absolute exposure to residential properties than there is to commercial properties.

Table 38. Island Loss Calculations

Hazard	Return Period (Years)	Critical Facility Losses	Residential Losses	Commercial Losses	Total Loss	Loss/Year
St. Thomas						
Drought	100	N/A	N/A	N/A	$1,058,990	$10,590
Earthquake	1000	$442,013,206	$4,641,269,145	$1,384,710,463	$6,467,992,814	$6,467,993
Riverine Flooding	100	$223,420,272	$752,430,862	$292,639,745	$1,268,490,879	$12,684,909
Coastal Flooding	120	$56,868,971	$115,105,946	$56,606,106	$228,581,024	$1,904,842
Hurricane	50	$314,644,509	$3,097,521,815	$571,109,732	$3,983,276,056	$79,665,521
Rain-Induced Landslide	50	$23,153,076	$76,647,667	$ -	$99,800,743	$1,996,015
Tsunami	500	$295,629,176	$808,769,974	$402,633,004	$1,507,032,154	$3,014,064
Wildfire	10	N/A	N/A	N/A	$571,815	$57,181
St. Croix						
Drought	100	N/A	N/A	N/A	$1,058,990	$10,590
Earthquake	1000	$528,799,950	$3,645,930,917	$746,489,600	$4,921,220,467	$4,921,220
Riverine Flooding	100	$61,399,508	$618,081,641	$150,076,139	$829,557,287	$8,295,573
Coastal Flooding	120	$17,245,151	$52,319,194	$26,256,719	$95,821,063	$798,509
Hurricane	50	$409,677,613	$1,508,195,711	$307,082,553	$2,224,955,877	$44,499,118
Rain-Induced Landslide	50	$ -	$ 20,892,953	$ -	$20,892,953	$417,859
Tsunami	500	$198,006,714	$524,598,730	$261,998,197	$984,603,641	$1,969,207
Wildfire	10	N/A	N/A	N/A	$571,815	$57,181
St. John						
Drought	100	N/A	N/A	N/A	$1,058,990	$10,590
Earthquake	1000	$120,120,930	$444,103,045	$88,306,986	$652,530,961	$652,531
Riverine Flooding	100	$58,192,860	$18,067,019	$1,804,774	$78,064,652	$780,647
Coastal Flooding	120	$54,333,776	$25,861,531	$4,738,932	$84,934,239	$707,785
Hurricane	50	$78,957,369	$188,034,154	$30,409,148	$297,400,671	$5,948,013
Rain-Induced Landslide	50	$ -	$21,247,859	$ -	$21,247,859	$424,957
Tsunami	500	$54,368,571	$96,449,264	$18,284,842	$169,102,677	$338,205
Wildfire	10	N/A	N/A	N/A	$571,815	$57,181

The following table shows combined hazard exposure for the three islands. The combined total losses are largest for earthquakes, riverine flooding, hurricanes, and tsunamis overall, but the likelihood of occurrences of earthquakes and tsunamis based on historical data are comparatively low. The data shows that hurricanes and flooding are much more likely to occur with more regularity in the Territory. Consideration of this aspect of the combined loss calculations is reflected in the return periods listed next to each hazard, which are shown in the loss per year. This potential loss per year must be factored into prioritizing the risks to be mitigated within the MIT-AP.

Table 39. Combined Loss Calculations

	Return Period	Critical Facility Losses	Residential Losses	Commercial Losses	Total Loss	Loss/Year
Drought	100	$ -	$ -	$ -	$3,176,969	$31,770
Earthquake	1000	$1,090,934,086	$8,731,303,107	$2,219,507,049	$ 12,041,744,242	$12,041,744
Riverine Flooding	100	$343,012,640	$1,388,579,522	$ 444,520,658	$ 2,176,112,818	$21,761,129
Coastal Flooding	120	$128,447,898	$193,286,671	$87,601,757	$ 409,336,326	$3,411,136
Hurricane	50	$803,279,491	$4,793,751,680	$ 908,601,433	$ 6,505,632,604	$130,112,652
Rain-Induced Landslide	50	$23,153,076	$118,788,479	$ -	$141,941,555	$2,838,831
Tsunami	500	$548,004,461	$1,429,817,968	$682,916,043	$2,660,738,472	$5,321,476
Wildfire	10	N/A	N/A	N/A	$1,715,445	$171,543
Total		**$2,936,831,652**	**$16,655,527,427**	**$4,343,146,940**	**$23,940,398,431**	**$175,690,281**

1.12 CDBG-DR Considerations

The primary focus of CDBG-MIT funding is to enable localities that are vulnerable to natural disasters to take a forward-looking, risk-based approach to implementing projects that are designed to reduce future losses from such disasters. Conversely, CDBG-DR is a responsive funding source intended to repair, restore, and rehabilitate communities after major disasters. For this reason, the required CDBG-MIT risks analysis will utilize similar data, but focus more on long-term priorities to mitigate risks instead of immediate recovery projects, even while making sure that identified CDBG-MIT project plans align with identified FEMA THMP and CDBG-DR plans for the Territory in an effort to ensure that undertaken CDBG-MIT activities effectively compliment projects already contemplated in the Territory.

During program design for CDBG-MIT, it became apparent that lessons learned, and data gathered implementing CDBG-DR programs would be a major consideration for CDBG-MIT programming. In this instance, the unmet housing and public facilities and infrastructure needs for Hurricanes Irma and Maria are major priorities for CDBG-MIT funding.

1.12.1 Analysis of the Mitigation Housing and Public Facilities Needs

Within the MNA outlined above, potential threats and risks have been analyzed with regard to mitigation measures that may reduce potential risk to residents of the Territory. Investment priorities, project selections and proposed programs in this Action Plan align the MNA with selected activities outlined herein. While the CDBG-MIT framework is not ideal to serve every action item, there is significant overlap between territorial priorities, the assessment of the data for community needs, and the CDBG eligible activities.

The programs outlined in this Action Plan were developed to meet CDBG-MIT, federal and Territorial requirements, and to fund activities that will protect against loss of life and property and reduce suffering and hardship attributable to natural disasters. Identified risks in the MNA have been considered along with planning, housing, economic, infrastructure and public facilities needs across the Territory to yield potential projects that will help to make the Territory more resilient in the event of future disasters or other threats to community lifelines.

Housing is a key component to be considered for residents of the Territory, as this is the primary means of shelter for residents when hurricanes and floods occur, with housing a key component for HUD in establishing the Community Development Block Grant program. In the Territory, limited

housing options continues to be a source of concern for many residents, especially those considered LMI. The 2015 Housing Demand Study commissioned by VIHFA determined that there was already a 5,000-unit shortage of affordable housing in the Territory before the dual hurricane disasters in 2017, both for purchase and rent. As shown within that study, the Territory's housing market severely limits options for LMI individuals, as approximately 6% of the homes sold could be designated as affordable for them.

Table 40. Home Sales Data by Type – USVI – April 2015

	St. Croix	St. John	St. Thomas	USVI
Average Sale Price				
Overall	$572,168	$1,984,599	$797,993	$966,826
Single Family	$763,485	$2,190,574	$1,218,199	$1,306,163
Condominiums	$186,236	$560,687	$272,736	$259,766
Median Sale price				
Overall	$259,500	$1,362,500	$798,436	$398,700
Single Family	$394,500	$928,000	$545,000	$647,700
Condominiums	$149,700	$510,000	$236,250	$210,000
Average Days on Market				
Overall	222	219	203	246
Single Family	254	318	207	265
Condominium	159	375	197	202
# of Homes for Sale				
Overall	350	182	279	811
Single Family	234	159	155	548
Condominium	116	23	124	263

Source: Community Research Services, LLC, 2015

Limited homeownership options can be linked to home prices increasing dramatically starting in 2000, a trend that has continued to the present, which means for many residents it is becoming considerably more difficult to obtain housing. As housing assumes an important role in mitigating hurricane and flood risks in particular, looking at housing availability for residents is an important consideration, especially for LMI households that have less income and have fewer housing options. The high cost of development across the Territory has been a primary issue in regard to providing affordable housing. Per unit costs are often as much as three times as compared to continental development. The numbers show that from a supply standpoint, an extremely limited number of homeowner choices are available for low- and moderate-income households on all three islands. While St Croix offers more options, far fewer exist on St. Thomas, and even fewer still on St. John, where affordable homeownership options are essentially nonexistent (Community Research Services, LLC, 2015).

Rental housing options for low- and moderate-income households also have been affected, with limited options available. As noted in the 2015 study, rental rates seem to be continuing to appreciate at a rate well above wage/income growth, resulting in an increase in the level of rent-overburden for low-income renter households, a trend that the 2017 hurricanes only exacerbated as landlords worked to rebuild damaged properties. That same 2015 Housing Demand Study conducted by the Community Research Services, LLC in 2015 showed strong findings of the significant need in the Territory for a myriad of housing, to include the following:

- Affordable rental housing – for households with one income and families across the Territory.
- Affordable homeownership opportunities – to provide a direct and indirect assistance for those families seeking homeownership.
- Supportive Housing – targeted for those that are homeless and/or exhibit various special needs characteristics.
- Senior rental housing – primarily targeted for persons age 65 and older on St. Thomas and St. Croix, with potential options for multi-generational housing, mixed-use development, and mixed- -income housing.

The Housing Needs Study made the following recommendations in 2015 that still represents present reflect the present-day market needs, with development options ranked by priority:

St. Croix:

#1) Homeless/Special Needs

#2) Affordable Senior Rental

#3) Workforce/Affordable Rental

#4) Homeownership

St. Thomas:

#1) Homeless/Special Needs

#2) Workforce/Affordable Rental

#3) Affordable Senior Rental

#4) Homeownership

St. John:

#1) Workforce/Affordable Rental

The condition of the existing housing stock is also a major factor in terms of overall housing need creating an increasing preference for newer and more modern housing options and a greater need for demolition of substandard units. There is a significant percentage of the Territory rental units that are considered substandard is much greater than the national average. The total substandard percentages range from 16 percent to 18 percent. The impact of major storms has only exacerbated the housing need and tighten the rental market. According the 2019 USVI Comprehensive Housing Market Analysis of the overall rental vacancy rate in the Territory was estimated to have fallen by more than one-half since the hurricanes, with rents estimated to have more than doubled for some unit types.

The USVI has historically had one of the highest cost-burden rental population with local residents spending more than 30% of their income on rent far exceeded the rest of the nation, an issue that has been compounded by rapidly rising rents since the hurricanes. The lack of affordable multi-family developments has resulted in many low-income residents being forced to seek market rate units. As of August 2019, Studio units, which rented for $600 a month prior to the hurricanes, are currently estimated to rent for up to $1,000 a month, while rents for one-bedroom units, which previously rented for $1,100 a month, are currently as high as $2,500 a month. Two- and three-bedroom units, which rented for approximately $1,800 and $2,500, currently rent for as much as $3,000 and $6,000 a month, respectively.1.13 Assessing Priorities

In Section 5 of the THMP, the Territory outlines goals aimed at reducing risk. Each major island is assessed by description of the goal to be achieved, the priority of the goal according to risk presented, collaborative partners, and identification of funding sources, among other things. The selection of projects and proposed programs in this Action Plan aligns the MNA with selected projects. While the CDBG-MIT framework is not ideal to serve every action item, there is significant overlap between territory priorities, the assessment of the data for community needs, and the CDBG eligible activities.

Identified mitigation actions to be considered based upon the MNA include:

- Planning activities including studies and other products that can help local communities better understand their risks.
- Engagement with all territorial entities to identify available funding that could be used for mitigation and discuss opportunities to collaborate.
- Housing development to increase the resilience of housing for their residents after disasters
- Infrastructure and public facilities improvements that use mitigation measures
- Economic resilience activities

The VIHFA recognizes that Territorial priorities exist in the THMP which are focused on risks that are unique to the Territory. These specific priorities are considered to be most strongly associated with CDBG-MIT funded interventions and in many instances are complimentary. USVI will continue to look at planned CDBG-MIT projects, to identify connections to those arising from the THMP to ensure alignment of these assessments and initiatives.



2.0 Long-term Planning and Risk Mitigation Assessments

2.0 LONG-TERM PLANNING AND RISK MITIGATION ASSESSMENTS

The Territory commends the various planning organizations for their accomplishments and disaster management efforts prior to the creation of this CDBG-MIT Action Plan (MIT-AP). Organizations and efforts, such as those undertaken by the Virgin Islands Office of Disaster Recovery, the Virgin Islands Territorial Emergency Management Agency, and Department of Planning and Natural Resources represent a few examples of existing efforts that have inspired the content of the present Mitigation Action Plan. The considerable funds made available in the CDBG-MIT allocation provided to the US Virgin Islands provides ample opportunities that require careful consideration as to their best and highest use for long-term planning and risk mitigation considerations.

Given the many fundamental needs within the Territory, the goal for this MIT-AP has been to select clear, actionable mitigation activities that are supported by a data-driven analysis of the corresponding mitigation need. An allocation of funds is available to fund planning events, as well as to fund the CDBG-MIT Action Plan development itself and good community outreach to inform future projects and programs. However, the Territory will revisit planning needs as projects and programs develop to ensure that activities undertaken with CDBG-MIT funds engage local and Federal partners to produce a data-driven, comprehensive analysis of the mitigation approaches funded in this Action Plan. This following Action Plan section reviews the state of broad planning initiatives across the Territory, examining actionable elements that include building codes, land use, and flood risk protection.

Due to the relatively small size and limited resources of the Territory, funding for planning activities has not been widely available in the past. Historically, local and regional planning efforts have been limited. However, approximately $29 mm is being set aside in the MIT-AP for planning efforts to be undertaken by the parties and stakeholders best positioned to do so in the USVI. This represents an unprecedented opportunity for local and regional planning to be undertaken on a scale not previously possible. UVI, VITEMA ODR and other departments of government, academic institutions and non-profits will be enabled to undertake much needed planning efforts to increase resiliency in the Territory.

2.1 Building Code Standards

The US Virgin Islands has adopted and enacted the International Code Council construction standards as its own within the Territory. These include:

- International Building Code (IBC) - Pertains to the construction of commercial and multi dwelling buildings.
- International Residential Code (IRC) – Regulates the construction of single and two-family dwellings.
- International Mechanical Code (IMC) – Establishes standards for electrical, plumbing and air quality systems.
- International Energy Conservation Code (IECC) – Pertains to the standards for energy efficient structure construction

Buildings in the Territory are required to comply with the USVI Building Code, which automatically updates every three years when the International Code Council (ICC) releases its updates, to then be enforced six months later. These codes established by the International Code Council contain specific references to hazard mitigation. Consistently enforcing these construction codes would result in a

significant reduction of property loss, especially from identified mitigation hazards like windstorm and earthquake, as well as fire and flooding.

The USVI Building code is also informed by the "Construction Information for a Stronger Home" guide available through the Department of Planning and Natural Resources (DPNR), which undergoes periodic updates, as needed. Newly constructed buildings and homes or those requiring renovations of over 50 percent of the structure must comply with code updates, and no requirements currently exist for retrofitting structures to meet updated building codes. The requirements are outlined in "Construction Information for a Stronger Home," a document promulgated by the Department of Planning and Natural Resources (DPNR). A complete copy of the most recent version of this guide will be attached to the final action plan as Appendix E.

The Division of Building Permits (DBP) within DPNR oversees both permit issuance and building code development for new and modified buildings. DBP does not perform regular or systematic compliance checks, relying instead on outside engineers to submit their recommendations for design approval and code issues prior to construction. Under the present system, current building codes do not explicitly address floodplain construction requirements, per se. A combination of local floodplain management regulations and building codes determine the requirements that govern construction, which are applied at the building permit stage, as outlined further herein.

2.1.1 Vertical Flood Elevation Protection

The VIHFA requires that new or substantially improved residential structures are elevated two feet or more above the BFE or high-water mark (if outside the floodplain), unless the home is already connected to an existing cistern, as is common with many older homes. For new construction using CDBG-MIT funds, VIHFA will remain consistent with this requirement and depending on the facts of the construction may require additional freeboard or other mitigation techniques to ensure that new construction is sufficiently protected.

2.2 Land Use and Zoning Policies

Land use and zoning practices, including adopting zoning regulation and amending zoning text or maps is a legislative policy choice entrusted to local elected officials. Plans provide a context to consider the long-term impact of individual land use decisions. Planning provides for public participation, coordination of programs and decisions, and the opportunity to set forth the basic policy choices that underlie a rational program of land use regulation.

While contemplated previously, no Territory-wide comprehensive land use and zoning plan is currently in place. A long-range Comprehensive Land and Water Use Plan (CLWUP) had previously been developed to provide guidance on how, when, and where the Virgin Islands were to be developed until the year 2005. That plan projected how the Virgin Islands would look by 2005 and addressed known issues, to include infrastructure deficiencies, lack of affordable housing, and environmental degradation. The Legislature did not adopt the draft plan, and in February 2020 plans emerged for revisiting the CLWUP approach to develop a land-use plan tailored to fit each island district as part of the larger whole, in order to account for variations in geography and land use in St. Thomas, St. John, and St. Croix, which would factor in existing plans for Coastal Zone Management and Land Development Regulations.

2.2.1 Coastal Zone Management

The Federal Coastal Zone Management Act of 1972 included requirements for the States and Territories of the United States to develop a coastal zone management program. The US Virgin Islands Coastal Zone Management Act of 1978 became effective in 1979. The resulting US Virgin Islands Coastal Zone Management Program was prepared by the US Virgin Islands Planning Office (which has since been reorganized as DPNR) and submitted by the Governor to the US Department of Commerce. The Virgin Islands Coastal Zone Management Program, as articulated in Title 12 VIRR, Chapter 21, §901-14, is based on a fundamental desire to preserve a significant environmental resource that benefits the economy and quality of life for the Territory's residents.

DPNR is the central territorial agency administering the Coastal Zone Management program in the US Virgin Islands. Other principal entities include the Office of the Governor, Legislature, the Department of Public Works, and the Board of Land Use Appeals. The Coastal Zone Management Act created a Coastal Zone Management Commission within DPNR. A Division of Coastal Zone Management was also created within DPNR to assist the Commission and the Commissioner in administration and enforcement.

2.2.2 Land Development Regulations

Land development regulations play an essential role in an integrated coordinated mitigation program. By controlling where and how development occurs, major problems can be lessened or avoided. Also, as properties are redeveloped or rebuilt, strong regulations can ensure that the replacement or repaired structures are better able to resist damage from future events.

In the US Virgin Islands, the key elements to land development regulation include the following:

- Zoning;
- Subdivision Regulations;
- Building Codes; and
- Building Permits

US Virgin Islands zoning law is based on VIC Title 29, Chapter 3, Subchapter 1. The code divides all the islands into various land and water-based districts. Applying these key elements functionally prohibits or regulates the development and redevelopment in hazard prone areas. In this way zoning can be an effective means to eliminate or reduce the risk of loss of life and property damage, especially for hazards that have defined geographic extents such as flooding, as identified within the MIT-AP Hazard Mitigation section. Comparing hazard profiling and risk assessment with the existing Zoning District Map helps to identify areas where potential development may be in harm's way. A careful study into updating or revising the current map to provide a better match between the suitability of the land for development and the type and intensity of use proposed would be an excellent use of mitigation planning funds.

Considering a revised Zoning District Map for the Territory that includes substantial reductions in development capacities in hazard prone areas would have immediate results in limiting future losses. Zoning can also be used to reduce density in existing developed areas. By down-zoning (i.e., reducing allowable development densities and intensities), non-conforming uses will be established. Under the current system, these uses will persist until such time as the property owners request permits for substantial changes to the property or until the property is substantially improved or damaged (i.e., at a level greater than 50 percent of its value). In these cases, provisions can then take effect to reduce hazard vulnerability and / or the property would not be redeveloped.

The US Virgin Island Code sets out Zoning and Subdivision Law, describing permitted uses and restrictions assigned to classified Agricultural, Residential, Business, Commercial, Industry, Waterfront, Public, and Special properties within the Virgin Islands Development Code. These zoning laws define acceptable lot uses, sizes, maximum density, height, parking requirements, and setbacks, for example. DPNR is charged with revising the US Virgin Islands zoning regulations and enforcing their use.

DPNR and the Division of Environmental Protection has implemented a regulation requiring all applicants submitting documents and plans for construction or earth change permits, for developments one acre or greater, to submit a storm water prevention plan. Any storm water prevention plan must consider pre-existing hydrology as well as postulate on post construction run-off. The storm water prevention plan must also clearly indicate how mitigation measures will be introduced in the site design. This action has potential to be an effective strategy to ensure that surface run-off does not exceed pre-existing conditions and may assure that future development does not exacerbate flooding in downstream areas.

2.3 Flood Mitigation Efforts

As the CDBG-MIT allocation is directly tied to the impacts of flooding from the 2017 hurricanes, flood mitigation must be a key part of the MIT-AP. The Territory remains committed to ensuring responsible floodplain and wetland management based on the history of flood mitigation efforts and the frequency and intensity of precipitation events.

Coordinating infrastructure and other projects can facilitate design decisions to mitigate potential drainage and water management issues. All programs will incorporate, where applicable, appropriate mitigation measures and floodplain management.

The Territory previously adopted NFIP-compliant floodplain management provisions under Rules and Regulations on Flood Damage Prevention, Title 3. Executive Chapter 22, Department of Planning and Natural Resources, Subchapter 401(b)(15), VIRR in 1993. The Rules and Regulations apply only to the areas defined on the most recent FIRMs as the Special Flood Hazard Areas (SFHA). In these areas, a permit is required for any type of development procedure or change to the floodplain including excavation, dredging, filling, drilling, modification to existing structures and construction of new structures. The Rules and Regulations reference the appropriate provisions of Section 44 of the Code of Federal Regulations (44 CFR) as General Standards, but also add several general and specific standards. The Commissioner of DPNR is appointed to administer and implement the provisions of these regulations and may request the assistance of other departments and agencies to provide technical assistance.

FEMA's HMGP funding anticipates obligating important mapping and hydrologic studies, which will provide up-to-date data and land use recommendations that are critical for roads and power-related projects and can be used as part of efforts to develop a comprehensive land use and zoning plan that is current and based on present observations within the Territory.

2.3.1 Elevation

While the Territory will implement resilient home construction standards, the Territory does not anticipate elevating homes given the cost and structural limitations of cisterns, which are structurally connected to the slab. However, new housing construction within the floodplain will be built in accordance with the existing local building codes. The existing code is consistent with HUD guidance

to ensure all structures, as defined at 44 CFR 59.1, designed principally for residential use and located in the 1 percent annual (or 100-year) floodplain that receive federal assistance for new construction, repair of substantial damage, or substantial improvement, as defined at 24 CFR 55.2(b)(10), must be elevated with the lowest floor, including the basement, at least two to three feet above the 1 percent annual base floodplain elevation as determined by best available data.

Residential structures with no dwelling units and no residents below two feet above the 1 percent annual floodplain, must be elevated or flood-proofed, in accordance with FEMA flood proofing standards at 44 CFR 60.3(c)(3)(ii) or up to at least two feet above the 1 percent annual floodplain. Thus, the Territory has put mechanisms in place to ensure all structures requiring elevation go through an in-depth structural analysis to determine how and whether the rehabilitation or reconstruction is the most cost-effective approach to helping the homeowner. Home elevation is not common in the Territory, as it is not often required due to the mountainous and hilly terrain. Further, a home's cistern is often connected to its foundation and provides some elevation to the home. However, elevation will be done where required by the Territory's building code, which in accordance with 44 CFR 59.1, requires the first floor of structures located in the 1 percent annual (or 100-year) floodplain that receive federal assistance to be at least two to three feet above the 1 percent annual base floodplain elevation as determined by best available data.

Property owners assisted through the recovery program will be required to acquire and maintain flood insurance if their properties are in a FEMA-designated floodplain. This requirement is mandated to protect the safety of residents and their property and the investment of federal dollars. The elevation height of a house can significantly reduce the cost of flood insurance. The Territory will implement procedures and mechanisms to ensure that assisted property owners comply with all flood insurance requirements, including the purchase and notification requirements as a condition of receiving assistance.

2.3.2 Stormwater Management

The Virgin Islands Department of Public Works (DPW) has been actively surveying and assessing the Territory's stormwater management post-hurricanes. For example, they conducted a survey of 160 culverts on St. Croix, as well as some on St. Thomas and St. John. The storm water management system includes ghuts, culverts, concrete swales, low water crossings and curbs. Some ghuts are naturally formed green infrastructure (dry stream beds) and others are concrete lined channels added to facilitate water runoff, often along the side of streets.

In conjunction with these efforts, the Territory continues to work on addressing water/flooding damages to local roadways in FEMA Public Assistance Project Worksheets (PWs) via hazard mitigation. Mitigation measures may include paving a gravel street, building new concrete swales, re-building sections of road as rigid pavement (concrete) instead of the original asphalt design that is easily damaged by water. Conversations moving forward need to include resizing culverts and replacing older ones and adding best use and maintenance of green infrastructure. Some older culverts simply need to be replaced as they have degraded over time to not work well, and large sections of the system need to have previously installed 8" pipes upgraded to larger ones to improve how the system currently functions.

2.3.3 Unified Watershed Assessment and Restoration Priorities

The Department of Planning & Natural Resources (DPNR) for the Territory has developed the Unified Watershed Assessment Report pursuant to the Territory's Clean Water Action Plan, in cooperation with the US Department of Agriculture and its Natural Resources Conservation Service. Undertaking

a cooperative process for restoring and protecting water quality on a watershed basis is a key priority for the Territory. DPNR has identified problem watersheds that have not met or are in danger of not meeting clean water or other natural resource goals. The DPNR assessments utilize existing information and represent a collaborative effort between local government, federal land management agencies, conservation districts and land conservation departments, non-governmental and private organizations, and other stakeholders as well.

The watershed approach and the collaborative model for public and private partnerships would be conducive to much of the work that needs to be done to implement a comprehensive hazard mitigation strategy. However, the implementation of these programs has been stymied by lack of adequate staffing and resources. Enforcement of erosion and sediment control should become priorities for DPNR, particularly as it relates to reducing surface run-off and flood hazard reduction along with water quality protection.

2.3.4 High Wind

In addition to this vertical height requirement, the VIHFA will take into consideration high wind considerations for new or rehabilitated buildings. There are many informational resources available to safeguard against high wind conditions, including *FEMA 543: Risk Management Series Design Guide for Improving Critical Facility Safety from Flooding and High Winds*. FEMA 543 recommends incorporating hazard mitigation measures into all stages and at all levels of critical facility planning and design, for both new construction and the reconstruction and rehabilitation of existing facilities (Federal Emergency Management Agency, 2007). While the guidelines in FEMA 543 are applicable to critical facilities, they may also be applied to new construction of other buildings and infrastructure. In all instances, the VIHFA will defer to engineering and design experts to ensure that high wind hazards are addressed.

2.3.5 Sea Level Rise

In addressing flood mitigation, it is essential to the long-term planning process to also consider the effects of sea level rise on the coastal communities of the State. According to National Oceanic and Atmospheric Administration (NOAA) data, the sea level off of the coast of USVI has risen 11 inches higher than its 1950 level (National Oceanic and Atmospheric Administration).

While the Territory's topography somewhat lessens the future impact, rising sea levels potentially place both private and public waterfront properties at risk of coastal erosion in the future, as well as greater risk of flooding, compounding complications with storm surges when hurricanes threaten the Territory. As a result, FEMA's 100-year floodplain will expand further, putting more homes at risk of flooding during storms and requiring more homeowners to purchase flood insurance (National Oceanic and Atmospheric Administration).

2.4 Local and Regional Planning Coordination

The CDBG-MIT Action Plan (MIT-AP) has been prepared by the Government of the U.S. Virgin Islands in consultation with local territorial government agencies and authorities (and/or their consultants), including the Virgin Islands Housing Authority (VIHA), and community stakeholders. As it is a territory, the U.S. Virgin Islands lacks the state government layer seen elsewhere in the United States. This means that government is conducted without restrictions that arise from state laws and regulations, as well as those that are connected with municipal and county regulations and laws too. As a result,

the USVI Territorial Government uses various autonomous and semi-autonomous agencies/authorities in conducting governmental operations in the Territory.

The U.S. Virgin Islands plans to spend no more than 15% of its total allocation on eligible Planning activities. This includes all Action Plan development activities, which are considered Planning activities. The U.S. Virgin Islands also intends to fund planning-only grants for studies, technical reports, or the like. This may include costs incurred for data gathering, studies, analysis, and preparation of plans. For the purposes of this grant award, the cost of engineering or architectural plans in support of construction activities will be treated as direct project delivery costs. Only the VIHFA and its subrecipients can incur planning costs.

Following the multiple methods CDBG-MIT funding for the Territory will be disbursed, the VIHFA will continue to coordinate with existing planning efforts, including the Governor's Hurricane Recovery and Resilience Taskforce and the planned update of the Hazard Mitigation Plan. FEMA's Hazard Mitigation Grant Program (HMGP) is funding a comprehensive update to the Territorial Hazard Mitigation Plan with 100 percent HMGP funding for an amount around $3 million, with the University of the Virgin Islands (UVI) taking the lead for the technical work on this key endeavor. The current plan was completed in 2014 and expires in 2019. The VIHFA is working closely with VITEMA to stay up to date on related efforts being funded through HMGP, which are also coordinated through the Territory of the Virgin Islands Administrative Plan for the Hazard Mitigation Grant Program.

As part of its coordination efforts, the VIHFA has partnered with VIHA, in consultation with the Government of the Virgin Islands and others, to convene an Urban Land Institute Advisory Panel to provide input on potential redevelopment areas. The panel focuses on ways to support the transformation of St. Croix through the long-term recovery process including economic growth through equitable and entrepreneurially means. The VIEDA Vision 2040 Plan, partially funded with CDBG-DR, functions as a long-term strategic economic recovery and development plan with economic growth, job creation and wealth generation as measurable deliverables, with a focus on improved quality of life for the Territory's residents.

Furthermore, the VIHFA will further develop a protocol for coordination amongst implementing entities and other stakeholders key to fulfilling programmatic goals defined with the Action Plan for the Territory. Working with the Government of the U.S. Virgin Islands and implementing entities to determine what additional planning needs exist and how to best coordinate them for the Territory will result in continuing updates to the unmet needs analysis and program identification interventions to support both short and long-term recovery efforts.

2.5 Flood Insurance Coverage

With respect to flood insurance, CDBG-MIT funded homeowners of a property located in a Special Flood Hazard Area (SFHA) must obtain and maintain flood insurance in the amount and for the duration prescribed in FEMA's National Flood Insurance Program. Section 102(a) of the Flood Disaster Protection Act of 1973 (42 U.S.C. 4012a) mandates the purchase of flood insurance protection for CDBG-MIT (a HUD-assisted property) within a SFHA, when CDBG-MIT is used to finance acquisition or construction, including rehabilitation. The VIHFA will encourage the purchase of flood insurance outside of SFHA's but carrying flood insurance outside of SFHA's is not a requirement.

Section 582 of the National Flood Insurance Reform Act of 1994, as amended, (42 U.S.C. 5154a) prohibits flood disaster assistance in certain circumstances. In general, it provides that no Federal disaster relief assistance made available in a flood disaster area may be used to make a payment

(including any loan assistance payment) to a person for "repair, replacement, or restoration" for damage to any personal, residential, or commercial property if that person at any time has received Federal flood disaster assistance that was conditioned on the person first having obtained flood insurance under applicable Federal law and the person has subsequently failed to obtain and maintain flood insurance as required under applicable Federal law on such property. This means that CDBG-MIT assistance may not be provided for the repair, replacement, or restoration of a property to a person who has failed to meet this requirement.

Section 582 also imposes a responsibility on the VIHFA and its subrecipients to inform property owners receiving assistance that triggers the flood insurance purchase requirement that they have a statutory responsibility to notify any transferee of the requirement to obtain and maintain flood insurance in writing and to maintain such written notification in the documents evidencing the transfer of the property, and that the transferring owner may be liable if he or she fails to do so.

Private rentals, tax credit rentals, and communities are insured with casualty and property policies to protect buildings in the event of a disaster. Insurance for privately owned real estate is only required if properties are mortgaged or their owners have construction loans. In the former case, forced-placed insurance is applied when homeowners do not insure a mortgaged property, and all financed properties must also be assessed for flood insurance requirements (see below). In the latter case, homeowners must purchase builders' risk insurance during construction. Unfortunately, owners who are not required to purchase insurance often do not do so: homeowners insurance premiums in the Territory are high, forcing many USVI homeowners with no mortgage USVI Hurricane Recovery and Resilience Task Force 139 "Housing and Buildings" to underinsure or forgo homeowners insurance entirely.

To ensure homeowners are educated on the risks of remaining uninsured or underinsured, the USVI government issued an emergency order in February 2018 to insurance companies, mandating explanation of the consequences of underinsurance to their policyholders.

2.5.1 National Flood Insurance Program, Floodplain Management, and Building Codes

In the future, as hurricanes become more intense— though not necessarily more frequent—homes and housing properties may face greater damage. For public housing, the aging 40+ year-old buildings in the territorial public housing communities will continue to deteriorate and sustain more damage if the buildings are not improved and mitigated. For private owners, worse storm damage, combined with an increase in storms and flooding, will also lead to stricter requirements and higher property and homeowner's insurance rates, potentially increasing the number of homeowners unable either to get or pay for insurance coverage.

Improved floodplain management, including land use planning, zoning, and enforcement in the Territory can reduce flood related damages for both existing buildings and new development. Taking full advantage of the National Flood Insurance Program (NFIP) is critical to the reduction of future, repetitive flood damage costs to taxpayers.

All developments, regardless of the location, require a permit to include buildings, fill, and any other type development. The Territory has the authority to implement and enforce adopted ordinances related to floodplain management, building code and zoning compliance. The NFIP requires that when the cost of reconstruction, rehabilitation, addition, or other improvements to a building equals or exceeds 50% of the fair market value, then the building must meet the same construction requirements

as a new building. Substantially damaged buildings must be brought up to new construction standards. A residence or building damaged so that the cost of repairs equals or exceeds 50% of the structure's fair market value must also be elevated above the Base Flood Elevation (BFE) in flood zones where BFEs are established. This provision applies to the entire jurisdiction of the Territory.

FEMA's National Flood Insurance Program (NFIP) offers flood insurance to businesses, homeowners, and renters, but the coverage is optional. Homeowners can purchase up to $250,000 in coverage, while businesses can purchase up to $500,000; renters can purchase separate contents protection for coverage. Typically, policies can be purchased through homeowner's insurance agents, as rates do not differ from one company or agent to the next. The amount a policy holder pays is based on various factors, including the year the building was constructed, building occupancy, number of floors, location of its contents, flood risk (flood zone), location of the lowest floor relative to the Base Flood Elevation on the flood map, the deductible amount, and amount of building and contents coverage. Buildings with federally backed mortgages (e.g., through Fannie Mae) are required to get insurance through NFIP if they are in FEMA-determined flood zones.



3.0 Connection of Mitigation Programs to Identified Risks

3.0 CONNECTION OF MITIGATION PROGRAMS TO IDENTIFIED RISKS

The Territory remains committed to advancing mitigation programs and projects that advance long term resilience to current and future hazards. HUD published 84 FR 45838 on August 30, 2019 (CDBG-MIT Main Notice) that outlined the primary rules for grantees administering CDBG-MIT funded projects and programs. The CDBG-MIT Main Notice established the following definition for mitigation:

> **For the purposes of this notice, mitigation activities are defined as those activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters.**

Each mitigation program or project funded through this Action Plan must meet this definition of mitigation to be eligible for funding through the CDBG-MIT program.

Additionally, each proposed mitigation program or project must comply with the following three-pronged test established in the CDBG-MIT Main Notice:

1. It must advance long-term resilience.
2. Align with other planned capital improvements; and
3. Promote community-level and regional planning for current and future disaster recovery efforts and additional mitigation investment.

The VIHFA will incorporate this three-pronged test as a requirement to be met for any projects proposed in procurements issued for CDBG-MIT funding or projects proposed by subrecipients. Additionally, this Action Plan provides approximately $29,000,000 for community and regional level planning which the VIHFA is making available to promote the kind of community and regional planning required above. In the past, the Territorial government has not had the financial resources necessary to engage in many of such planning activities. This relatively massive investment in planning will make such planning efforts possible.

The Mitigation Needs Assessment (MNA) cited the Hazard Ranking from the 2019 Territorial Hazard Mitigation Plan (THMP) (see Table 4 above). Hurricanes and Riverine Flooding were identified as the two top ranked hazards. While earthquakes and tsunamis were ranked third and fourth respectively, the return periods for such hazards are much longer than those for hurricanes and riverine flooding (see Table 27 above).

The projected return periods for Hurricanes is 50 years and riverine flooding is 100 years. In contrast, the return periods for earthquakes are 1,000 years and tsunamis are 500 years. The Combined Loss Calculations in Table 27 take into consideration the relationship between relative frequency and potential losses of likely hazards. This analysis yields a loss/year calculation of $130,112,652.00 for hurricanes, $21,761,129.00 for riverine flooding, $12,041,744.00 for earthquakes and $5,321,476.00 for tsunamis.

To demonstrate the connection between mitigation and identified risks, all proposed projects or programs must fall squarely within the above mitigation definition and meet the three-pronged test outlined above. Furthermore, each program or project selected must be coordinated with and guided by the identification and prioritization of hazards described in the MNA. Examining the combined loss

calculation analysis shows that Hurricane, Riverine Flooding, Earthquake, and Tsunami pose the most significant risks financially overall when factoring in losses to critical facilities, commercial interests, and residential losses.

3.1 Infrastructure & Public Facilities

The U.S. Virgin Islands' reliance on the proper functioning of its infrastructure systems—including energy, transportation, and telecommunications infrastructure—was evident when these systems failed in the aftermath of Hurricanes Irma and Maria. High winds, torrential rainfall, and flooding from both disasters had compounding effects on the infrastructure sectors on each of the U.S. Virgin Islands, leading to widespread and prolonged failures which has delayed economic recovery. High winds toppled above-ground utility lines; storm water runoff flooded roads and induced mudslides; and flooding, wind, and heavy rain severely damaged water and wastewater treatment plants, hospitals, and other buildings that provide critical services. Electrical substations were crippled, causing power failures to 95% of electrical customers. Water pump failures and sewage overflows from storm water surges led to potable water safety precautions such as "boil water" advisories and EPA drinking water assessments. Lacking both a steady power supply and functioning transportation and water infrastructure, many businesses were forced to shut down, some for extended periods. Closure of the ports and airports for more than two weeks, had significant effects on the Territory's connectivity, limiting the pace of voluntary evacuation efforts, delaying the delivery of essential supplies for emergency relief, and causing further disruption to the economy.

The U.S. Virgin Islands' has identified multiple infrastructure priorities that must be addressed, and which directly support housing needs. Residents not only suffered from direct damage to their homes from the hurricanes, but also endured the loss of critical services such as power and water due to damaged public infrastructure. Without water or power, residents were forced to evacuate their homes and seek shelter and emergency assistance. If the Territory's infrastructure is made more resilient, critical services could be stabilized and maintained for residents in the event of a future disaster, creating a safer and more secure environment. Like housing programs, all infrastructure programs will meet a HUD national objective. The most applicable national objective for infrastructure will likely be LMI benefit. A subcategory of LMI benefit is the low- and moderate-income area benefit (LMA). LMA allows activities that benefit all persons in a particular service area to count towards the LMI objective when at least 51% of residents in the service area are classified as LMI. For each activity, the Territory will determine the appropriate service area based on factors including: the nature of the activity; the location of the activity; accessibility issues; the availability of comparable activities; and boundaries for facilities and public services. The Territory will ensure that projects will be appropriately prioritized to provide services to LMI persons and support unmet housing needs.

Program activities will be reviewed to determine URA/104(d) compliance and required actions. The policies and procedures will be further developed in modifications to the existing Residential Anti-displacement and Relocation Assistance Plan (RARAP) and a soon to be developed Optional Relocation Policy. Primary needs for the proper preparedness for, and recovery from, future natural disasters include: (i) comprehensive planning to identify resilience opportunities; (ii) adoption and enforcement of codes to bring critical infrastructure up to industry standards; (iii) holistic mitigation designs to meet future challenges and hazards; and (iv) implementation of innovative technology and other best practices to create a more reliable, sustainable, and cost-effective electric grid.

Infrastructure improvements to the public water system will increase resilience by providing a more plentiful, safe, and stable water system. The current system relies heavily on individual residents capturing rainwater in cisterns. Approximately 25% of the residents are connected to the public water

system and therefore rely on cistern capture for the water needed to sustain life. Frequent “dry spells” and droughts often result in residents having to refill their cisterns with costly water obtained from private tanker trucks which serve as backup when rainwater is not available. Therefore, extending the public water system to more homes will help more USVI families to decrease the risks to health and safety posed by rainfall water shortages.

Infrastructure improvements to the pedestrian and vehicular mobility systems will enable residents to more effectively evacuate as necessary to remove themselves from harm’s way when natural disasters strike. Currently, the street systems for vehicular traffic are generally very narrow with little or no shoulder for emergency stops to enhance driver safety in the event of an accident or mechanical problem. Additionally, the street system experiences significant congestion and traffic delays in the more concentrated areas. The pedestrian mobility system is almost non-existent, except for a few commercial areas predominantly frequented by tourists. The lack of sidewalks, crosswalks, medians and hike and bike trails makes it extremely difficult and dangerous for pedestrians to move safely between residential and commercial centers even when no natural disasters are present. During disasters this danger is exacerbated when floods, storm debris (e.g., vegetative, building, etc.), and other hazards impede vehicular mobility and render pedestrian mobility even less practical and even more dangerous. For low-income residents who do not own cars and for the chronically homeless, the lack of safe alternatives to vehicular mobility is a significant barrier to resilience. Furthermore, the inadequate street system heightens danger to residents in times of crisis.

Improvements to the USVI storm drainage system will significantly decrease danger to residents during hurricanes, and other high rain events that result in riverine and other flooding.

USVI recovery efforts have been supported through the provision of multiple funding sources. Primarily of interest to long-term mitigation are funds received for FEMA Public Assistance (PA), FEMA Individual Assistance (IA), FEMA Hazard Mitigation Grant Program (HMGP), Small Business Administration (SBA) Disaster Loans, Department of Transportation (DOT) funds, and U.S. Army Corps of Engineers (USACE) funds. Currently, a list of ongoing USACE projects does not indicate that there is significant priority overlap with CDBG-MIT activities (United States Army Corps of Engineers). If new USACE projects are introduced, the VIHFA will establish whether they would be a vehicle to leverage CDBG-MIT funds. Given the limited CDBG-MIT funds available, it is difficult to meaningfully interface with the major infrastructure projects that the USACE typically undertakes.

3.2 Housing

Within the Housing programs, the VIHFA will utilize a slate of solutions to address the need for resilient and viable permanent housing solutions. Solutions include mitigation rehabilitation or reconstruction of owner-occupied and rental units; options for first time homebuyers; voluntary acquisition or buyouts of high-risk properties; increased affordability of rental stock; and restoring and making more resilient the inventory of units for particularly vulnerable populations, especially those living in public and supportive housing. Priority will be given to the most vulnerable Virgin Islanders.

3.2.1 New Construction for Homeownership Opportunity and First Time Home Buyer Assistance

To build resiliency, reduce the pressure on the housing stock, and improve the quality of life for residents of the U.S. Virgin Islands funds will be used to provide LMI households the opportunity to purchase a home through direct financial incentives, effectively creating first time home buyers. The program will provide an affordable alternative to renting by creating new homeowner stock; thus, it will

alleviate some of the pressure on the rental market post-storms. Hurricanes Irma and Maria caused significant damage to both owner-occupied and rental stock, depleting the already-limited housing stock, and drove up prices beyond affordable levels. Almost half of all renters in the Territory were cost-burdened paying more than 30% of their income on rent prior to the storms. Due to the limited affordable rental stock, renters are most often paying more than the costs of a mortgage for homes of a similar size.

3.2.2 Public and Affordable Housing Development

The VIHFA will use funding to redevelop and create new affordable rental housing stock including subsidized and mixed income rental units. Eligible development activities include development of low-income and mixed-income units, infill construction of new units, and substantial rehabilitation of vacant commercial or uninhabitable dwellings to bring more mixed-use rental stock online. Funding will be used to incentivize the development of new low-income and mixed-income small and multi-family stock, including project-based subsidized housing. While low-income stock remains an urgent priority, mixed-income stock is also needed on the islands given the unmet need for rental units across the full spectrum of citizens, from low-income individuals typically supported by Low-Income Housing Tax Credit housing, low-income households with incomes that make them ineligible for LIHTC tax credit units (e.g. households with incomes between 60% of AMI and market rate) and tenants that can afford market rate units. This program intends to enable the development of rental housing which prevents concentrations of poverty. The VIHFA uses the HUD-defined fair market rents as a basis to determine affordable rent caps.

For mitigation projects, the VIHFA will foster the creation of Public Private Partnerships (PPP) to leverage available CDBG-MIT funds and focus additional resources on the identified risks. For example, in developing more resilient affordable housing, the VIHFA and the Virgin Islands Housing Authority (VIHA) plan to work cooperatively to form PPPs with Low Income Housing Tax Credit equity investors, commercial lending institutions and private sector nonprofit and for-profit developers. These PPPs will allow the VIHA to comprehensively rehabilitate or reconstruct its portfolio of approximately 3,000 aging and functionally obsolete public housing units.

Many of these units are more than 50 years old and sustained significant damage from Hurricane's Irma and Maria. VIHA's goal is to transform these homes by hardening or replacing them with state-of-the-art hurricane, flood and drought resiliency design features and components. Repairing and hardening existing structures would conserve natural resources and reduce construction and demolition waste by maintaining the available housing stock.

In addition to the pressing need to render VIHA's housing stock safer and more resilient, as explained within the 2015 Housing Demand study prepared for the VIHFA, the Virgin Islands Housing Authority (VIHA) has confirmed that a 5,000 unit shortage of affordable housing in the Territory existed even before the 2017 hurricanes devastated VIHA's existing housing (see VIHA 10-year Action Plan, page 1).

The acute shortage of affordable housing in the Territory has put enormous economic pressure on LMI residents resulting in many Virgin Islanders being housed in substandard or overcrowded conditions or becoming homeless. Therefore, improving and increasing resilient affordable housing will directly address the needs of those most vulnerable to Hurricanes and flooding by providing affordable housing that can safely sustain such disasters and by providing safe shelter to those who are chronically homeless.

3.2.3 Homeless and Supportive Housing

The Territory will continue to prioritize the creation of a Supportive Housing for Vulnerable Populations program which covers eligible costs to rehabilitate or replace damaged residential units for the Territory's most vulnerable populations. CDBG-MIT funds will be allocated for the creation of new temporary and supportive housing, and for the expansion or development of supportive U.S. Virgin Islands' This housing will be available to assist those USVI residents who were homeless before the storms, those who became homeless as a result of the storms and those applicants who are in danger of becoming homeless as a result of job loss in connection with the storm, the requirement to make higher than normal rental housing payments. It will also be developed to assist victims of domestic violence, drug abuse or developmental disabilities and mental illness. The VIHFA will continue to use its emergency housing plan as a guide to prioritize potential projects for populations, including domestic violence, natural disaster victims, catastrophic incident victims, and financial hardship victims.



Pictured: Groundbreaking ceremony for the VIHFA's Wild Pineapple housing development.



4.0 Low- and Moderate-Income Priority

4.0 LOW- AND MODERATE-INCOME PRIORITY

The VIHFA is committed to serving the LMI population of the impacted areas of the Territory. By waiver in the Notice, the requirement to expend 70 percent of CDBG funds on activities that benefit low- and moderate-income persons is replaced by a requirement to expend 50 percent of funds on LMI activities. This waiver does not change the need to prioritize the protection of LMI individuals. The VIHFA has a goal of reaching the traditional 70 percent level of LMI benefit.

Therefore, the affordable housing components of the CDBG-MIT allocation will be at least 70 percent allocated to the benefit of LMI individuals and households. To the extent that it is feasible, buyout and acquisition activities will also prioritize LMI individuals and households – although following HUD guidance on executing buyouts strategically, exceptions may be made as a means of acquiring contiguous parcels. To the maximum extent practicable, the VIHFA will attempt to avoid circumstances in which parcels that could not be acquired through a buyout remain alongside parcels that have been acquired through the grantee's buyout program. This may require executing buyouts that do not serve an LMI individual or household.

4.1 Vulnerable Populations

Of significant concern is housing which typically serves vulnerable populations, including transitional housing, permanent supportive housing, permanent housing serving individuals and families (including subpopulations) that are homeless and at-risk of homelessness, and public housing developments. The VIHFA intends to repair or rehabilitate existing housing and will also create new housing opportunities outside of the floodplain. An analysis of the housing need in these areas will be conducted prior to project approval to ensure that these vulnerable populations are not ignored.

The VIHFA is considering individuals with access and functional needs that will require assistance with accessing and/or receiving CDBG-MIT disaster resources. These individuals may be children, senior citizens, persons with disabilities, from diverse cultures, transportation disadvantaged, homeless, having chronic medical disorders, and/or with limited English speaking, reading, having comprehension capacity, or altogether be non-English speaking.

The VIHFA is taking into account the provision of specialized resources that may include, but are not limited to, public or private social services, transportation accommodations, information, interpreters, translators, I-speak cards, and other services for those persons who may be visually or speech impaired during the Action Plan process free of charge. The VIHFA is taking care to ensure that individuals are able to access disaster recovery resources.

As previously stated in its Hurricanes Irma and Maria CDBG-DR Action Plan, the approach to recovering both homes and neighborhoods after Hurricanes Irma and Maria was to strategically examine where the damage occurred, and then focus its recovery efforts in those areas, paying special attention to the housing types, household types, and special needs of these unique communities. The strategy for mitigation and resiliency is similar in that the VIHFA will approach disaster resilience and climate change adaptation through a cross-sector lens that anticipates how a changing climate, extreme events, ecological degradation, and their cascading effects will impact the needs of the Territory’s vulnerable populations.

4.2 Specific Impact on Vulnerable Populations and Protected Classes

4.2.1 Seniors

According to the 2010 Census, 10% of households in the Virgin Islands are single households comprised of an individual 65 or older. FEMA IA data bolsters this estimate of the elderly population in Territory: as of March 30, 2018, 12% of registered households were individuals 65 or older living alone, and 30% of registered households had at least one individual 65 or older in their household. Based on past experiences from other disasters, the U.S. Virgin Islands recognizes that certain senior households may face special challenges after natural disasters. For example, senior owner-occupied households in the Territory are likely to have larger unmet needs following a disaster as a large proportion has fully paid off their mortgages and thus are not frequent purchasers of home insurance. Hurricanes Irma and Maria have highlighted the need to increase the resilience of seniors' homes and utilities so that vulnerable senior residents can remain housed safely during future severe weather events. Furthermore, there is a need to ensure a safe potable water supply and prevent the loss of power to maintain medicines at correct temperatures. The senior population is expected to grow significantly, intensifying the need for special considerations and accommodations for the aging population.

4.2.2 Special Needs

According to the 2010 U.S. Census, approximately 15% of the population of the U.S. Virgin Islands have disabilities. Hurricanes Irma and Maria had a particularly negative affect on these individuals, who are more likely to have a difficult time navigating assistance programs and finding accommodating housing. Moreover, the storms also inflicted damages on support facilities and impacted service delivery for the special needs' population. For example, VIHFA's Emergency Housing Program provides close to 40 units of temporary housing for victims of domestic violence, natural disaster, catastrophic incidents, and financial hardships across four complexes – three in St. Croix and one in St. Thomas. All four complexes sustained damages as a result of the hurricanes. According to the service providers managing the complexes, residents had to be relocated to other housing. Other residents chose to leave the Territory for the mainland. Estimates of the total amount of damage incurred to the Program's facilities are still being developed. Another example is Lutheran Social Services (LSS), which is the largest provider of housing for adults and children with developmental disabilities and vulnerable seniors with 166 individuals housed in 8 properties. LSS experienced at least some amount of storm-damage to all 8 properties, requiring them to temporarily move some of their vulnerable residents to less damaged units in partially repaired facilities or to place them with local families.

4.2.3 Homelessness

According to a January 2019 study conducted by the Virgin Islands Continuum of Care consortium (CoC), the organization of service providers, advocacy groups and other stakeholder agencies charged with preventing and ending homelessness, there are 314 individuals across the Territory who were homeless. Of that total, 0 were family households, 13 were Veterans, 6 were unaccompanied young adults (aged 18-240), and 105 were individuals experiencing chronic homelessness. The hurricanes had a devastating impact on this population, many of whom were unable to find shelter during the storms. The storms caused severe damage to homeless facilities and providers serving vulnerable populations. According to the Homeless Management Information System (HMIS) maintained by the CoC, there were 14 homeless facilities operating in the Territory as of January 2017, providing a total of 136 beds. As of March 2018, only 11 of these facilities were in operation and offered

only 99 beds. The lack of insurance or sufficient insurance has left several providers without the resources to repair facilities. Furthermore, several shelters are in floodplains, thereby inhibiting their ability to consistently provide assistance.

Facilities are in need of immediate and longer-term assistance to return to the level of repair they were before the storm. Few have been able to repair the structures with their own funds and all need improvements to make them more resilient for future disasters.

Based on emerging contractor estimates of repair costs for existing facilities, the unmet need for the Territory's homeless population is approximately $2 million, including efforts aimed at bringing existing facilities back to pre-storm condition and increasing the resilience of those facilities.

The CDBG-MIT housing programs will coordinate with the CDBG-DR housing programs to prioritize the most vulnerable Virgin Islanders, especially those who remain placed or living in severely damaged homes more than a year after the 2017 hurricanes. The Territory will further prioritize reconstruction for owner-occupied low- and moderate- income households whose homes were either completely destroyed or with major or severe damage with no other resources to complete rehabilitation or reconstruction. The roof repair solution under STEP has drastically reduced the number with unmet needs. Households not eligible for STEP are being evaluated for CDBG-DR funded home rehabilitation or reconstruction.

The proposed housing program will also support the repair and development of affordable rental and public housing as well as sheltering initiatives. The program will support landlords who continue to make repairs or build new rental housing to more quickly repair and expand the availability of affordable rental. Additionally, the Territory will build new affordable housing for eligible owners and renters. The program will case manage disaster-impacted, low- to moderate-income households that may be ready to move up to home ownership or are interested in subsidized and affordable rental housing.

New public housing and affordable rental units, the need for which predates but was exacerbated by the storms, will be built to provide long-term housing for LMI families throughout the U.S. Virgin Islands. Residential units for particularly vulnerable populations—the homeless, disabled, mentally ill, and elderly—will also be prioritized. New housing units funded through this Action Plan will meet the U.S. Virgin Islands' enhanced building codes and HUD's resilience standards, which will reduce the future need for emergency sheltering.

Based on available data, as well as input from relevant Territorial departments, organizations and agencies, the needs of vulnerable populations include:

- Assisting providers of housing for the vulnerable to repair or replace their damaged units;
- Supporting the expansion or new development of units for the vulnerable, especially for the aged and the mentally ill; and
- Enabling providers to support the most vulnerable through provision of services including those for mental health and crisis counseling, legal counseling, and case management, enabling individuals to access the programs they need.

In October 2017, the Governor created an expert advisory committee to help guide short- and long-term recovery efforts for the Territory. This Task Force included representatives from territorial departments and agencies that serve low-income residents, the elderly, children, and persons with physical and developmental disabilities. While these individuals face the most barriers, they may be

the least able to advocate on their own behalf. The involvement of groups and agencies that represent them ensures that these vulnerable individuals and households are not forgotten in the recovery.

The vulnerable population is estimated by the Governor's Recovery and Resilience Task Force to be approximately 63,000 people; 56,500 supported through financial programs, 6,300 elderly, 1,100 children and 400 persons with disabilities (USVI Hurricane Recovery and Resilience Task Force, 2018). This number represents roughly 60% of the Virgin Island's total population (U.S. Census Bureau, n.d.). Through the consultation process and Task Force involvement, the organizations helped to make sure the needs of these populations were recognized and addressed in both the CDBG-DR Action Plan and the CDBG-DR MIT Action Plan.

Funds under the CDBG MIT Plan are allocated among 4 broad categories—infrastructure; economic resilience; housing; and public services. The Virgin Island Housing Finance Authority Analysis of Impediments dated 2006; updated in 2015, and as may be further amended, contains discussion on vulnerable populations, areas of poverty concentration; and steps that VIHFA are already undertaking to insure priority and inclusivity of the protected classes under the Fair Housing Act. We hereby incorporate the AI by reference herein and will continue to roll in other recommendations as the projects are more specifically defined. Thus, the impact that the above-mentioned activities will have on both vulnerable and protected classes, etc. includes, but are not limited to the following:

(1) Creating more resilient units of affordable housing through:
    a. An increase in the number of units of affordable single-family housing
    b. An increase in the number of units of affordable multi-family housing

(2) There will be better access to information for protected and vulnerable populations

(3) Will provide the appropriate number of disabled units in multifamily projects; and more than the minimum, if necessary

(4) Single-family housing for disabled persons will be equipped and made appropriately accessible for their comfortable living and maneuvering

(5) For vulnerable populations, there will be an increased number of resilient transitional housing units and shelters

(6) VIFHA will increase the capacity of system providers and coordination between providers

(7) Work with Public Transportation and the public to ensure that to the greatest extent feasible; public transportation is accessible to persons with disabilities

(8) All public facilities will be accommodated to ensure use by the disabled community

(9) Will seek other ways to work with public and private transportation companies in how to assist this vulnerable community.

The VIHFA is dedicated to ensuring that it reaches its vulnerable populations; providing accessibility and making changes and adjustments to enhance quality of life.

Historically, over 52% of fair housing complaints are filed by persons with special needs or persons with a disability. VIHFA will ensure that this population has easy access to voicing any and all complaints to HUD. VIHFA will also use its own Virgin Island Fair Housing Commission to ensure complaints are being heard; and resolutions are following.

The Fair Housing Act prohibits discrimination because of race, color, national origin, religion, sex, familial status, and disability. We recognize that additional protection under fair housing includes, but is not limited to Title VI of the Civil Rights Act of 1964, Section 109 of the HCD Act of 1974, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1973, American With Disabilities Act of 1990, The Architectural Barriers Act, HUD's Equal Access Rule that specifically includes sexual orientation, etc. The VIHFA is committed to driving an equitable recovery and serving all residents, particularly the most vulnerable in the Territory where the entire territory has been designated as a Most Impacted and Distressed or "MID" area, which means that the great majority of the funding will be spent in LMI. We understand that while income is not a factor in the fair housing statute; the low-income requirement overlays protected classes (see maps below delineating dispersal of LMI populations across the USVI).

Following are minimum actions that the VIHFA will take to ensure that the public is aware of their rights; and that they have convenient and immediate access to filing complaints of discrimination in all areas impacted by the Act.

(1) VIHFA will launch an aggressive Fair Housing Campaign, that educates the public with respect to their rights under the Fair Housing Act, in coordination with the Virgin Islands Housing Authority (VIHA).
(2) VIHFA will make educational materials and information available in prominent public places; to include some of the following: apartment associations, public platforms, radio spots, PSA's, etc.
(3) VIHFA will work with utility companies to place an education pamphlet in the electric bills.
(4) VIHFA will place a Fair Housing PowerPoint presentation on the VIHFA Website.
(5) VIHFA will require training for all employees and recipients of federal funds.
(6) In conjunction with VIHA, establish a Fair Housing Hotline to capture data regarding prevalent issues and the number of protected classes that may be impacted.
(7) Analyze data at the end of each year in order to determine what steps VIHFA will take to ameliorate such barriers.
(8) VIHFA will offer continuing training that will help to overcome lack of affordable housing barriers (credit repair, financial literacy, computer services, etc.) VIHFA already provides such training to the community, adding additional training on Fair Housing.
(9) VIHFA will hold a regular Housing Expo event that brings together governmental agencies, non-profits, for-profits, etc. that covers all things Fair Housing.

Finally, due to the unique demographics and small land areas of the islands, coupled with the fact that approximately 80% of the population in the Territory is African or Hispanic, racially and ethnically concentrated areas as well as concentrated areas of poverty are not segregated as is often the case in the continental United States.

Additionally, there is a lack of data describing and delineating protected classes as opposed to such data which is normally readily available in the continental US. Nevertheless, VIHFA reported in the earlier version of its Analysis of Impediments that Public Housing presents an issue of concentration. The issue is whether or not it is minority concentration, since the island is majority minority. VI will look

at case scenarios around the country that have been previously approved by FHEO, along with the rules, and will work directly with FHEO to resolve any concentration issues.

Figure 51. LMI Household Damage Analysis (St. Croix)

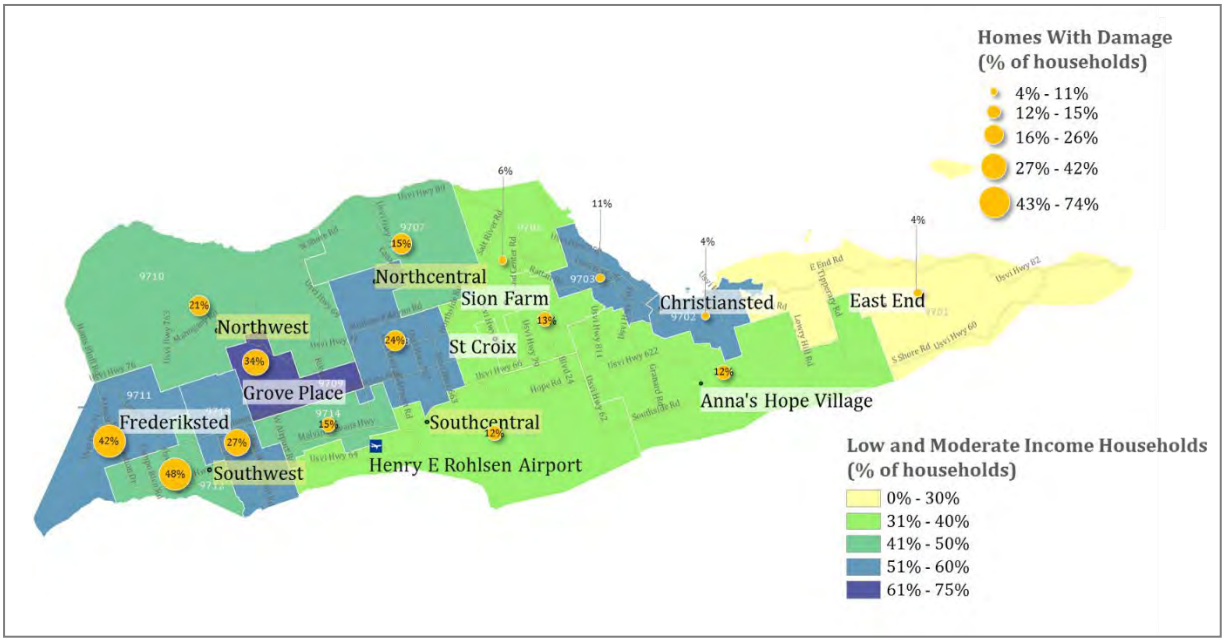
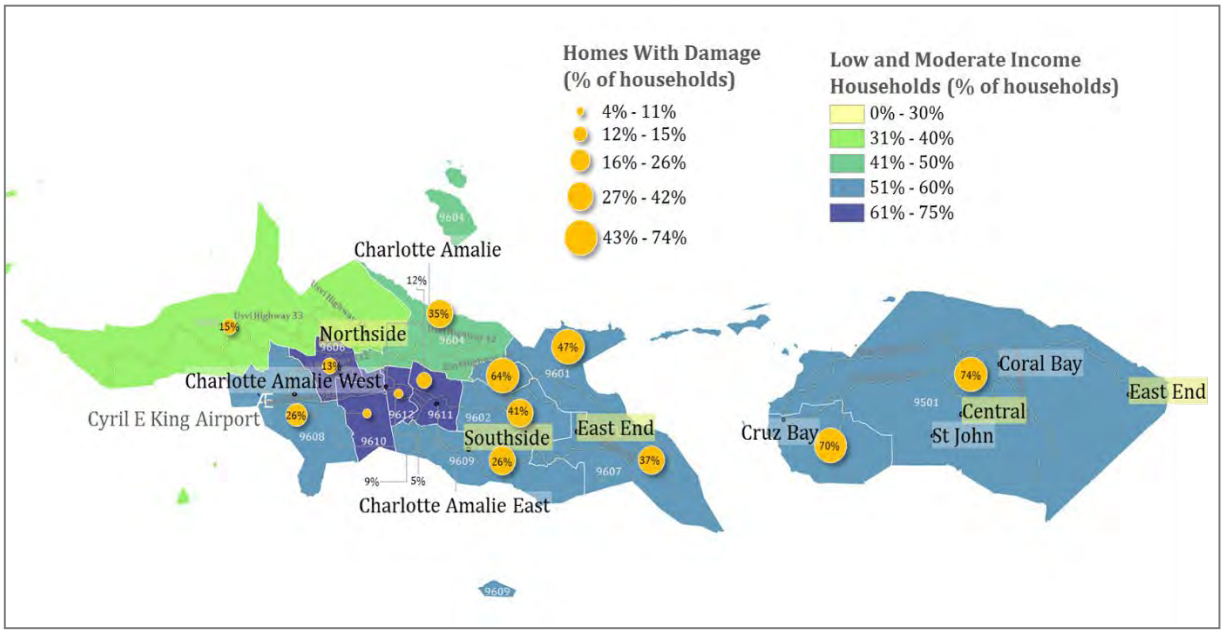


Figure 52. LMI Household Damage Analysis (St. Thomas and St. John)



Advocates of vulnerable populations who may need additional resources to engage with the CDBG-DR-MIT planning process are encouraged to contact the CDBG-DR Program Communication Manager at (340) 772-4432. A list of the vulnerable populations that will continue to be outreached to directly and information about equitable accessibility is available in the VIHFA Citizen Participation Plan which is available in Spanish on the VIHFA Mitigation website (https://cdbgdr.vihfa.gov/programs/cdbg-mitigation/). Citizens are advised on the website to please call (340) 772-4432 or write to cdbgdr@vihfa.gov, for any questions on any accessibility needs.

Physical copies of the proposed Action Plan with a Spanish translation are available at VIHFA and partner government offices and public libraries. A large print version is available online and in print upon request. The website continues to be compatible with Google Translate and screen reader software.

All meeting locations will be ADA-accessible and language (Spanish (required based upon population) and French Creole (by request only) and accessibility services for hearing or sight-impaired available upon request (with 48-hours' notice).

4.2.4 Natural Infrastructure

Beyond the specific methods needed to assess and compare grey (human engineered) infrastructure against natural infrastructure options relative to their utility to mitigate risk, a framework is required that would provide guidance to USVI on how to consider natural infrastructure solutions in its envisioned CDBG-MIT projects. The VIHFA is focused on how municipalities are advancing adaptation to climate change through the management of natural infrastructure assets that provide municipal and ecosystem services. Such focus provides effective solutions for minimizing coastal flooding, erosion, and runoff, as do man-made systems that mimic natural processes – known as natural infrastructure. Across the Territory, aging water infrastructure is creating challenges for water management. Combined sewer systems are pumping toxins into estuaries, bays, lakes, and other water bodies and overflowing during extreme precipitation events into urban and residential areas. At the same time, coastal communities are being heavily damaged from extreme storm events and sea level rise.

Experts agree that natural infrastructure such as healthy wetlands can provide many of the same benefits of traditional man-made infrastructure at a much lower investment and maintenance cost. Natural infrastructure approaches include forest, floodplain and wetland protection, watershed restoration, wetland restoration, permeable pavement, and driveways; green roofs; and natural areas incorporated into city designs, and conservation easements. A natural infrastructure approach represents a successful and cost-efficient way to protect riverine and coastal communities. While there is much to be done in the way of design and restoration in coastal communities, this plan, due the preponderance of MID counties and communities and their locations, will focus on upstream rather than coastal natural infrastructure.

Ordinances and codes are the regulatory mechanisms available to local governments for land use and natural resource management. Though local governments in USVI have no preexisting grants of power, the General Assembly has made both general grants of power to cities and counties and specific grants of power to regulate other activities under certain special circumstances. Cities and counties are generally allowed to "by ordinance define, regulate, prohibit, or abate acts, omissions, or conditions detrimental to the health, safety, or welfare of its citizens and the peace and dignity of the county; and may define and abate nuisances." Other grants of authority are made to address specific issues, including the environmental impacts of development, and are found in other statutes.

Many of the resources discussed here are written as separate ordinances but could also be modified to work in a unified ordinance framework. Some of the ordinances are written as overlay ordinances, which are used to establish additional development requirements in specific areas of a community, such as environmentally sensitive areas. The additional requirements are superimposed over, or "overlay", the base regulations already in place.

4.2 How Programs or Projects Increase Resiliency for Housing Serving Vulnerable Populations

The territory has allocated 25% of its CDBG-MIT which is approximately $192,700,000 towards housing activities that will include but not be limited to new single family and multi-family construction or reconstruction that will serve its vulnerable population. The new and reconstructed housing units will meet additional resiliency and mitigation standards. The USVI will serve as a regional example for more resilient residential construction practices and provide the opportunity to disseminate these practices through the residential construction industry on a scale larger than previously attempted.

Given the increased construction costs of the U.S. Virgin Islands the VIHFA will invest additional CDBG-MIT program funds into the rehabilitation to increase the resiliency of its existing housing inventory, including but not limited to affordable rental housing, transitional housing, public housing, permanent supportive housing and permanent housing serving individuals and families that are homeless or at risk of becoming homeless and new housing developments. All housing construction or rehabilitation will comply with the accessibility requirements under Section 504, the ADA, and the Fair Housing Act, and local building codes.

The USVI programs and projects will serve a two-fold function: (1) provide high quality, durable, sustainable, and mold resistant housing; and (2) demonstrate cost effectiveness of enhanced resiliency features in residential construction on a large scale to protect against the inevitable next storm or flooding event. By building homes to a higher standard than conventional construction practices on the scale proposed through this Action Plan, new housing activities will bring those more resilient building practices into the mainstream where they can scale-up and become cost-competitive with conventional building practices.

To ensure that CDBG MIT activities focus on providing services to the territory's low/moderate vulnerable population, all proposed projects will undergo AFFH review by the VIFHA before approval. Such review will include assessments of (1) a proposed project's area demography, (2) socioeconomic characteristics, (3) housing configuration and needs, (4) educational, transportation, and healthcare opportunities, (5) environmental hazards or concerns, and (6) all other factors material to the AFFH determination. The VIHFA will ensure that projects lessen area racial, ethnic, and low-income concentrations, and/or promote affordable housing in low-poverty, nonminority areas in response to natural hazard-related impacts. This effort will also assist the territory to allocate funding to increase resiliency for housing that serves vulnerable populations, including transitional housing, permanent supportive housing, permanent housing serving individuals and families that are homeless and at-risk of homelessness and public housing developments

The VIHFA will also expand its range of populations under the definition to include socially vulnerable populations to reflect protected classes that are vulnerable to the effects of disasters. The VIHFA will collect data to identify the following in areas vulnerable to damage from disasters: (1) racial and ethnic make-up of population; (2) Limited English proficiency (LEP) populations; (3) number or percentage of persons belonging to other protected classes (race, color, national origin, religion, sex, disability, and familial status); and (4) racially and ethnically concentrated areas and concentrated areas of poverty.

The VIHFA will utilize its planning and administration allocation for the comprehensive review of land use policies, codes, and procedures, including affordable housing siting maps and decisions to protect against segregation and to comply with HUD's site and neighborhood standards.

The VIHFA will also encourage the use of its CDBG-MIT Planning allocation for modifications to USVI planning, zoning and other land use policies, codes, and procedures. The VIFHA will also review projects to ensure against the segregation of persons with disabilities.

The VIHFA will ensure that a key target population for all CDBG-MIT projects and activities are Section 3 residents (public housing residents and low- and very low-income residents who live in areas where Section 3 covered assistance is expended) and businesses. The VIHFA will require all CDBG-MIT funding recipients to have a Section 3 plan to ensure that construction activities (commercial and residential) provide employment, training, contracting, and other economic opportunities to Section 3 residents to the greatest extent feasible.

4.3 Minimizing Displacement

Prior to pursuing each activity, the VIHFA will consider the potential that the activity will trigger relocation or displacement and will explore options to minimize relocation or displacement of persons and entities. In instances in which relocation or displacement is necessary, the VIHFA will take the following steps to mitigate disruption due to relocation and to minimize displacement.

1. Facilitate, to the greatest extent possible, new construction on government-owned, vacant land.
2. Stage rehabilitation of apartment units in a manner such as to allow tenants to remain in the building or complex during and after the rehabilitation – i.e., by working with vacant units first and transferring existing tenants as units are completed.
3. Arrange for facilities to house persons who must be relocated temporarily during rehabilitation.
4. Adopt policies which provide reasonable protections for tenants faced with conversion of their housing to a condominium, cooperative, or single-family ownership, such as working closely with the local PHA to identify alternate housing including provision of Housing Choice Vouchers for those tenants who choose to vacate rather than participate in the conversion initiative.

Permanent relocation is not anticipated under the programs covered in this Action Plan; however, if invoked, temporary relocation and permanent replacement housing payments will be provided in accordance with the Uniform Relocation Act. As temporary relocation will likely be necessary, the VIFHA will develop an Optional Relocation Policy. The policy will include certain provisions for relocation advisory services to persons with disabilities such as facilitating supportive services and also provide for grievance procedures.



5.0 Coordination of Mitigation Projects Leverage

5.0 COORDINATION OF MITIGATION PROJECTS LEVERAGE

The Territory has benefitted from the extensive and fruitful participation in mitigation planning by stakeholders, including VITEMA, Public Works, ODR, DPNR, Waste Management, WAPA as well as with representatives of the major non-profit entities in this community. This communication has enabled the VIHFA to identify key risks and structure activities and programs that will yield projects that will provide optimum resilience against those risks. Additionally, such cooperation has facilitated identification of opportunities to leverage CDBG-MIT funds with other funding from USVI, federal, private nonprofit and for-profit enterprises together with philanthropic sources.

Favorable leverage opportunities will receive greater prioritization for CDBG-MIT funding.

For mitigation projects, the VIHFA will foster the creation of Public Private Partnerships (PPP) to leverage available CDBG-MIT funds and focus additional resources on the identified risks. For example, in developing more resilient affordable housing, VIHFA and the Virgin Islands Housing Authority (VIHA) plan to work cooperatively to form PPPs with Low Income Housing Tax Credit equity investors, commercial lending institutions and private sector nonprofit and for-profit developers. These PPPs will allow the VIHA to comprehensively rehabilitate or reconstruct its portfolio of approximately 3,000 aging and functionally obsolete public housing units.

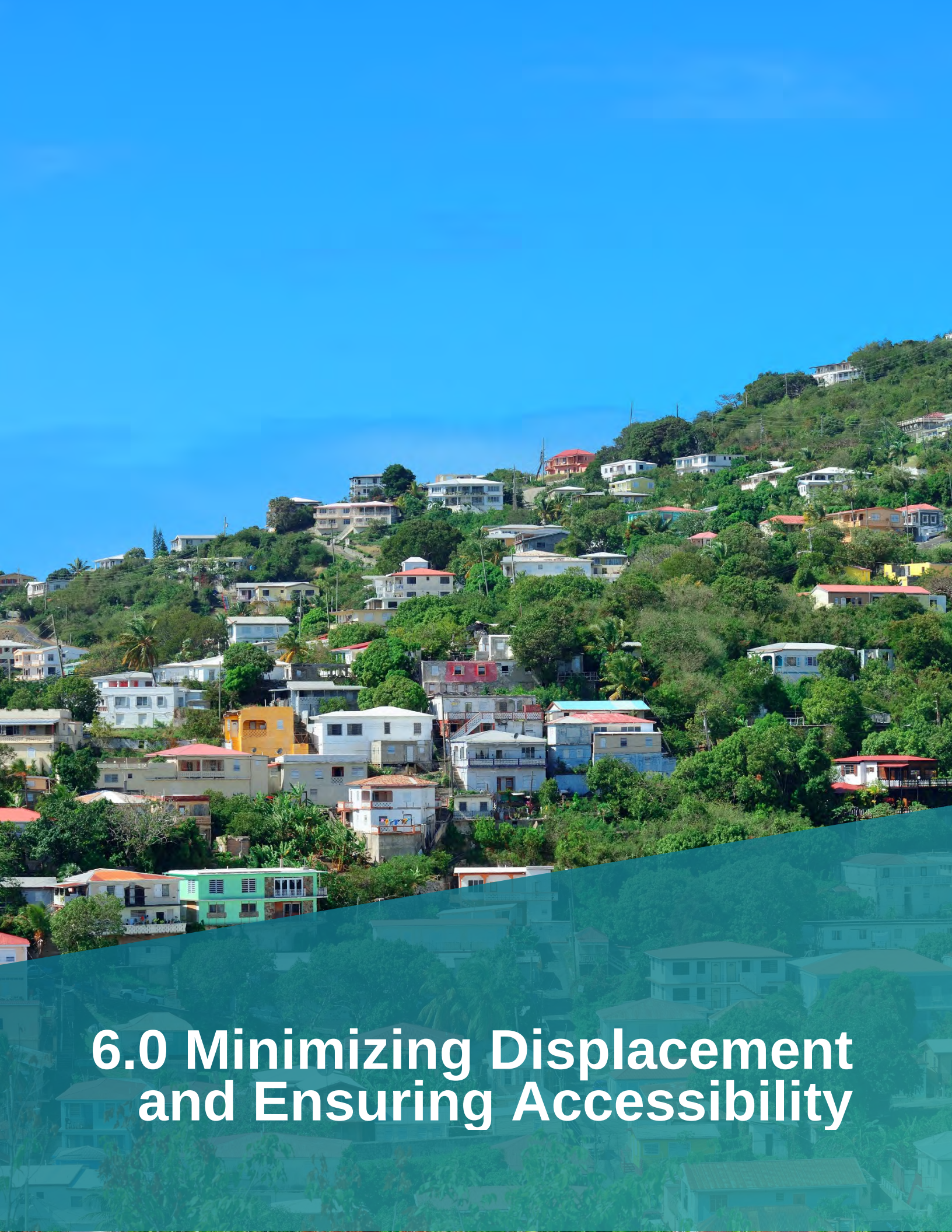
The development of new construction for Homeownership Opportunity and First Time Home Buyer Assistance will also be priority of the CDBG-MIT Funding. CDBG MIT funding will be used to provide to expand existing VIHFA program for LMI households the opportunity to purchase a home through direct financial incentives, effectively creating first time home buyers.

Due to the ongoing need, CDBG-MIT funding will also be leveraged to expand the EnVIsion Tomorrow's Homeowner Rehabilitation and Reconstruction Program. The program will continue eligible costs for the rehabilitation or replacement of damage to real property, replacement of disaster-impacted residential appliances, and environmental health hazard mitigation costs related to the repair of disaster-impacted property. For residences considered substantially damaged, support will be granted for reconstruction or provision of a modular (or manufactured) home in place of their original unit. The Program recognizes the advantages of modular construction, from a cost standpoint, speed of construction and the potential for workforce development as well.

Homeless Initiatives to provide Permanent Supportive Housing for those experiencing chronic homelessness will provide leveraging opportunities through the potential utilization of Low-income Housing Tax Credits, FEMA funding, private debt or equity and other sources.



Pictured: VITEMA Emergency Operation Center on St. John.



6.0 Minimizing Displacement and Ensuring Accessibility

6.0 MINIMIZING DISPLACEMENT AND ENSURING ACCESSIBILITY

The Territory will minimize displacement of persons or entities as a result of the implementation of CDBG-MIT projects by ensuring that all programs are administered in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) of 1970, as amended (49 CFR Part 24) and Section 104(d) of the Housing and Community Development Act of 1974 and the implementing regulations at 24 CFR Part 570.496(a), subject to any waivers or alternative requirements provided by HUD. While nonstructural mitigation (e.g. elevations, buyout and/or acquisition) programs may prove to be necessary to achieve flood risk mitigation goals and may cause displacement in certain rare instances, the majority of the programs detailed in this MIT-AP will be implemented with the goal of minimizing displacement of families from their homes, whether rental or owned. Moreover, in the event displacement does occur, VIHFA will take into consideration the functional needs of the displaced persons in accordance with guidance outlined in Chapter 3 of HUD's Relocation Handbook.

In practice, when a tenant is displaced by a CDBG-MIT activity, relocation case managers are assigned to both owners and tenants work with applicants to coordinate activities and communicate updates in real time concerning when to expect to move out of their residences, assist the displaced individuals with securing temporary housing arrangements, and all other aspects of moving belongings. One of the case manager's primary goals is to minimize the time that the tenant/owner will be impacted by coordinating the construction calendar in real time and during construction, keeping the displaced individual updated on the construction progress and communicating an expected timeline for construction completion and eventual move in.

To ensure accessibility for applicants, VIHFA has adopted a Section 504/Americans with Disabilities Act (ADA) policy which ensures the full right to reasonable accommodations by all program participants. Under this policy, case managers shall assess the specific needs of each program beneficiary and determine if a 504/ADA modification is required based on the family composition members. All public facilities that are federally assisted shall also exceed the minimum threshold for 504/ADA compliance. Multifamily and other housing development programs will also be required to have a certain set-aside of fully compliant 504/ADA units of varying sizes to accommodate eligible applicants. Along with single family programs, the multifamily rental programs will be required to have an architect's/engineer's signature on a form stating that the designed unit meets 504/ADA compliance. Failure to deliver the appropriately constructed ADA/504 compliant unit(s) will result in the construction firm not being paid and in breach of contract until the deficiencies are corrected.



7.0 Allocation and Maximum Award Amounts, Necessary and Reasonable Assistance

7.0 ALLOCATION AND MAXIMUM AWARD AMOUNTS, NECESSARY AND REASONABLE ASSISTANCE

The Virgin Islands Housing Finance Authority (the VIHFA) has established program allocations that consider the risks identified and prioritized in the MNA, data from ongoing CDBG-DR recovery, and the public participation process. In addition, the mitigation activities to be undertaken have been considered in conjunction with potential threats to Community Lifelines. These combined factors were evaluated in determining reasonable and necessary amounts of assistance in different programs to improve the Territory's resilience to future disaster events in the most effective manner possible.

The VIHFA has identified the maximum assistance available for each program (minimum amounts will be identified in program guidelines) and has established priorities for the programs with consideration of the guidelines set forth in the CDBG-MIT Main Notice. Some CDBG-MIT activities align with unmet recovery needs and have functional overlap with CDBG-DR activities. Activities where a CDBG-MIT activity is used in combination with CDBG-DR funds previously allocated will be indicated in project applications submitted to the VIHFA.

All of the Territory's mitigation activities under this grant will meet at least one CDBG-MIT national objective for either (1) benefitting low- to moderate-income persons (LMI), or (2) urgent need mitigation (UNM). At least 50 percent of CDBG-MIT funds will be used to support activities that benefit LMI persons.

- LMI (Low- and moderate-income). Activities which benefit low- and moderate-income individuals, such as providing an area benefit to an LMI area, establishing benefits to limited clientele, housing LMI individuals and households, or job creation or retention. While the VIHFA will strive to attain approximately 70% LMI benefit overall, at least 50% of CDBG-MIT funds must be spent on projects that primarily benefit LMI individuals to comply with HUD rules.
- UNM (Urgent Need Mitigation). Set by HUD in the Notice to allow for certain mitigation activities. To meet the UNM National Objective, the VIHFA must document that the activity addresses the current and future risks as identified in the MNA of most impacted and distressed areas and will result in a measurable and verifiable reduction in the risk of loss of life and property.

Most activities undertaken by the Territory are anticipated to meet the LMI national objective, and if certain projects do not meet this objective, the UNM national objective will be used.

Projects utilizing the CDBG-MIT UNM National Objective must indicate that they meet the following two criteria:

1. Addresses the current and future risks as identified in the grantee's Mitigation Needs Assessment of most impacted and distressed areas; and
2. Will result in a measurable and verifiable reduction in the risk of loss of life and property.

Projects qualifying under the UNM national objective will be required to submit as part of the application documentation evidence of a measurable and verifiable reduction in loss of life or property which addresses risk(s) identified in the Mitigation Needs Assessment. Additional guidance regarding UNM project justification requirements will be released in the program guidelines, and the VIHFA will assess these criteria prior to undertaking projects using the UNM national objective.

7.0.1 Projected LMI Benefit

The Territory has unique geographic and demographic characteristics. Given the impact of both Hurricanes and its unique geography, all of the 3 islands are Most Impacted and Distressed or "MID" areas as defined by HUD, and should each be seen as having sufficient LMA for the territory to qualify as having more than 51% of its residents as LMI. The relatively small geography of the islands coupled with high density in developed areas results in a situation where mitigation projects with general or community-wide impact will benefit LMI residents, as reflected within the LMI projections herein.

At least 51% of its residents must be LMI persons for an area to meet the low- and moderate-income area (LMA) benefit requirements under HUD guidelines. Many areas that qualify as low- and moderate-income within the U.S. Virgin Islands are shown via the 2010 U.S. Census data, which is still the most recently available data at the census tract level. 2010 Census data shows that a majority of St. Thomas and St. John census tracts exceed the threshold 51% LMI resident threshold. Just over half (52%) of households in the Virgin Islands are LMI households overall, though this figure varies slightly between the Islands. Given population density, both St. John (54.8% LMI) and St. Thomas (57.9% LMI) qualify for the LMA benefit at an island level, with Hassel Island and Water Island included as part of the St Thomas data. While only a third of St. Croix census tracts qualify for LMA benefit, the island does not meet the LMA based only on the 2010 census data, as only 46.3% of residents are LMI, just a few percentage points below the 51% threshold. The updated LMA and Service Benefit derived from the FEMA IA data allowed by HUD specifies that 64.21% of the island is LMI. With St. Thomas at 61.90%, St. Croix at 66.39% and St. John at 65.35% which appropriately represents the most accurate post-storm LMI data for the USVI. As a result, all eligible projects and activities that are determined to provide an "island-wide" benefit should utilize the FEMA IA LMI data.

While census data is important to the HUD CDBG-MIT Action plan, the 2010 Census data does not reflect the current picture in the Territory, which HUD acknowledged in its 9/28/2020 "Waivers and Alternative Requirements for Community Development Block Grant Disaster Recovery Grantees" Federal Register notice. Recognizing the high cost and other unique characteristics of the Territory, HUD granted the USVI a waiver of 42 U.S.C. 5302(a)(20)(A) in order to standardize the area median incomes (AMI) across the entire territory, permitting the USVI to use the St John area median income for all islands in the territory (because those LMI income limits are the highest of the three islands). As LMI eligibility is defined by the AMI standard and St. John qualifies with its higher income level than on St. Croix, the entire Territory can properly be classified as having over 51% of LMI residents within the present plan.

7.1 Program Allocations

The total CDBG-MIT allocation set forth in PL 115-123 is $774,188,000.00. The VIHFA will set aside five percent of these funds for administrative costs associated with the mitigation activities described below. As a result of the MNA, lessons learned from CDBG-DR, and from community and stakeholder input, the following table outlines the allocations for each CDBG-MIT eligible activity. All funds have been allocated to the eligible mitigation activities outlined in Sections 7.3 through 7.8 below.



Pictured: VIHFA office on St. Croix.

Table 41: CDBG-MIT Program Allocations

Activity Category	Project/Program	Project Costs	VIHFA Project Delivery Costs	Total Allocations	% of Total	% LMI Projection	Identified Community Lifeline Risks	Identified Territory Risks
Infrastructure & Public Facilities	Community Resilience & Public Facilities	$100,000,000	$2,500,000	$102,500,000			• Food Water Shelter • Transportation • Energy • Health & Medical	• Hurricane • Riverine Flooding
	Resilient Critical & Natural Infrastructure	$308,000,000	$7,700,000	$315,700,000			• Transportation • Hazardous Material • Safety& Security	• Hurricane • Riverine Flooding • Drought
	Total Allocation	$408,000,000	$10,200,000	$418,200,000	54%	70%		
Economic Resilience & Revitalization	Commercial Hardening & Financing	$40,000,000	$962,500	$40,962,500			• Transportation • Food Water Shelter • Health & Medical	• Hurricane • Riverine Flooding • Pandemic
	Small Business Mitigation	$35,000,000	$787,500	$35,787,500			• Health & Medical • Communication • Energy	• Hurricane • Riverine Flooding
	Total Allocation	$75,000,000	$1,750,000	$76,750,000	10%	70%		
Housing	Multifamily Housing	$100,000,000	$2,500,000	$102,500,000			• Food Water Shelter • Health & Medical	• Hurricane • Riverine Flooding
	VIHFA New Home Construction (Home Ownership)	$60,000,000	$1,500,000	$61,500,000			• Food Water Shelter • Health & Medical	• Hurricane • Riverine Flooding
	Homeless Housing Initiative	$23,000,000	$575,000	$23,575,000			• Food Water Shelter • Health & Medical	• Hurricane • Riverine Flooding
	Innovative Resilient Housing	$5,000,000	$125,000	$5,125,000			• Food Water Shelter • Health & Medical	• Hurricane • Riverine Flooding
	Total Allocation	$188,000,000	$4,700,000	$192,700,000	25%	80%		
Public Services		$15,000,000	$400,000	$15,400,000	2%	100%		
Planning		$29,750,000	$2,678,600	$32,428,600	4%	70%		
Administration		$38,709,400	$0	$38,709,400	5%			
Totals		$754,459,400	$19,728,600	$774,188,000	100%	≥70%		

7.2 Overall Method of Distribution and Delivery

All programs will be implemented by the VIHFA, its subrecipients, or non-profit or for-profit entities selected in accordance with applicable procurement requirements. Details regarding program allocations, maximum awards, eligible applicants, project prioritization and timeline are outlined within the programs described below. Further details including application process and criteria used to select applicants for funding under each program, including the relative importance of each criterion, will be developed in program policies and procedures.

The VIHFA will oversee the entire portfolio of programs but certain projects will be implemented by other appropriate agencies of the territorial government. The VIHFA determined funding will be delivered through three primary methods based on the needs for services and the expertise of certain entities to complete specific projects.

- The first method will deliver funds directly to beneficiaries including primarily residents and landlords depending on the eligibility criteria detailed within respective programs.
- The second method will be a direct grant to implementing entities, or subrecipients, to oversee a specific program and/or projects as outlined within the Action Plan.
- A third method will utilize subrecipients selected through a competitive process to deliver a service or project to beneficiaries under a specific program.

Many projects are being further defined in direct coordination between the VIHFA, partner agencies of the territorial government, and other entities established by the territorial government. If any project development results in a Covered Project, this Action Plan will be amended to include project details and a benefit-cost analysis as detailed in the CDBG-MIT Main Notice. A Covered Project is defined for USVI as "any infrastructure project having a total project cost of $50 million or more, with at least $25 million of CDBG funds, regardless of the source (e.g., CDBG–DR, CDBG–MIT, or CDBG)."

FR-6109-N-02 encourages grantees to maximize the impact of available funds by encouraging leverage, private-public partnerships, and coordination with Federal programs. This includes mitigation grants administered by FEMA or the US Army Corps of Engineers (USACE). Use of CDBG-MIT funding as non-federal cost share for the FEMA Public Assistance Program ("Local Match") is authorized by relevant legal requirements pertaining to FEMA and HUD. Additionally, both FEMA and HUD have encouraged the use of the "Flexible Match Concept" in the "*Implementation Guidance for Use of Community Development Block Grant Disaster Recovery Funds as Non-Federal Cost Share for the Public Assistance Program*" published jointly by FEMA and HUD in October of 2020. Therefore, applicants may request (subject to approval of the VIHFA) that any of the CDBG-MIT funds referenced in this Action Plan may be used as Local Match if doing so would be consistent with all applicable legal requirements pertaining to the FEMA PA and HUD CDBG-MIT programs.

7.3 Infrastructure and Public Facilities

The U.S. Virgin Islands' reliance on the proper functioning of its infrastructure systems—including energy, transportation, and telecommunications infrastructure—was evident when these systems failed in the aftermath of Hurricanes Irma and Maria. High winds, torrential rainfall, and flooding from both disasters had compounding effects on the infrastructure sectors on each of the U.S. Virgin Islands, leading to widespread and prolonged failures which has delayed economic recovery. High winds toppled above-ground utility lines; storm water runoff flooded roads and induced mudslides; and flooding, wind, and heavy rain severely damaged water and wastewater treatment plants, hospitals, and other buildings that provide critical services. Electrical substations were crippled, causing power failures to 95% of electrical customers. Water pump failures and sewage overflows from storm water

surges led to potable water safety precautions such as “boil water” advisories and EPA drinking water assessments. Lacking both a steady power supply and functioning transportation and water infrastructure, many businesses were forced to shut down, some for extended periods. Closure of the ports and airports for more than two weeks, had significant effects on the Territory’s connectivity, limiting the pace of voluntary evacuation efforts, delaying the delivery of essential supplies for emergency relief, and causing further disruption to the economy.

The U.S. Virgin Islands’ has identified multiple infrastructure priorities that must be addressed If the Territory’s infrastructure is made more resilient, critical services could be stabilized and maintained for residents in the event of a future disaster, creating a safer and more secure environment.

In addition to hardening infrastructure and following other construction best practices to mitigate the risks described in the MNA, the Territory will seek to incorporate the “no adverse impacts” approach (NAI) set forth by the Association of State Floodplain Managers, as applicable. This strategy relies on a calculated mix of mitigation approaches to ensure infrastructure development does not increase flooding risks. A key consideration in NAI is green infrastructure and the use of green spaces and natural systems to promote safer, more predictable conveyance of water through communities. All projects in the Infrastructure and Public Facilities programs will be required to provide a narrative summary of the green and natural infrastructure components applicable to the project during scope and budget development and are encouraged to use the ASFPM’s NAI How-to-Guide for Infrastructure to assist in effective project design.

Table 42. Infrastructure Program

Program	Project Allocation	Community Lifeline Impact	National Objective
Community Resilience & Public Facilities Construction	$100,000,000.00	• Food, Water, Sheltering • Communications • Safety and Security	LMI UNM
Resilient Critical and Natural Infrastructure	$308,000,000.00	• Food, Water, Sheltering • Transportation • Health and Medical • Hazardous Materials	LMI UNM

7.3.1 Community Resilience Centers & Public Facilities Construction

There are several risks to the Territory identified in the MNA that require adequate sheltering during and after disasters. When Hurricanes Irma and Maria hit the U.S. Virgin Islands in September of 2017 there were limited locations for individuals, families and the most vulnerable to seek shelter from the storms. Throughout the public participation process, community shelters and communications were mentioned as mitigation measures residents believe are needed in order to be better prepared for future disasters. The VIHFA has identified the need to have centralized and well-equipped shelters for receiving resources, critical communications, charging phones and battery-operated equipment, among other functions.

This program addresses the urgent need for adequate, permanent emergency shelters in the U.S. Virgin Islands. To this end, the program will support the development of multi-purpose facilities which will be dedicated to disaster preparedness, sheltering needs in disasters and other emergency situations. Additionally, the program may support increasing sheltering capacity by hardening and upgrading existing community, public or private infrastructure to bring them up to sheltering standards. To address this need, this program will cover the eligible costs to rehabilitate, reconstruct or newly construct a facility to meet the needs of this population. In addition, the projects will address mitigation measures by utilizing construction methods that meet FEMA standards.

Allocation Amount and Maximum Award

Project Allocation Amount: $100,000,000.00

Maximum Award Amount: $25,000,000.00

Minimum Award Amount: $1,000,000.00

Eligible Applicants

- Non-governmental organizations (501(c)(3)) or Not for Profit Entities
- Units of Government of the USVI, and its autonomous and semi-autonomous entities
- Public or Private Institutions of Higher Learning (Universities)
- Private developers
- Private Utility Companies

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(14) Activities Carried Out through Nonprofit Development Organizations
- HCDA Section 105(a)(15) Eligible nonprofit organizations
- HCDA Section 105(a)(21) Higher Education
- HCDA Section 105(a)(12) Planning

Priorities

- All facilities constructed or rehabilitated as part of this program must be available to the public in future disaster events.
- Organizations and agencies must agree to provide year-round maintenance and operations expenses as CDBG-MIT funds will not fund long-term maintenance and operations.
- During non-crisis events shelters may serve as traditional community centers for public benefit. For example, the shelter may be leased or rented year-round for community organizations or for events, and income generated will be utilized to maintain the operation of the center and shall not be considered program income.
- Projects may be selected based on their projected performance against a set of factors, including but not limited to: cost effectiveness, speed with which projects and shelters can be developed, number of individuals served, location and accessibility, and proposed use(s) outside of hurricane season or other disaster events.
- All projects must:
    - Meet the definition of mitigation activities;
    - Address identified current and future risks; mitigation related to hurricanes, tropical storms and depressions, severe flooding, earthquake, tsunami, drought, landslide, wildfire, and pandemic;
    - Meet a CDBG national objective;
    - Include a plan for the long-term funding and management of the operations and maintenance of the project.
- For any proposed projects not listed below, the VIHFA will develop a competitive application process to select eligible projects that meet the criteria described above. The competitive

application process will be open to all eligible applicants and one application may be submitted per entity. Applicants are encouraged to incorporate nature-based solutions, including natural or green infrastructure, into their proposed projects.

- The VIHFA will prioritize development of the following known shelter projects, assuming they meet the criteria and application requirements developed for public facilities projects:
    - A multi-purpose complex on the St Croix campus of the University of the Virgin Islands (UVI) in an amount of approximately $25,000,000.00.
    - A community shelter and natural infrastructure recreational area at Mars Hill Park
    - Restoration and hardening of the Territory's two homes for the elderly, which also serve as special needs shelters – Herbert Grigg and Queen Louise, managed by the Department of Human Services at an amount of no more than $25,000,000 per development.
- The Territory will also prioritize a potential dredging project at Gallows Bay in an amount of approximately $6,000,000.00, which is intended to expand port capacity through dredging and additional berthing space. This will enable the Territory to enter formal berthing access agreements for larger cruise ships, thus increasing the number of cruise passenger arrivals and overall tourism expenditures in the Territory. This project may also be eligible as an Economic Resilience and Revitalization project.

Projected Start and End Date

The proposed timeline for shelter and public facilities projects is from 2021 to 2029.

7.3.2 Critical & Natural Infrastructure Resilience

Hardening public infrastructure is critical to the Territory's ability to mitigate risks to public health and safety even before an extreme weather event occurs. A high priority for the U.S. Virgin Islands will be funding activities that mitigate risks to utility, transportation, and hazardous waste disposal systems particularly for the facilities that serve the health and safety of the community. The Territory has identified several resilience and mitigation measures, which include hardening public infrastructure, elevating key roadways, burying or otherwise hardening utility lines, reducing the risk of storm water runoff erosion and flood exposure, and creating sustainable waste management for the Territory.

Activities related to these projects will be focused on hardening infrastructure against severe weather events. This will include measures to harden infrastructure facilities against high winds, heavy rainfall, flood exposure, storm water run-off, and their effects (e.g., erosion). For example, the Department of Public Works (DPW), with assistance from FEMA and FHWA, has identified potential mechanisms to reduce overall vulnerability of the transportation infrastructure. Structural projects for DPW may include, repair, reconstruction, and improvement of resilience to transportation infrastructure including roads, bridges, ghuts, culverts, additional drainage systems, embankments, traffic signals, and bringing signage up to industry standards, as applicable to the Territory. Non-structural approaches may include hydrologic and hydraulic studies, flood-risk modeling, monitoring systems such as GIS, public outreach and education, and future planning measures.

The US Virgin Islands Waste Management infrastructure was severely damaged by Hurricanes Irma and Maria. The hurricanes generated 825,000 cubic yards of debris, which is almost three times as much waste as the Territory typically generates in an entire year. The Territory's two existing landfills

are mandated to close by two Consent Decrees, entered in 2012 and 2013. One of the overburdened landfills is near an environmentally sensitive zone on St. Thomas (Bovoni) and the other landfill is near the St. Croix airport (Anguilla).



Pictured: Storm impact at the VI Waste Management facility on St. John near Cruz Bay.

The debris from the two hurricanes during that time period, further exacerbated the serious waste disposal issues that previously existed in the Territory. VIWMA is subject to two federal Consent Decrees, under which a district court judge in St. Thomas directly oversees compliance with the Decrees, which require installation and operation of the gas collection and control systems, plus the closure of the landfills. Not only must VIWMA close the existing landfill, but also there may be more waste excavation and re-shaping needed due to all the excess waste placed over the last several years.

Ultimately the goal is to close the landfill, open a new landfill site and manage stormwater and landfill gas so that there is no negative impact to resident health and safety due to hazardous materials being dumped outside of acceptable locations, and/or damaging groundwater, surface water, or the adjacent mangroves, which have already been significantly impacted by both hurricanes.

The limitations on landfill use makes debris removal and cleanup a major health and safety concern for residents when future disasters generate significant amounts of additional debris. Few mangroves remain on the island and it is important for the long-term sustainability of the coast to preserve the mangroves as they assist with flood control. Mangroves may reduce the impact of the storm surge and resulting debris generation.

The VIHFA will develop policies and procedures for the Critical and Natural Infrastructure Resilience program that will outline all requirements for a project to be eligible for funding. Potential projects to be carried out by governmental departments of the Territory have been determined to be key mitigation priorities for the Territory as described below. All proposed projects must submit an application that describes the project's connection to mitigation needs and the priorities and eligibility requirements outlined in this Action Plan. If remaining funds allow for additional projects that are not identified below in Priorities, they may be ranked and scored in conformance with a set of scoring criteria identified in the policies and procedures.

If a proposed infrastructure project results in a Covered Project, which is an infrastructure project having a total project cost of $50 million or more, with at least $25 million of CDBG funds (regardless of source (e.g., CDBG–DR, CDBG–MIT, or CDBG), this Action Plan will be amended to include the project at a future date. See Infrastructure Projects Cost and Benefits section below for details about this process.

Allocation and Maximum Award

Allocation Amount: $308,000,000.00

Maximum Award Amount: To be determined based upon necessary and reasonable costs submitted with applications for infrastructure projects. If a Covered Project is proposed, this Action Plan will be amended at a future date.

Eligible Applicants

- Units of Governments of the USVI, including its autonomous and semi-autonomous instrumentalities, such as the Water and Power Authority, the Department of Public Works, the Waste Management Authority, the Bureau of Information Technology and other infrastructure related governmental and quasi-governmental entities, plus private sector entities procured to execute Public-Private Partnerships.

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Nonprofit Development Organizations
- HCDA Section 105(a)(15) Eligible nonprofit organizations
- HCDA Section 105(a)(21) Higher Education
- HCDA Section 105(a)(12) Planning

Priorities

- Project beneficiaries are evidenced to be at least 50% low- and moderate-income persons or communities.
- Projects that meet the definition of mitigation activities.
- Projects that meet a CDBG-MIT national objective.
- Projects that demonstrate an accelerated timeline.
- Projects that use natural infrastructure methods to achieve resilience.
- Projects that include measures to prevent vulnerability in the future or provide innovative solutions to existing vulnerabilities.
- Projects that both improve existing infrastructure and address identified current and future risks; mitigation related to hurricanes, tropical storms and depressions, severe flooding, earthquake, tsunami, drought, landslide, wildfire, and pandemic;
- Projects that employ modern sustainability standards or best practices.
- An operations and maintenance plan must be provided to maintain the infrastructure in the long-term.
- The project is evidenced to resolve an impediment to or create new opportunities for economic activities.
- For any proposed projects not listed below, the VIHFA will develop a competitive application process to select eligible projects that meet the criteria described above. The competitive application process will be open to all eligible applicants and up to three applications may be

submitted per entity. Depending on demand, no applicant will be awarded for their subsequent application until all successful eligible applicants have been awarded funding at least once. If a project is a phase of a larger project, the phase of the project submitted must be viable as a stand-alone project. Applicants are encouraged to incorporate nature-based solutions, including natural or green infrastructure, into their proposed projects.

- Department of Public Works projects in an aggregate amount of approximately $147,479,876.00.
- Essential Water projects by WAPA Water in an amount of approximately $36,500,000.000.
- Essential Electric projects by WAPA Electric in an amount of approximately $30,000,000.00.
- Waste Management department solutions that meet the requirements of this Action Plan and offer long term advantages for sustainability will be considered in an amount up to $100,000,000.00.

Projected Start and End Dates

Due to the complexity of this program, the timeline is 12 years from the date of the grant agreement.

Infrastructure Project Cost and Benefits Analysis

Infrastructure projects typically carry a high cost of labor and materials relative to the continental U.S. due to the isolated geography and limited workforce in the Territory. Each project will be informed by a consideration of cost and benefits considering these unique circumstances, but whenever possible will utilize local/regional talent and materials to reduce costs. The Territory's approach to assessing costs and benefits may be based on two existing frameworks. The first, HMGP's Guidance on cost effectiveness relies on a Benefit Cost Analysis, where projects for which benefits exceed costs are generally considered cost effective.

- The project cost estimate requested with each project application includes a line-item breakdown of all anticipated costs, including, as applicable: Costs for anticipated environmental resource impact treatment or historic property treatment measures;
- Costs for engineering designs/specifications, including hydrologic and hydraulic studies/analyses required as an integral part of designing the project;
- Construction/demolition/relocation costs, such as survey, permitting, site preparation, and material/debris disposal costs;
- All other costs required to implement the mitigation project, including any applicable project-type specific costs. Benefits in this methodology are often calculated using standard loss of function estimates provided by relevant federal agencies, which may also be utilized by the Territory.

One disadvantage of this method is that benefits may only be measured as avoided damage, loss of function, and displacement and not fully consider the important socio-economic factors involved. Given the Territory's approach to mitigation and resilience as giving full consideration to systemic, inter-related processes that promote resilience, the method produced through the National Disaster Resilience Competition (NDRC) will help to supplement some of these factors. Under this method, to the greatest extent possible, a narrative description may be produced to identify evidence-based practices as the basis for the project proposal.

This method includes the following steps:

1. A full proposed cost, including Federal, Territorial, and private funding, as well as expected operations and maintenance costs and functionally related to geographically related work;
2. A description of the current situation and the problem to be solved (including anticipated changes over the analysis period);
3. A description of the proposed project or program including functionally or geographically related elements and estimated useful life;
4. A description of the risks to the community if the proposal and any land use, zoning or building code changes are not implemented, including costs that might be avoided if a disaster similar to the qualifying disaster struck again, including costs avoided if as a result of the project remaining effective in a future disaster;
5. A list of the benefits and costs of the proposal and the rationale for including each effect using the table provided according to the following categories:
    a. Lifecycle costs;
    b. Resiliency value;
    c. Environmental Value;
    d. Social Value; and
    e. Economic Revitalization.
6. A description of risks to ongoing benefits from the proposed project or program; and
7. An assessment of challenges faced with implementing the proposal.

The exact method of benefit and cost assessments may vary and will be detailed further in the Infrastructure Policies and Procedures. Infrastructure programs will generate a wide array of employment opportunities and other positive impacts The Territory is committed to ensuring local firms and jobseekers are fully engaged in this work. Coordination is underway with the Virgin Islands Department of Labor (DOL) to ensure employers' and jobseekers' needs are being considered for both large and small-scale infrastructure projects. DOL is a critical partner in ensuring the Territory's workforce is trained, prepared, and qualified for the work initiated by infrastructure construction. A key target population for this program will be low-income residents and businesses that qualify under Section 3. The Section 3 program requires that recipients of certain HUD financial assistance, to the greatest extent possible, provide training, employment, contracting and other economic opportunities to low- and very low-income persons, especially recipients of government assistance for housing, and to businesses that provide economic opportunities to low- and very low-income persons. Each agency receiving funds under the Infrastructure Programs will receive technical assistance from VIHFA and direct hiring and training assistance from DOL to ensure their projects are compliant with Section 3 to the greatest extent feasible.

7.4 Economic Resilience & Revitalization

As part of a comprehensive mitigation program, economic development is a crucial component for the long-term resilience and viability of communities and households. Each economic resilience activity must demonstrate how it will contribute to meeting the CDBG-MIT criteria for eligible economic development assistance.

In addition to the economic hardship caused by Hurricanes Irma and Maria, the U.S. Virgin Islands economy has contracted since the Great Recession in 2008 and the closure of the Hovensa oil refinery in 2012. A 2019 report notes that "Economic stressors on the predominantly single -sector economy have contributed to high unemployment and conspicuous poverty in the Territory" (Caribbean Exploratory Research Center, 2019). According to the assessment, the major areas of employment in the U.S. Virgin Islands are government, services, leisure and hospitality, and wholesale retail trade

while the areas of manufacturing and information represent the industries with the lowest employment levels in the Territory.

As detailed in the CDBG-DR Action Plan, Hurricanes Irma and Maria had profound and lasting effects on the already fragile economy of the U.S. Virgin Islands. Revitalizing economic sectors like tourism and retail are critical to job creation/retention and expanding economic opportunities for small businesses throughout the Territory. Along with creating economic opportunities for residents, hardening commercial areas, and assisting small businesses with mitigation efforts will ensure that future disasters cause less economic disruption.

In addition to reinvigorating existing economies such as tourism, it is important to support the sustainable diversification of the economy. A more diversified economy will be more resilient in the face of future natural disasters and will incentivize the creation of higher-earning jobs in the long-run.

Economic diversification can pose major challenges, as there are considerable obstacles to attracting private investment and expanding existing businesses within the Territory. In addition to dramatically higher-than-average shipping and electricity costs and regulatory hurdles, the lack of a skilled labor force can preempt the relocation, growth, and creation of new, high-value businesses. Furthermore, access to financing is seriously limited, especially for small business ventures. It is critical that entrepreneurs in the Territory have a supportive business environment with easier access to capital and adequate technical support in the design and implementation of viable business plans.

Therefore, the U.S. Virgin Islands proposes an economic resilience program to complement its economic revitalization efforts through CDBG-DR.

The VIHFA will develop policies and procedures that will outline all requirements for any Economic Resilience & Revitalization project to be eligible for funding. All proposed projects must submit an application that describes the project's connection to mitigation needs and the priorities and eligibility requirements outlined in this Action Plan. Identified projects will be ranked and scored in conformance with a set of scoring criteria identified in the policies and procedures.

Table 43. Economic Resilience and Revitalization

Program	Allocation	Community Lifeline Impact	National Objective
Commercial Hardening & Financing	$40,000,000.00	• Food, Water, Sheltering • Safety and Security • Hazardous Materials • Communications	LMI UNM
Small Business Mitigation	$35,000,000.00	• Food, Water, Sheltering • Safety and Security • Communications	LMI UNM

7.4.1 Commercial Hardening & Financing Program

The goal of the Commercial Hardening & Financing Program is to minimize operational down time and accelerate recovery of commercial areas after a disaster to benefit LMI residents and others. Privately owned commercial or industrial buildings or ports may be rehabilitated or hardened to become more resilient. Such projects may include but are not limited to those that result in abatement of asbestos hazards, remediation of mold, lead abatement, lead-based paint hazards evaluation and reduction, and the correction of code violations and provision of permanent emergency power (e.g., generators and solar arrays). 24 CFR 570.202(a)(3).

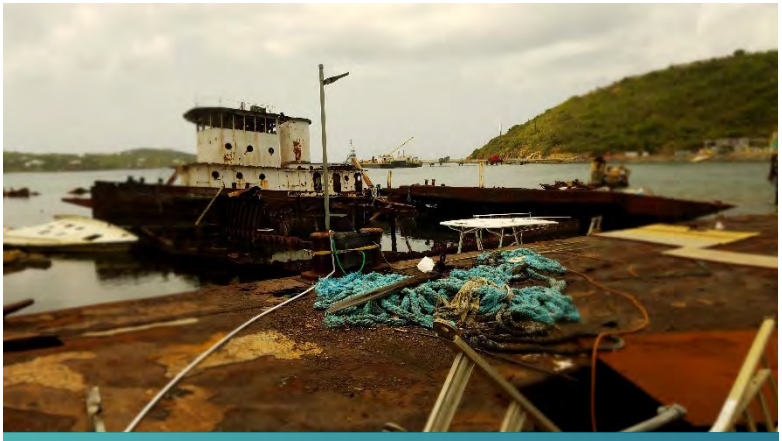
The intention of the program is to upgrade private buildings and return them to productive business uses and ensure the ability for such facilities to be fully operating during emergencies. Accordingly, at the time the application is submitted the private entity or person that is going to undertake the rehabilitation of the structure must own the property or have an option to purchase the property.

Commercial financing is often needed to supplement or replace CDBG-MIT funds for economic resilience and revitalization projects. Programs initiated or systems improved to enhance or replace privately available capital sources may be eligible for funding.

Historic Preservation: CDBG-MIT funds may be used for the rehabilitation/hardening, preservation or restoration of historic properties that are privately owned. Historic properties are those sites or structures that are either listed in or eligible to be listed in the National Register of Historic Places, listed in an inventory of historic places, or designated as a landmark or historic district by appropriate law or ordinance. Historic preservation, however, is not authorized for buildings for the general conduct of government.

Hardening marine industrial and commercial facilities has particular importance to the US Virgin Islands. Current facilities are limited, with only three marine industrial sites operating in the Territory at present. Therefore, damage to or degradation of such facilities can and has had profound impact on island commercial enterprises that depend on having clear and functioning port facilities.

For example, when a hurricane approaches, many ships--be they residential or commercial--must be moved out of ports and on to safe land-based facilities to avoid destruction from hurricane winds and waves. Previous disasters have resulted in the sinking of numerous ships in areas such as Krum Bay where deteriorating sunken ships have resulted in environmental degradation of the Bay and pose an environmental risk to the island's salinization-based water supply system, which has its intake nearby.



Pictured: Deteriorating ships and barges in Krum Bay.

The USVI has received a small grant from the United States Environmental Protection Agency (EPA) to assist in removing the sunken vessels from Krum bay. However, the EPA grant would only cover a small part of the cost of eliminating the environmental hazards and clearing the defunct wreckage out of the bay.

There is an essential need for alternate port sites to dramatically improve the efficiency and speed of critical life-saving operations and the inflow of supplies needed to assist residents of the island, especially during emergencies.

Mitigation measures undertaken as part of commercial hardening may include but are not limited to:

- Drainage and stormwater/surge management for commercial areas
- Boat ramps and improved shoreline and roads for evacuation/receiving supplies
- Port and harbor improvements
- Generators for commercial facilities' infrastructure
- Generators for continuous power at critical private retailers
- Removal of hazardous materials
- Hardening of Building exteriors and improved facility for community outreach/education efforts

Allocation and Maximum Award

Allocation Amount: $40,000,000.00

Maximum Award Amount: $20,000,000.00

Eligible Applicants

- For profit businesses
- Non-profit organizations
- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Nonprofit Development Organizations
- HCDA Section 105(a)(15) Eligible nonprofit organizations
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(17) Assistance to For-Profit Entities
- HCDA Section 105(a)(19) Provision of technical assistance to public or nonprofit entities to increase the capacity of such entities to carry out eligible neighborhood revitalization or economic development
- HCDA Section 105(a)(22) Assistance to public and private organizations, agencies, and other entities to facilitate economic development

Priorities

Priorities will be projects that meet the CDBG-MIT criteria for eligible economic development assistance and do the following:

- Create jobs for predominantly LMI individuals
- Reduce risks to life, property, and critical environments
- Stabilize and grow the tourism industry through key infrastructure improvements to ports and commercial areas that will increase the Territory's capacity to receive tourists
- Remove hazardous materials from key commercial areas

- Harden infrastructure to mitigate against future disasters in key commercial areas
- In conjunction with improvements, utilize job placement programs for trainees
- Increase the capacity of ports, harbors, and other marine infrastructure

The VIHFA will develop a competitive application process to select eligible projects that meet the criteria described above. The competitive application process will be open to all eligible applicants and up to two applications may be submitted per entity. Depending on demand, no applicant will be awarded for their subsequent application until all successful eligible applicants have been awarded funding at least once. Applicants are encouraged to incorporate nature-based solutions, including natural or green infrastructure, into their proposed projects.

Projected Start and End Dates

Commercial hardening and financing activities may involve complex projects with an expected timeline of 2021 for up to 12 years from the program start date.

7.4.2 Small Business Mitigation Improvements

The Mitigation Improvements for Small Business Program is intended to minimize operational down time and accelerate recovery of small businesses after a disaster.

Mitigation measures may include but are not limited to:

- Dry Floodproofing of Non-residential Structures
- Generator installation
- Solar power installation
- Weatherization
- Drainage Improvements
- Communication Systems

Allocation and Maximum Award

Allocation Amount: $35,000,000.00

Maximum Award Amount: $2,000,000.00 per small business

Eligible Applicants

- Small businesses as defined the SBA at 13 CFR part 121 or businesses engaged in “farming operations” that meet the U.S Department of Agriculture Farm Service Agency criteria described at 7 CFR 1400.500

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Nonprofit Development Organizations

- HCDA Section 105(a)(15) Eligible nonprofit organizations
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(17) Assistance to For-Profit Entities
- HCDA Section 105(a)(19) Provision of technical assistance to public or nonprofit entities to increase the capacity of such entities to carry out eligible neighborhood revitalization or economic development
- HCDA Section 105(a)(22) Assistance to public and private organizations, agencies, and other entities to facilitate economic development

Priorities

Priorities will be projects that meet the CDBG-MIT criteria for eligible economic development assistance and do the following:

- Create jobs predominantly for LMI individuals
- Reduce risks to life, property, and critical environments
- In conjunction with improvements, utilize job placement programs for trainees

The VIHFA will develop a competitive application process to select eligible projects that meet the criteria described above. The competitive application process will be open to all eligible applicants and up to two applications may be submitted per entity. Depending on demand, no applicant will be awarded for their subsequent application until all successful eligible applicants have been awarded funding at least once. Applicants are encouraged to incorporate nature-based solutions, including natural or green infrastructure, into their proposed projects

Projected Start and End Dates

Small business mitigation activities may be carried out from 2021 when project applications are released through 2027.

7.5 Resilient Housing Programs

The VIHFA is exploring expansion of existing CDBG-DR development projects to conform to the additional objectives and responsibilities set forth in this Action Plan. Any changes to the existing housing programs will be reflected through an Action Plan amendment. In assessing the community demand (driven by public outreach and stakeholder events), the VIHFA has identified significant increased need for housing in addition to the programs already undertaken through the CDBG-DR program.

All housing construction and repairs are projected to use sustainable building code standards as well as prioritizing opportunities to include advanced housing mitigation solutions.

Table 44. Resilient Housing

Program	Allocation	Community Lifeline Impact	National Objective
Single Family Resilient New Home Construction	$60,000,000.00	Food, Water, Sheltering	LMI UNM
Resilient Multifamily Housing	$100,000,000.00	Food, Water, Sheltering	LMI UNM
Homeless Housing Initiative	$23,000,000.00	Food, Water, Sheltering	LMI
Innovative Resilient Housing	$5,000,000.00	Food, Water, Sheltering	UNM

7.5.1 Single Family Resilient New Home Construction Program

The Territory has historically relied much more on single-family housing than multi-family housing to meet housing needs and home ownership has traditionally been an attainable goal for USVI residents. However, the cost of single-family housing has risen dramatically, therefore, many residents are unable to become homeowners. This program will be established to increase home ownership opportunities for residents of low-moderate income at or below 80% of AMI and to provide workforce housing for those with of income levels between 80% and 120% of AMI. Providing a broader income spectrum will have the benefit of decreasing the concentration of poverty and helping to provide work-force housing for those who could otherwise not be able to reach the aspiration of home ownership.

The VIHFA will develop policies and procedures for the Single Family Resilient New Home Construction program that will outline all requirements for funding eligibility.

Allocation and Maximum Award

Allocation Amount: $60,000,000.00

Maximum Award Amount: Awards will be based on the scope of work based on a consistent economy grade of building materials for the Territory, using a national building standard estimating software. Units will be required to meet housing quality standards (HQS) standards. Details of building standards will be further defined in the program guidelines. Per unit costs may not exceed $700,000 (inclusive of mitigation measures such as elevation as needed).

Funds for rehabilitation and construction will be delivered in the form of forgivable construction loans. These loans will be forgivable over a five-year period. Rents must be restricted based on AMI as applicable.

Eligible Applicants

- Units of Government of the USVI
- Public housing authorities
- For-profit Developers/Borrowers
- Not-for-profit Developers/Borrowers

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(18) Rehabilitation or development of housing

Priorities

- Projects with single family home resiliency solutions including but not limited to elevation, breakaway ground floor walls, reinforced roofs, storm shutters, use of ENERGY STAR appliances and fixtures, cisterns and septics built to code and household need; band mold and mildew resistant products.
- Projects with longer affordability periods may receive priority

Projected Start and End Dates

The proposed timeline is from HUD approval through 2027.

7.5.2 Resilient Multifamily Housing Program

The Resilient Multifamily Housing Program will allow for rehabilitation, reconstruction, and the new construction of multi-family developments. The purpose of the rental program is to repair restore and increase the affordable housing stock predominantly for LMI households.

A minimum of 51 percent of the units must be restricted for a minimum affordability period of fifteen (15) years for the rehabilitation or reconstruction of multifamily rental projects with eight or more units, and a minimum affordability period of twenty (20) years for the new construction of multifamily rental units with five or more units for LMI individuals earning 80 percent or less of the AMFI at HUD established affordable rents. If a rental project that requires rehabilitation or reconstruction is subject to existing affordability requirements associated with other funding sources, the 15-year and 20-year affordability periods may run concurrently (or overlap) with the affordability requirements associated with such other funding.

The VIHFA will develop policies and procedures for the Resilient Multi-family Housing program that will outline all requirements for a project to be eligible for funding.

Allocation and Maximum Award

Allocation Amount: $100,000,000.00

Maximum Award Amount: $30,000,000.00 million per development

Eligible Applicants

- Public housing authorities
- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities
- The VIHFA
- For-profit Developers/Borrowers
- Not-for-profit Developers/Borrowers

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings (including Housing)
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Private or Public nonprofits

Priorities

The priority in implementation of these initiatives is the benefit to LMI individuals and households. In addition, the following priorities will be considered:

- Projects that leverage public and private financing, such as Low-Income Housing Tax Credits (LIHTC) and other funds
- Projects located in Opportunity Zones
- Projects that use mitigation solutions and other construction technology designed to mitigate disaster risks including but not limited to elevation; retention basins; fire-safe landscaping; firewalls; and landscaped floodwalls

Projected Start and End Dates

The proposed timeline is from HUD approval up to 12 years from the start of the program. New resilient construction may take additional time to complete when considering siting, design, development, and construction timeframes.

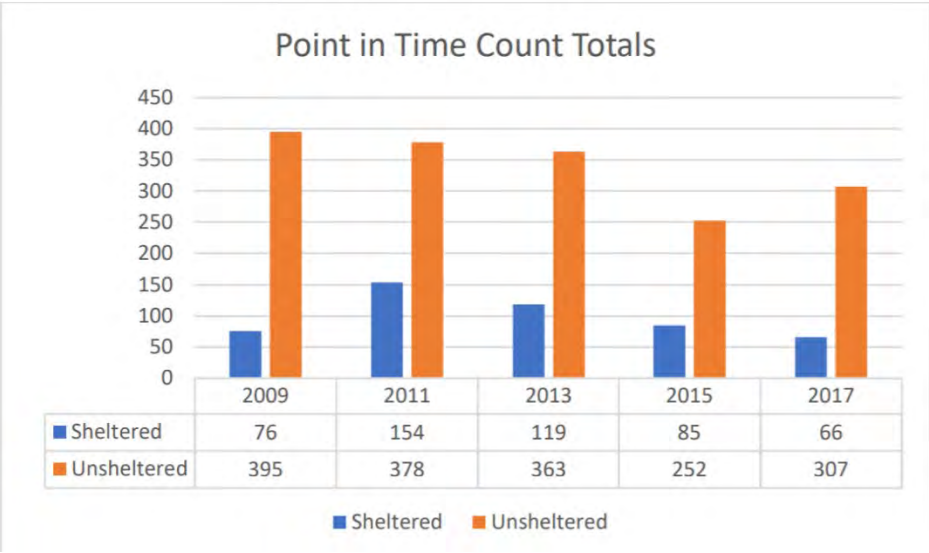
7.5.3 Homeless Housing Initiative--Permanent Supportive Housing Development

According to recent Point in Time Count data (see chart below) the Territory has an unusually high percentage of chronically homeless persons relative to the homeless population as a whole. For example, in 2017, 66 homeless persons were sheltered, versus 307 homeless persons who were unsheltered.

Additionally, previous Point in Time Counts have emphasized the need for more Permanent Supportive Housing. Because Permanent Supportive Housing has proven to be the most effective method of housing those who are chronically homeless, this program will focus on the production of Permanent Supportive Housing units to account for more recent data on the USVI homeless population.

The VIHFA will develop policies and procedures for the Homeless Housing Initiative program that will outline all requirements for a project to be eligible for funding.

Figure 53. USVI Homeless Count Totals



Allocation and Maximum Award

Allocation Amount: $23,000,000.00

Maximum Award Amount: Project awards will be deemed reasonable on a case-by-case basis within the parameters of the program policies and procedures established.

Eligible Applicants

- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities (including Public housing authorities)
- For-profit Developers/Borrowers
- Not-for-profit Developers/Borrowers

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings (including Housing)
- HCDA Section 105(a)(5)
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(11) Relocation
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Private or Public nonprofits

Projected Start and End Dates

The proposed timeline is from HUD approval until 2027.

7.5.4 Innovative Resilient Housing

The USVI has an acute shortage of housing units that may be used for temporary housing in the event of emergencies or disasters. The VIHFA desires to establish an innovative resilient housing program to mitigate the risk to loss of life of those who are homeless or residing in substandard housing when disasters strike.

This program will encourage innovative architectural and construction techniques to provide strong, resilient housing with economical development costs.

The VIHFA will develop policies and procedures for the Innovative Resilient Housing Initiative program that will outline all requirements for a project to be eligible for funding.

Allocation and Maximum Award

Allocation Amount: $5,000,000.00

Maximum Award Amount: $5,000,000.00

Eligible Applicants

- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities
- Public housing authorities
- For-profit Developers/Borrowers
- Not-for-profit Developers/Borrowers

Eligible Activities

- HCDA Section 105(a)(1) Acquisition of Real Property
- HCDA Section 105(a)(2) Public Facilities and Improvements
- HCDA Section 105(a)(4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings (including Housing)
- HCDA Section 105(a)(5) Architectural Barrier Removal
- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Private or Public nonprofits

Projected Start and End Dates

The proposed timeline for the Innovative Resilient Housing project is from 2022 to 2026.

7.6 Public Services

In addition to public services associated with many of the programs listed above, the MNA and public input process have revealed the need for direct services to the community to increase resilience during and after disasters.

The 2017 disasters exacerbated situations for already vulnerable populations. Within this group the share of unemployment is high resulting in a wide range of social services and subsidies required for these individuals and households. The occurrence of two back-to-back Category 5 storms and the displacement and chaos that followed, has also increased the need for supportive services for vulnerable populations.

To address this need, the program will provide grants through a competitive application process to social services organizations that may enhance the support service network for vulnerable populations through the following types of programs:

- Education and outreach campaigns designed to alert communities and beneficiaries to opportunities to further mitigate identified risks through insurance, best practices, and other strategies
- Health and welfare programs to increase personal resilience to disasters and protect the health and safety of residents during and after disasters
- Apprenticeship/Mentorship programs in key sectors
- Homelessness prevention
- Hurricane and other disaster preparedness
- Technology-based Resiliency Programs
- Housing Counseling

7.6.1 Improved Access to Healthcare

Public service funds will be used to propose new services or provide a measurable increase in an existing operational service.

Table 45. Public Services Allocation

Program	Allocation	Community Lifeline Impact	National Objective
Public Services	$15,000,000.00	• Food, Water, Sheltering • Safety and Security • Health and Medical	LMI

7.6.2 Allocation and Maximum Award

Allocation Amount: $15,000,000.00

Maximum Award: Awards will be determined on the amount of funding available and based on applications received and projects determined eligible for award. Reasonable costs for services will be considered on a per unit basis based on comparison of standard industry-specific costs. For example, if an organization is selected to provide meal delivery services, the award would be based on current reasonable, documented costs of these services as determined through a cost reasonableness evaluation considering the unique costs experienced in the Territory.

7.6.3 Eligible Applicants

- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities
- Public, nonprofit, and for-profit providers of support services for vulnerable populations. This includes but is not limited to the Department of Human Services and the Department of Health.

7.6.4 Eligible Activities

- HCDA Section 105(a)(8) Public Services
- HCDA Section 105(a)(12) Planning
- HCDA Section 105(a)(14) Activities Carried Out through Private or Public nonprofits

7.6.5 Priorities

Funding will be allocated to the individual program components as needed to ensure that the most vulnerable are served expediently and effectively. The Territory reserves the right to include additional vulnerable populations.

7.6.6 Projected Start and End Dates

Public service activities may be carried out from the date of HUD approval up to 12 years. The VIHFA anticipates that most public services projects will be administered during the initial 6 years of the CDBG-MIT program.

7.7 Territory Planning Program

In addition to using Planning funds for activities such as Action Plan development, public outreach, and coordination, the VIHFA understands through the MNA process that planning studies may be beneficial to identify solutions to disaster risks and promote sound mitigation practices across the Territory.

The requirements at 24 CFR 570.483(b)(5) or (c)(3), which limit the circumstances under which the planning activity can meet a low- and moderate-income national objective, will not apply to CDBG-MIT planning activities; instead, the Territory will comply with 24 CFR 570.208(d)(4) when funding mitigation, planning-only grants, or directly administering planning activities that guide mitigation in accordance with the Appropriations Act. In addition, the types of planning activities that may be funded or undertaken in the MIT-AP will be consistent with those of entitlement communities identified at 24 CFR 570.205, which may include support for local and regional functional land use plans, master plans, historic preservation plans, comprehensive plans, community recovery plans, resilience plans, development of building codes, zoning ordinances, and neighborhood plans.

Studies may include, but are not limited to, climate change, flood control, earthquake mitigation, waste management, drainage improvements, resilient housing solutions, homelessness, surge protection, economic development and sustainability, infrastructure improvement, engineering studies or other efforts to mitigate risks and future damages and establish plans for comprehensive recovery and emergency planning efforts. Further amendments to this Action Plan may convert a portion of these planning funds to execute specific projects contemplated or developed through the planning process.

Table 46. Planning Allocation

Program	Allocation	Community Lifeline Impact	National Objective
Planning	$29,750,000.00	• Food, Water, Sheltering • Safety and Security • Hazardous Materials • Communications • Transportation • Health & Medical • Energy	LMI UNM

7.7.1 Allocation and Maximum Award

Allocation Amount: $29,750,000.00

Maximum Award Amount: The minimum planning award is $10,000 and the maximum award is $5,000,000. No more than 60 awards will be made.

7.7.2 Eligible Applicants

- Non-governmental organizations (501(c)(3)) or Not for Profit Entities
- Units of Government of the USVI, including its autonomous and semi-autonomous instrumentalities
- Public or Private Institutions of Higher Learning (Universities)
- Organizations and/or vendors to conduct studies with CDBG-MIT funds

7.7.3 Eligible Activities

- HCDA section 105(a)(12) Eligible planning, urban environmental design, and policy-planning-management-capacity building activities as listed in 24 CFR 570.205.

7.7.4 Priorities

The criteria to select plans for completion will be set forth in the Planning policies and procedures developed by VIHFA.

Planning priorities include the following:

- Promote sound, sustainable mitigation planning informed by an evaluation of hazard risk, especially land-use decisions that reflect responsible floodplain management and consider future possible extreme weather events and other natural hazards and long-term risks
- Integrate mitigation measures into rebuilding activities and achieve objectives outlined in regionally or locally established plans and policies that are designed to reduce future risk to the jurisdiction
- Consider the costs and benefits of the project
- Ensure that activities will avoid disproportionate impact on vulnerable populations such as, but not limited to, families and individuals that are homeless or at risk of homelessness, the elderly, persons with disabilities, persons with alcohol or other drug addiction, persons with HIV/AIDS and their families, and public housing residents
- Ensure that activities create opportunities to address economic inequities facing local communities
- Align investments with other improvements and infrastructure development efforts
- Employ adaptable and reliable technologies to guard against premature obsolescence of infrastructure and to increase the resilience of the economy

7.7.5 Projected Start and End Date

The proposed timeline is from HUD approval through 2028. Plans that relate to projects which may be carried out with CDBG-MIT funds as part of another project will have required plan completion dates that allow time for construction completion within the program timeline.

7.8 VIHFA Administration

VIHFA administrative costs including subrecipient administration costs will not exceed five (5) percent, $38,709,400. Planning and administrative costs combined will not exceed twenty (20) percent. The VIHFA will retain the full 5 percent allocated for administrative costs associated with the CDBG-MIT allocation for purposes of oversight, management, and reporting.

The VIHFA may also set forth caps on administration and project delivery costs for partner entities and subrecipients in subsequent program guidelines and policies and procedures.

7.9 Timely Information on Application Status and Confidentiality

The VIHFA understands the importance of providing all program applicants current, accurate, and clear information throughout their application process. The processes required to deliver benefits, particularly in housing-related activities, are multi-step complex processes that require extensive documentation. Not only do applicants need to keep up to date on any missing supporting documentation or impediments to their grant award, but the program can also assist applicants in staying aware of other resources that may be available to them. Real time access to information about grant status is a priority, together with effective case management, including the ability to contact their case manager by appointment, mail, email, or phone during operation hours. Parameters will be set so that applicants will understand their expected return response times. Printed status updates to applicants who do not have access to electronic media and phone service will be provided.

In addition to program-wide information available on the CDBG-MIT area of the VIHFA's website, the Program will use printed and electronic materials, various forms of media including television and radio, publications, direct contact, and placement of flyers/posters in public facilities, neighborhood facilities, churches, and community centers to provide timely information. Program information and documents

will also be available in multiple languages to accommodate the non-English speaking participants. The website will also contain a contact number to obtain information by phone and to contact a Constituent Services Representative to request information related to applications along with a Web Form Application Status Request. There will be a link on the website to access VIHFA's secure method of requesting specific information related to the status of applications.

Prior to scheduling an in-person appointment for the intake process of their application, program applicants will receive a detailed listing of all required documentation needs. Applicants with physical disabilities and/or a need for translation services will be accommodated as needed. Scheduled updates will be made to keep the applicant updated on missing documentation and application status. Application status will be accessible to the program applicant during the processing of the application, until the eligibility determination is made, and the grant award is determined via the applicant's preferred contact method, as selected in their application. This determination of grant award will be provided to the applicant in writing.

Applicants will have an opportunity to appeal the determination of eligibility and grant award as well as provide additional documentation to support their appeal through an appeals process that will be provided to all applicants at the initial intake and posted on the Program's website. All applications, guidelines, and websites will include details on the right to file an appeal, and the process for beginning an appeal. Refer to Appendix O of the Implementation Plan– Timely Information on Application Status Policy as well.

7.9.1 Confidentiality/Personally Identifiable Information (PII)

VIHFA is committed to ensuring the privacy and confidentiality of Personally Identifiable Information (PII). The current measures of the VIHFA include distribution of an Employee Handbook during the orientation process for all new employees.

If there is a question of whether certain information is considered confidential, the employee should first check with their supervisor. All employees may be required to sign a non-disclosure agreement as a condition of employment. Employees who improperly use or disclose trade secrets or confidential business information will be subject to disciplinary action, up to and including termination of employment and legal action, even if they do not actually benefit from the disclosed information.

The protection of confidential business information and trade secrets is vital to the interests and the success of VIHFA. Such confidential information includes, but is not limited to, the following examples:

- Compensation data
- Customer lists
- Customer preferences
- Financial information
- Labor related strategies
- New materials research
- Pending projects and proposals
- Proprietary production processes
- Research and development strategies
- Scientific data
- Scientific formulae
- Specific prototypes
- Technological data
- Technological prototypes

A policy regarding confidentiality and personally identifiable information will be distributed to all contractors, consultants, vendors, contractors, auditors, and any personnel engaged on any part of the CBDG-DR program, information received via electronic media and all agreements. This fully updated policy will be included in the Action Plan. Refer to Appendix Q – Employee Handbook: Section 112 – Non-Disclosure/Confidentiality; Appendix R – Personally Identifiable Information (PII) draft policy as well.

Finally, and including all of the aforementioned information, for any application status on any program that requires an application submission, a status update can be obtained by contacting Ms. Antoinette Fleming at (340) 777-4432 or via email at anfleming@vihfa.gov. An additional phone number will be established under CDBG-MIT to provide information to the public, by making a request by email, similar to what is already being done under CDBG-DR's EnVIsion program.

7.10 Exceptions to Maximum Award Amounts

The VIHFA will make exceptions to the maximum award amounts based on its Exception Policy. Each request for an exception to the maximum award amount or other program policies will be reviewed on a case-by-case basis by VIHFA. Requests must be submitted in writing and include a justification for exceeding the maximum award amount or other policy requirements. The policy exception is not to be implemented until the VIHFA authorizes the exception in writing. Requests will be review by VIHFA and a response will be provided in writing within 45 business days.

7.11 Long-term Operation and Maintenance

The specific funding for long-term Operation and Maintenance (O&M) for infrastructure and public facility projects will depend upon what specific projects are chosen through the procurement process. The chart below is duplicative from Section 7.3 of the MIT-AP.

Program	Project Allocation	Community Lifeline Impact	National Objective
Community Resilience & Public Facilities Construction	$100,000,000.00	• Food, Water, Sheltering • Communications • Safety and Security	LMI UNM
Resilient Critical and Natural Infrastructure	$308,000,000.00	• Food, Water, Sheltering • Transportation • Health and Medical • Hazardous Materials	LMI UNM

Community Resilience and Public Facilities Construction projects selected will include items such as community shelters and multipurpose facilities dedicated to disaster preparedness. Such projects will be underwritten by VIHFA staff to ensure that the financial models upon which they are based will include funding for long term O&M. Such projects may be proposed by departments of the Territorial government acting as subrecipients or to private non-profit or for-profit groups that successfully to respond to VIHFA procurement activities. In the case of government owned facilities, the VIHFA will not find them to be eligible unless they provide assurance that sufficient funding has been dedicated from existing local taxation, or other fees or revenue that can reasonably be projected as viable sources for the Territory, with information to be collected by the VIHFA as part of the application process.

Resilient Critical and Natural Infrastructure projects will consist of food, water, sheltering, transportation, health, and medical projects and those relating to the safe and appropriate disposition of hazardous materials. This broad spectrum of potential projects will also be underwritten by VIHFA staff to ensure that the financial models upon which they are based will include funding for long term O&M. In the case of such projects that address water, transportation and other infrastructure provided by the Territorial Government or quasi-governmental entities such as WAPA, sufficient resources for O&M will have to be dedicated from available and reasonably predictable revenue sources such as taxation and user fees. Food, sheltering, health and medical projects will be required to demonstrate that sufficient reserves have been established to cover long term O&M.

Because such projects have not yet been identified, the VIHFA will include language in its policies and procedures that clearly requires dedicated revenue streams to be adequate for long term O&M for any proposed projects to be eligible for CDBG-MIT funding.

7.12 Subrecipient Expenses, Program Income, and Timely Payment

The VIHFA is currently updating its Financial Policy and Procedures to provide more detail regarding monitoring subrecipient expenditures, accounting for and managing program income and reprogramming funds in a timely manner.

Program Income is defined as "gross income generated from the use of CDBG-MIT funds." Examples of program income include, but are not limited to, the following: a) proceeds from the disposition by sale or lease of real property purchased or improved with CDBG-MIT funds, b) proceeds from the disposition of equipment purchased with CDBG-MIT funds, c) net income from the use of rental property owned by the grantee. The VIHFA does not anticipate generating any program income with the utilization of CDBG-MIT funds, and the VIHFA intends to continue to follow its practice of ensuring that any program income will be used or distributed before seeking further withdrawals from the U.S. Treasury. However, should program income be generated, the VIHFA will track the receipts within the VIHFA's financial records and report the receipts to HUD via the Disaster Recovery Grant Reporting System (DRGR) database as required in the regulations. Any program income received prior to grant closeout shall be utilized for additional eligible CDBG-MIT activities.

The updated Financial Policy and Procedures will further detail how the VIHFA will ensure that all contracts and bills that require payment are timely paid, as well as ensuring that its actual and projected expenditure of funds will be accurately reported in DRGR QPR. In conjunction with this Financial Policy and Procedure update, the VIHFA plans to enhance its SOP documents, and complete a Subrecipient Handbook that will be provided to HUD, all CDBG-MIT grantees, and subrecipients.

Upon ongoing development of the CDBG-MIT Program, this comprehensive CDBG-MIT Subrecipient Handbook builds on lessons learned from CDBG-DR operations. It will encompass administration, programmatic implementation, and compliance and monitoring, including required monitoring of subrecipient expenditures. This Handbook will serve as the guide for CDBG-MIT Program staff, grantees, and subrecipients. The purpose of the handbook will be to assure that all CDBG-MIT funds are properly managed and accounted for, to establish a process for submitting and receiving timely payments; for processing program income, if any; the rules for determining when VIHFA may recapture funds for reprogramming; instructions to ensure that actual and project expenditures are reported in DRGR QPR; and finally it will provide assurances that require grantees and subrecipients to administer their projects and programs in accordance with all CDBG-MIT rules and regulations.

Additionally, VIHFA will provide required training to grantees and subrecipients on how to use the Handbook, in addition to continuing to follow its practices for signed required agreements and approved checklists for vetting potential subrecipients for eligibility before proceeding with any steps to provide CDBG-MIT funds.

Current VIHFA processes will be further enhanced and updated with the integration of subrecipient and grantee communication via the CDBG-MIT area of the VIHFA's website, advertisements of program milestones, meetings throughout the affected areas of the territory, direct mailings regarding individual application status, and emails. Finally, the VIHFA is considering an application portal for subrecipients and grantees to check the status of submissions in real-time. VIHFA personnel will be responsible for the communication and processing of applications.



8.0 Natural Infrastructure

8.0 NATURAL INFRASTRUCTURE

Located in the Leeward Islands of the Lesser Antilles, the U.S. Virgin Islands (USVI) is approximately 40 miles east of Puerto Rico and over 1,100 miles from Miami, Florida. The USVI is a territory comprised of three main islands—Saint Croix, Saint John, and Saint Thomas—and several surrounding islands. The Territory is focused on advancing resilience strategies through carefully managing its natural infrastructure, while also carefully improving infrastructure systems on each of the major islands to maintain the natural resources it currently enjoys. This focus can continue to provide effective solutions for minimizing flooding, erosion, and runoff, by developing man-made systems that work with and mimic natural processes— known as natural infrastructure.

Natural infrastructure approaches include forest, coastal, floodplain and wetland protection, watershed restoration, wetland restoration, permeable pavement, and driveways; green roofs; and natural areas incorporated into designs and conservation easements. A natural infrastructure approach represents a successful and cost-efficient way to protect communities within the Territory. While there is much to be done to further improve the design and restoration efforts in coastal communities, this Action plan will focus on key programs that strengthen and support the natural infrastructure through data-driven solutions that improve resiliency within the Territory.

As outlined within this MIT-AP, regulations and codes are key mechanisms used within the Territory for land use and natural resource management. Many of the resources discussed within the plan are parts of the US Virgin Islands Code and additional requirements may need to be superimposed over, or “overlay”, the base regulations already in place.

Beyond the specific methods needed to assess and compare grey infrastructure against natural infrastructure options relative to their utility to mitigate risk, a framework is required that would provide additional guidance on how to further consider natural infrastructure solutions in its envisioned CDBG-MIT projects within the Territory.

The Territory has and will continue to collaborate with experts in the field of resource management to verify that projects funded through this grant maintain and sustain natural processes, while minimizing impacts to critical habitats, species composition and biodiversity. Further, the Territory will consider natural infrastructure during the CDBG-MIT project selection and program development process.



9.0 Construction Standards

9.0 CONSTRUCTION STANDARDS

In the interest of reducing the risks associated with natural hazards, the Territory will continue to seek to incorporate an industry-recognized standard for building resilient or disaster resistant structures, such as those outlined within the International Code Council construction standards that have been already adopted.

To ensure that housing activities result in resilient, energy efficient affordable housing units, the VIHFA has developed CDBG-DR Construction Standards (Standards) which are required for housing activities and projects that include CDBG-DR funding. These Standards promote energy efficiency and green building practices for new construction or rehabilitation (retrofit) residential projects. The VIHFA subrecipients and developers must utilize the VIHFA Green Building Retrofit Checklist in its entirety based on the type of structure (new construction or rehabilitation of single- or multi-family housing). The VIHFA will also incorporate the "Stronger Home" construction standards developed by FEMA and the Department of Planning and Natural Resources (DPNR).

9.1 Sustainability

All construction will implement methods that emphasize high quality, energy efficiency, sustainability, and mold resistance. All rehabilitation, reconstruction, and new construction will be designed to incorporate principles of sustainability, including water and energy efficiency, resilience, and mitigation against the impact of future disasters.

9.2 Accessibility

The use of recovery funds must meet accessibility standards, provide reasonable accommodations to persons with disabilities, and take into consideration the functional needs of persons with disabilities in the relocation process.

A checklist of accessibility requirements under the Uniform Federal Accessibility Standards (UFAS) is available at: http://www.hudexchange.info/resources/796/ufas-accessibility-checklist/. The HUD Deeming Notice 79 FR 29671 (May 23, 2014) explains when HUD recipients can use 2010 ADA Standards with exceptions, as an alternative to UFAS to comply with *Section 504*.

9.3 Green Building Standards

Within the Territory, all new construction of residential buildings or replacement and/or reconstruction of substantially damaged buildings are expected to incorporate the VIHFA's Green Building Standards recently approved by HUD, and rehabilitation of non-substantially damaged residential buildings must follow guidelines in the HUD Community Planning and Development Green Building Retrofit Checklist. Any construction subject to the Green Building Standards must meet an industry-recognized standard and achieve certification under at least one of the following programs: Energy Star; Enterprise Green Communities; LEED; ICC-700 National Building Standard; EPA Indoor AirPLUS; or any other equivalent comprehensive green building program deemed acceptable to HUD and approved by the VIHFA.

9.4 Broadband Infrastructure

Per 83 FR 8362, any substantial rehabilitation, as defined by 24 CFR 5.100, or new construction of a building with more than four rental units must include installation of broadband infrastructure, except

where the U.S. Virgin Islands documents that: a) The location of the new construction or substantial rehabilitation makes installation of broadband infrastructure infeasible; b) the cost of installing broadband infrastructure would result in a fundamental alteration in the nature of its program or activity, and/or pose an undue financial burden; or c) the structure of the housing to be substantially rehabilitated makes installation of broadband infrastructure infeasible.



10.0 Operation and Maintenance Plans

10.0 OPERATION AND MAINTENANCE PLANS

FRN-6109-N-02 allows for flexibility in the use of program income to address on-going operations and maintenance of mitigation projects. Such eligible uses include repair, operation, and maintenance of publicly owned projects financed with CDBG–MIT funds. The Territory will request an appropriate waiver in order to avail itself of this flexibility for itself and subgrantees as appropriate. Through its implementation of CDBG-MIT programs, the VIHFA will plan for the long-term operation and maintenance of infrastructure and public facilities funded with CDBG-MIT funds

Each proposed project application must identify the plan for long-term operation and maintenance of infrastructure and public facility projects funded with CDBG-MIT. The proposed project application must describe how it will fund long-term operation and maintenance for CDBG-MIT projects. The VIHFA will also address the following requirements within its policies and procedures on a program-by-program basis, including specific benchmarks instituted to ensure operations and maintenance requirements are met:

1. Resources must be identified for the operation and maintenance costs of projects assisted with CDBG-MIT funds;
2. If operations and maintenance plans are reliant on any proposed changes to existing taxation policies or tax collection practices, those changes and relevant milestones must be expressly addressed; and
3. Any public infrastructure or facilities funded with CDBG-MIT resources must illustrate the ability to account for long-term operation and maintenance needs beyond an initial investment of CDBG-MIT funds.



11.0 Cost Verification

11.0 COST VERIFICATION

At all times, construction costs must remain reasonable and consistent with market costs at the time and place of construction.

If Covered infrastructure projects are implemented in a future change to the Action Plan, the VIHFA will establish specific cost controls for infrastructure, in accordance with accepted HUD standards.

The VIHFA will review projects and test for compliance with financial standards and procedures including procurement practices and adherence to cost reasonableness for all operating costs and grant-funded activities. All program expenditures will be evaluated to ensure they are:

- Necessary and reasonable
- Allocable according to the CDBG contract
- Authorized or not prohibited under territory/local laws and regulations
- Conform to limitations or exclusions (laws, terms, conditions of award, etc.)
- Consistent with policies, regulations, and procedures
- Adequately documented.
- Compliant with all Cross Cutting Federal Requirement including Uniform Administrative Requirements at 2 CFR 200.



12.0 Building Code and Hazard Mitigation Planning

12.0 BUILDING CODE AND HAZARD MITIGATION PLANNING

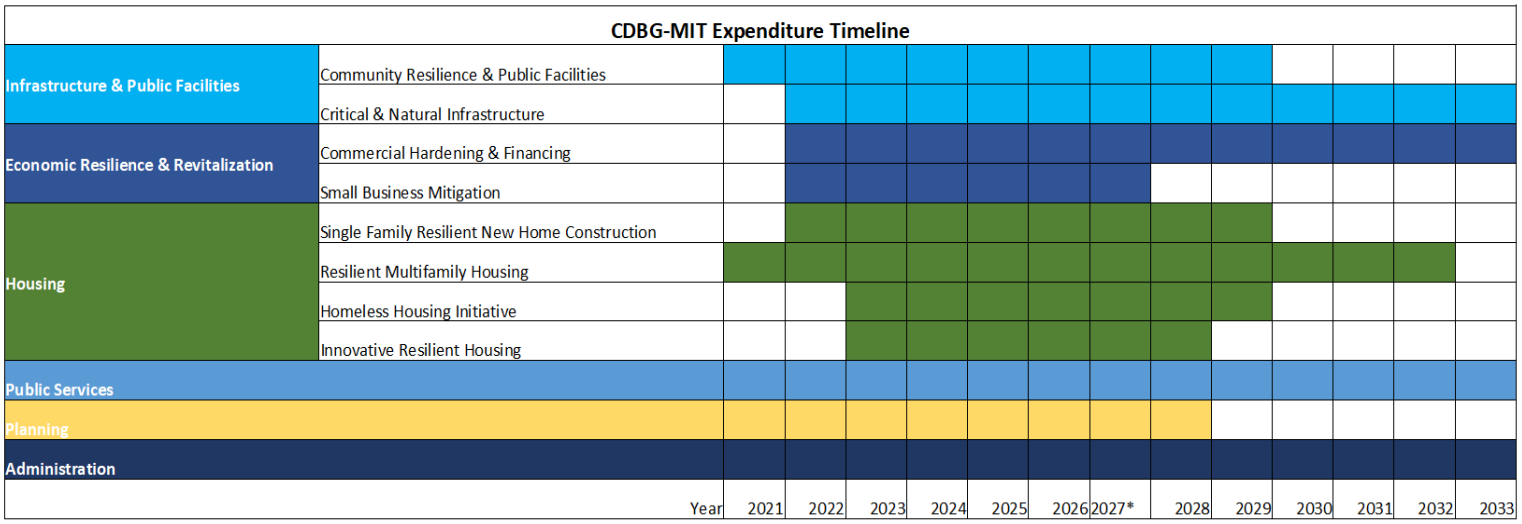
The Territory is committed to strengthening the resiliency of the islands by implementing strategies and plans; and by adopting ordinances to ensure building codes and mitigation plans are reflective of same. While no funds appropriated under Public Law 114-123 have been allocated for building code and hazard mitigation planning, these areas were already under discussion by territorial and regional agencies and collaborators, stakeholders, partners, and the local communities, prior to Hurricanes Irma and Maria. As a result of such discussions and meetings, plans have been implemented, and changes to the building codes were and still are being addressed to ensure construction and mitigation efforts result in a more resilient USVI. These areas are discussed in more detail hereinabove in Section 2.0 Long-Term Planning and Risk Mitigation Considerations and a copy of current Building Standards are in Appendix ED.

APPENDIX A: SCHEDULE OF EXPENDITURES AND OUTCOMES

The VIHFA maintains a schedule of expenditures and outcomes, periodically updated in accordance with its mandatory reporting to HUD. The schedule of expenditures and outcomes will be located at https://cdbgdr.vihfa.gov/programs/cdbg-mitigation/.

In accordance with the requirements of the Federal Register notice, these projections will be monitored and updated to achieve compliance with the following:

- 50 percent of funds will benefit low-and-moderate income persons;
- 50 percent of funds will be expended within six years; and
- 100 percent of funds will be expended within 12 years of HUD's execution of the grant agreement.



* 50% of funds expended

FIRST 6 YEARS SPENDING DETAILS (2021 – 2026):

Activity Category	Project/Program	Total Project Allocation	FY2021	FY2022	FY2023	FY2024	FY2025	FY 2026	50% Funds Expended
Infrastructure & Public Facilities	Community Resilience & Public Facilities	$102,500,000.00	$5,125,000.00	$10,250,000.00	$10,250,000.00	$10,250,000.00	$12,812,500.00	$15,375,000.00	$182,450,000.00
	Resilient Critical & Natural Infrastructure	$315,700,000.00	$0.00	$15,785,000.00	$15,785,000.00	$23,677,500.00	$23,677,500.00	$39,462,500.00	
	Total	$418,200,000.00	$5,125,000.00	$26,035,000.00	$26,035,000.00	$33,927,500.00	$36,490,000.00	$54,837,500.00	
Economic Resilience & Revitalization	Commercial Hardening & Financing	$40,962,500.00	$0.00	$2,048,125.00	$2,048,125.00	$4,096,250.00	$4,096,250.00	$6,144,375.00	$48,852,500.00
	Small Business Mitigation	$35,787,500.00	$0.00	$3,578,750.00	$3,578,750.00	$5,368,125.00	$8,946,875.00	$8,946,875.00	
	Total	$76,750,000.00	$0.00	$5,626,875.00	$5,626,875.00	$9,464,375.00	$13,043,125.00	$15,091,250.00	
Housing	Multifamily Housing	$102,500,000.00	$2,562,500.00	$5,125,000.00	$5,125,000.00	$10,250,000.00	$10,250,000.00	$15,375,000.00	$100,911,250.00
	VIHFA New Home Construction (Home Ownership)	$61,500,000.00	$0.00	$3,075,000.00	$6,150,000.00	$7,687,500.00	$9,225,000.00	$12,300,000.00	
	Homeless Housing Initiative	$23,575,000.00	$0.00	$0.00	$1,178,750.00	$2,357,500.00	$2,357,500.00	$3,536,250.00	
	Innovative Resilient Housing	$5,125,000.00	$0.00	$0.00	$768,750.00	$1,281,250.00	$1,281,250.00	$1,025,000.00	
	Total	$192,700,000.00	$2,562,500.00	$8,200,000.00	$13,222,500.00	$21,576,250.00	$23,113,750.00	$32,236,250.00	
Public Services		$15,400,000.00	$0.00	$1,540,000.00	$1,540,000.00	$1,540,000.00	$1,540,000.00	$1,540,000.00	$7,700,000.00
Planning		$32,428,600.00	$3,242,860.00	$6,485,720.00	$8,107,150.00	$4,864,290.00	$3,242,860.00	$4,053,575.00	$29,996,455.00
Administration		$38,709,400.00	$967,735.00	$1,935,470.00	$1,935,470.00	$3,870,940.00	$3,870,940.00	$4,838,675.00	$17,419,230.00
Total Per Fiscal Year			$11,898,095.00	$49,823,065.00	$56,466,995.00	$75,243,355.00	$81,300,675.00	$112,597,250.00	$387,329,435.00

SECOND 6 YEARS SPENDING DETAILS (2027 – 2033):

Activity Category	Project/Program	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	Remaining 50% Funds Expended
Infrastructure & Public Facilities	Community Resilience & Public Facilities	$17,937,500.00	$15,375,000.00	$5,125,000.00	$0.00	$0.00	$0.00	$0.00	$235,750,000.00
	Resilient Critical & Natural Infrastructure	$55,247,500.00	$47,355,000.00	$31,570,000.00	$23,677,500.00	$15,785,000.00	$15,785,000.00	$7,892,500.00	
	Total	$73,185,000.00	$62,730,000.00	$36,695,000.00	$23,677,500.00	$15,785,000.00	$15,785,000.00	$7,892,500.00	
Economic Resilience & Revitalization	Commercial Hardening & Financing	$8,192,500.00	$4,096,250.00	$4,096,250.00	$2,048,125.00	$2,048,125.00	$1,024,062.50	$1,024,062.50	$27,897,500.00
	Small Business Mitigation	$5,368,125.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
	Total	$13,560,625.00	$4,096,250.00	$4,096,250.00	$2,048,125.00	$2,048,125.00	$1,024,062.50	$1,024,062.50	
Housing	Multifamily Housing	$20,500,000.00	$12,812,500.00	$5,125,000.00	$5,125,000.00	$5,125,000.00	$5,125,000.00	$0.00	$91,788,750.00
	VIHFA New Home Construction (Home Ownership)	$15,375,000.00	$7,687,500.00	$0.00	$0.00	$0.00	$0.00	$0.00	
	Homeless Housing Initiative	$5,304,375.00	$5,304,375.00	$3,536,250.00	$0.00	$0.00	$0.00	$0.00	
	Innovative Resilient Housing	$512,500.00	$256,250.00	$0.00	$0.00	$0.00	$0.00	$0.00	
	Total	$41,691,875.00	$26,060,625.00	$8,661,250.00	$5,125,000.00	$5,125,000.00	$5,125,000.00	$0.00	
Public Services		$1,540,000.00	$1,540,000.00	$1,540,000.00	$770,000.00	$770,000.00	$770,000.00	$770,000.00	$7,700,000.00
Planning		$1,621,430.00	$810,715.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,432,145.00
Administration		$5,806,410.00	$4,838,675.00	$3,870,940.00	$1,935,470.00	$1,935,470.00	$1,935,470.00	$967,735.00	$21,290,170.00
Total Per Fiscal Year		$137,405,340.00	$100,076,265.00	$54,863,440.00	$33,556,095.00	$25,663,595.00	$24,639,532.50	$10,654,297.50	$386,858,565.00

APPENDIX B: AMENDMENTS TO THE ACTION PLAN

Amendments to the action plan will be made to update its needs assessment, modify, or create new activities, or reprogram funds, as necessary. HUD requires amendments to be included in a contiguous document to make easier tracking of program and budget changes.

Substantial Amendments are characterized by the following criteria:

- The addition of a CDBG-MIT Covered Project
- A change in program benefit or eligibility criteria
- The addition or deletion of an activity
- The allocation or reallocation of any change greater than $25 million dollars or a change constituting more than 25% of an activity's budget. Substantial amendments will be available on the U.S. Virgin Islands CDBG-MIT Action Plan website (https://cdbgdr.vihfa.gov/programs/cdbg-mitigation/) for public review and comment for at least 30 days.

Nonsubstantial Amendments are minor changes that do not materially alter the program activities or eligible beneficiaries as described above. The grantee must notify HUD five business days before the effective date of any nonsubstantial amendments. Nonsubstantial amendments will be numbered in sequence, posted to the VIFHA website, and incorporated into this Action Plan.

APPENDIX C: CERTIFICATIONS

As the responsible agency for the United States Virgin Islands CDBG-MIT funding, and as the HUD designated grantee, VIHFA makes the following certifications with its CDBG-MIT Action Plan:

a. The grantee certifies that it has in effect and is following a residential anti-displacement and relocation assistance plan in connection with any activity assisted with funding under the CDBG program.

b. The grantee certifies its compliance with restrictions on lobbying required by 24 CFR part 87, together with disclosure forms, if required by part 87.

c. The grantee certifies that the Action Plan is authorized under local law and that the grantee, and any entity or entities designated by the grantee, possess(es) the legal authority to carry out the program for which it is seeking funding, in accordance with applicable HUD regulations and this Notice. The grantee certifies that activities to be administered with funds under this Notice are consistent with its Action Plan.

d. The grantee certifies that it will comply with the acquisition and relocation requirements of the URA, as amended, and implementing regulations at 49 CFR part 24, except where waivers or alternative requirements are provided for in this Notice.

e. The grantee certifies that it will comply with section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. 1701u) and implementing regulations at 24 CFR part 135.

f. The grantee certifies that it is following a detailed citizen participation plan that satisfies the requirements of 24 CFR 91.105 or 91.115, as applicable (except as provided for in notices providing waivers and alternative requirements for this grant). Also, each local government receiving assistance must follow a detailed citizen participation plan that satisfies the requirements of 24 CFR 570.486 (except as provided for in notices providing waivers and alternative requirements for this grant).

g. The grantee certifies that it has consulted with affected local governments in counties designated in covered major disaster declarations in the non-entitlement, entitlement, and tribal areas of the State in determining the uses of funds, including method of distribution of funding, or activities carried out directly by the State.

h. The grantee certifies that it is complying with each of the following criteria:

1) Funds will be used solely for necessary expenses related to disaster relief, long-term mitigation, restoration of infrastructure and housing, and economic revitalization in the most impacted and distressed areas for which the President declared a major disaster in 2016 pursuant to the Robert T. Stafford Disaster Relief and emergency Assistance Act of 1974 (42 U.S.C. 5121 et seq.).
2) With respect to activities expected to be assisted with CDBG-MIT funds, the Action Plan has been developed to give the maximum feasible priority to activities that will benefit low- and moderate-income families.
3) The aggregate use of CDBG-MIT funds shall principally benefit low- and moderate-income families in a manner that ensures that at least 50 percent of the grant amount is expended for activities that benefit such persons.
4) The grantee will not attempt to recover any capital costs of public improvements assisted with CDBG-MIT grant funds, by assessing any amount against properties owned and occupied by

persons of low- and moderate-income, including any fee charged or assessment made as a condition of obtaining access to such public improvements, unless:

(a) disaster mitigation grant funds are used to pay the proportion of such fee or assessment that relates to the capital costs of such public improvements that are financed from revenue sources other than under this title; or

(b) for purposes of assessing any amount against properties owned and occupied persons of moderate income, the grantee certifies to the Secretary that it lacks sufficient CDBG funds (in any form) to comply with the requirements of clause (a).

i. The grantee certifies that it will conduct and carry out the grant in conformity with title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d) and the Fair Housing Act (42 U.S.C. 3601–3619) and implementing regulations, and that it will affirmatively further fair housing. The grantee further certifies it will comply with 24 CFR Part 570 Subpart K – Other Program Requirements, including Section 109 of the Act, Labor Standards (including the Contract Work Hours and Safety Standards Act), Environmental Standards at 24 CFR Part 58, NFIP standards at 24 CFR Part 91 and Section 202(a) of the Flood Disaster Protection Act, minimizing displacement and 42 U.S.C. 4601-4655, Employment and contracting opportunities as set in Executive Order 11246 and amending executive orders, Equal Employment Opportunity, Equal Protection of the Laws for Faith-Based and Community Organizations, 67 FR 77141, and the implementation regulations at 41 CFR chapter 60, Section 3 of the Housing and Urban Development Act of 1968 and implementing regulations at 24 CFR Part 135, the Lead-Based Paint Poisoning Prevention Act and Residential Lead Based Pain Hazard Reduction Act of 1992, 24 CFR Part 5, 2 CFR Part 200, Conflict of Interest Provisions in 2 CFR Part 200.317 and 200.318 or as otherwise stated in 24 CFR Part 570.611, Executive Order 12372, eligibility restrictions for certain resident aliens, the Architectural Barriers Act and Americans with Disabilities Act, and housing counseling as defined in 24 CFR Part 5.100, if applicable. Complete certifications are found in 24 CFR Part 570.600 through 570.615.

j. The grantee certifies that it has adopted and is enforcing the following policies. In addition, States receiving a direct award must certify that they will require UGLGs that receive grant funds to certify that they have adopted and are enforcing:

1) A policy prohibiting the use of excessive force by law enforcement agencies within its jurisdiction against any individuals engaged in nonviolent civil rights demonstrations; and
2) A policy of enforcing applicable State and local laws against physically barring entrance to or exit from a facility or location that is the subject of such nonviolent civil rights demonstrations within its jurisdiction.

k. The grantee certifies that it (and any subrecipient or administering entity) currently has or will develop and maintain the capacity to carry out disaster mitigation activities in a timely manner and that the grantee has reviewed the requirements of this notice. The grantee certifies to the accuracy of its Public Law 114-254 Financial Management and Grant Compliance certification checklist, or other recent certification submission, if approved by HUD, and related supporting documentation referenced at A.1.a under Section VI and its Implementation Plan and Capacity Assessment and related submission to HUD referenced at A.1.b under Section VI.

l. The grantee certifies that it considered the following resources in the preparation of its action plan, as appropriate: FEMA Local Mitigation Planning Handbook: https:// www.fema.gov/media-library-data/ 20130726-1910-25045-9160/fema_local_ mitigation_handbook.pdf; DHS Office of Infrastructure Protection: https:// www.dhs.gov/sites/default/files/ publications/ip-fact-sheet-508.pdf; National Association of Counties, Improving Lifelines (2014): https:// www.naco.org/sites/default/files/ documents/NACo_ResilientCounties_ Lifelines_Nov2014.pdf; the National Interagency Coordination

Center (NICC) for coordinating the mobilization of resources for wildland fire: https://www.nifc.gov/nicc/); the U.S. Forest Service's resources around wildland fire (https://www.fs.fed.us/managing-land/ fire); and HUD's CPD Mapping tool: https://egis.hud.gov/cpdmaps/.

m. The grantee will not use grant funds for any activity in an area identified as flood prone for land use or hazard mitigation planning purposes by the State, local, or tribal government or delineated as a special flood hazard area (or 100-year floodplain) in FEMA's most recent flood advisory maps, unless it also ensures that the action is designed or modified to minimize harm to or within the floodplain, in accordance with Executive Order 11988 and 24 CFR part 55. The relevant data source for this provision is the State, local and tribal government land use regulations and hazard mitigation plan and the latest issued FEMA data or guidance, which includes advisory data (such as Advisory Base Flood Elevations) or preliminary and final Flood Insurance Rate Maps.

n. The grantee certifies that its activities concerning lead-based paint will comply with the requirements of 24 CFR part 35, subparts A, B, J, K, and R.

o. The grantee certifies that it will comply with environmental requirements at 24 CFR Part 58.

p. The grantee certifies that its activities concerning lead-based paint will comply with the requirements of 24 CFR part 35, subparts A, B, J, K, and R. o. The grantee certifies that it will comply with environmental requirements at 24 CFR Part 58. p. The grantee certifies that it will comply with applicable laws.



Signature

06/14/2021

Date

Daryl Griffith, Executive Director

Printed Name and Role

APPENDIX D: COMMUNITY PARTICIPATION AND PUBLIC COMMENT

The VIHFA values the input of its many affected citizens, decision makers, and stakeholders representing the vulnerable communities that suffered the impacts of Hurricanes Irma and Maria. As set forth in the Notice at Page 45852, Section V.A. 3.a.; based upon the allocation designated for the Territory, the VIHFA was required to convene at least three (3) public hearings in the HUD identified MID areas (the entire USVI is a HUD MID area) to obtain citizen views; and to respond to proposals and questions. The Notice further requires that one of the public hearings must be held prior to the publication of public comment of its Plan on the website; and that all hearings are convened in different locations in order to ensure geographic balance and maximum accessibility.

HUD has determined the entire Territory to be a MID area, thus eliminating meeting location concerns. As such, COVID-19 and its impact have moved public meetings across the globe from place or location-based to virtual based environments; the USVI notwithstanding. Thus, the Territory has utilized the most popular and accessible technology in order to reach the full breadth of the USVI MID. The technology is inclusive of all media and social media venues, including the internet via Facebook, Zoom, Go-To Meeting, or similar applications, radio, and television, taking into account the realities of the current COVID-19 pandemic and the corresponding need to factor social distancing into public outreach. The amount of public participation in these virtual meetings has far surpassed the number of participants who have participated in any of the previous “in person” public hearings held by the VIHFA. Additionally, the use of technology such as Facebook preserved recordings of the entire proceedings which were then available to the public to review in an asynchronous time frame if they were unable to attend the live event. For example, 3,400 people viewed the November 12th public hearing; 741 people viewed the November 19th public hearing; and 5,600 people viewed the December 2nd public hearing. The VIHFA appreciates HUD’s flexibility in allowing virtual public participation in light of the COVID 19 pandemic—doing so dramatically enhanced the public’s participation in this process.

It has been the primary goal of the public hearing process to create an environment to receive feedback and guidance from citizens and stakeholders throughout the Territory in order to shape project and program design, allocation amounts, and community needs. Further, the driver of community engagement and impacted jurisdictions is to course-correct the Plan and to include elements that may have been overlooked. It is difficult to gauge reactions on sometimes divisive issues, such as new construction or development, which has both significant supporters and understandable hesitance. VIHFA will work to incorporate feedback into program development to ensure that the programs that are funded, are effectively meeting the needs of the affected individuals.

This appendix is designed to include all prescriptive authority. Thus, the following sections are included hereunder to meet such compliance with the public engagement regulations under the Notice.

a. (D-1) Provide information on Community Engagement; particularly, the 3 required public hearings
b. (D-2) Copies of Public Notices
c. (D-3) Website Links for easy access to materials presented at public hearings
d. (D-4) Website Links to screen shots of Attendees, Facebook Views, and Chat Discussions
e. (D-5) Survey and Summary of Data
f. (D-6) Intent to develop Citizen Advisory Committee
g. (D-7) Complaints, Appeals, and Website Information
h. (D-8) Comments and Responses

D-1 Community Engagement

The VIHFA convened three (3) public hearings prior to posting the Draft Action Plan (Draft), as well as three (3) public meetings following its publication; all were done virtually, rather than in-person due to the COVID-19 pandemic, The details and documentation from these hearings are presented herein and/or on the website links that are provided to allow quick access to all information related to the hearings.

Prior to the completion of the Draft, the VIHFA held a series of public engagements that were designed to inform people (residents, public agencies, decision makers, stakeholders, etc.) of the coming events, the unique opportunity presented by the CDBG-MIT funding, and to encourage the public to present information regarding potential mitigation needs in the territory, as well as considering best ways to engage the public both pre-COVID-19; and post-COVID-19. While the details of the three preliminary engagements are not included in detail as a part of the below discussion, information on the engagements are indicated on the charts below to show that the VIHFA executed robust outreach efforts prior to the completion of the CDBG-MIT Action Plan. In addition to the public hearings reflected hereunder, other outreach events that were held prior to posting the Draft, are reflected in the charts below.

The following meetings were held after the submission of the Draft Action Plan.

Activity	Date	Details	Type of Meeting	Total ZOOM Participants	Total Facebook Comments/ Views
Draft Action Plan Meeting 1	11/12/20	Zoom with Facebook Live Link Town Hall Meeting	Virtual	28	11/3,400
Draft Action Plan Meeting 2	11/19/20	Zoom with Facebook Live Link Townhall Meeting	Virtual	42	5/741
Draft Action Plan Meeting 3	12/3/20	Zoom with Facebook Live Townhall Meeting; Radio and Television spots for hearing	Virtual	45	9/5,600
Totals				**115**	**98/3,792**

The VIHFA presented PowerPoint Presentations during the Zoom and GoTo meetings that outlined the authority for the funding, allocations, eligible activities, national objectives, funding priorities, etc. Consultants, Experts, and Officials of the VIHFA were responsive to comments and questions that arose during the hearings.

The PowerPoint Presentations used at the meetings are discussed further in Section D-3.

Attendees of Public Hearing Number 1 after Publishing the CDBG-MIT Action Plan Draft (Virtual Sign-In-Sheet)

1. **Brenna Minor**
2. **Keva Miller**
3. **Andrew Thorley**
4. **Neal Rackleff**
5. **Alma Winkfield**
6. **Antoinette Fleming**
7. **Barbara Walsh**
8. **Brittany Brin Robinson**
9. **Condon John**
10. **D. Douglas**
11. **Daryl Griffith**
12. **David Martin**
13. **Genevieve Whitaker**
14. **Gio Moss**
15. **Jason Budsan**
16. **Kent Brenier**
17. **Kim Poss**
18. **Margaruru**
19. **Melvin Mathurin**
20. **Miguel Quinones**
21. **Mario Leonard**
22. **O. Davis**
23. **Rafael**
24. **Sandra Lashley**
25. **Shakeema**
26. **Shoup02061**
27. **Tania Serrano**
28. **TSG**

Speakers of Public Hearing Number 1: Ms. Keva Muller, Mr. Daryl Griffith, Mr. David Martin, Ms. Antoinette Fleming, and Mr. Neal Rackleff

Attendees of Public Hearing Number 2 (Virtual Sign-In)

1. **Brenna Minor**
2. **Keva Muller**
3. **Andrew Thorley**
4. **Adrain Lailaw**
5. **Daryl Griffith**
6. **Qiyamah Rahman – St. Croix**
7. **David Martin**
8. **Alexis George**
9. **Anthia Been-Buncome**
10. **Antoinette Fleming**
11. **Brian Leonard - WAPA**
12. **Derval Petersen**
13. **Devin Flaherty**
14. **Elouise S. Brown**
15. **Gary**
16. **Giovanni Moss**
17. **Graciela Rivera**
18. **Gregoired**

19. **Haldane Davies**
20. **Irose Payne-Chalon**
21. **Julia Plotkin**
22. **Karen Hunt**
23. **Louis Mills**
24. **Luana Wheatly**
25. **Mabel Maduro**
26. **Oluwafemi Banjoko**
27. **Qiyahma Rahman- St. Croix**
28. **Sahil Gulati**
29. **Sarah Mahurt**
30. **Shanika DeWindt**
31. **Sharon Coldren**
32. **Shoup02061**
33. **Susan Julius**
34. **Yvonne A. Galiber**
35. **13402770951**
36. **Peter Arianas**
37. **Richard Bourne-Vanneck**
38. **Sahil Gulati**
39. **Tamera**
40. **TSG**
41. **Zeno Bain**
42. **13406904474**

Public Hearing Speakers: Ms. Keva Muller, Mr. Daryl Griffith, Mr. David Martin, Ms. Antoinette Fleming, and Mr. Andrew Thorley

Attendees of Public Hearing Number 3 (Virtual Sign-In)

1. **Brenna Minor**
2. **Keva Muller**
3. **Andrew Thorley**
4. **Amy Dempsey**
5. **Anna and Alcedo**
6. **Antoinette Fleming**
7. **Barbara Walsh**
8. **Bonnilyn Thomas**
9. **Chaneel Callwood-Daniels**
10. **Condon John**
11. **Daryl Griffith**
12. **David Martin**
13. **Desiree Ross**
14. **Devin Flaherty**
15. **dgonzalez**
16. **D. Mercer**
17. **Dr. Hymer**
18. **Florecita Brunn**
19. **Frandelle Gerard**
20. **Giovanni Moss**
21. **Greg Guannel**
22. **Guest**
23. **Jason Browne**
24. **Jaye**
25. **Jvanna Augustine**
26. **J'Mari Clark**

27. **Johnathan Tucker**
28. **Jonetta Darden Hill**
29. **K. Fedd**
30. **Kendall Tutein**
31. **Leba**
32. **Maribel**
33. **Michal Rhymer Browne**
34. **ML Scotland**
35. **Robynn**
36. **SAMSUNG-SM-GL50U**
37. **Shawna K. Richards**
38. **Sue Southon**
39. **T. Petersen**
40. **Thora Letang**
41. **Tom Eader**
42. **Yihan Wang**
43. **TSG**
44. **13405146626**
45. **Chaneel Callwood-Daniels**

Speakers of Public Hearing Number 3: Ms. Keva Muller, Mr. Daryl Griffith, Mr. David Martin, Ms. Antoinette Fleming, Mr. Andrew Thorley

Additionally, the chart below which reflects the following pre-Draft citizen engagements that have contributed to a robust effort to obtain feedback, encourage conversation, promote good-will, and create a comfortable exchange between affected populations, decisions makers, and stakeholders, so that the needs assessed address the best and highest needs of the USVI.

The following meetings were held prior to the completion and submission of the Draft Action Plan.

Activity	Date	Details	Meeting Type	Total Participants	Facebook Comments/ Views
Public Outreach at Agriculture Festival 2020 on St Croix	2/15-16, 2/20/2020	Annual Fair provided opportunity to engage, and hand out flyers regarding mitigation	In-Person	111 persons completed the Survey during Agri Fest	N/A
Town Hall Meeting	6/11/2020	Go-To Meeting introducing through PowerPoint the process and Plan Preparation	Virtual Go-To Meeting	28 participants	N/A
Town Hall Meeting	7/9/2020	Go-To Meeting introducing through PowerPoint the process and Plan Preparation	Virtual Zoom and Facebook Live	151 participants	5/1,500

Town Hall Meeting	8/6/2020	Zoom Meeting with Facebook link introducing through PowerPoint the process and Plan Preparation	Virtual Zoom and Facebook Live	47 participants	3/196
Totals				**337**	**8/1,696**

Type of Engagement	Number Targeted/ Participated/Attendants
Zoom Meeting Participants	198
Go to Meeting Participants	28
Facebook Viewers	3,792
Facebook Comments	98
Survey Participants	199
Website Engagements	217

D-2 Links to Websites and PowerPoint Presentations

The public hearings consisted of a presentation on CDBG-MIT funding facts and potential uses. The virtual electronic/online format offered the opportunity for the VIHFA and its agents and consultants to offer immediate feedback to all participants making comments or inquiries about the grant or the proposed processes. These public comments, and their summary responses, are included in this Appendix D. The actual comments, as recorded in the chat responses, etc. are made available below and on the Website at: https://cdbgdr.vihfa.gov.

A summary of all comments submitted after the hearings; and during the comment period are summarized herein below. All such written responses are included herein, except certain voluminous attachments that were part of some of the comments and only included herein by reference; but are made available on the website at: https://cdbgdr.vihfa.gov.

D-3 Links to Websites for Screenshots of Chats and other Transcript Data

Transcripts of the chat are included below; or they can be accessed at: https://cdbgdr.vihfa.gov.

D-4 Survey and Summary Data

The VIHFA looked to engage the public to obtain input on what potential priorities should be considered in deciding on potential mitigation activities, including links to the survey in correspondence and asking the public to submit responses. Less than half of the surveys received came via email, with the remainder completed in person. The VIHFA gathered most in-person surveys at the 2020 Agricultural Festival on St Croix, with 111 of the 199 total coming during that weekend, despite rain at the popular festival lowering the number of attendees.

Even with a box and open space for comments in the survey, most respondents focused primarily on ranking in order what should be considered top priorities for the Territory to prepare for future disasters. With the top being the highest priority, the following were the options provided:

- Communications – (Alerts, dispatch/911, finance, and warnings)
- Economic Development – (Jobs creation and other sustainable neighborhood benefits)
- Energy – (Fuel and power grid)

- Food, Water, Shelter – (Food distribution and supply chain, commercial facilities, water/sewer)
- Hazardous Materials Management – (Contaminants, facilities, HAZMAT, and pollutants)
- Health and Medical – (Medical care and supply chain, patient movement, and public health)
- Housing – (Interim and permanent, owner and rental, single-family and multifamily)
- Public Services – (General health, housing/legal counseling, job training, and mental health)
- Safety and Security – (Community safety, fire/government services, and law enforcement)
- Transportation – (Aviation, maritime, mass transit, sidewalks, pathways, pedestrian infrastructure, and motor vehicle/roadway)

Even with a limited sample size, Communication, Energy, Housing, and Food/Water/Shelter were regularly ranked as top priorities by survey respondents. The link to the Survey can be found at: Disaster Recovery Plan Perception Survey (office.com) via the VIHFA website. The link for the results of the survey can also be found at: https://cdbgdr.vihfa.gov.

D-5 Citizen Advisory Committee

In compliance with the Notice, the VIHFA will develop a Citizen Advisory Committee (CAC). The CAC will convene periodically (no less than twice a year) and review the mitigation needs of the Territory. The purpose of the CAC is to provide increased transparency in the implementation of CDBG-MIT funds, to solicit and respond to public comment and input regarding the VIHFA's mitigation activities, and to serve as an on-going public forum to continuously inform the VIHFA's CDBG-MIT projects and programs.

D-6 Response to Citizen Complaints, and Appeals & Website Information

The VIHFA shall provide a written response to every complaint relative to CDBG-MIT within fifteen (15) working days of receipt. The Territory will conduct an Appeals Process to be further developed for applicants and will require any subrecipients to adopt a similar process. The process will be tiered whereby applicants will be able to appeal a decision and receive further review from another level. All sub-contractors and local government grantees will be required to develop an appeals and complaint procedure to handle all complaints or appeals from individuals who have applied for or have an interest in CDBG-MIT funding. A written appeal may be filed when dissatisfied with program policies, eligibility, level of service or other issue by including the individual facts and circumstances as well as supporting documentation to justify the appeal. Generally, the appeal should be filed with the administrating entity or sub-contractor. The appeal will be reviewed by the administrating entity with notification to the VIHFA for the purpose of securing technical assistance. If the appeal is denied or the applicant is dissatisfied with the decision, an appeal can be made to the VIHFA directly. If the VIHFA denies the appeal, the final step in the internal appeals process is to appeal to the Office of Disaster Recovery (ODR).

In programs that serve individual applicants, applicants may appeal their award determinations or denials that are contingent on Program policies. However, it should be noted that the VIHFA does not have the authority to grant an appeal of a statutory or HUD-specified CDBG-MIT requirement.

A comment period of at least forty-five (45) days, as required by HUD, shall be provided for citizens, affected local governments, and other interested parties an opportunity to comment on the initial draft and subsequent substantial amendments to the Action Plan.

In accordance with CDBG-MIT requirements, the VIHFA has developed and will maintain a comprehensive website regarding all disaster recovery activities assisted with these funds. The VIHFA will post all Action Plans and amendments on the VIHFA's CDBG-MIT website at: https://cdbgdr.vihfa.gov.

The website gives citizens an opportunity to read the plan and to submit comments. This website is featured prominently on, and is easily navigable from, VIHFA's homepage. The VIHFA will maintain the following

information on its website: action plan, any substantial amendments, all performance reports, citizen participation requirements, and activities/program information that are described in the action plan, including details on contracts and ongoing procurement opportunities and policies, including opportunities for minorities, women and other disadvantaged persons, veteran, and other historically underutilized businesses (HUB). Paper copies of the Action Plan Amendment will be available in both English (including large, 18pt type) and Spanish as needed at applicant service centers. Applicant service center locations are found at https://cdbgdr.vihfa.gov.

(intentionally left blank)

D-7 Summary of Comments

11/12/2020 Public Hearing Virtual on Zoom and Facebook Live

Comment Received:

From Barbara Walsh to Everyone: 04:49 PM

I am Barbara Walsh with VI Trail Alliance. When and how would specific projects be submitted from nonprofit t groups? Or can we submit general ideas that we would like to see implemented?

Staff Response:

With $30M of planning available, that funding can be used to look at mobility improvements and plans for the island. A lot can be done between the planning and infrastructure funding. How do you go about applying?

You can apply to do different projects or activities within the Draft Action Plan (Plan) based on program guidelines. General ideas can be submitted via comments.

The Plan lays out programs, but specific policies and procedures must be written to address the specifics. An RFP or NOFA will go out.

Comment Received:

From D. Douglas to Everyone: 04:54 PM

When do you expect to have the specifics for nonprofit RFP's?

Staff Response:

Staff pointed to the timeline in the presentation, the Action Plan itself, and offered that grant agreements would roll out in 11 months.

Comment Received:

From Jason Budsan to Everyone: 04:55 PM

Jason Budsan-Individual - Hazard mitigation materials were mentioned as a category, has an agency such as the waste management authority shown interest in funding for a project? Or public works? Thanks**.**

Staff Response:

Yes, VIHFA has worked with Department of Public Works, Waste Management, etc. and information from the Mitigation Needs Assessment has also impacted the results of the Plan.

Comment Received:

From Miguel Quinones to Everyone: 04:59 PM

Miguel Quinones-Resident. DPNR has stated that they are relying on the CDGB-MIT process to support the update of their land and water used plan, including the drafting of the scope of work and funding. Can residents contribute and review the scope to ensure that it addresses the needs of the community and promotes construction methods that better address storm water management, grey water re-use, and on-site renewable energy generation? DPNR has not generally been transparent. Thank you for sharing the plan and for the opportunity to review the documents.

Staff Response:

Public participation is generally part of the planning process; if this plan was funded it would involve public comment in the early phases.

Comment Received:

Alma Winkfield VI Trail Alliance

Categories are very appropriate. Overall theme, she hopes that some of the projects will consider:

livable communities, whether it's housing, infrastructure, etc.

Staff Response:

Thank you for your comments; they will be considered.

Comment Received:

From Barbara Walsh to Everyone: 05:14 PM

Barbara Walsh - Is there any consideration for mitigating a health or environmental disaster from the Limetree Refinery?

Staff Response:

This hasn't been specifically considered it, but it is a possibility.

11/19/2020 Public Hearing Virtual on Zoom and Facebook Live

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 04:50 PM

How much of the $774,1888,000 has already been allocated?

Staff Response:

None is technically allocated; there will be a process to establish grant awards for specific projects.

Comment Received:

What is innovative resilient housing?

Staff Response:

Making a home safe or providing a means for occupants to shelter in place.

Comment Received:

From Richard Bourne-Vanneck to Everyone: 04:50 PM

Richard P. Bourne-Vanneck, Esq. representing the St. Croix Surgery Center. I would like to comment.

He read the report and appreciated the detail in it, stating he would submit a written comment as well. He shared the following oral comments:

1) Concerned that the proposed allocations do not allocate sufficient dollars to economic resilience and revitalization.
2) Concerned about the implications of awarding projects in Infrastructure. Health care services and facilities are not represented enough. Health and medical is a lifeline, none of the lifelines address health and medical. Wants to make sure economic development addresses for-profit.
3) Infrastructure section has $308 million and should contemplate public health care. Public private partnerships important for the territory.

Staff Response:

Thank you for your comments; they are being considered.

Comment Received:

From Sharon Coldren to Everyone: 04:51 PM

How will you choose the actual individual projects? What is the process for that?

Staff Response:

A Request for Proposals (RFP) or application process will be established in program guidelines and that information will be publicly available as it is developed.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 04:52 PM

This is a considerably smaller turnout than I would have expected. What mailing listings and PR did you utilize? The STX Foundation has a non-profit consortium. I do not see any represented other than VI Partners for Healthy Communities. I think a lot more of the non-profits would want to have been involved.

Staff Response:

See Appendix D-8; a summary of outreach is also provided at the end of the presentation.

Comment Received:

From Charon Coldren to Everyone: 04:53 PM

Can a copy of your slides be put on the website, please? Great presentation.

Staff Response:

The slide presentation is located on the website under the mitigation tab: https://cdbgdr.vihfa.gov.

Comment Received:

From Brian Leonard Wapa Cell to Everyone: 04:56 PM

Brian Leonard - VIWAPA - Water: I have two verbal questions -Thought the presentation said that WAPA is ineligible. How do they know where to submit projects?

Staff Response:

There will be a section provided to select where the application will fall.

Comment Received:

Brian Leonard: Will they use their Tranche 2 application?

Staff Response:

No, please wait until there is a new application.

Comment Received:

From Alexis George to Everyone: 04:56 PM

what about the current home repair program how is that going and are there any future allocations for that program and how much?

Staff Response:

12 under construction. 12 pending. Will mitigation be used for housing repair? Most unmet need is under DR, but other homeownership type activities will happen under MIT to increase housing capacity.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 04:58 PM

where do schools and educational facilities fall in these "activity categories?

Staff Response:

Mitigation funds must be spent on activities that meet the definition of mitigation. Possibly can serve some unmet needs.

Comment Received:

From Alexis George to Everyone: 05:00 PM

What recourse can be expected for those individuals that for whatever reason doesn't qualify the program; and is it possible for non-profits to fill this gap through CDBG funds?

Staff Response:

Thank you for your questions. Please submit your comments in writing.

Comment Received:

From Sharon Coldren to Everyone: 05:01 PM

Should we trying to get you to mention our physical facilities projects desired in this plan itself?

Should members of public and PNPs be sending project ideas?

Staff Response:

Yes, please send comments to the website.

Comment Received:

From S. Edwards to Everyone: 05:02 PM

S. Edwards. Disaster Case Manager from VIPHC/LTRG. Please give examples about Commercial Hardening.

Staff Response:

Making commercial areas more resilient to disasters. Krum Bay is used as an example in the Plan.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 05:04 PM

I hope that Aldershville Senior Center will be considered for renovation as a public facility. It has been

closed for over ten years and seniors in F'sted have not had the benefit of a community center. While this is not a problem while the pandemic is raging, at some point public facilitities will be reopened. What about the seniors in F'sted?

Staff Response:

Your comments will be considered.

Comment Received:

From Shanika DeWindt to Everyone: 05:05 PM

To piggy back on Qiyamah's question, can community centers fall under this grant?

Staff Response:

Yes, they are eligible under public facilities and public services.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 05:06 PM

Some schools were previously utilized as shelters. Is that not a consideration?

Staff Response:

One goal was to create shelters that are not schools so that students could go back to school.

Comment Received:

From Hodgen to Everyone: 05:07 PM

Noel Hodge WAPA - I have a comment

WAPA Water – drought, based on a truck of water that costs $400 can. Need to expand WAPA water lines.

Staff Response:

Your comments will be considered.

Comment Received:

From Sharon Coldren to Everyone: 05:17 PM

How did you determine the allocation mix between the themes? For instance, $100M for Public Facilities and $300 M for Natural Infrastructure? What created the amounts?

Staff Response:

Explained the high cost of infrastructure construction.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 05:24 PM

thank you for making this opportunity available to share our questions!

Facebook live:

Are there plans for home construction loans and if yes when can applicants apply?

Staff Response:

This is part of VIHFA's everyday business so please don't wait for the Action Plan.

Comment Received:

From Richard Bourne-Vanneck to Everyone: 05:27 PM

To all at VIHFA, thank you for an excellent presentation and for all your hard work!

Staff Response:

Thank you.

Comment Received:

From Qiyamah Rahman-St Croix, to Everyone: 05:28 PM

Will any of the housing include solar and green technology?

Staff Response:

Yes, both the SF and MF homes will include solar and green technology.

12/03/2020 Public Hearing Virtual on Zoom and Facebook Live

Comment Received:

VI Trail Alliance, Barbara. Are the categories available on the website?

Staff Response:

Yes. The presentation is on the website under the Mitigation tab.

Comment Received:

Barbara: Can someone help explain resilient critical and natural infrastructure?

Staff Response:

I will respond to you directly.

Comment Received:

From Greg Guannel to Everyone: 01:42 PM

Another example of natural infrastructure is the drainage they built in Bovoni by the purple house

What about pedestrian walkways?

Staff Response:

May not be standalone, but as part of another project they could be.

Comment Received:

From Greg Guannel to Everyone: 01:42 PM

Natural infrastructure is everything that use natural systems or resources to help mitigate the impacts of a hazard**.**

Staff Response:

Yes.

Comment Received:

From Anna & Alcedo to Everyone: 01:38 PM

Anna Francis, in what ways will the department be able to help nonprofits?

Staff Response:

We will keep you posted on our website.

Comment Received:

From Frandelle Gerard to Everyone: 01:38 PM

Good afternoon - regarding public services and support for nonprofits, what is the definition of "public services" for vulnerable populations? Can the plan include fiber network infrastructure expansion?

Staff Response:

Depends on whether the project can meet the definition of mitigation.

Comment Received:

Sheila on STX: Can there be a creation in the government for someone who is responsible for trees/flowers and beautification of the island.

Staff Response:

UVI, Dept of Agriculture should be contacted.

Comment Received:

From Greg Guannel to Everyone: 01:53 PM

This idea of beautification could be proposed to folks working on the Tourism Master Plan (EDA funded) and maybe Vision 2040.

Staff Response:

Yes. And your comments are being considered.

Comment Received:

From Greg Guannel to Everyone: 01:54 PM

It can also be roped in with mitigation activities using natural infrastructure for stormwater retention or temperature control. Money available for Homeless services? $32 million for Planning but not exclusively for homelessness. Does Antoinette know of key people who could help with this?

Staff Response:

Antoinette will respond to you directly.

Comment Received:

From Greg Guannel to Everyone: 01:54 PM

Trees and plants help water retention and temperature mitigation. Contact UVI CES Cooperative Extension Service and Dept of Ag (in front of Bryan nursery on STT)

Staff Response:

Thank you.

Comment Received:

From Frandelle Gerard to Everyone: 01:55 PM

Caribbean Tree Planting Project is in place - contact Essence Carter at the St. Croix Foundation!

Staff Response:

Thank you

Comment Received:

From Amy Dempsey to Everyone: 01:56 PM

The UVI CES is a fantastic resource and can help guarantee that we plant native species rather than exotics which done do as well or negatively impact our native flora.

Staff Response:

Thank you; your comments are being considered.

Comment Received:

From Anna & Alcedo to Everyone: 01:42 PM

Alcedo Francis, will the revitalization plan be eligible for old and abounded properties in our local areas, such as Savan?

Staff Response:

Many of the abandoned buildings are owned by individual who would have to sell their property.

Comment Received:

From Shawna K. Richards to Everyone: 01:46 PM

Is funding for multi-family housing specifically designated for public housing (Virgin Islands Housing Authority) or will this funding be available through grants to developers/community?

Staff Response:

The majority of funds are for PHA; developers are eligible to participate.

Comment Received:

Liba – what do you mean by "" housing? To complete construction of a house that is not eligible for Vision could it be eligible in this program?

Define Innovative Resilient Housing, Andrew: the allocations

We're presenting the activities and programs but the projects are TBD.

Staff Response:

Suggests that Liba put his comment in writing with detail.

Comment Received:

From Jonetta Darden Hill to Everyone: 01:51 PM

Please expound on commercial hardening & financing definition.

Staff Response:

From Andrew Thorley to Everyone: 01:56 PM

Commercial Hardening & Financing looks at activities to minimize operational down time and accelerate recovery of commercial areas after a disaster. Privately owned commercial or industrial buildings or ports may be rehabilitated or hardened to become more resilient, for example.

Comment Received:

From Jonetta Darden Hill to Everyone: 01:58 PM

Andrew, would that encompass buildings in the enterprise zones that are both private and public connected to downtown revitalization

Staff Response:

AT to Everyone: 01:59 PM

It could - Commercial Hardening & Financing activities can upgrade private buildings with the goal of returning them to productive business use so that they are fully operating during emergencies.

Comment Received:

From Senator Hodge to Everyone: 01:53 PM

This is Senator Hodge; The Historic Districts can definitely benefit from this funding. The "Step Streets", Culverts, Guts and Sanitary Sewage Lines and Water Lines make-up the oldest infrastructure in this District. A project program and hazard mitigation plan can place garden street in this category. Is it possible that the Historic Districts qualify under the proposed program? Step Streets. Can they be covered by this program?

Staff Response:

This is a project that would need to be developed and submitted to VIHFA. Recommend putting it in writing and then a nonprofit or governmental agency could apply for the grant.

Comment Received:

From Barbara Walsh Everyone: 02:00 PM

Is there an email list we can be on for updates such as due dates regarding the Action Plan?

Staff Response:

The VIHFA issues press releases. Please feel free to drop email into the Chat.

Comment Received:

From Desiree Ross to Everyone: 02:11 PM

Request to be added to the media distribution list: usviwalkabilityinstitute@gmail.com

Staff Response:

From Andrew Thorley to Everyone: 02:05 PM

Comments on this draft CDBG-MIT Action plan can also be submitted via email using mitigation@vihfa.gov

Comment Received:

From Haley Cutler to Everyone: 02:06 PM

Good Afternoon, will these slides be available for download? Is there any chance they can be uploaded as a file in this chat?

Staff Response:

From Antoinette Fleming to Everyone: 02:06 PM

The slides will be posted on the website vihfa.gov

Actual address: https://cdbgdr.vihfa.gov/.

From Andrew Thorley to Everyone: 02:07 PM

Yes, these slides will be available on the website, along with the ones from prior presentations that have already been posted at https://cdbgdr.vihfa.gov/programs/cdbg-mitigation/.

Comment Received:

From Amy Dempsey to Everyone: 02:09 PM

One of the things we really need to address is protecting our incredible historical resources which continue to be damaged with passing storms and could be damaged by other natural disasters such as flooding or earthquakes.

Staff Response:

Thank you; your comments are being considered.

Comment Received:

From Haley Cutler to Everyone: 02:12 PM

Will nonprofits be considered eligible entities for the economic resilience & revitalization activities? i.e., commercial hardening & financing and Small Business Mitigation? Nonprofits are economic engines, they are businesses who employ people, spend money, rent spaces, etc. and reducing downtime after a disaster is absolutely critical since their "business" is helping people and our community. Please ensure nonprofits are eligible under that program for those activities.

Staff Response:

Yes.

Comment Received:

From Frandelle Gerard to Everyone: 02:12 PM

How do we go from planning to implementation?

Enhance or rethink the strategies so that VI is truly hardening the community

Staff Response:

Please put your comments in writing so that we can explain the process and provide information.

Comment Received:

From Maribel to Everyone: 02:12 PM

Please add armapaviesportsclub@gmail.com

Staff Response:

We will add it.

Comment Received:

Sheila in STX: Would it be possible to develop a small site where a structure is erected for every project that is completed is given a brick or an element to indicate that it was complete. A small monument to the work.

Staff Response:

Your comments are being considered.

This page intentionally left blank.

Note: The following comments were received by email or by U.S. mail during the 45-day comment period which began on November 3, 2020 and officially ended on December 22, 2020. Most of the comments represent great effort in detailing community needs; and contain value resource references and data. As such, we have included these comments in their entirety below. However, we are also preceding these comments with a succinct summary of each email received; the response that was sent as well. Additionally, all commenters received a general response by email; a copy of which is attached hereto as well. All commenters will be contacted to set up a date and time to discuss their comments. Some emails contained additional voluminous attachments. If such attachments are not included hereinbelow in this document; they are hereby included herein by this reference. Further, all such entire comments and attachments are posted in their entirety at www.cdgbdr.vihfa.gov; and are being considered.

NAME AND CONTACT INFORMATION	SUMMARY OF COMMENTS	STAFF RESPONSE
Commenter 1. Patrick Barber; patrik@esf6solutions.com (203 259-0281)	Advocating for a state-of the art modular housing factory; creation of job opportunities. Also asking to determine if project qualifies as a Public Facilities and Improvements activity.	Thank you for your participation in the Planning process for the mitigation funding. The VIHFA will review various eligible activities to determine the best vehicle through which the project such as you describe, can be carried out. Currently, there are allocations in the Draft where this type of project may fit. However, specific details need to be examined in order for us to determine the best approach. While your ideas are under considerations, we will be contacting you in the very near future to set up a one-on-one meeting to discuss your ideas.
Commenter 2. Rich Odman, VIP Health; 786-395-8777	Advocacy for multi-purpose health care facilities that will serve as special shelters for persons 65 and older.	Thank you for your participation in the Planning process for the mitigation funding. Health care projects certainly represent a critical care need for the VI. Your project description includes multiple service components that presents opportunities to serve multiple needs in one project. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss them.
Commenter 3. Carol Lodz-Felix	Advocacy for retaining walls for roads. Ground coverings are suggested, among other things. Also asking for consideration of stairway and walkway programs	Thank you for your participation in the Planning process for mitigation funding. The suggested items in your request point to building a more resilient Virgin Islands. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 4. USVI Research and Technology Park	Advocate targeting economic development. Mentions Section 108 capital investment model.	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development, which includes training and

Aminah Saleem, Chief of Staff; 340 474-0922 or Peter Chapman, Executive Director	Presented extensive outline on specific projects i.e., film technology, battery production and other manufacturing operations that strengthen critical lifelines.	training facilities as well. We look forward to speaking with you further regarding the models you have presented in your letter and how such models may be valuable to building a more resilient Virgin Islands. your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
NAME AN CONTACT INFORMATION	**SUMMARY OF CONTENTS**	**STAFF RESPONSE**
Commenter 5. Chris Finch, Board Member, St. Croix Children's Museum, christopherefinch@gmail.com	Mental health projects through the Children's Museum that address mental health/stress, and PTSD as a result of Irma and Maria	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public services. We look forward to speaking with you further. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 6. *Richard P. Bourne-Vanneck, Esq.* *St. Thomas, U.S. Virgin Islands for* Liberty Medical Development, LLC St. Croix Surgical Center attorneyrichardbournevanneck.com	Advocacy for Surgery Center as a catalyst for economic development and revitalization; and building medical surgical facilities	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development. We look forward to speaking with you further. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 7. Denna James, President, St. Croix Foundation for Community Development Harley Cutler, Project Manager hcutler@stxoundation.org	Advocacy for medical supply chain; and economic resiliency through critical manufacturing operations	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development. We look forward to speaking with you further. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 8. Leo R. Sibilly, President, All in the Family, LLC; Sibs4one@yahoo.com	Due to lack of mobility and access to transportation, asking for resilient modular food service facilities for l/m populations and emergency access to affordable food supplies in remote areas	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and public services. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.

Commenter 9. Sent by Zeno Bain and Carmen Guerrero Perez, Director, Caribbean Environment Protection Division, guerrero.carmen@epa.gov	Advocating for a safer more sustainable society, providing comments on more than 100 items in the Plan for consideration before submission. Asking federal government to extend submission date of submission to incorporates all of their comments	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development and other activities that are discussed in your letter. We look forward to speaking with you further. Also be advised that we will review each of the items addressed in the spreadsheet that was submitted along with your letter. If necessary, all substantial items noted; will be included in the Plan by a future substantial amendment in accordance with regulatory authority. However, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 10. Teneshia Taylor, Managing Partner, TAJ, LLC ttaylor@taj-llc.com	Real Estate Investment company specializing in HUD Programs to provide relocation assistance	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
NAME AND CONTACT INFORMATION	**SUMMARY OF COMENTS**	**STAFF RESPONSE**
Commenter 11. Jay Rollins, ED, St. Croix Recovery Group; edrn@stxltrg.org	Advocating for Solar-Supported Community Center and Workforce Development Initiative	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for economic development, etc. While your ideas are under considerations, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 12. Roger E. Merritt, Jr. ED, Virgin Islands Waste Management Authority; r.merritt@viwma.org Submitted by Juanita Iles	Advocating for solid waste improvements—in a state of deficiency since the storm	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 13. Frandelle Gerard, ED, CHNT; info@chanvi.org 340-277-4834	Advocating for funding to train and educate; and building training facilities in addressing economic resiliency	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure an economic. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.

Commenter 14. Sharon Coldren, President, Coral Bay Community Council; Sharon@coralbaycommunitycouncil.org	Advocating for non-profit partnerships in building and managing community facilities and infrastructure	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 15. Sharon Coldren, President, Coral Bay Community Council; Sharon@coralbaycommunitycouncil.org	Advocating for a Community Center inclusive of multiple quality of life components	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 16. Daniel Dabakaroff; Chief Development Officer; daniel@skulandmg.com	Mixed use development as part of multi-family housing program	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for housing development/rehabilitation. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 17: MaxCom; Duane S. McNab, President; duane@maxcom.hn	Advocating cable and fiber technology as a leader in the field	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
NAME AND CONTACT INFORMATION	**SUMMARY OF COMMENTS**	**STAFF RESPONSE**
Commenter 18. Chantel Hoheb, Executive Director of Children's Museum; chantel1025@hotmail.com	Offering ways that the museum can be a resource to the community both before and after the storm	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public services, etc. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 19. VI Water and Power Authority; Noel Hodge Submitted by Brian F. Leonard, Water Distribution Manager brian.leonard@viwapa.vi	Advocating for Water Distribution Infrastructure	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities/infrastructure. While your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.

Commenter 20. Leba Ola-Niyi ola_minka@yahoo.com	Advocating for assistance for homeowners who are ineligible to participate in Envision Tomorrow;	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for various housing initiatives and projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 21. Alonzo T. Beyene, Consultant Industry Assurance Consulting, Inc. 6303 Blue Lagoon Drive, Suite 400, Miami, FL 33126 Office#: (786) 505-1862 Email: mailto:alonzo@iacadvice.com	Advocating for high-speed wireless communications infrastructure assets (ex: 5G) are being rolled out across the globe. Such assets offer higher speeds (ex: 1GB per second and above) but tend to work better in smaller areas.	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and infrastructure projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 22. Matthew Rose Chairman, Romason Group (301) 537-2014	Advocating for capacity building, a housing factory, and economic development allocations. Expresses support of continuing efforts on behalf of the VIHFA.	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside the multiple activities you advocate for in your letter. We would like to more closely evaluate the initiatives you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 23. Barbara Walsh Virgin Islands Trail Alliance	Advocating for possible hazards presented by the Limetree facility.	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and infrastructure projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 24. Qiyamah Rahman Aldershville Senior Center 27/27A Strand Street Frederiksted St. Croix, VI 00841 revdocrok@gmail.com	Advocating for Senior Center in Frederiksted	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and infrastructure projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.

Commenter 25. Monique Clendinen Watson BlueGaulin Media Strategies, LLC Public Relations Consultant mcw@bluegaulinmedia.com	Advocating for Built Heritage and Crafts, Inc. and the Virgin Islands Museum, Civic and Cultural Center, Inc.	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and infrastructure projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.
Commenter 26. Haley Cutler St. Croix Foundation for Community Development hcutler@stxfoundation.org	Advocating for Housing - Affordable Rental Housing for Low- to Moderate-Income Residents, Affordable Commercial Space, and Innovative Nonprofit Co-Working Space to Nurture Civic Sector Collaboration, Capacity Building, and Resilience	Thank you for your participation in the Planning process for the mitigation funding. As you are aware, funds have been set aside for public facilities and infrastructure projects. We would like to more closely evaluate the initiative you describe in your letter. Thus, while your ideas are under consideration, we will be contacting you in the very near future to set up a one-on-one meeting to more fully discuss same.

Comments in their entirety submitted by email during the 45-day Comment Period

Commenter 1

Comment Received:

To whom it may concern:

By way of introduction, my name is Patrick Barber. I am the managing member of ESF6 Solutions, LLC -a private firm that partners with national homebuilders to produce environmentally sound, sustainable and resilient affordable housing. We applaud the Virgin Island Housing Finance Authority on the creation of a data-driven and comprehensive CDBG-Mitigation Action Plan. Your commitment to innovation and focus on public private partnerships to build resilience in the U.S Virgin Islands is both visionary and commendable. Our team has over 50 years of experience in federal grant (CDBG, CDBG-DR, HOME, NSP, etc.) administration, the development of affordable housing, and the private financial industry. We represent several national homebuilding partners that have constructed thousands of homes throughout the United States and the Caribbean and are committed to community service and building back better. Due to the ongoing impact of natural disasters and the national COVID-19 pandemic, we've recently been engaged on a number of large initiatives with both private and nonprofit partners. These initiatives have focused on the ongoing development of innovative and the "crisis quick" delivery of affordable housing solutions in Louisiana, Nevada, and Florida.

Our team has thoroughly reviewed the U.S Virgin Islands (USVI) draft CDBG- Mitigation Action Plan. The USVI, like many places in our country impacted by major disasters and the economic downturn of this global pandemic; has a tremendous need to build resiliency by providing access to affordable housing, create sustainable jobs, and stimulate economic growth. Our national partners have successfully addressed these critical areas of need by constructing and operating manufacturing facilities within low/moderate income

communities to produce patented modular solutions for residential and commercial uses. The design and engineering standards of these patented modular solutions exceed international and local building codes. These modular solutions are designed and constructed to be significantly more energy efficient than conventional units and address major territorial hazards such as windstorm damage from hurricanes, and earthquakes.

We are proposing that the VIHFA through this CDBG-MIT grant engage with us to build a state-of-the-art modular housing factory in the islands. The benefits to building modular are significant and manifest. We are partnered with one of the largest national homebuilders, who has developed a patented building material and system that is truly ESG-centric. The system is more environmentally efficient and resilient than traditional modular material and construction; it exceeds all of the most stringent building codes for catastrophic damage, i.e., wind, earthquake, fire; and best of all the system materials don't rely on wood or steel, thus reducing weight, and improving the overall carbon footprint. A factory like this will position the USVI at the front of the most important shift in the homebuilding industry today.

A facility or facilities located in the USVI will generate **thousands of permanent low skilled to high skilled jobs**. The output will **inject hundreds of millions of dollars annually into the local economy**, **generate millions of dollars of new tax revenue to the Territory, and make the USVI a regional leader of affordable modular housing**. This project also means the USVI will manufacture the housing to fulfill its local affordable needs, quickly recovery from future housing losses, and drastically reduce construction costs. These manufacturing jobs will build economic resiliency and provide diversification from the tourism industry.

We are committed to local partnerships and very mindful not to disrupt local construction ecosystems. Therefore, our aim is to partner with local construction firms, provide training programs for small firms and if necessary, limit our production to affordable residential and commercial uses. We are also very focused on building skills for the next generation. We would engage the local schools and Step-up programs to provide training and paid internships for local students.

The construction of a facility through a public-private partnership aligns with HUD's goals of CDBG-Mitigation funding appropriation, meets multiple HUD national objectives and addresses multiple community lifelines. The ongoing production and access to affordable housing will increase the territory's resilience to impacts from major disasters, and reduce the long-term risk of life, property loss and address homelessness. Our proposal also envisions a portion of the facility to be used as an emergency shelter.

Based on the CDBG-MIT open public forum presentation we understand that the territory must address several essential large-scale infrastructure projects. But we would recommend that you strongly consider allowing a facility of this type to be an eligible project under the Infrastructure & Public Facilities and Housing activity categories. No other project will create thousands of jobs, resilient housing, and economic stability. We would also urge the USVI to consider the ongoing use of CDBG-DR and CDBG-MIT to provide housing to low/moderate income residents of the USVI

We look forward to HUD's final approval of the USVI's CDBG-MIT Action Plan and we plan on following up with formal correspondences to the Governor's Office, the Office of Disaster Recovery, and Virgin Island.

Patrick Barber (203) 859-0280

Housing Finance Authority with additional details *on* our proposal.

Staff Response:

See summary above and general letter below.

Commenter 2

Comment Received:
Further to your November 19,2020 Public Hearing, we submit the comments below (same has also been attached).

Target Locations: U.S. Virgin Islands (USVI) Low/Moderate Income Areas

Objective: To improve access to healthcare for low/moderate income USVI residents by creating multi-purpose healthcare facilities which will also serve as special needs shelters for residents 65 and older.

Overview: Morrison VIP Healthcare, Inc. (MVIP) is a resiliency focused primary healthcare provider whose practice is centered around patients 65 years and older that reside in low/moderate income and underserved communities. The company is headed by Michele Morrison, MD, chairman, who has 30+ years of experience as a physician and complimented by Readus Smith, as president, who has 35+ years of experience in the healthcare industry.

The MVIP model incorporates education, lifestyle modifications and preventative medicine. In that, MVIP designs its local community-based healthcare facilities to comprehensively address the holistic spectrum of healthcare needs of the elderly community and will incorporate the necessary design and mitigation/hardening features to serve as special needs shelters in multiple locations throughout the territory.

MVIP will be building local healthcare provider and local nonprofit agency relationships within the US Virgin Island marketplace. Our team of dedicated community-focused healthcare professionals look forward to partnering with the Virgin Island Housing Finance Authority to utilize CDBG-MIT funding to address these major public services needs within the territory; to improve low/moderate income residents access to healthcare and build local resiliency through the provision of special needs shelters.

Best regards,

Rich Oddman

MVIP Health

786-395-8777

Pembroke Pines, Florida

Staff Response:

See summary above and general letter below.

Commenter 3

Comment Received:

Thank you for the opportunity to express my two cents of wisdom.

I think the St Thomas money should be spent on retaining walls.

We can easily see where roads are sinking, edges falling away; and rather than wait for total collapse we need to get ahead of the repair.

I would also like to see more community education and enforcement of erosion safeguards. After a heavy rain the ocean would not be brown if we were doing our job to retain our soil. I have planted clover on my steep rocky plot. It adds nitrogen to the soil, retains soil, reduces the amount of weed whacking necessary and makes for happy bees. We might also consider ground cover for the road sides instead of periodically cutting back to soil and rock.

As for housing I think most are building stronger the past few years. We need civil engineers on island to evaluate and educate. We also need more stringent inspections as part of the home purchase process. My house was sliding off a flimsy foundation and the inspector ignored slanting floors and termite infestation.

Possibly reinforcement of stairways and walkways around homes should have some attention.

I look forward to the constructive and efficient use of these monies.

Carol Lodz-Felix

Staff Response:

See summary above and general letter below.

Commenter 4

Comment Received:

USVI Research & Technology Park's

Response to the VIHFA Draft CDBG Mitigation Plan

Leveraging the USVI's CDBG Mitigation Allocation for Job-Creating Economic Development Projects

December 18, 2020

I. Framing the Issue

The 2017 hurricanes, combined with the devastating impact of the Covid-19 pandemic, have further exacerbated the Virgin Islands' already tenuous economic position. Of particular note is the decline of tourism—the driver of the Virgin Islands economy—and how this has once again exposed the fundamental risk of having an economy that relies so heavily on a single industry, and one that is so vulnerable to natural—and unnatural—disasters. The news that has recently come to light regarding the uncertain future of the Limetree Bay oil refinery is further

cause for concern regarding the Virgin Islands' prospect for recovery. Our unemployment rate has been steadily increasing, and it is presently 9.4 percent. **It is clear that if we are to prevent a wholesale economic implosion that has a long-term negative impact on our tax base, quality of life, regional and global image, and overall fiscal health, we must change course now and assume a more aggressive and creative approach to fostering the creation of jobs for our citizens. We cannot continue to conduct business as usual and expect a different outcome. And to be clear, there can be no true, sustainable disaster recovery for the Virgin Islands without *economic* recovery.** While it is encouraging that VIHFA is proposing a carve out of $75 Million for economic development in the draft CDBG Mitigation Plan, there is a need for a more targeted, best practices-oriented strategy that will produce measurable impacts for Virgin Islanders. This means, at minimum, targeting infinitely more disaster recovery funding to activities that:

a) foster public-private partnerships that leverage and stimulate maximum private investment into projects with the potential to create lots of jobs for Virgin Islanders while also expanding the tax revenue base; and

b) harness opportunities in targeted growth sectors with the potential to encourage and promote economic diversification.

The USVI's approximately $1.8 billion allocation of CDBG-DR and CDBG Mitigation funding represents the most significant opportunity the Governor and the Territory may have to advance job-creating economic development projects over the next two years. Making strategic investments of CDBG Mitigation funding into larger-scale private sector sponsored economic development projects that create lots of jobs and result in major capital investment could have a transformational impact on the Territory, thereby bolstering, for example: 1) local businesses (e.g., restaurants and small establishments devastated by Covid); 2) tax revenues (which, in turn, help support government services such as education and health and human services); and 3) the number of Virgin Islanders with employer-based health insurance and retirement benefits.

The initial disaster recovery tranches totaling over $1 billion earmarked only 6% of funding for economic development, so it is especially important that the Government of the Virgin Islands not only dedicate a larger percentage of the forthcoming HUD Mitigation tranche for projects generating private sector jobs, but also take steps to ensure that qualifying projects can be identified, underwritten and executed in a timely manner.

Larger-scale private sector projects—irrespective of industry or size of the deal—almost *always* have a financing gap after companies/real estate developers and their partners dedicate the maximum amount of debt and equity to a venture. Because of the costs associated with (re)locating a business to a particular community, and the benefits that often accrue to that community in the form of jobs and capital investment, there is typically an expectation that governments or their partner quasi-public entities, will "put skin in the game."

This is why most state and municipal jurisdictions within the mainland U.S. utilize Tax Increment Financing, New Markets Tax Credits, EB-5 capital, and customized performance-based grants, just to name a few gap financings tools, to facilitate job-creating economic development projects. **Over 1.000 U.S. Jurisdictions use different forms of CDBG (basic block grant dollars, Section 108 capital, disaster recovery funding) to support job-creating private sector ventures. By implementing this model, the USVI would simply be playing catch up with our competitor markets including Puerto Rico.**

While the USVI provides robust tax exemptions via the RTPark and the USVIEDA, **these programs do not help businesses with their front-end project needs, which often fall into the categories of construction, purchase of furniture, fixtures and equipment, and working capital. The absence of a meaningful gap financing toolbox in the USVI is one of the factors that places the Territory at a competitive disadvantage in executing larger job-creating projects.**

II. The Opportunity

With the forthcoming tranche of CDBG Mitigation funding, the USVI—via the Governor—has a unique opportunity to utilize a modest portion of this $775 million resource to stimulate private sector jobs for Virgin Islanders by providing gap financing to high-impact economic development projects. In fact, the CDBG regulations—which apply to DR and Mitigation funding—explicitly allow for financing and grants to private businesses via public-private partnerships.[5]

Indeed, this is exactly what over 1,000 jurisdictions including Puerto Rico are doing. Puerto Rico's CDBG-DR plan provides the latest example of why that jurisdiction has been infinitely more successful than the Virgin Islands in expanding its economic base. Their action plan places an explicit focus on sector-based economic development and the revitalization of distressed commercial areas and sites, and thus allocates a hefty $1.6 billion, or nearly a quarter of their CDBG-DR dollars, to job-creating economic development. Their plan also makes a concerted effort to highlight growth industries and sectors that will help the island strengthen and diversify the economy. While Puerto Rico's administration of federal monies has not been without a few challenges, their comprehensive and visionary CDBG-DR plan (the RTPark has not seen PR's Mitigation plan yet), if successfully implemented, will reinforce the Commonwealth's position as a regional economic powerhouse, thereby enabling them to capture investment that could otherwise come to the Virgin Islands.

The USVI certainly has the same flexibility as Puerto Rico in using HUD disaster recovery dollars in a creative manner that fosters private sector jobs. **The problem, however, is that the existing process and system for administering HUD funding in the USVI does not allow for expeditious (nor technically proficient) underwriting and deployment of capital into private sector transactions. As any entrepreneur, corporate executive and real estate developer well knows, time is money, and wasted time kills deals.**

III. The Proposal

To accelerate progress in fostering the creation and attraction of quality jobs for Virgin Islanders, **the RTPark proposes that the Governor carve out a modest amount of HUD Mitigation funding—ideally $60 million—and allow the RTPark and its partners to underwrite and place these dollars into private sector deals—as loans, not grants—on behalf of the Territory. In this respect, the RTPark would simply be a subrecipient in the same way that VIDOL and VIPA have been subrecipients in administering CDBG-DR funding.** The RTPark team has deep experience in development finance, financial-product development, economic development underwriting and credit analysis, and CDBG fund administration. Having been recently designated as a best-in-class economic development organization by the International Economic Development Council (IEDC), the RTPark now has a level of credibility and stature that will serve the Virgin Islands well as it seeks to expand the pipeline of prospective new employers with the potential to bring quality jobs to the Territory.

Moreover, the RTPark's **strategic partnership with the National Development Council (NDC)—one of the largest U.S. Treasury-certified Community Development Financial Institutions in the nation—would allow for the timely and skillful underwriting and origination of these investments by an institution that is eminently respected by HUD.** This reality, combined with the RTPark's demonstrated effectiveness in getting

[5] **§ 570.203 Special economic development activities.**

(b) The provision of assistance to a private for-profit business, including, but not limited to, grants, loans, loan guarantees, interest supplements, technical assistance, and other forms of support, for any activity where the assistance is appropriate to carry out an economic development project, excluding those described as ineligible in § 570.207(a). In selecting businesses to assist under this authority, the recipient shall minimize, to the extent practicable, displacement of existing businesses and jobs in neighbourhoods.

economic development done in the Territory, makes this a logical approach toward changing course with at least a small portion of the HUD disaster recovery funds.

The RTPark has built a solid platform for business attraction over the past two years, which has resulted in the recruitment of 29 new technology and knowledge-based firms to the USVI since 2018. In recent months the organization has begun to focus more intensively on attracting high-impact companies; that is, businesses that can bring a large number of jobs and capital investment to the Territory. Following is a breakdown of actual high-impact businesses and projects in the RTPark pipeline that could be advanced with some modest infusion of HUD funds as gap financing. The RTPark has sourced these companies through lead generation partnerships with corporate site selectors and investors, and by tapping into the network of existing USVI tech entrepreneurs. (NB: While the following are RTPark business recruitment projects, the CDBG Mitigation loan funds would also be invested into non-RTPark projects. In particular, the RTPark would also target a portion of the loan capital to companies that support the USVIEDA's business attraction goals.) **These projects are the Territory's to lose, but the administration must commit itself to well-established best practices in utilizing HUD funding if the RTPark is to close these deals. It bears emphasis that some of these projects may also be a good fit for the USVIEDA, so the RTPark will seek to work collaboratively with that organization to deploy capital into these and future projects that may be of interest to the USVIEDA team.**

By structuring these investments as loans as opposed to grants, the RTPark would help the Territory revolve and recycle these precious federal dollars for future projects, thereby creating a permanent sustainable financial resource for economic development projects and local businesses.

Status quo is getting the USVI nowhere in terms of economic development, so we must change course now to foster a significant expansion of our job base.

NOTE: The following are businesses and projects that have been vetted by the RTPark, but there will be other high-impact, job-creating employers that will be sourced in the coming months which may also require gap financing in order to establish operations in the USVI.

1. **Hemp Products Manufacturer:**

- **Company Profile:** This is a cutting-edge South Korea and California-based material science company that uses a disruptive hemp processing, water, and energy technology to manufacture hemp fiber and nanosized hemp power that are used in the textile and apparel industries. The company has a test factory in Southern California. They've deiced to locate their main R&D factory to the U.S. Virgin Islands. This entity holds trade secrets for its degumming process developed by the founder Thomas Yun and his team of scientists.
- **Projected Investment:** $45 million ($40 million to come from private sources, $5 million needed in CDBG gap financing)
- **Job Creation:** 900 employees within 36 months; will create additional indirect jobs
- **Annual Production:** a typical 100 manufacturing lines factory produces 12,000 tons of premium hemp ecofiber, 1,200 tons of premium hemp nanopowder, and additional monetizable hemp byproducts each year

2. **Solar Tech Company:**

- **Company Profile: This company** uses the most advanced technology solutions in the process of producing, installing, and managing water filtration systems as well as commercial, utility-scale and residential solar energy solutions.
- **Projected Investment:** initial investment is $13 million ($10 million from private sources, $3 million needed in CDBG gap financing)
- **Job Creation:** 285 jobs over a five-year period

- **Financial Projection:** $78 million of total revenue in first year of operation. Projected to grow to $96 million revenue per year within five years

3. Indoor Vertical Farm/Food Producer:

- **Company Profile:** This company grows, harvests, packages in a single facility. All products are organic and free of pesticides, herbicides, and GMOs. Operates all year round and farm-to-fork within two hours.
- **Annual Production:** 500,000 – 1,500,000 lbs.
- **Projected Investment:** $7 million ($3.5 million from private sources, another $3.5 million needed in CDBG gap financing)
- **Job Creation**: 125 people with an average salary of $15 per hour

4. Sustainable Agriculture Grower of Disease-Free Vegetables/Other Crops:

- **Company Profile:** This unique company specializes in growing disease-free cassava lines in the U.S. Virgin Islands. Revenue is projected to be $500/acre on 20 ton per acre yield. The byproducts of cassava farming include high-quality animal feed, chips, pasta, specialty starches, etc. The long-term goal of this project is to create a vertically integrated cassava production and processing industry that provides job opportunities and growth in the USVI GDP.
- **Annual Production:** Processing facility will produce two metric units of roots/hr. Based on an 8-hour, 200 processing days per year operating schedule, the facility can process 3200 metric units per year, requiring approximately 175 acres.
- **Projected Investment**: $13 million ($8 million from private sources, $5 million needed in CDBG gap financing)
- **Job Creation**: 150 full time positions at full build out (including jobs and economic opportunities for farmers), generating more than $2.4 million in direct salaries and benefits to the island by 2028.

5. Full-Service Film Technology Complex:

- **Company Profile:** This is a full-service film technology, finance, production and distribution company. The goal of the business is to create marketable and engaging content for a global audience. The entity will entice filmmakers from around the world; increase awareness of varied filmmaking opportunities in the Virgin Islands; build critical physical and economic infrastructure; develop programs that train and provide opportunities to retain skilled industry crew; and cultivate local talent to create homegrown, culturally relevant films to distribute to a worldwide audience.
- **Annual Production:** The business plans to bring at least ten films per year to the USVI.
- **Projected Investment:** The company will invest $50M ($45 million from private sources, $5 million in CDBG gap financing needed) in infrastructure (soundstage facilities, rental houses, backlots), education programs and film finance incentives for global producers to film in the USVI.
- **Job Creation**: Up to 150 permanent jobs. The initial job growth will encompass both a construction and a film production element. The company anticipates 500 short term jobs will be created during construction. After completion of the soundstage facility, they anticipate hiring people on a full-time permanent basis.

6. Full Service Electric Vehicle and Battery Producer:

- **Company Profile:** This company produces electric trucks, electric buses, and electric cars. Currently the company has four locations worldwide: Shenzhen, China; Las Vegas, NV; San Luis Potosi, Mexico; and Santiago, Chile. They are looking to expand to the USVI to build a turnkey battery manufacturing operation. Battery buyers will include automobile manufacturers, mobile phone companies, computer manufacturers, electronic equipment manufacturers, and energy storage equipment companies.
- **Annual Production:** 1,000 KWH batteries every 24 hours
- **Projected Investment:** $50 million ($45 million from private sources, $5 million in CDBG gap financing needed)
- **Job Creation**: 1,000 positions. This will be achieved by having 100 employees for each product line per shift per day. A total of five product lines with 2 shifts per day will create approximately 1,000 jobs. Job types break down as follow:
    - Engineers: 10%
    - Managers: 10%
    - Service personnel: 20%
    - Manufacturing/production staff: 60%

7. **High-Tech Building Materials Manufacturer:**

- **Company Profile:** This is a high-tech building materials company that produces affordable products that help make structures more weather-resistant so they can more easily withstand natural disasters. Their materials have withstood 200mph winds and 2x4 wood projectiles without any damage during product tests.
- **Annual Production:** On a monthly basis, an average of 60 single family residential units and multifamily units combined with 45,000 sqf of commercial/industrial buildings will be manufactured, delivered, and assembled on a turn-key basis
- **Projected Investment:** $25 million ($22 million from private sources, $3 million in CDBG gap financing needed) for a 40,000 sf mobile facility and a 60,000 sf building to house Strongkor's production operation. The building alone would cost $3 million and a site has been identified within the STX Industrial Park.
- **Job Creation**: 200 people will be employed. These consist of 150 laborers and maintenance staff within the facility and another fifty onsite assembly workers of individual homes and commercial buildings.

This is the initial group of business ventures to potentially receive gap financing using CDBG Mitigation funds. Here's what Virgin Islanders lose if we let these specific businesses walk away:

Total Estimated Jobs: 2,810

Total Projected Investment for Companies/Projects Vetted Thus Far: $203 Million

-Est. Private Investment: $173.5 Mil. (85.4% of total cumulative est. project costs)

-Est. CDBG Mitigation Gap Financing Required for Initial Group of Projects: $29.5 Mil. ($14.6% of est. cumulative project costs)

IV. Models & Best Practices

The bottom line: We need to use some of our CDBG Mitigation money to strategically and systematically foster the creation of private sector jobs to help reduce the USVI's 9.4% unemployment rate and address myriad other challenges.

There are, literally, over 1,000 U.S. jurisdictions (including Puerto Rico) that actively use various forms of CDBG (Disaster Recovery, Section 108, regular block grant funding) for economic development lending. They include state governments as well as small towns with populations that are a fraction the size of the USVI. Using CDBG for economic development lending is neither new nor "avant garde,"; but rather, it has become a standard practice that is used to stimulate business activity and job creation. If the Virgin Islands adopts this model, it will simply be playing catch up with competitor markets that have been doing this for decades. Following are details on selected models:

Urban Institute 2002 Study on CDBG and HUD Loan Programs: https://www.urban.org/sites/default/files/publication/60771/410818-public-sector-loans-to-private-sector-businesses.pdf

HUD Website on CDBG/Section 108 Loan Funds: Section 108 Loan Guarantee Program - HUD Exchange

HUD Report on Section 108 Loan Funds: https://www.huduser.gov/portal/publications/pdf/HUD_Section108_LoanGuaranteeProgram.pdf).

Puerto Rico: https://cdbg-dr.pr.gov/en/download/construction-and-commercial-revolving-loan-program/

State of Florida: https://www.enterpriseflorida.com/wp-content/uploads/bootcamp-deo-st-fed-programs-for-rural-ed.pdf

State of Montana: https://comdev.mt.gov/Portals/95/shared/Resources/docs/ProgrammaticResources/RLFManual.pdf

Colorado: https://choosecolorado.com/doing-business/incentives-financing/cdbg-business-loan-funds/

Michigan: https://www.michiganbusiness.org/49c8a7/globalassets/documents/reports/fact-sheets/cdbg-revolving-loan-fund.pdf

Wisconsin: http://weda.org/wp-content/uploads/2017/09/MStaff-DPawlish-CDBG-CLOSE-PPTs.pdf

Town of Grand Traverse, MI: https://www.grandtraverse.org/706/CDBG-Revolving-Loan-Fund

Green Bay, WI: https://greenbaywi.gov/462/Revolving-Loan-Fund

Platteville, WI: https://www.platteville.org/sites/default/files/fileattachments/community_development/page/315/cd_brochure_may17.pdf

Albany, GA: https://www.albanyga.gov/home/showdocument?id=2119

Town of Maple Lake, Minnesota: http://ci.maple-lake.mn.us/vertical/sites/%7B499CE594-35D8-4E51-8130-0403E222C7B2%7D/uploads/RFLProgramGuidelines.pdf

Republic, County, Kansas: http://www.republiccountykansas.com/page/business-resources-incentives/covid-19-revolving-loan-funds-republic-county.html

Troy, OH: https://www.troyohio.gov/460/Economic-Development-Revolving-Loan-Fund

Concord, NH: https://nh-concord.civicplus.com/DocumentCenter/View/4041/Revolving-Loan-Program-2015?bidId=

Eureka, CA: http://www.ci.eureka.ca.gov/depts/development_services/ed/revolving_loans.asp

Please direct all questions to:

Peter H. Chapman, Executive Director & CEO or

Aminah Saleem, Chief of Staff

340.474.0922

info@uvirtpark.net

Staff Response:

See summary above and general letter below.

Commenter 5

Comment Received:

Thank you for this opportunity to add a comment for the CDBG-MIT Action Plan draft. I am writing this note on behalf of the St. Croix Children's Museum. We previously submitted a concept paper for plans for constructing a permanent children's museum home on St Croix. A copy of that paper is attached.

The Action Plan includes the following mitigation definition: "... mitigation activities are defined as those activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters." We are requesting that consideration and funding be devoted to programs that reduce suffering and hardship to children. Experiences, such as those offered by a children's museum program, can provide educational resources, parenting support, and an outlet for families to reduce stress. The Action Plan is correctly focused on programs that protect housing, businesses, and public buildings and on programs that promote economic self-sufficiency and affordable housing. We certainly understand and agree this should be the main focus. However, the amount of available funds may allow for some funding to be devoted to programs that promote healthy mental health and family support.

The University of the Virgin Islands, Caribbean Exploratory Research Center, conducted research on the mental health and behavioral health of youth and adults one-year post hurricanes Irma and Maria. The findings indicated that “there is evidence that elementary aged students across the Territory may have future issues with PTSD

(Post Traumatic Stress Syndrome) as a result of experiencing Hurricane Irma and/or Hurricane Maria and that girls may have more challenges with future PTSD than boys."[37] Their findings also indicated that "approximately 42.5% of the secondary students with enough data to compute a score may be at risk for PSDT."[38] Adults in the study were recruited from the two Federally Qualified Health Centers, on St. Croix and one on St. Thomas. Findings indicate that of the study participants results indicate that:

60.2% could have depressive symptoms.

71.4% experience moderate stress and 5.5% experience high stress

57.5 % have issues with PTSD

This research also looked at resiliency factors, finding that while the scores suggest that the majority of persons in the study have the capacity to "bounce back from the stressors of Hurricane Irma and Maria, there is still a large portion of the population who are in need of assistance with getting to the place of being able to "bounce back" from the effects of Hurricanes Irma and Maria."

A post-storm newspaper story included the following: But the storms had another, less visible impact: on the mental health of island residents. Dr. Vincentia Paul-Constantin, a mental health counselor who works with children in the public schools says, "We see ... regression in behaviors, especially with our little ones who had been potty-trained, reverted to using diapers." Among older children, Paul-Constantin says, "We see a lot of frustration, cognitive impairment, hopelessness and despair."

Infants, toddlers, and preschool children are more difficult to evaluate with surveys. They may be significantly impacted by others in their household experiencing PTSD and/or depression. "Serious depression in parents and caregivers can affect far more than the adults who are ill. It also influences the well-being of the children in their care. Because chronic and severe maternal depression has potentially far-reaching harmful effects on families and children, its widespread occurrence can undermine the future prosperity and well-being of society as a whole. When children grow up in an environment of mental illness, the development of their brains may be seriously weakened, with implications for their ability to learn as well as for their own later physical and mental health. When interventions are not available to ensure mothers' well-being and children's healthy development, the missed opportunities can be substantial." (from the Center on the Developing Child at Harvard University (2009). Maternal Depression Can Undermine the Development of Young Children)

We believe that programs like a children's museum that focuses on positive family interaction and support and mentally healthy activities for children improve a community's resilience. We hope you will agree and choose to allow such programs to compete for CDBG-MIT funds.

Thank you,

Chris Finch

Member, St. Croix Children's Museum Board of Directors

Staff Response:

See summary above and general letter below.

Commenter 6

Comment Received:

LIBERTY MEDICAL DEVELOPMENT, LLC /St. Croix Surgery Center (SCSC)

COMMENTS TO VIRGIN ISLANDS HOUSING FINANCE AUTHORITY

CDBG-MITIGATION ACTION PLAN

December 21, 2020

On November 9, 2020, the Virgin Islands Housing Finance Authority ("VIHFA") published its Community Development Block Grant – Mitigation Action Plan (the "Action Plan") and made it available for review and comment. Liberty Medical Development, LLC ("LMD") d/b/a St. Croix Surgery Center ("SCSC") entered comments into the record at a (virtual Zoom platform) public hearing held on November 19, 2020. The public comment period for written comments is to run through December 22, 2020. This submission comprises the written comments of LMD.

I. Comments regarding the Action Plan.

A. Allocations for Resilient Critical Facilities Should Include Significant Funding for Health Care Public-Private Partnerships to Provide Hazard Mitigation by Developing and Hardening Structures and Facilities.

Critical Facilities are one of the three identified areas in the Territorial Hazard Mitigation Plan that are cross-referenced to the five FEMA "Lifeline Categories".1 "Health/Medical" is one of the five specified Lifelines and includes "facilities that comprise the medical supply chain, perform public health services, facility management, patient movement, and medical care".2

1 Action Plan, Section 1.3, pg.23-24.

2 *Id,* pg. 24.

3 Action Plan, Map 6, pg. 26.

4 *Id,* pgs. 52, 53.

Plainly, the "medical supply chain" includes private sector entities because the description includes home care and pharmacies as examples. The Action Plan notes that impacts to medical facilities from the 2017 hurricanes were "profound", requiring the evacuation of over 800 patients from the Territory.

The SCSC medical facilities are relatively close to the Juan F. Luis Hospital and the St. Croix Health/Medical Community Lifeline concentration depicted in the Action Plan.3 Health/Medical Lifeline exposure is high/moderate for 3 of the 4 facilities on St. Croix, and "Consequence Classification" is high impact.

The Action Plan proposes an allocation of $315,000,000 for projects that address "Critical & Natural Infrastructure Resilience".5 Eligible applicants for project funding include a variety of governmental and

quasi-governmental units, agencies, and instrumentalities as well as “private sector entities procured to execute Public-Private Partnerships.”

6 5*Id*, pg. 95.

6Id.

7*Id,* at pg. 94.

8*Id*, pg. 78. 9*Id*, pg. 97.

LMD is a private entity that operates the SCSC and seeks project funding for the grant proposal described below through a public-private partnership endeavor for its current and potential facilities at Estate Diamond, St. Croix. Before proceeding with the specific proposal, however, it is noteworthy that the Action Plan discussion of critical infrastructure resilience begins with the statement that hardening infrastructure “[I]s critical to the Territory’s ability to mitigate risks to public health and safety even before extreme weather occurs. A high priority for the U.S. Virgin Islands will be funding activities that mitigate risks . . . particularly to the facilities that serve the health and safety of the community.”7

With respect to the health/medical lifeline it is important to understand that private health care providers and health care provider facilities in the Virgin Islands serve the health care needs of our community. Accordingly, public health care interests require support for private sector health care provider facilities. Thus, aggressive allocation of significant funding for health care public-private sector partnerships will develop resilience and provide hazard mitigation measures.

The allocation of significant funding for health care public-private partnerships to harden existing structures and facilities dedicated to the “medical supply line” is fully consistent with the definition of “mitigation activities” as the basis for prioritized mitigation projects because such allocation will increase resilience to disasters and reduce the risk of life and/or injury.8 By hardening private sector health care facilities in structured public-private partnerships the Territory will gain resources that can serve the public health needs of the community under circumstances when the public sector facilities are damaged or destroyed. Facilities such as SCSC would be invaluable resources for immediate emergency care as well as more routine procedures in the long aftermath period before full restoration of the central hospitals.

B. Increased Funding Should Be Allocated for Economic Resilience and Revitalization.

The Action Plan properly notes that economic development is a crucial component of a comprehensive mitigation program for the long-term resilience and viability of the Territory.9

However, the Action Plan proposes to allocate only 10 percent of the total CBG – MIT funding to this area, roughly divided between commercial hardening and financing and small business

mitigation.10 The 2017 hurricanes caused enormous damage to the Virgin Islands’ economy, particularly in the critical component of tourism. Economic development is furthered by diversification, and opportunities exist in the adjacent areas of medical tourism and sports tourism. Medical tourism, in particular, is uniquely attractive because it (1) generates high quality employment (much of which would further the development of the University of the Virgin Islands), (2) creates ancillary opportunities for small businesses, such as restaurants, private chefs, villas, and leisure activities, and (3) supports the overall marketing plan of the

Territory as promoted by the Department of Tourism and the Economic Development Authority. Funds allocated for workforce development projects would further economic development by expanding the pool of trained workers, particularly among the low- and moderate-income population.

CORAL BAY COMMUNITY COUNCIL Mail: 9901 Estate Emmaus, St. John, VI 00830 8-1 Estate Emmaus, Coral Bay, St. John, U.S. Virgin Islands CBCC@CoralBayCommunityCouncil.org Phone 340-776-2099 www.CoralBayCommunityCouncil.org - CBCC is a 501(c)(3) nonprofit organization - December 22, 2020 CBCC

Comments # 1 on Mitigation Action Plan draft 11 4 20 Delivered to: Mitigation@vihfa.gov

Seasons Greetings and wishing you all well,

Re: Edits to Plan

The Coral Bay Community Council (CBCC) is a 17-year-old nonprofit 501 c (3) organization in Coral Bay, St. John, which acts as a watershed management agency and environmental protection and community services agency. In the wake of the terrible hurricanes of 2017, which destroyed all four building locations for large groups (churches, old school two public buildings), CBCC at the urging of the community moved into championing a new community center to increase resilience and provide and emergency shelter and a year-round location for various community services and gatherings. CBCC's current 2020 expenditures are approximately $400,000. Full information on our work is at Coral Bay Community Council | Coral Bay Community Council on St. John in the US Virgin Islands

Thank you for the opportunity to present comments on the CDBG November 4th 2020 Mitigation Action Plan draft. These comments are related to editing individual components of the description, as an assistance to completion of the final version. A second letter is being sent with details of the needed safe room/shelter project for Coral Bay, St. John. P. 25 of PDF (p. 17 of document), the single line hurricane track for Irma is shown much further north of St. John than we have seen in any other official source. According to other official sources, it should be shown almost touching St. John's northeast shore near Coral Bay, as it went over the BVI islands right next to us. (The wind impact broader line would be more relevant and compelling to display too.) Coral Bay was in the eyewall for several hours that day, experiencing the worst winds of 185 mph and over in tornadoes. Here is the NWS summary which shows it much closer; Detailed Meteorological Summary on Hurricane Irma (weather.gov) Some much more compelling exhibits are in this report and other VI government reports than the current line drawings, if that would be useful. P. 37 of pdf (p. 29 of document) - The blue and green dots on St. John's map outside of the town of Cruz Bay do not seem to correspond with known physical locations of buildings or services (with the exception of the Coral Bay Fire Station). This needs review, and possibly highlights the need for local experts with mapping knowledge in compiling these reports. CBCC would be happy to assist with its personnel and arc-gis mapping tools. Page 2 P. 52 of PDF (p. 44 of document) – Looking at the flood hazard map of Coral Bay, St. John – a much better understanding is needed about actual potential inundation levels in a given area from rainwater. Given the topography of steep hills, certain areas of the hillsides can have vertical rushing torrents of stormwater destroying structures and road infrastructure that are outside of the flood zone – and highly dangerous – even though most of the shown flood zone might not be susceptible at all in the same storm conditions. This fact makes prudent planning for location of new facilities even more difficult. It is noted that landslides on steep slopes is discussed elsewhere, but that does not include vertical torrents of water than can take unpredictable paths in natural conditions. What steps should be taken to acknowledge and prepare for this hazard? P. 62 of pdf (p. 54 of document) - It looks like the contents of Tables 22 and 23 have been reversed, as Table 23 shows highest wind speeds in Maria on St. John – not St. X – and visa versa. P. 101 of PDF (p. 93 of document) - CBCC requests that the proposed

new Coral Bay shelter and community center facility be added to the planned physical facilities for construction list, or a companion PPP list. A multipurpose community center building providing for emergency shelter and distribution of food, water and medical is needed in the remote Coral Bay Community. Also note that the population of this community is growing in contrast to rest of USVI, as more homes are being built in this area in last 10 years, including affordable housing that opened in 2010 and 11 after the census count. Note that it might be possible to repurpose the closed Guy H. Benjamin Elementary school and adjacent Port Authority land for this purpose. This acreage is some of the only publicly owned land in Coral Bay not directly in the FEMA flood plain. A separate comment letter with more detailed information about the community center concept is being submitted. CBCC realizes the need to plan carefully for all the territory's needs, and respectfully submits that remote areas, with limited public infrastructure (including no public water or sewer) like Coral Bay may become most resilient and best handled with nonprofit organization leadership/partnership and multipurpose facilities. A local nonprofit agency can give attention to the details of management that the central territorial government simply cannot prioritize. In addition, CBCC has direct experience managing projects for stormwater management, road paving, and natural infrastructure for erosion protection, and planning, as well as using federal grants and meeting federal requirements. We look forward to participating in a number of recovery and resilience objectives. Thank you for your hard work. Sincerely, Sharon Coldren President, CBCC 10*Id*, pg. 98.

II. The CDBG-MIT Project Grant Proposal

A. The LMD Project Proposal Would Provide Significant Hazard Mitigation for Health/Medical Lifelines and Support Economic Revitalization by Immediate Development of Medical Tourism.

LMD, a U.S. Virgin Islands limited liability company, proposes a CDBG-MIT project seeking a grant of $8.5 million allocation to harden, expand and further develop the SCSC health care facilities and services at Estate Diamond, St. Croix, U.S. Virgin Islands. The purposes of this grant would be twofold:

(1) To enable SCSC to serve a target population of Medicare and Medicaid eligible older and indigent persons in the Virgin Islands who need total joint replacement and spine surgical procedures, for whom there has been no availability of services in the Virgin Islands for approximately 5 years. With this funding SCSC would build out an extended care facility suite at its St. Croix Surgery Center that would enable this target population to have these procedures done locally with appropriate post-procedure monitoring for 1-2 days prior to discharge home.

(2) To enable SCSC to strengthen, harden and expand its premises at Estate Diamond and thereby significantly expanding St. Croix's health care facilities infrastructure, which would provide critical backup facility redundancy in the event of a partial or total loss of central public hospital facilities due to windstorm or other natural disaster, particularly during the current and forecasted period reasonably expected before the Juan F. Luis Hospital can be rebuilt.

B. The Project Would Serves a Compelling Purpose and Provide Significant Public Benefits to the Health Care Services Infrastructure.

1. Lack of access to important surgical procedures.

With respect to total joint replacement and spine surgical procedures Medicare/Medicaid eligible Virgin Islands residents are not merely underserved, they are totally unserved. Although these procedures are now authorized generally on an out-patient basis, for much of this target population best practices dictate that there be an opportunity for post-procedure monitoring at the facility site before sending the patient home. Factors such as diabetes, obesity, high blood pressure and similar concerns are important considerations from the standpoint of patient safety.

An extended care facility suite is necessary to provide appropriate post-procedure monitoring and promote optimal patient care recovery outcomes. For a variety of reasons, including disadvantageous approved reimbursement rate, neither Juan F. Luis Hospital nor Schneider Regional Medical Center has scheduled total joint replacement procedures or spine surgical procedures for almost 5 years. Medicare/Medicaid eligible Virgin Islands residents needing this treatment have had to be taken off-island. The cost of travel expenses associated with bringing these patients to off-island facilities makes it difficult for physicians to undertake this on a regular basis. The result is a near total denial of access to these surgical procedures for Virgin Island Medicare/Medicaid eligible patients.

An additional benefit of funding build out of an extended care suite would be the potential for the suite to serve a variety of short term stay patient procedures in the immediate aftermath of a major hurricane event. For example, maternity patients could have deliveries in situations where hospital services are suspended following a severe storm.

SCSC has the available space at its Estate Diamond premises to develop an extended care facility suite that would accommodate the need for Medicare/Medicaid eligible patients following total joint replacement and/or spine surgical procedures. Best estimates put the cost of building out the extended care suite at approximately $1,000,000.

2. Capital projects to upgrade and harden the Estate Diamond building.

When originally constructed in 1999 the Estate Diamond building was considered to be a state-of-the-art office building in which almost all mechanical equipment (air conditioning, electrical, etc.) were located inside the building itself. Unfortunately, the original building owner, the former Innovative Communications company, went through a protracted bankruptcy receivership, during which much maintenance was deferred. After 20 years, the useful life of several building components, notably the elevator system, exterior wall weatherproofing, roof membrane, and parking lots now need replacement or major refurbishment, LMD seeks funding to replace both existing elevator cabs and add a new exterior medical service elevator that would connect to the second floor surgical suite, replace the roof membrane, strengthen and restore waterproofing on two exterior walls, replace interior A/C handlers, resurface the parking lots, improve drainage, and renovate the exterior lighting, and make other capital improvements. Best estimates put the total cost of these capital improvements and renovations proposed is $2,500,000.

3. Grant to support acquisition of a majority interest in the Estate Diamond building.

Currently LMD holds a leasehold estate over approximately 70% of the leasable space in the Estate Diamond building. LMD seeks a grant of $5,000,000 to serve as the down payment on a $10,000,000 purchase of the property, which includes a total of 3.402 acres of land, of which approximately 1.5 acres are undeveloped flat land adjacent to the building. If this grant were approved LMD would pay the $5,000,000 balance of the purchase price through a 20-year mortgage facility. The acquisition of the building would enable LMD to support establishment of additional services and facilities in the building in 2 respects. First, LMD would seek to partner with specialty medical practices to develop services for Veterans' care services, psychiatric care services, and urgent care services. These specialty health services areas could

be accommodated almost immediately with existing space that could be made available on an incentivized lease partnership. (In terms of long-term planning, the undeveloped land that would be included in the purchase could be used to further develop and expand these specialty practice services.) Second, LMD would be able to build out additional facilities within the building to house diagnostic services, pharmacy, and lab services.

The Estate Diamond building property presents a unique opportunity for a public-private partnership utilizing funding from the CDBG-MIT grant to acquire, harden, and improve an asset that will provide resilience to the St. Croix health services safety net, and serve to launch a host of complimentary health care services from a centrally located location connected to major island transportation networks. The undeveloped adjacent flat land provides another health/medical lifeline hazard mitigation benefit because it would be ideal for use as an emergency shelter area in the event of catastrophic storm damage to housing developments, as well as serve as a distribution area for relief supplies, in close proximity to the VIYA communications hub located in a section of the ground floor of the building.

4. Project Summary

LMD seeks total CDBG-MIT grant funding of $8,500,000 to expand, augment and further develop health care services at its SCSC Estate Diamond ambulatory surgical center facility. The grant components are: $1,000,000 for build out and development of an extended care services suite, $2,500,000 for capital improvements and renovations to harden the Estate Diamond building, and $5,000,000 for a down payment toward its $10,000,000 acquisition of the Estate Diamond property comprising the building and adjacent undeveloped land.

LMD believes the grant funding sought in this proposal, if approved, would be transformational to the health care facilities infrastructure on St. Croix, serve as the basis for meaningful expansion of health care services for elderly and indigent persons, provide a basis to launch new initiatives for Veterans care, psychiatric care, and urgent care.

Summary

These comments and description of its specific CDBG-MIT funding project have sought to address what is perceived as inadequate support for private sector engagement in the Action Plan proposed allocations, with particular reference to health care lifeline and economic development. To increase our resilience to hurricanes and other natural disasters in the area of health care we need to diversify the facility resources that would be available in the aftermath of the disaster event. We should not continue to rely solely on centralized large public hospitals. Instead, resiliency requires redundancies of facilities so that the public's health care needs can be met even when the hospital is severely damaged or destroyed. We need an alternative to mass evacuation of persons who require dialysis, or need reasonably routine medical treatment or surgical procedures. At the same, we have the opportunity to achieve these goals on St. Croix by utilizing an existing building that has withstood the 2017 hurricanes without significant damage. Moreover, the building is part of a property that includes undeveloped adjacent land ideal for further development as part of the St. Croix health care facility infrastructure. Finally, SCSC is poised for immediate launch of a medical tourism marketing plan that would leverage the CDBG-MIT funding to be an important economic development initiative with significant revenue generation potential for the Virgin Islands.

Staff Response:

See summary above and general letter below

Commenter 7

Comments Received:

Dear Virgin Islands Housing and Finance Authority,

Please accept these comments on behalf of the St. Croix Foundation for Community Development regarding the CDBG-MIT action plan, currently up for public comment.

We applaud VIHFA's approach to leveraging CDBG-MIT funds to positively and substantially impact our community's longstanding issue of inadequate services, programs, and facilities for people experiencing homelessness.

Like you, we hope that CDBG-MIT funds will help bring many projects to fruition which increase resilience and reduce risks posed by future disasters and the impending threats of climate change. We hope that these funds will be utilized in a way that creates lasting change for our community's most vulnerable residents and we implore VIHFA to root programmatic decisions in equity and sustainability.

We urge the VIHFA and the Territory to view nonprofit organizations as true partners and project champions in CDBG-MIT, and to develop program budgets and policies accordingly to meaningfully include nonprofits as potential subrecipients across all programs.

Below, we have identified several projects which St. Croix Foundation would be willing and capable of leading as subrecipients in order to serve our community. We submit these brief project overviews to you for consideration and encourage program design and budgets to be structured in a way which includes and prioritizes these projects.

1) Housing - Affordable Rental Housing for Low- to Moderate-Income Residents

The proposed project will lead to the development of seven (7) low- to moderate-income housing units. Housing will be located in Sunday Market Square, at 35 A & B King Street, and 39 Company Street. Housing will be located on the upper floors of existing, historic buildings at both addresses and in an additional new construction, two story structure adjacent to the existing historic building at 35 King Street. Existing and new structures will be hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied in to existing underground utilities, providing hurricane resilient housing for low- and moderate-income families in Christiansted town. Hardening the facilities will mean that they stand resiliently in the face of future storms and other disasters. Trying in to existing underground utilities in Sunday Market Square means residents will experience minimal downtime of critical utilities in the aftermath of a disaster. This project reduces risk to human life and reduces risk of property loss and damage. Furthermore, these properties are across the street from (extremely close proximity) to the Alexander Theater, which is a current FEMA Hazard Mitigation Grant Program project. This facility will serve as a disaster safe room and critical supply distribution point during and after a storm or other disaster. Therefore, the residents in these affordable rental units for low- to moderate- income individuals will benefit greatly from easy access to responders, food, water, and other lifesaving supplies. This project addresses an unmet need identified in the CDBG-MIT action plan by replenishing affordable rental housing for low- and moderate-income residents. These activities tie to the FEMA lifelines of shelter, food, and water.

This project substantially fulfills the HUD National Objective of *Activities Benefiting Low/Moderate Income Persons* as it is both *a Housing Activity* and an *Area Benefit Activity*. In addition to providing affordable rental housing for low- and moderate-income families, all properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income. 100% of those served by this project will be low- to moderate-income. This project has the additional benefit of helping to redevelop

properties currently blighted or in a state of disrepair in a critical corridor of commercial and tourism related activity.

Approximate cost: $3,000,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Budgeted in this amount are two ADA lifts, one each for Properties A & C where affordable housing will be located on the second floor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement.

2) **Economic Resilience & Revitalization - Affordable Commercial Space to Contribute to Economic Revitalization and Resiliency**

The proposed project will lead to the development of three (3) commercial spaces. Commercial space will be located on the ground floors at 35 King Street and 39 Company Street in Sunday Market Square. Existing structures will be hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied in to existing underground utilities, providing hurricane resilient, affordable commercial space for local businesses in Christiansted town and bringing businesses back into the Square after decades of blight. Hardening the facilities will reduce risk of property loss and tying in to existing underground utilities will reduce downtime in the aftermath of a storm, therefore helping to kickstart economic activity in the days (instead of months) following a disaster.

This project contributes to economic revitalization by replenishing affordable commercial space on the island, providing opportunity for small businesses to thrive. Historic Christiansted town is an important area in which to combat blight and doing so has positive implications for tourism and economic development. The building at 39 Company Street has stood in a severe state of disrepair since Hurricanes Hugo and Marilyn. These properties are both located in Sunday Market Square, a historically significant corridor of Christiansted town. Sunday Market Square once served as a center of economic vitality on St. Croix. It served as a center for trading among enslaved Crucians in the 1700's, the Square was a designated convening space where enslaved people were allowed to trade goods, connect with loved ones, and socialize in the marketplace on Sundays- their only day off from work. Through the years, Sunday Market Square remained a popular meeting place for residents through the 1900s. This project will result in three (3) units of affordable commercial space for lease in Sunday Market Square, facilitating the economic revitalization of this important corridor.

***This project fulfills the HUD National Objective of Activities Benefiting Low/Moderate Income Persons* as it is an *Area Benefit Activity*.** All properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income.

Approximate cost: $1,500,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement.

3) Public Services - Innovative Nonprofit Co-Working Space to Nurture Civic Sector Collaboration, Capacity Building, and Resilience

The proposed project will lead to the development of one Nonprofit Co-Working Space located at 10 Market Street in Sunday Market Square. This facility will provide meeting and convening space and affordable workspace for local nonprofit organizations who provide critical services to our community. This facility will house up to five nonprofit organizations and provide meeting and convening space for more. In the aftermath of a

disaster drop-in space will be provided to enable even more nonprofit organizations to work from the site in order to reduce operational downtime after a disaster. This facility will enable the Foundation to better provide technical assistance to nonprofits to help them build capacity and will foster collaboration as organizations are co-located, increasing their effectiveness in collectively meeting the needs of our community's most vulnerable residents. The facility will include affordable access to technology and other resources that would otherwise be out of reach for many local organizations and improve their ability to provide services to people experiencing homelessness and other critical vulnerabilities. Existing structure will be rehabilitated and hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied to existing underground utilities, providing hurricane resilient and affordable operating space for local nonprofit organizations so that they are more prepared and able to respond when our community needs them most before, during, and after a disaster.

For the purposes of the action plan, we encourage VIHFA to expand its scope of eligible activities under Public Services to include the capacity building necessary for nonprofit/civic sector organizations to scale in order to more adequately and effectively meet the needs of our community's most vulnerable. If considered an eligible activity, this project could also include training and capacity building services, provided by St. Croix Foundation, to aid the myriad of essential nonprofit organization's on St. Croix and in the Territory in improving and advancing their operations so as to be more capable and resilient in the face of future disasters. This will increase their capacity to meet the incredible unmet needs identified in the CDBG-MIT action plan and is an essential capacity building tool necessary to do so.

***This project fulfills the HUD National Objective of Activities Benefiting Low/Moderate Income Persons* as it is an *Area Benefit Activity*.** All properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income. Furthermore, the services provided by the nonprofits which will be located on site overwhelmingly benefit (at least 80%) low- to moderate-income residents.

Approximate cost: $1,000,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement. If considered an eligible activity, this budget could also include the cost of capacity building training, services, and professional development for nonprofit organization's responsible for providing critical services to address unmet needs identified in the CDBG-MIT action plan, improving their ability to meet those objectives.

These projects substantially fulfill goals outlined in the CDBG-MIT action plan. They also align with creative placemaking and other recommended strategies outlined in the Urban Land Institute's 2018 study which outlines strategies for building a resilient and equitable St. Croix (available here: https://ia71z1oozio1p7cpp37o43o1-wpengine.netdna-ssl.com/wp-content/uploads/ULI-Documents/St.Croix_ASP_2018.pdf). This mixed-use development model reflects the historic nature of Christiansted town as it is how historic towns like ours originally functioned. This model of development increases walkability, livability, and a sense of vibrant community culture in the area. Since all properties will be hardened, tied in to existing underground utilities, these projects also reduce risk of loss of life and damage to property in future disasters, and reduce downtime for commercial and critical human service activities in the aftermath of a storm or other disaster. Taken together, these projects provide a model for holistic, sustainable community development and revitalization and they meet several HUD national objectives and VIHFA action plan goals for mitigation.

If funded by CDBG-MIT, these projects will be adjacent to and will compliment an existing FEMA Hazard Mitigation Grant Program funded project also located in Sunday Market Square for which St. Croix Foundation is the subrecipient. That project, the Alexander Theater Safe Room/Building Retrofit, is a top tier FEMA HMGP project, obligated at $1.6M for Phase 1 (currently under way) and awarded more than $10M for Phase 2. The Alexander Theater Safe Room/ Building Retrofit will lead to the development of downtown Christiansted's only

disaster safe room/shelter for use during disasters, with capacity to safely house more than 300 residents. During blue skies, the Alexander Theater will serve as a performing arts center and convening space, vital for economic revitalization. The Alexander Theater shares Sunday Market Square with the properties that will be redeveloped under these CDBG-MIT projects, located directly across the street from properties mentioned herein. These two projects are complimentary, leveraging diverse philanthropic and federal recovery resources for holistic development that will finalize the transformation of this historic area, providing housing, a cultural and economic epicenter, and vibrant quality of life for St. Croix's residents, while increasing resilience to disasters and reducing or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters on residents and commercial enterprises located in the Square, and by providing resilient operating space for nonprofit organization to facilitate the critical, lifesaving services they provide to our community's most vulnerable residents.

Thank you for your leadership and service on this project.

Sincerely,

Deanna James, President

Haley Cutler, Project Manager

St. Croix Foundation for Community Development

hcutler@stxfoundation.org

Mobile: (954) 260-5601

www.stxfoundation.org

Staff Response:

See summary above and general letter below.

Commenter 8

Comment Received:

Leo R. Sibilly II

Sibs4one@yahoo.com

40-643-1215

To Whom It May Concern:

My name is Leo Sibilly and as a local business owner that has provided food service within the US Virgin Islands (USVI) for over 20 years, lived through and been involved in the recovery of multiple major storms over the last 30 years.

Due to the USVI's high concentration of low-income residents, its geographical landscape, and its high population of elderly residents with mobility issues and access to transportation. I would like to recommend that the Virgin Islands Housing Finance Authority provide CDBG Mitigation funding for resilient modular food service facilities in targeted low-income neighborhoods throughout the territory. These facilities would provide affordable food and other essential supplies to low-income residents in remote areas throughout the USVI. These facilities are essential to ensure that residents in remote areas don't suffer following major disasters and have emergency access to affordable food and supplies.

We have a partnership with a national modular fabrication company that has experience building models of these resilient modular food service facilities. I feel this would be beneficial to our economy to prepare for future emergency output locations.

I look forward to discussing this matter further with your department. Please contact me with any questions or concerns.

Leo R. Sibilly II

President, All in The Family LLC

Staff Response:

See summary above and general letter below.

Commenter 9

Comment Received:

Attention: Ms. Antoinette Fleming

On behalf of EPA, I thank you for the opportunity to submit comments on the *Draft United States Virgin Islands Community Development Block Grant – Mitigation (CDBG-MIT) Action Plan* proposing to carry out strategic and high-impact activities to mitigate risks and reduce future losses, suffering and hardship resulting from future disasters. EPA hereby provides its draft comments to the *Draft CDBG-MIT Action* Plan. Please find the attached cover letter and Microsoft Excel file, containing detailed comments. Per the attached cover letter, the EPA Regional Administrator has requested some opportunity to provide any additional comments or edits to the attached draft comments. Additionally, EPA has also contacted HUD to respectfully recommend that the federal agency considers extending the deadline imposed to VIHFA of January 4th, 2020 to submit the final CDBG Mitigation Action Plan, as VIHFA will not have sufficient time to be able to effectively evaluate and integrate all public comments within this tight timeframe, including significant comments from EPA.

EPA is committed to working collaboratively to support the Territory and the development of the CDBG Mitigation Action Plan. If you have any questions regarding this matter, please feel free to contact me.

Thank you

Zeno Bain
Sustainability Advisor USVI
US Environmental Protection Agency
202.270.7124

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2

CARIBBEAN ENVIRONMENTAL PROTECTION DIVISION
CITY VIEW PLAZA II BUILDING, 7TH FLOOR

ROUTE 165 GUAYNABO, PUERTO RICO 00968

December 22, 2020

Ms. Antoinette Fleming
Director of CDBG-DR Program

Virgin Islands Housing Finance Authority
1110 Beltjen Road

2nd Floor, Suite 200

St. Thomas, USVI 00802-6735

RE: EPA Feedback and Comments to the Draft CDBG-MIT Action Plan

Dear Ms. Antoinette Fleming:

Thank you for your commitment and work assisting disaster survivors in the Territory of the United States Virgin Islands (USVI) in the aftermath of Hurricanes Irma and María. As you may know, since the initial stages of the emergency, the U.S. Environmental Protection Agency (EPA) has been helping the USVI respond to the damages caused by these hurricanes to ensure the protection of human health and the environment. Among our continuing key priorities, we have been actively engaged in life-sustaining efforts and temporary assistance in ensuring that the public has access to clean drinking water, minimizing illegal discharges of pollutants to the waterways and in collecting and disposing of medical, electronic and household hazardous waste (HHW), among many other activities. EPA is also working in collaboration with FEMA, the Government of the Virgin Islands, local agencies, non-governmental organizations (NGOs) and communities to ensure that all disaster related response and recovery activities result in a more resilient Virgin Islands and a safer, more sustainable society.

The federal government and local governments, for more than 50 years since the creation of the EPA, share the responsibility of protecting human health and the environment. This shared responsibility facilitates exchanges of best practices, expertise, and much more. An effective environmental protection

between the federal and local governments is best achieved when they work together with the community in a spirit of trust, collaboration and partnership. To this end, we want to thank you for the opportunity to submit comments on the *Draft United States Virgin Islands Community Development Block Grant – Mitigation (CDBG-MIT) Action Plan* proposing to carry out strategic and high-impact activities to mitigate risks and reduce future losses, suffering and hardship resulting from future disasters. EPA hereby provides its draft comments to the *Draft CDBG-MIT Action Plan*, addressing public health, environmental, housing, infrastructure and economic development issues for the Virgin Islands Housing Finance Authority (VIHFA) consideration in developing the final CDBG-MIT Action Plan for the approval of the U.S. Department of Housing and Urban Development (HUD) (see enclosed *Attachment*). Additional final comments will be provided in the upcoming days by our EPA Region 2 Regional Administrator, Peter D. Lopez, who is interested in sharing additional input to the Mitigation Action Plan.

The feedback and comments to the *Draft CDBG-MIT Action Plan* were developed by subject matter experts from EPA and have been categorized by administrative, substantive or critical comments. They have also been arranged following the chapter and page number in the *Draft CDBG-MIT Action Plan* to facilitate cross-referencing. EPA has also contacted HUD to respectfully recommend that the federal agency considers extending the deadline imposed to VIHFA of January 4th, 2020 to submit the final CDBG Mitigation Action Plan, as VIHFA will not have sufficient time to be able to effectively evaluate and integrate all public comments within this tight timeframe, including significant comments from EPA.

EPA is committed to continue working collaboratively with our federal and local partners in providing support to the Government of the Virgin Islands. It is critical that the Government of the Virgin Islands is properly supported by EPA to ensure that all disaster related response and recovery activities result in a more resilient Virgin Islands and a safer, more sustainable society.

If you have any questions regarding this matter, please feel free to contact me at 787-977-5875 or guerrero.carmen@epa.gov or contact Zeno Bain, USVI EPA Sustainability Advisor at 202-270-7124 or bain.zeno@epa.gov.

I look forward to continuing our collaboration and commitment to ensure a short-term and long-term recovery for USVI and its residents. Thank you for your consideration of this request.

Cordially,

CARMEN GUERRERO PEREZ

Carmen R. Guerrero Pérez Director

Digitally signed by CARMEN GUERRERO PEREZ

Date: 2020.12.22 13:18:38

-04'00'

Caribbean Environment Protection Division EPA Region 2

cc: Jessie Huddleston

Community Planning and Development Specialist, US Department of Housing and Urban Development

Jean Pierre Oriol

Commissioner, Department of Planning and Natural Resources

Staff Response:

See summary above and general letter below, including comment chart.

Excel Attachment:

Number	Commenter Name	Page	Chapter	Comment	Comment Category (C=Critical, S=Substantive, A=Administrative)
1	Zeno Bain	1	Executive Summary	Add comma after HUD in the following sentence: "CDBG-MIT presents a new funding approach from Congress and HUD intended to protect lives and property through development of greater resilience to natural disasters"	Administrative
2	Zeno Bain	2	Executive Summary	Consider also including suffering and hardship in the following sentence: The VIHFA is focused on implementing data-informed investments through high-impact projects that will reduce risks attributable to natural disasters, with particular attention to repetitive losses of property and critical infrastructure. Revised sentence with addition in red: The VIHFA is focused on implementing data-informed investments through high-impact projects that will reduce risks, suffering and hardship attributable to natural disasters, with particular attention to repetitive losses of property and critical infrastructure.	Critical
3	Zeno Bain	2	Executive Summary	The following points should be discussed in the Executive Summary and throughout the report, including Compounding Factors section: - Urgently weak economic status verging on insolvency; the status is exacerbated by storms and pandemic. - Pre-existing condition of substandard aging deteriorated infrastructure; lack of investment, deferred maintenance, insufficient reviews to sustain critical systems. - Heavy, unsustainable debt with associated impacts of reduced liquidity, limited access to financial markets, higher costs of borrowing, etc. - USVI lacks sufficient managerial and financial resources to ensure the proper operation and fiscal integrity of critical systems. Attention should be given to supporting the restructuring of these systems to ensuring they perform adequately and are sustainable over time; attention to eliminating systematic limitations in management and financial resources available to the USVI to ensure proper function and sustainable operations of key systems.	Critical
4	Zeno Bain	2	Executive Summary	Consider adding HUD's mitigation definition to include aspects such as social capital in the following definition "Hazard mitigation is defined as any action taken to reduce or eliminate the long-term risk to human life and property from man-made or natural hazards." HUD's mitigation definition is aligned with the Disaster Recovery Reform Act (DRRA) of 2018. The 2018 DRRA is the most comprehensive reform of the Federal Emergency Management Agency's (FEMA's) disaster assistance programs improving pre-disaster planning and mitigation, response, and recovery, and increasing FEMA accountability. HUD defines mitigation as activities that increase resilience to disasters and reduce or eliminate the long-term risk	Critical

				of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters.	
5	Zeno Bain	3	Executive Summary	Include narratives about FEMA efforts to align their FEMA mitigation programs to the mitigation definition pursuant to section 1235a of the 2018 DRRA - ensures Hazard Mitigation Grant Program funding increases resilience to future damage, hardship, loss or suffering. The lack of narratives referencing the 2018 DRRA may suggest that there are two mitigation definitions; HUD's and FEMA's. Although, both agencies are working towards requirements of the 2018 DRRA. In October 2019, FEMA published the Disaster Recovery Reform Act (DRRA) Annual Report. This report provides an overview of the DRRA, highlights its alignment with FEMA's strategic goals, and describes FEMA's efforts to implement the law.	Substantive
6	Zeno Bain	3	Executive Summary	In the list of benefits of hazard mitigation, consider revising "Preventing or minimizing property damage" to "Preventing or minimizing property damage and social dislocation" and adding a new bullet to state "Reducing suffering and hardship".	Substantive
7	Zeno Bain	3	Executive Summary	In the list of benefits of hazard mitigation, consider revising "Saving lives and protecting public health" to "Saving lives and protecting public health and the environment".	Substantive
8	Zeno Bain	3	Executive Summary	Add the following to the list of hazard mitigation measures: - asset management; - reduced debris generation, waste diversion and sustainable materials management programs; - medical waste management standard operating procedures; - industrial facility mapping and assessment associated with environmental release; - water reuse and recycling, including additional measures for catchment/retention; - cistern and septic system outreach, education and maintenance programs; and - proper stormwater management and use of green infrastructure.	Critical
9	Zeno Bain	3	Executive Summary	Add the following to the list of Benefits of hazard mitigation: - protection of the environment and green infrastructure;	Critical
10	Zeno Bain	6	Executive Summary	In the first paragraph, the focus is on developing new resilient affordable housing stock. Consider programs for the rehabilitation of abandoned housing stock, single family and multi-family. The Territory should consider a tax to promote homeowners to develop or sell abandoned homes. Many cases homes are abondonded and forgotten about for various reasons (e.g., uninterested children, deceased, disaster damage, relocation).	Critical
11	Kevin Kijanka	8	1.3	The link returns a "page not found" error.	Administrative
12	Zeno Bain	10	1.2	Consider additions in red in the first sentence of section: The risk assessment methodology utilized in this Mitigation Needs Assessment (MNA) is the same as was utilized in the 2019 Territorial Hazard Mitigation Plan (THMP), but additional hazards and the incorporation of post disasters data and risk will be adopted.	Critical
13	Zeno Bain	10	1.2	In the second paragraph of section 1.2, there appear to have some extra spacing as well as a missing period for the following sentence "The THMP Update also considered the frequency of occurrence and/or estimate the magnitude of historical events to accurately estimate vulnerability and losses (i.e. future impacts)"	Administrative

14	Zeno Bain	11	1.3	Consider addition in red for second paragraph in section: The storms crippled the Territory, destroying communications, the power grid, roads and bridges, drinking water and wastewater facilities, and other infrastructures, as well as disrupting food supply, compromising medical services, surpassing landfill capacity, and causing significant detriment to the environment and public health in various routes such as the release of waste and hazardous material into oceans and watersheds.	Critical
15	Kimiko Link	12, 13	1	The MAP states that the MNA builds upon the foundation of the USVI's 2019 THMP Plan and that it was updated in 2019 for the following purposes: § Promote interagency coordination of programs, policies and practices regarding hazard mitigation opportunities; § Enhance public awareness and understanding of hazards that affect communities and actions the public can take to make themselves safe; § Identify, evaluate and prioritize a range of mitigation actions that are specific to St. Thomas, St. Croix and St. John; § Comply with federal program requirements regarding eligibility for disaster recovery and mitigation grant funding; § Incorporate assessment findings to incorporated post disaster data to identify capability deficiencies and risks that were not identified prior to Hurricane Irma and Maria; and § Expand on Mitigation efforts which would be crucial in the implementation of mitigation efforts for the territory Please describe how each of these objectives were achieved.	Substantive
16	Kimiko Link	13	1	The MAP states that Tetra Tech generated supplementary risk assessment analysis to incorporate best available data for drought and flood hazards. Was this analysis provided for public review and comment? If not, please provide this analysis for public review.	Substantive
17	Zeno Bain	13	1.4	Capitalize the word "Territory" in the last bullet at the top of the page.	Administrative
18	Zeno Bain	13	1.5	Format header for section 1.5.	Administrative
19	Kevin Kijanka	16	1.5	There appears to be a minor grammatic error in the first paragraph. It may need to read "The USVI *consists…"*	Substantive
20	Zeno Bain	16	1.5	Consider adding more cultural background in the last paragrph on this page that discusses the countries that controlled the Virgin Island, such as the following sentence at the beginning of the paragraph: The archipelago of the Virgin Islands is home to a melting pot of people with roots from the Taíno Indians, Spanish, African, French, Middle Eastern, British, Asian, continental United States of America cultures, and a multitude of other backgrounds. It has a rich and storied cultural history that spans centuries.	Substantive
21	Zeno Bain	16	1.5	Consider adding the following sentence at the end of the last paragraph on this page that discusses the cultural background and the countries that controlled the USVI: The combination of the warm, wet climate, coastal floodplains, beaches and interior mountains produced a region rich with opportunity for fishing, grazing livestock, agriculture, ocean economies, as well as coastal development. While this location in the Caribbean Sea produced a varied history of exploration, conquest and settlement, it also makes the Virgin Islands uniquely vulnerable to a multitude of natural disruptions and disasters, such as hurricanes, floods, earthquakes, including human-induced incidents. Please note that the August 2019 National Mitigation Investment Strategy looks for including mitigation for man-made hazards as well. Page 3 of the August 2019 National Mitigation Investment Strategy states:	Critical

				"Scope. Currently, the Investment Strategy focuses on recommendations to mitigate risks posed by natural hazards (for example, sea level rise, droughts, floods, hurricanes, tornadoes, wildfires, and earthquakes). However, recommendations do not exclude implementation efforts that will also mitigate risks posed by man-made hazards." Page 19 of the August 2019 National Mitigation Investment Strategy states: "Mitigation projects for critical infrastructure should account for evolving design needs. The Federal Government and nonfederal partners should continue to support research and development in critical infrastructure security and resilience (for example, infrastructure design standards for protection from natural and human-caused incidents).	
22	Zeno Bain	18	1.5	Two comments for this sentence. 1) Revise the following sentence as follows in red: Ports were closed for three weeks and more than 400 vessels were sunken or grounded with over 300 containing hazardous substances. 2) This sentence is describing a unique damage that needs a separate bullet.	Substantive
23	Zeno Bain	18	1.6	The first paragraph of this section provides two apparently contradictory statistics. Revise one of the following statistics for clarity: "22% of population in the USVI is below the poverty level" or "25% of all persons in the Islands live in poverty"	Substantive
24	Zeno Bain	21	1.7.1	Since the Hazard Analysis in the FEMA approved HMP is the starting point of the CDBG-MIT Hazard Analysis, VIHFA should consider including narratives describing significant secondary hazards that affect public health, hardship and suffering that may occur in conjunction with natural disasters and be included in a future CDBG-MIT Hazard Analysis such as: • uncontrolled waste (hazardous, medical, solid, wastewater) release to environment • contamination of water supplies and/or distribution system • contaminant exposure to public via water and air, and the associated risk of acute and chronic health effects to public • inundation by rainwater or seawater to underground utility lines for wastewater and stormwater, electricity, drinking water distribution VIHFA should also consider including narratives describing possible hazards caused by human activity such as: • uncontrolled waste generation behavior, • lack of water conservation behavior, • poverty, • crime For example, one aspect that can be included in a future Hazard Frequency Analysis is the frequency of illegal dumping events (based on complaints and/or public works cleaning schedules), events of leachate impacting groundwater and surface water, trash found on coastal areas. This information can be found with EPA, DNER Compliance Staff, state and municipal public works and NGOs.	Critical
25	Zeno Bain	21, 79	1.7	Vulnerabilities for various sectors should be discussed in a new section, including: • wastewater sector – construction-related pipe breaks, illicit connections from sanitary sewers to stormwater sewers, informal construction of septic systems, lack of water conservation practices, lack of integrated water management approaches, sewage discharges from unsewered areas, corrosion of aged pipe material, lack of clarity on soil absorption test requirements for septics from the local government in sensitive areas, oil absorption conditions including soil type in sensitive areas for septic construction	Critical

				• drinking water sector (water supply and quality) – construction-related pipe breaks, lack of water conservation practices, lack of reforestation to control sediment deposits in reservoirs, lack of integrated water management approaches, excessive water age due to storage, travel time, and low pressure zones, corrosion of aged pipe material, cross-connections and backflows, private storage/contamination, biofilm growth within system, intrusion via damaged pipe (compounded by low pressure events), permeation through pipe material, contamination during pipe repair and new construction, leaching of pipe material, cistern maintenance/use • materials management sector – continued operation of unlined open dumps, illegal dumping, lack of implementation of sustainable materials management practices in the residential and commercial sectors	
26	Zeno Bain	79	3	EPA recommends including the following interdependencies/vulnerabilities for septic systems, which should be included in the infrastructure discussion: 1. soil absorption conditions in USVI including soil type in sensitive areas. 2. lack of clarity on soil absorption test requirements from the local government in sensitive areas	Critical
27	Zeno Bain	21	1.7.1	Consider the following edit in red for the first paragraph in this section: Following the vulnerability assessment, these hazards were ranked by potential dollar loss in the table below with 1 being the highest.	Critical
28	Zeno Bain	21	1.7.2	First sentence is missing a period. "Following the vulnerability assessment, these hazards were ranked by potential dollar loss in the table below."	Administrative
29	Zeno Bain	23	1.7.3	Insufficient technical, managerial and fiscal capacity should be discussed within the Compounding Factors section for the majority of Territorial agencies and utility providers (water, wastewater, municipal waste). In many cases, these are the primary factors and should not be diluted within the "Compounding Factors" section.	Critical
30	Zeno Bain	23	1.7.3	Place the following, last bullet in section on a new line. "Planning for storms: No plans, old plans (22 years had passed since the previous devastating hurricane), or plans were not followed (USVI Hurricane Recovery and Resilience Task Force 2018)."	Administrative
31	Zeno Bain	24	1.8	Hazardous waste is missing from the lifelines discussed in this section. A paragraph for each of the other lifelines are included. Hazardous waste should include medical waste as well.	Critical
32	Zeno Bain	24	1.8	EPA is recommending significant changes in this section due to inconsistencies with definitions from the federal and local government and academia. 1. Hazardous Materials is not discussed but when discussed should not include Solid Waste Sector as this sector pertains to both, non-hazardous materials and hazardous materials. The Hazardous Materials Lifeline pertains, generally, to chemical and hazardous waste and oil facilities, and contaminated sites with hazardous waste. EPA recommends including the Solid Waste Sector in the Food, Water and Sheltering Lifeline due to nexus to: • solid waste sanitation services (collection, hauling, treatment, disposal) for safe and healthy sheltering • water resource protection • sustainable food management. 2. Solid Waste Sector is not discussed, which it should be discussed (in the Food, Water and Sheltering Lifeline) more accurately as “Materials Management Sector” as not all materials turn into waste if they are managed throughout their entire lifecycle. Sustainable Materials Management (SMM) requires focusing on the life cycle of a product, from the time it is produced, used, reused and ultimately recycled or discarded. SMM conserves resources, reduces waste and minimizes the adverse environmental impacts of material use. SMM shifts the focus from end-of-life management (solid waste management) of materials to management throughout their entire life cycle. By acting less wastefully and considering systemwide impacts in the design, marketing, reuse, recycling,	Critical

				and disposal of products, life-cycle materials assessment represents an important change in how we think about waste management. 3. Landfills as critical infrastructure The Solid Waste Sector (proposed to be named as Materials Management) should be discussed as critical infrastructure.	
33	Zeno Bain	24	1.8	Including the infrastructure assets from the Solid Waste (Materials Management) Sector as lifeline infrastructure assets.	Critical
34	Zeno Bain	24	1.8	Include the following as critical infrastructure within the Food, Water, Shelter Lifeline: - Stormwater infrastructure and green infrastructure for flood control - Water distribution system (in addition to plants/facilities) - Wastewater infrastructure (in addition to plants/facilities) - Septic systems for wastewater treatment and discharge, acknowledging less than half of population is connected to the wastewater system.	Critical
35	Zeno Bain	30	1.9	The bulleted list of impacts of droughts needs to be revised such that the first bullet states "Meteorological drought (degree of departure from expected precipitation)". and the following should be included in the paragraph not the bulleted list "Droughts can impact an array of economic, environmental, and social activities. The demand that society places on water systems and supplies—such as expanding populations, irrigation, and environmental needs—also contributes to drought impacts. Droughts can be categorized thusly: Currently, it is all combined under the first bullet.	Administrative
36	Zeno Bain	30	1.9	The following text in this section regarding the focus of environmental hazard of droughts is limiting. There are many other environmental and public health hazards of droughts with regards to contaminant concentrations and transport in ground and surface waters. "Environment, public health, and safety—The environmental, public health, and safety sector focuses on wildfires that are both detrimental to the forest ecosystem and hazardous to the public. It also includes the impact of desiccating streams, such as the reduction of in-stream habitats for native species." For example, see text on page 32 includes air and water quality as well: "Environmental losses from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity; and soil erosion."	Substantive
37	Zeno Bain	30	1.9	The following paragraph is misleading because 1) the examples are not necessarily unique, for example agricultural impacts and water supply issues occur on all islands, although stated that the droughts have "disparate impacts across the Islands" and 2) the activity discussed for agricultural activity in St. Croix is "rangeland milk production" which is no longer as prominent in St. Croix after Island Diaries closed. According to USGS fact sheet (available at https://www.usgs.gov/ecosystems/climate-adaptation-science-centers/drought-impacts-livestock-us-caribbean), drought Impacts to Livestock in the U.S. Caribbean In the U.S. Virgin Islands (USVI), cattle production has been declining in recent years due to higher insurance costs and natural disasters, while sheep and goat production has increased (Gould et al., 2015). "The four types of drought have disparate impacts across the Islands. On St. Croix, where there is a significant amount of agricultural activity, droughts impact rangeland milk production. St. John's vulnerability to drought is borne by small-scale agriculture and residential developments. St. Thomas' vulnerability is predominantly in the East End. Socioeconomic impacts are experienced in urbanized areas like Charlotte Amalie, where there are	Substantive

				increased costs for water supply and transfer." Consider revising this paragraph to explain the most prominent impact in each island or consider providing the most prominent example or how each type of drought affects each island.	
38	Zeno Bain	30	1.9	Note to verify accuracy of the following statement: "According to the 2018 USVI Task Force Report, only one quarter of residents are connected to the USVI's central water system that the Water and Power Authority (WAPA) operates." According to 2019 RA Briefing from CEPD, "WAPA provides drinking water service to nearly half of the population of the Territory."	Substantive
39	Zeno Bain	30	1.9	Suggest edit in red and strikethrough for the following sentence in the last paragraph on the page: "According to the 2018 USVI Task Force Report, only one quarter of residents are connected to the USVI's ~~central~~ public water system that the Water and Power Authority (WAPA) operates."	Substantive
40	Zeno Bain	31	1.9	There is an extra period after the second sentence on this page that should be deleted: "According to the 2019 THMP, the National Climate Data Center reports no new drought events since 2002. ."	Administrative
41	Zeno Bain	33	1.9	In the second to last paragraph, revise as follows in red: "St. John – with the smallest population of the Islands – is susceptible owing to decreased water supply and increased transportation costs owing to drought.	Substantive
42	Zeno Bain	33	1.9	Suggest further clarification in the second to last paragraph on this page. For example, statements suggest highest exposure is predominantly in dense areas of St. Thomas but should include dense areas within the Territory. The same should apply to any water supply, transportation or agricultural demands within all of the Territory.	Substantive
43	Zeno Bain	34	1.9	Acronym MMI VIII should be defined in first use here: "The most significant earthquake on record occurred in 1867, when a MMI VIII was recorded at St. Thomas and St. Croix."	Administrative
44	Zeno Bain	34	1.9	PGA and %g should be defined in first use in the following sentence: "The map indicates a PGA with 2% probability of exceedance in 50 years of between 30 and 40 %g in St. Croix and 45 and 50 %g for St. Thomas and St. John."	Administrative
45	Zeno Bain	35	1.9	Consider providing additional interpretation of the results in Table 9 in the preceding paragraph.	Substantive
46	Zeno Bain	35	1.9	Unable to interpret Table 9 clearly. Clarification of headers would assist. Ensure each column has a header and accuracy of headers.	Substantive
47	Zeno Bain	35	1.9	Revise the following sentence as follows in the last paragraph on the page: "Table 10 below shows lifeline exposure to the earthquake hazard."	Administrative
48	Zeno Bain	36	1.9	Map does not have a title and number. Subsequent map numbering should be increased by one.	Administrative
49	Zeno Bain	38	1.9	Consider revising the following sentence as shown in red and strikethrough in the second paragraph on the page: "Increased development, undersized culverts, impervious surface installation following development, combined sewer system for stormwater and wastewater, insufficient preventative maintenance of sewer infrastructure, improper engineering design for drainage of constructed surfaces and inadequate use of green infrastructure such	Critical

				as guts as an asset for stormwater management ~~and functionally obsolete stormwater management~~ ~~infrastructure~~ contribute to the pervasiveness of runoff and riverine flooding in the USVI."	
50	Zeno Bain	38	1.9	Table header should be revised from Table 10 to Table 12. All the subsequent tables numbering should be corrected as well and increased by one.	Administrative
51	Zeno Bain	41	1.9	Remove the extra period at the end of the following sentence in the first paragraph on the page: "On St. Thomas, two additional schools, the Police Headquarters, and liquefied petroleum gas facilities are expected to be inundated.."	Administrative
52	Zeno Bain	51	1.9	Consider revising storms to hurricanes in the following sentence in the second paragraph as shown in red to be consistent in language with the first paragraph and emphasis the proximity as the differentiating factor: "In the same time period, 87 hurricanes passed within 50 miles of the US Virgin Islands."	Administrative
53	Zeno Bain	53	1.9	Table header should be revised from Map 18 to 20 and subsequent map numbering increased by two. Both page 51 and 53 have Maps title Map 18.	Administrative
54	Zeno Bain	57	1.9	Clarify in the following sentence if this is globally: "Since 1530, 116 tsunamis with run-ups exceeding 0.5 meters (1.6 feet) have been separately observed.."	Administrative
55	Zeno Bain	62	1.10	Revise the last sentence on the page as shown in red: "The USVI recognizes that the perpetual cycle of disaster and recovery is not a model that is socially, economically, environmentally or fiscally sustainable, so activities and projects will be selected based on fact-based analysis and careful review toward increasing resilience in the Territory."	Administrative
56	Kimiko Link	65	2	The MAP states: The primary focus of CDBG-MIT funding is to enable localities that are vulnerable to natural disasters to take a forward-looking, risk-based approach to implementing projects that are designed to reduce future losses from such disasters. Conversely, CDBG-DR is a responsive funding source intended to repair, restore, and rehabilitate communities after major disasters. The hazards listed in this section did not address solid waste and wastewater facilities in the context of vulnerabilities, including landfills, landfill access, bin sites/drop off center, TDMAs, wastewater facilities, wastewater facility access and piping/pump houses. These facilities are essential for all other infrastructure services to continue.	Critical
57	Zeno Bain	66	1.12.1	In the second paragraph of this section, in the following sentence, consider the edits in red: The programs outlined in this Action Plan were developed to meet CDBG-MIT, federal and Territorial requirements, and to fund activities that will protect against loss of life and property, and reduce suffering and hardship attritubatable to natural disasters.	Substantive
58	Zeno Bain	66	1.12.1	Consider the following edit in red in the last sentence on the page: As shown within that study, the Territory's housing market severely limits options for LMI individuals, as approximately only 6% of the homes sold could be designated as affordable for them.	Substantive
59	Zeno Bain	67	1.12.1	In the last paragraph on the page, consider edits in red and strikeout, including the percent of substandard rental units in nation for the following sentence: There is a significant percentage of the Territory rental units that are considered substandard ~~is quite high~~, ~~and significantly~~ much greater than the national average of X percent.	Administrative

60	Zeno Bain	68	1.12.1	In the first sentence on the page, consider the following edit in red: Analysis of the overall rental vacancy rate in the USVI was estimated to have fallen by more than one-half since the hurricanes, with rents estimated to have more than doubled for some unit types.	Administrative
61	Zeno Bain	68	1.13	In the third bullet in the section, add a period at the end and consider revising for clarity such as shown in strikethrough and red: Housing development to increase the resilience of housing ~~and~~ for their residents after disasters.	Administrative
62	Zeno Bain	71	2.2.2	In the second paragraph in this section, consider adding comma after proposed and deleting "in" as shown here: A careful study into updating or revising ~~in~~ the current map to provide a better match between the suitability of the land for development and the type and intensity of use proposed, would be an excellent use of mitigation planning funds."	Administrative
63	Zeno Bain	71	2.2.2	In the last paragraph of this section, regarding developments larger than an acre that require a storm water prevention plan, it states: "Any storm water prevention plan must consider pre-existing hydrology as well as postulate on post construction run-off." A potential use of funds may be to further the regulation to require all developments, larger and smaller than an acre, to develop post-construction stormwater prevention plans or require the use of a specific percentage of permeable surfaces.	Substantive
64	Zeno Bain	72	2.3.1	Consider clarifying the following sentence in the last paragraph on the page; consider the following edits in strikethrough and red if appropriate: Residential structures with ~~no~~ dwelling units and ~~no~~ residents below two feet above the 1 percent annual floodplain, must be elevated or flood-proofed, in accordance with FEMA flood proofing standards at 44 CFR 60.3(c)(3)(ii), ~~or~~ up to at least two feet above the 1 percent annual floodplain.	Administrative
65	Zeno Bain	72	2.3.1	Consider the following edits in strikethrough and red for the following sentence in the last paragraph on the page: Thus, the Territory has put mechanisms in place to ensure all structures requiring elevation go through an in-depth structural analysis to determine how and whether the rehabilitation or reconstruction is the most cost-effective approach to helping the homeowner.	Administrative
66	Zeno Bain	73	2.3.1	Consider adding a comma after "property" in the following sentence in the second paragraph on this page: "This requirement is mandated to protect the safety of residents and their property and the investment of federal dollars."	Administrative
67	Zeno Bain	73	2.3.2	Consider the edit in red and strikethrough for the following sentence in the first paragraph in this section: Some ghuts are naturally formed green infrastructure ~~formations~~ (dry stream beds) and others are concrete lined channels.	Substantive
68	Zeno Bain	73	2.3.2	In the second paragraph of this section, consider the following edit in red and strikethrough: Conversations moving forward need to include resizing culverts, ~~and~~ replacing older ones, and best use and maintenance of green infrastructure.	Critical
69	Kimiko Link	78	3	The MDC states: For the purposes of this notice, mitigation activities are defined as those activities that increase resilience to disasters and reduce or eliminate the longterm risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters. As such, waste reduction, reuse, repair, recycling and composting should be an integral part of the plan as this not only conserves resources, but also reduces burden on infrastructure and creates green jobs, thereby increasing resiliency and enhancing mitigation	Critical

70	Zeno Bain	79	3.0	Lack of asset management should be included as a contributor of instability under Local Planning and Regulation.	Critical
71	Zeno Bain	79	3.0	EPA recommends considering water reuse and recycling, as well as additional measures for catchment and retention, as a mitigation approach and an unmet need and an area for improvement under the CDBG-MIT Action Plan. Water Reuse and Recycling - Water reuse (also commonly known as water recycling or water reclamation) reclaims water from a variety of sources then treats and reuses it for beneficial purposes such as agriculture and irrigation, potable water supplies, groundwater replenishment, industrial processes, and environmental restoration. Water reuse can provide alternatives to existing water supplies and be used to enhance water security, sustainability, and resilience. Water reuse can be defined as planned or unplanned. Unplanned water reuse refers to situations in which a source of water is substantially composed of previously used water. A common example of unplanned water reuse occurs when communities draw their water supplies from rivers, such as the Colorado River and the Mississippi River, that receive treated wastewater discharges from communities upstream. Planned water reuse refers to water systems designed with the goal of beneficially reusing a recycled water supply. Often, communities will seek to optimize their overall water use by reusing water to the extent possible within the community, before the water is reintroduced to the environment. Examples of planned reuse include agricultural and landscape irrigation, industrial process water, potable water supplies, and groundwater supply management.	Critical
72	Zeno Bain	79	3.0	Mitigators for instability in the natural environment could include benefits of reduced debris generation and resource conservation. One way to highlight reduced debris generation or resource conservation in the mitigators listed could be: “Focus on ecosystem services provided by natural coastal systems that increase resilience and protect local infrastructure and natural resources from future hazards (ex: wetlands, mangroves, dunes).”	Critical
73	Zeno Bain	79	3.0	Mitigators for instability in education and awareness could include benefits of reduced debris generation and resource conservation. Include mitigator that highlights education and awareness on the benefits of taking a sustainable materials management approach, conserving resources, and protecting natural systems. The mitigator could expand the awareness of the “ecosystem services provided by natural coastal systems that increase resilience.”	Critical
74	Zeno Bain	79	3.0	For the agriculture sector, promote: - compost use - material management infrastructure to be built to collect and process food waste into compost for use on farms. This would further promote food security in USVI. In addition, this use would reinforce the economics of managing organic waste and conserve landfill resources for future debris management by diverting organic waste for further use.	Critical
75	Zeno Bain	79	3.0	Lack of road maintenance should be included as contributors of instability for Transportation Lifeline.	Critical
76	Zeno Bain	79	3.0	Include additional mitigator on the use of sustainable materials management practices in future roadway construction. Mitigators for instability in local planning and regulation could include benefits of incorporating sustainable materials management and life cycle analysis in roadway construction.	Critical

				Federal Highway Administration pavement sustainability page: https://www.fhwa.dot.gov/pavement/sustainability/	
77	Zeno Bain	79	3.0	Include additional mitigator that highlights the benefits of incorporating compost into drainage and slope areas surrounding roadways. This use can increase water retention and drainage and increase slope stability. In addition, this use would bolster and reinforce sustainable material management streams for organic and vegetative materials and conserve landfill resources for future debris management. See references: https://www.epa.gov/sites/production/files/2015-11/documents/highwy3a.pdf https://www3.epa.gov/npdes/pubs/compostblankets.pdf	Critical
78	Zeno Bain	79	3.0	Suggest including the following for Contributors and Mitigators of Instability for the following: Water and Wastewater Lifeline Sector Septic systems Contributors 1. shortfalls in the permitting process to facilitate management from central and municipal authorities and to address noncompliance with building codes and best management practices. DPNR is the local authority that manages permits and compliance with building code and proper operation and maintenance of residential, multi-family, commercial and industrial septic systems. 2. lack of consensus about roles and legal jurisdictions from local and municipal authorities. 3. lack of outreach through the homeowner awareness model to support outreach and education Septic Systems Mitigators 1. Leverage existing federal and local funds to support design, construction, operation and maintenance of septic systems in low-income communities. Stormwater Contributors 1. Lack of asset and outfalls mapping with attributes of the system 2. sewage discharges from flood control pumps Stormwater Mitigators 1. data collection and digitalization to develop interactive maps 2. Implementation of an Illicit Discharge Detection and Elimination Program (IDDE)	Critical
79	Zeno Bain	79	3.0	Stormwater Contributors 1. Installation of hard engineering practices for flood control and drainage which are more invasive to ecosystems. Stormwater Mitigators 1. Installation of green infrastructure as best management practice for stormwater management 2. Channels restoration through nature base solutions Include the recommended mitigators for stormwater: The "no adverse impacts" approach is noted on page 91, section 7.3 to ensure infrastructure development does not increase flooding risk. However, the Territory currently has stormwater management issues to address. Please note that nature-based solutions need to be bold and incentivize as it is one of the national priorities according to the August 2019 National Mitigation Investment Strategy.	Critical
80	Zeno Bain	79	3.0	Include additional mitigator that highlights the benefits of incorporating compost into drainage and slope areas within watersheds, as well as coastal zone protection and constructed wetlands. This use can increase water retention and drainage and increase slope stability. The risks of flooding events could be mitigated due to the buffering capacity provided by compost. In addition, this use would bolster and support systems that manage organic waste and conserve landfill resources for future debris management	Critical

81	Zeno Bain	79	3.0	Suggest discussing capacity of the water and wastewater sector including the amount of water lost, unauthorized water consumption etc. in a discussion of Contributors and Mitigators of Instability for Water and Wastewater sector.	Critical
82	Zeno Bain	79	3.0	Include additional mitigator that highlights the benefits of utilizing anaerobic digestion and collecting landfill gas for electricity generation. This would diversify power generation, add redundancy to the grid, and increase renewable energy generation. Supporting anaerobic digestion of organic material would bolster and reinforce sustainable material management streams for organic and vegetative materials and conserve landfill resources for future debris management.	Critical
83	Zeno Bain	79	3.0	Encourage energy and water utilities to adopt ENERGY STAR Portfolio Manager Web Services to automate utility data uploads for building benchmarking. See: https://www.energystar.gov/buildings/program_administrators/ci_program_sponsors/pm_web_servs Automated benchmarking through Web Services streamlines and improves the accuracy of the benchmarking process. It provides a consistent process to obtain data from utilities, as well as a consistent format of data received from utilities into Portfolio Manager. This, in turn, makes it easier for building owners to obtain the data they need for the benchmarking process. There is a strong relationship between benchmarking and the implementation of actual energy reduction measures. The results of benchmarking are improved energy efficiency and energy management in buildings, reduced emissions, and improved building performance, thereby helping states reach its energy efficiency goals. As energy benchmarking becomes standard practice in the commercial building industry, owners and managers of buildings are seeking to simplify the process of obtaining utility data. These performance metrics allow owners and operators of buildings to consider energy efficiency investments and make operational adjustments and behavioral interventions. Building benchmarking leads directly to reduced energy consumption and lower energy costs to rate payers. Reductions in energy consumption can also reduce the potential overload of the grid, reducing brownouts and blackouts. Sixty-seven utilities in the country have invested in Web Services to electronically upload utility data into Portfolio Manager.	Critical
84	Zeno Bain	79	3.0	Renewable energy opportunities should be discussed such as solar, hydropower, wind, as well as anaerobic digestion and landfill gas. Supporting anaerobic digestion of organic material would reinforce the economics of managing organic waste and conserve landfill resources for future debris management. https://www.epa.gov/lmop https://www.epa.gov/anaerobic-digestion/basic-information-about-anaerobic-digestion-ad#productsOFAD	Critical
85	Kevin Kijanka	80	3.0	Consider modifying the sentence below as shown in red to include storm debris: During disasters this danger is exacerbated when floods, storm debris (e.g., vegetative, building, etc.), and other hazards impede vehicular mobility and render pedestrian mobility even less practical and even more dangerous.	Substantive
86	Zeno Bain	80	3.0	Mitigators for instability in structures and infrastructure could include benefits of reduced debris generation and resource conservation. One way to highlight reduced debris generation or resource conservation in the mitigators listed could be: “Incorporate self-sustaining infrastructure alternatives that include green infrastructure and nature-based solutions to address and mitigate hazards such as debris generation.” or “Incorporate self-sustaining infrastructure alternatives that include green infrastructure and nature-based solutions to address and mitigate hazards and maintain infrastructure function.” or “Build infrastructure to updated construction standards proved to withstand recent hurricane impacts and reduce debris generation.”	Critical

				or “Build infrastructure to updated construction standards proved to withstand recent hurricane impacts and maintain their function.”	
87	Zeno Bain	80	3.0	Include additional mitigator in the Housing sector that: - highlights the benefits of adopting and implementing building codes for resilient building design and construction and constructing resilient buildings. Such practices can help to reduce the amount of debris generated during a disaster and thereby reduce the amount of debris that must be managed. This could include maintaining updated building codes and implementing resilient construction practices to maintain housing function and reduce debris generation. - utilizes and repairs available housing stock over new construction. Doing so would conserve natural resources and reduce construction waste. - promotes improvement of condition of a large percentage of roads that limit access to a large percentage of communities and are a deterrent to developing or investing in rental housing thereby limiting quantity of affordable housing and housing.	Critical
88	Kevin Kijanka	81	3	Consider tieing in the repair and hardening of housing to resource conservation and waste minimization with the edits shown in red: Many of these units are more than 50 years old and sustained significant damage from Hurricane’s Irma and Maria. VIHA’s goal is to transform these homes by hardening or replacing them with state-of-the art hurricane, flood and drought resiliency design features and components. Repairing and hardening existing structures would conserve natural resources and reduce construction and demolition waste by maintaining the available housing stock.	Substantive
89	Kimiko Link	85	4.0	It is critical that on-island resources to mitigation such as compost blankets and compost socks for drought resilience, erosion control, and particulate filtration to protect coast zones and minimum recycled content for new/rebuilt construction be incorporated into the regulatory and permitting structure. These requirements will facilitate on-island markets for these materials, conserving valuable resources, lessening the burden on existing infrastructure, protecting human health and the environment, creating green jobs and green economy, and increasing resilience and sustainability.	Critical
90	Zeno Bain	88	7.0	A significant increase in workforce capacity—both in terms of the number of workers and workforce skills—is required to facilitate recovery. We estimate that the USVI will need over 5,000 new workers for recovery efforts. Given the relatively small size of the local workforce, supporting recovery efforts will likely require bringing more USVI residents into the labor market and training them in needed skills, and bringing in skilled workers from the continental United States and Puerto Rico. Preference must be given to training local unemployed or under-employed workers, which should be planned in advance. 2nd option would be to bring workers from Puerto Rico and last option would be to have workers come from the Continental US.	Critical
91	Lenny Grossman Flaire Mills	94	7.3.2	Suggest revising the following paragraphs as shown here in red and strikethrough. Paragraphs were slightly edited to accurately reflect the CDs and to allow for discussion to be relevant to both the Anguilla and Bovoni landfills. The US Virgin Islands Waste Management infrastructure was severely damaged by Hurricanes Irma and Maria. The hurricanes generated 825,000 cubic yards of debris, which is almost three times as much waste as the Territory typically generates in an entire year. The Territory’s two existing landfills are ~~have been~~ mandated to close by two Consent Decrees, entered in 2012 and 2013. ~~due to overfilling as a result of this increase.~~ One of the overburdened landfills is near an environmentally sensitive zone on St. Thomas (Bovoni) and the other landfill is near the St. Croix airport (Anguilla).	

				~~The existing Bovoni Landfill was overfilled in order to accommodate t~~The debris from the two hurricanes during that time period, ~~which has~~ further exacerbated the serious waste disposal issues that previously existed in the Territory. VIWMA is subject to ~~working under a~~ two federal Consent Decrees,~~Order~~, under which a ~~through the f~~Federal d~~D~~istrict c~~C~~ourt judge in St. Thomas directly oversees compliance with the Decrees, which require installation and operation of gas collection and control systems and closure of the landfills.~~,which is being administered through the Department of Justice and U.S. EPA Region 2 to close theexisting landfill and bring it into a stable posture.~~ Not only must VIWMA ~~go ahead and immediately~~ close the existing landfills, but also there may~~will~~ be more waste excavation and re-shaping needed due to all the excess debris waste placed~~ment that has occurred~~ over the last several years. Ultimately the goal is to close the landfill, open ~~a~~ new landfill sites and manage stormwater and landfill gas so that there is no negative impact to resident health and safety due to hazardous materials being dumped outside of acceptable locations, and/or damaging groundwater, surface water, or the adjacent mangroves, which have already been significantly impacted by both hurricanes.	
92	Kevin Kijanka	94	7.3.2	The following paragraph may need to be added to or revised. The link between debris generation and removal and mangroves is unclear. *The limitations on landfill use makes debris removal and cleanup a major health and safety concern for residents when future disasters generate significant amounts of additional debris. Few mangroves remain on the island and it is important for the long-term sustainability of the coast to preserve the mangroves as they assist with flood control.* A sentence could be added that states: mangroves may reduce the impact of storm surge and resulting debris generation.	Substantive
93	Zeno Bain	94	7.3.2	Incorporate water efficiency, conservation, reuse whenever opportunities for investment exist among the various programs for planning, infrastructure, housing and multi-sector.	Critical
94	Zeno Bain	94	7.3.2	EPA recommends considering heathy watersheds as an unmet need and an area for improvement. Healthy Watersheds - A healthy watershed is one in which natural land cover supports dynamic hydrologic and geomorphologic processes within their natural range of variation, habitat of sufficient size and connectivity to support native aquatic and riparian species, and physical and chemical water quality conditions able to support healthy biological communities. Natural vegetative cover in the landscape, including the riparian zone, helps maintain the natural flow regime and fluctuations in water levels in lakes and wetlands. This, in turn, helps maintain natural geomorphic processes, such as sediment storage and deposition, that form the basis of aquatic habitats. Connectivity of aquatic and riparian habitats in the longitudinal, lateral, vertical, and temporal dimensions helps ensure the flow of chemical and physical materials and movement of biota among habitats. A healthy watershed has the structure and function in place to support healthy aquatic ecosystems. Key components of a healthy watershed include intact and functioning headwater streams, floodplains, riparian corridors, biotic refugia, instream habitat, and biotic communities; natural vegetation in the landscape; and hydrology, sediment transport, fluvial geomorphology, and disturbance regimes expected for its location. Healthy watersheds not only affect water quality in a good way, but also provide greater benefits to the communities of people and wildlife that live there.	Critical
95	Zeno Bain	94	7.3.2	EPA recommends considering WRR to help enhancing collaboration by integrating SDM efforts and approaches between federal and local partners to protect human health and the environment as an unmet need and an area for improvement under the CDBG-MIT Action Plan.	Critical

				Comprehensive mapping tool and replicable framework – Spatial data management (SDM) is a critical element for striving for environmental excellence. SDM can integrate regulatory and non-regulatory programs, guide resource planners, conserve program resources, highlight multiple environmental benefits, maximize watershed benefits, and is transparent and predictable to ensure resilience, sustainability and recovery. A Watershed Resources Registry (WRR) is a tool that integrates multiple Sections of the Clean Water Act (CWA). It can transform mitigation targeting away from a piecemeal approach, towards site selection based on the highest priority resource areas, those that offer the greatest benefit if preserved or restored. Each state decides what qualities or factors are most desirable for each of the spatial analyses. For example, most jurisdictions would wish to encourage riparian restoration near impaired streams. Some jurisdictions would allow wetland restoration in forested areas while other jurisdictions would not. In this way, a WRR reflects each jurisdiction's priorities and values. A WRR also promotes collaboration between regulatory agencies at the jurisdiction and federal level, as well as between regulatory and non-regulatory agencies, and between the permit issuing body and the regulated agency or public The objective of the WRR is to map natural resource areas that are a priority for preservation or restoration. A major effort of the WRR process is a set of desirability analyses developed with sound science and the best professional judgment of regional experts, which will be used as a screening tool to target opportunity sites for the protection of high quality resources, restoration of impaired resources, and improvement of water resources. Federal and local partners are working on a variety of SDM efforts and approaches under the recovery efforts.	
96	Zeno Bain	94	7.3.2	EPA recommends including narratives describing the following: Brownfields: Brownfields are abandoned, idled or underused industrial and/or commercial properties where expansion or redevelopment is complicated by real or perceived environmental contamination. In some instances, after conducting environmental assessments, Brownfields sites have been determined to be contaminated with hazardous substances, pollutants, and/or petroleum derived products and remediation activities have been implemented to address the risks associated with the contamination. Therefore, addressing Brownfields sites is critical to remove the uncertainty caused by the lack of environmental data and promote the sustainable redevelopment within vulnerable and disadvantaged communities. Landfills: Rising sea level poses a significant risk of erosion to landfills located near sea level and the potential migration of contaminants towards nearby communities and ecosystems (i.e. coastal wetlands and coral reefs).	Critical
97	Zeno Bain	94	7.3.2	EPA is sharing significant comments to provide to VIHFA a description of the Hazardous Materials universe, their needs, contributors and mitigators in USVI. EPA suggest relocating all non-hazardous solid waste information to the new proposed section called “Materials Management”. The prospect of more intense and more frequent storms carries with it the risk of contaminant releases from RCRA Corrective Action sites, Superfund sites and Brownfield sites. Inundation and flooding may lead to transport of contaminants through surface soils, groundwater, surface waters and/or coastal waters. Uncontrolled migration of contaminants may pose an increased risk of adverse health and environmental impacts. Communities face the risk of toxic exposure due to existing/historic contamination and pollution from the surrounding industry and the risk of damage to chemical storage during a storm event. Hazardous Materials Management Needs Chemical and hazardous waste and oil facilities are vulnerable to disasters, possibly leading to the dispersal of such materials to nearby properties or surface waters and, in turn, creating risks to public health and the environment. Local businesses and industry organizations must play a key role in implementing disaster risk reduction and community resiliency strategies. Industrial businesses are a critical source of stable employment for working class residents who depend on living wage jobs. In order to protect these jobs and businesses, and protect the health and safety of those working and living in and around industrial waterfront neighborhoods, there is a need for technical and financial strategies to	Critical

				help businesses comply with environmental regulations, respond to the potential impact of disasters, and build more resilient working communities. Strategies should include building adaptation interventions to protect industrial buildings, emergency response protocols to secure chemicals released, and pollution prevention strategies to reduce chemicals required for industrial processes and utilities.	
98	Zeno Bain	94	7.3.2	Contributors Hazardous Materials Lifeline: • Changes in precipitation patterns and temperature caused by disasters may adversely affect the performance of some site cleanup remedies and may require some remedies to be adapted. • Changes in site conditions and contaminant characterization of groundwater plumes as groundwater recharge may be affected by disasters. • Flooding and storm surges are also likely to affect ongoing ecological redevelopment of sites, as well as oil tank storage. • Increased risk of exposure to lead, asbestos and PCBs, when buildings are initially damaged and when they are renovated/demolished as part of the recovery efforts. Children are particularly vulnerable to this risk, particularly those living in disadvantaged communities where buildings tend to be older and poorly maintained. Mitigators Hazardous Materials Lifeline: • Disaster adaptation measures could be accounted for within the cleanup remedy assessment criteria or the Five-Year Review process at hazardous materials sites. • Evaluation of existing sites in USVI looking at more details regarding vulnerabilities during a site's lifecycle, as well as sediment. • Identify sites with on site pump and treat or contaminant remedies within 100 and 500 year floodplains, as well as those with 4 ft sea level rise. • Educate affected communities about safeguading themselves on the risks of hazardous materials following disasters. • Develop a program for training, SOPs and management of O&M of autoclaves for the medical waste. • Provide technical assistance to debris removal companies and the construction/renovation industry on the risks of hazardous materials following disasters.	Critical
99	Zeno Bain	94	7.3.2	Include inventory of facilities and sites where hazardous -non-hazardous waste and hazardous substances/materials and petroleum derived products are managed/stored (i.e. Large Quantity Generator under Resource Conservation and Recovery Act, Pesticides, Risk Management Plan, Spill Prevention, Control and Countermeasures facilities. EPA and DOT impose regulations to safely manage and transport waste/hazardous materials. Facilities subject to emergency preparedness should be identified as hazards in the Action Plan, to promote awareness and capacity building in those areas. Funding should be allocated, to design and implement drills for municipal's evacuation plans, as applicable. These plans should consider the location of those facilities that manage, generate and store hazardous materials/wastes. Evacuation plans should include annual drills in coordination with the owners/operators of those facilities considered to manage hazardous materials/waste. Mitigation funds could provide funds to purchase, equipment such as spills kits, drones (to obtain real time visuals) all-terrain vehicles and/or boats to facilitate evacuations, and to address potential minor-releases from these facilities, to protect life and water resources. Air Monitoring stations could be included/expanded into the existing network, to provide real-time readings.	Critical
100	Zeno Bain	94	7.3.2	EPA suggests considering the following needs for the materials management sector discussion based on EPA best management practices and guidelines:	Critical

				• Assess solid waste management and infrastructure needs to provide information needed for creating a tailored plan for solid waste management before, during, and after a disaster. • Develop plans implementing mitigation measures to prevent solid waste generation and contamination resulting from a disaster. • Need to establish ongoing community outreach program and develop education materials • Support pre-incident planning to increase sustainable materials management • Capacity plans to support a strong operation of solid waste infrastructure and management • Strengthen solid waste infrastructure for day-to-day operations, which would translate to more effective and efficient management of solid waste and debris streams generated by a disaster. • Improve economic growth in communities through green businesses and job opportunities • Sustainably deconstruct buildings and land acquisition for repurposing when needed. • Incorporate materials management (solid waste and disaster debris) into hazard mitigation planning. Suggest discussing the urgency of the landfill needs as well in this section. VIWMA is subject to federal consent decrees to meet the landfill requirements of the CAA and RCRA to install and operate gas collection control systems and properly close the landfills.	
101	Zeno Bain	94	7.3.2	Identifying the true cost of solid waste and material management can help municipalities strategically plan for future operations. Having in place and implementing a resilient integrated solid waste management plan before a disaster can mitigate risks resulting from a disaster and speed recovery. EPA Guide – “Planning for Natural Disaster Debris” https://www.epa.gov/sites/production/files/2019-05/documents/final_pndd_guidance_0.pdf Possible mitigators of instability to local planning and regulation could include: • “Develop an island-wide disaster debris plan that identifies temporary debris management sites and material management strategies needed to maximize the amount of debris diverted from landfills.” • “Support the training and certification of municipal sanitation workers, municipal planners, and emergency managers. Solid waste training and certification includes, but is not limited to, collection and transfer, landfill and landfill gas, planning and management, recycling and special waste management, and sanitation worker safety.” • “Support planning for fostering financially sustainable waste management operations. This includes the clear identification of solid waste collection and disposal costs in municipal budgets as well as evaluating possible municipal revenue streams through sustainable materials management.”	Critical
102	Zeno Bain	94	7.3.2	Possible mitigators of instability to structures and infrastructure could include repair and/or improvement of disposal infrastructure for the proper collection, hauling, and disposal of solid waste: • “Support the operation and construction of lined municipal solid waste landfills.” • “Close open dumps. These actions include, but are not limited to, cover installation, stormwater control, gas control, leachate monitoring, and groundwater monitoring. These actions are necessary to mitigate the instability the open dumps pose to the continued operation of compliant landfills as well as mitigate the hazards the open dumps pose to life, land, and groundwater.”	Critical
103	Zeno Bain	94	7.3.2	Add mitigators for instability in the natural environmet, such as: • “Support the operation and construction of lined municipal solid waste landfills.” • “Implement resilient construction practices in future building projects to increase a structure’s ability to withstand a disaster and thereby reduce the amount of debris that may be generated.” • Mitigating or reducing the chance that debris is generated is a more preferred practice than managing debris that is generated.	Critical

104	Zeno Bain	94	7.3.2	Add mitigators to education and awareness such as: • “Support education of sustainable materials management systems and the benefits of source reduction, reuse, and recycling through outreach events.” • “Connect solid waste and recycling coordinators between Municipios. Support learning opportunities that advance their knowledge of sustainable materials management.” • “Build awareness of the full cost of solid waste collection, hauling, and disposal within the Territory.	Critical
105	Zeno Bain	94	7.3.2	Provide funding to conduct assessments in collaboration with state and municipal officials to identify and designate areas for the temporary accumulation of disaster generated debris. Designated areas, must be fenced, roofed or partially roofed, concreted pad, paved or covered with low permeability soil, accessible and located away from waterbodies. Reference: https://www.epa.gov/sites/production/files/2019-05/documents/final_pndd_guidance_0.pdf Brownfields sites may be used for this purpose. Local abandoned sites inventories could be developed and used to identify Temporary Debris Management Sites.	Critical
106	Zeno Bain	94	7.3.2	EPA recommends considering energy efficiency and renewable energy at water and wastewater treatment plants infrastructure and capital projects as an unmet need and an area for improvement under the CDBG-MIT Action Plan. In the aftermath of Hurricanes Irma and Maria, water and wastewater treatment plants needed exploring energy redundancy approaches and alternatives to provide this essential public service and to ensure safe drinking water and clean water. U.S. renewable energy companies compete in a rapidly growing, highly competitive global market worth hundreds of billions of dollars per year, a market projected to grow to $460 billion per year by 2030. Due in part to a highly skilled workforce and a growing energy education system, American businesses, workers, and their communities are uniquely positioned to take advantage of this opportunity. Our nation has abundant solar, water, wind, and geothermal energy resources, and many U.S. companies are developing, manufacturing, and installing cutting edge, high-tech renewable energy systems. The Office of Energy Efficiency and Renewable Energy (EERE), part of DOE, plays a key role in advancing America’s “all of the above” energy strategy, leading a large network of researchers and other partners to deliver innovative technologies that will make renewable electricity generation cost-competitive with traditional sources of energy. Working with our national laboratories, such as the National Renewable Energy (NREL) Laboratory and Sandia National Laboratories (Sandia), and through these partnerships, we are catalyzing the transformation of the nation’s energy system, building on a tradition of U.S. leadership in science and engineering as a cornerstone of our economic prosperity, and positioning America to win the global clean energy race.	Critical
107	Zeno Bain	94	7.3.2	This section should include narratives describing priorities for septic systems infrastructure. EPA recommends the following priorities for septic systems under the wastewater sector: USVI should implement a management framework that identify, prioritize and manage septic systems to direct interventions from DPNER and VI Department of Health. Inventory – Identify resources to conduct an inventory of septic systems. Prioritize – Repair and compliance assistance should be prioritized based on unsewered areas contributing to nutrient impairments in surface waters. Manage – Assisting communities and private owners with access to federal and local funds for repairs and improvements. Provide compliance assistance and deterrence. Provide education and awareness about impacts and risk of failing septic systems and how to access funds.	Critical

108	Zeno Bain	94	7.3.2	EPA recommends considering septic systems as an unmet need and an area for improvement under the CDBG-MIT Action Plan. Working to address an environmental and human health legacy issue – Over 40 percent of the population living in USVI relies upon septic systems to dispose of domestic wastewaters. The prevalence of the septic systems is due to limited resources, soil conditions, and the lack of wastewater systems, including sewage piping and wastewater treatment plants. Septic systems are used to treat and dispose of relatively small volumes of wastewater, usually from houses and businesses located in suburban and rural locations not served by centralized public sewer systems. Septic systems that are properly planned, designed, sited, installed, operated and maintained can provide excellent wastewater treatment. However, systems that are sited in densities that exceed the treatment capacity of regional soils and systems that are poorly designed, installed, operated or maintained can cause problems, which is a potential issue in the USVI.	Critical
109	Zeno Bain	94	7.3.2	1) Ensure that the Federally Qualified Health Centers (FQHCs) and the hubs have key resources & training on health issues related to disaster preparedness to recovery, including, mold-flood cleanup to recovery, asthma triggers, mental health-PTSD; food insecurity, chronic health issues, disability, etc. 2) Social vulnerability maps should also have current layers on acute and chronic health issues: asthma and lead poisoning rates; heart disease, diabetes, etc. Asthma is further exacerbated during disasters. Hubs and FHQC's must have needed spacers, medication and other asthma management tools stop and prevent asthma attacks. This is necessary as nebulizer requires electricity. Train community health workers across these hubs and FQHCs on in-home asthma management that can assist during disaster response and recovery. Develop a community health worker training program across the island which can mobilize rapidly and can also assist families with contact tracing, chronic disease management & referral such as asthma, diabetes, heart disease, mental health and assist people with special needs/disability who are generally forgotten. They can also advocate for the families and liaison with the disaster recovery case workers to ensure they receive the full benefits/assistance. Children and persons with uncontrolled asthma are super utilizers of the health care system & most importantly cannot live, play, work at their full potential.	Critical
110	Zeno Bain	94	7.3.2	HSS RSF identified Schools as Community Shelters - Schools/shelters should be mapped as well for public ease of use. - Schools must be remediated of mold-lead-asbestos to serve as a school and/or shelter. - Local unemployed and under employed workers must be trained and certified for these key environmental skill trade jobs to assist the remediation activities at schools. Workers trained locally must be ensured job placement through community benefit agreements.	Critical
111	Zeno Bain	94	7.3.2	Focused training and certification of local workers in environmental skilled trades: ex: Mold-Lead-Asbestos abatement/remediation. Funding for these skilled trades and those needed in energy and water efficiency & weatherization, etc. must be allocated by regions. Current training assets exist at the Atlantic OSHA training Center of Puerto Rico, which is located at the Ana Mendez University in Bayamon, PR. Training of local workers in these environmental skilled trades is key to ensure that the renovation/rebuilding projects are being done by locally trained and certified workers.	Critical
112	Zeno Bain	96	7.3.2	Of note, it states "Waste Management department solutions that meet the requirements of this Action Plan and offer long term advantages for sustainability will be considered in an amount up to	Critical

				$100,000,000.00." However, most recent discussions estimated $22M from CDBG-DR Tranche 2 and $104M from Mitigation for a total of $126M for the landfill, which was decreased from previous estimates of $159M in previous discussions. It is expected that the unmet need would not decrease from previous estimates, and if anything woudl increase. The need for a landfill is a priority that spans all sectors, including housing and sufficient funding should be allocated to ensure the expansion of Bovoni landfill and the opening of a new landfill in St. Croix, along with the closure of Anguilla landfill.	
113	Zeno Bain	98	7.4	Delete extra space after "Revitalization" in the following sentence within the fifth paragraph on the page: "The VIHFA will develop policies and procedures that will outline all requirements for any Economic" Resilience & Revitalization project to be eligible for funding.	Administrative
114	Zeno Bain	98	7.4.1	Edit the following sentence as shown in red: Such projects may include but are not limited to those that result in abatement of asbestos hazards, remediation of mold, lead abatement, lead-based paint hazards evaluation and reduction, and the correction of code violations and provision of permanent emergency power (e.g., generators and solar arrays). 24 CFR 570.202(a)(3).	Critical
115	Zeno Bain	100	7.4.2	Suggest including environmental workforce development such as asbestos removal, mold remediation and lead abatement in the list at the top of the page.	Critical
116	Zeno Bain	103	7.5.1	Revise the first bullet in the list of Priorities as follows: Projects with single family home resiliency solutions including but not limited to elevation; breakaway ground floor walls; reinforced roofs; storm shutters; use of ENERGY STAR appliances and fixtures; cisterns and septics built to code and household need; band mold and mildew resistant products.	Critical
117	Zeno Bain	112	9.0	Under "Sustainability", revise the following sentence as shown in red: All construction will implement methods that emphasize high quality, energy efficiency, sustainability, and mold resistance.	Administrative

Commenter 10

Comment Received:

Good afternoon,

I hope this email finds you well. I am contacting you because I reviewed the USVI-HFA CDBG Mitigation Plan and want to know if the Housing Finance Authority will administer compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act or will this activity be outsourced for the project? My company, TAJ LLC, is a real estate and community investment consultancy, and we provide financial feasibility analysis, real estate development advisory, and primary and subrecipient grant compliance. Our team specializes in compliance management for HUD programs such as HOME Investment Partnership, CDBG, URA, and tax credit funded projects. Given the scope of the action plan's activities, I would like to better understand how minimizing displacement and ensuring accessibility will be overseen and coordinated among the project teams and financial partners.

I look forward to hearing your response and can be reached directly at 954.629.6883 if needed.

Regards,
Teneshia Taylor
TAJ, LLC

Managing Partner

Real Estate Broker

Ph: (954) 228-0963

Cell: (954) 629-6883

Fax: (954) 342-1993

Office Address:

4801 S. University Dr.

Suite. 238

Davie, FL 33328

"Most of the things worth doing in the world had been declared impossible before they were done." --Louis D. Brandeis

Staff Response:

See summary above and general letter below.

Commenter 11

Comment Received:

Dear Virgin Islands Housing and Finance Authority,

Please accept these comments regarding the CDBG-MIT action plan, currently up for public comment.

We recommend VIHFA leverage CDBG-MIT funds to expand on a proven workforce development project for low- to moderate income residents which also increases resilience for critical facilities. After Hurricane Maria, St. Croix Foundation for Community Development launched a pilot program called the Solar-Supported Community Center and Workforce Development Initiative. Funded in partnership with the VI Department of Labor, the Center for Disaster Philanthropy, GlobalGiving, and several other national philanthropic entities, the Foundation designed and implemented a creative workforce development pilot program in which nine students ages 18-28 successfully completed a 6-month National Center for Construction Education and Research (NCCER) course, received intense classroom instruction in NCCER Core Curriculum, Electrical Levels 1-4, Solar PV Installation, and workplace soft-skills and readiness training. Students also received on-the-job training installing Solar Photovoltaic Systems by completing the installation of solar systems on several local community centers which will serve as community resiliency hubs and relief distribution sites during times of disaster. Excitingly, all nine students have been hired by local solar installation companies as a result of their participation in the program. This program is a model for creating solutions at the intersection of resiliency and economic development.

The successes and lessons learned from that pilot project could be leveraged and scaled in order to very meaningfully address several HUD National Objectives and unmet needs identified in the CDBG-MIT Action plan. For the purposes of CDBG-MIT, we propose these two projects for consideration for the Public Services and Critical Facilities programs outlined in the CDBG-MIT action plan.

These projects may be meaningfully led by the St. Croix Long Term Recovery Group (LTRG)/Voluntary Organizations Active in Disasters (VOAD) or another nonprofit/civic sector organization as a subrecipient. We encourage program design and budgets to be structured in a way which includes and prioritizes these projects or others like them.

1) **Public Services – Workforce Development for Low- to Moderate-Income Residents: Certification in essential resilience and recovery related trades**

Provide National Center for Construction Education and Research (NCCER) certification courses and other resources for 150 low- to moderate-income students ages 18-28. Youth apply through the Department of Labor. Program would include a choice between one of three 6-month NCCER certified courses- Solar installation, the requisite courses for electricians, or carpentry. Students will receive intense classroom instruction in NCCER Core Curriculum, other technical courses as required for certification, and workplace soft-skills and readiness training. Program activities include job placement assistance and on the job training.

This project fulfills the HUD National Objective of *Activities Benefiting Low/Moderate Income Persons* as program participants will be low- to moderate income. Certification in these trades increases community resilience by providing more skilled workers to rehabilitate and harden property and critical facilities before, during, and after future disasters. However, it also addresses an unmet need identified in the CDBG-MIT action plan by providing workforce development opportunities which will yield career opportunities with a living wage for many of our community's most vulnerable residents who would otherwise be disproportionately negatively impacted by future disasters due to a lack of necessary resources to preserve life and property.

Approximate cost: $1,500,000 includes all aspects of the project including: project management, grant administration, instructor salaries, stipends for students, classroom rental, and power tools, books, and supplies for instructors and students to serve and certify 150 students.

2) **Harding and Solarizing of Critical Facilities to form Community Resilience Hubs**

Harden and solarize 25 community centers, critical facilities and other properties owned by nonprofit organizations strategically located across island to serve as community resilience hubs. The subrecipient will identify 25 strategically located facilities that will serve as locations to pre-position supplies, and be positioned to immediately respond before, during, and after a disaster. Some of these facilities could serve as secondary shelters, addressing an unmet need identified in the CDBG-MIT action plan. These facilities would be hardened and solarized, and these organizations would agree to serve in a disaster mitigation and response capacity. Construction work on these critical facilities could be leveraged as on the job training for the participants in the public services workforce development project outlined above.

This project fulfills the HUD National Objective of *Activities Benefiting Low/Moderate Income Persons* as it is an *Area Benefit Activity* and an activity providing direct services to low/moderate income persons at critical facilities. The majority of the critical facilities that will be identified to serve as resilience hubs will be located in Census Tracts where more than 51% of the residents are low- to moderate-income. These hubs will reduce risk to human life by providing safe access to communications, food, water, and other lifesaving supplies in the aftermath of a storm as these hubs will be poised to serve as supply distribution sites and will facilitate timely assessment of individual and household needs since they will be located within communities across island.

Approximate cost: $7,750,000 includes all aspects of the project including: project management, grant administration, construction for hardening, solarizing, etc. for 25 critical facilities/community centers to serve as resilience hubs. Each facility would be hardened to IBC 2018 ED AND V.I. TITLE 29building codes and a Solar PV system installed so that the critical facility/resilience hub can operate before, during, and after a storm with no downtime.

Sincerely,

Jay Rollins

Executive Director of Regional and National

Relationships, St Croix Long Term Recovery Group

Chair, Virgin Islands VOAD

Staff Response:

See summary above and general letter below.

Commenter 12

Comment Received:



Office of the Executive Director

ROGER E. MERRITT, JR.

St. Croix | St. Thomas | St. John | Water Island

December 22, 2020

Mr. Daryl Griffith, Director

Virgin Islands Housing Finance Authority
Community Development Block Grant 3438
Kronpindsens Gade I GERS Complex, 1st
Floor St. Thomas, VI 0802

Subject: Waste Management Authority WMA's CDBG-MIT Action Plan Public Comments

Dear Executive Director Griffith,

The Virgin Islands Waste Management Authority (VIWMA) appreciates the opportunity to provide input and comments to the Virgin Islands Housing Finance Authority (VIHFA) on the Community Development Block Grant-Mitigation (CDBG-MIT) Action Plan. These comments present the best available description and estimate of unmet needs to increase the resilience of WMA's solid waste and wastewater infrastructure.

Introduction

The Virgin Islands Waste Management Authority's (WMA) mission is to provide waste collection, treatment, and disposal services to protect public health and preserve the environment of the U.S. Virgin Islands (hereafter referred to as "USVI" or "Territory"), including both solid waste and wastewater.

Even before the catastrophic 2017 storms, the waste management infrastructure was either inadequate or did not perform satisfactorily – the wastewater infrastructure resulted in frequent sanitary sewer overflows (SSOs), and the landfills were nearing capacity.

- The wastewater infrastructure in the Territory was frequently in non-compliance with the Territorial Pollution Discharge Elimination System (TPDES) permits issued by the Department of Planning and Natural Resources (DPNR) – not only at the treatment plants but in the wastewater collection system. The 2017 disaster worsened the system performance by damaging various facilities and increasing the frequency of non-compliance events that resulted in more SSOs into the environment.

- The Bovoni and Anguilla landfills are rapidly nearing maximum capacity. In an Environmental Protection Agency (EPA) News Release issued in May 2019, EPA Regional Administrator Pete Lopez was quoted as saying, “The U.S. Virgin Islands was already facing a waste management crisis when Hurricanes Irma and Maria struck the islands, worsening the problem.” The News Release went on to say that the landfills are being ordered to either close or to come into compliance to meet federal requirements by 2022.

just as the Community Development Block Grant Disaster Recovery (CDBG-0DR) funding is an all-important resource that WMA is relying on to fund the improvements needed for the Territory’s waste management infrastructure that has been adversely impacted by the 2017 storms, the Community Development Block Grant Mitigation (CDBG-MIT) funding is essential for the USVI to create solid waste and wastewater infrastructure that will sustain the Territory into the future. These projects represent high-impact investments that will significantly reduce community risks from contamination resulting from future natural disaster impacts. As per the Community Lifelines identified in the CDBG-MIT Action Plan (Nov 4 Draft), investments in WMA projects are eligible under “Hazardous Materials,” and will also indirectly improve the Territory’s performance in the “Food, Water, Shelter” and “Health and Medical” lifelines due to the interconnected nature of community’s needs.

This document separately addresses the Territory’s solid waste and wastewater infrastructure needs.

Solid Waste

With the influx of over 825,000 cubic yards of debris generated from the 2017 storm’s destruction, the Territory’s landfills that were already nearing capacity even before the storm have now reached a critical state. The lack of stormwater management at the landfills and the dumping of hazardous materials creates a public health risk for the community. Due to the lack of capacity and risks posed to the health and safety of the community, both the Bovoni and Anguilla landfills are under **EPA’s consent decree to close by 2021**.

Solid Waste Infrastructure and the Priorities of CDBG-MIT

As identified in the CDBG-MIT Action Plan (Nov 4 Draft), continued dumping of waste and hazardous materials outside of the landfills and the subsequent additional management burden of the convenience centers results in negative impacts on public health and safety of the USVI population.

The debris generated by the 2017 hurricanes caused excessive stress on both the Bovoni and Anguilla landfills. The disaster recovery work, both projects currently underway and those planned, continues to increase the demand for capacity to manage construction and demolition waste, further stressing the Territory’s solid waste infrastructure. Additionally, the solid waste sector is extremely vulnerable to further hazards that will result from future hurricanes excessive winds (i.e., additional construction and demolition debris, vegetative debris, bulk waste, etc.) especially as the climate continues to warm, generating more frequent and severe storms. Addressing the Territory’s landfill capacity is integral and critical to being prepared for such disasters.

WMA has been working towards improving the financial management with increased efforts to resolve backlog payments to solid waste haulers and increase revenue generation through tipping fees. Support from CDBG-MIT will significantly improve the status of the landfills in the Territory.

Unmet Needs Estimate

This section addresses the solid waste sector's unmet needs. While these unmet needs provide opportunities for mitigation against future disasters, many of these projects also have a direct tie to the 2017 storms and qualify for CDBG-DR funding since the damage was sustained in Hurricanes

Irma and Maria. There is a critical strategic need for ancillary infrastructure to process the industrial, household, and biomass materials generated throughout the Territory. The infrastructure can be categorized into three categories:

- Landfills (including the expansion of the Bovoni and Anguilla facilities, closure and construction of new landfills);
- Convenience centers;
- Grinders (including green waste grinders).

These solid waste infrastructure unmet needs are presented separately for the two relevant categories in the CDBG-MIT Action Plan (Nov 4 draft): Infrastructure and Public Facilities, and Planning.

Category: Infrastructure and Public Facilities

The solid waste infrastructure unmet needs are based on the WMA's knowledge of the existing infrastructure and the needs in the sector. These unmet needs are separated by type of solid waste facility with a sub-categorization by island or facility as relevant.

Table 1 shows the unmet needs for landfills – the largest category within Solid Waste. There are two types of funding required – closure of existing landfills; new landfills (or expansion of existing landfills).

Table 1: *Unmet Needs for Landfills (Infrastructure and Public Facilities)*

Facility Name	Approximate Cost	Comment
Closure of Existing Landfills		
Anguilla	$39.3 M	Note: Funds are sought through CDBG-DR only for the design of landfill closure; WMA is in the process of submission of the application. Funds have NOT been approved. These projects are likely to classify for "urgent need"
Bovoni	$38.9 M	
Landfill Expansion or New Landfills		
Bovoni Expansion	$15.1 M based on a preliminary estimate. Note that land acquisition costs and local cost adjustment factors are not included in this preliminary estimate.	Funds are sought through CDBG-DR only for the design of Bovoni Landfill Extension; WMA is in the process of submission of the application. Funds have NOT been approved. Bovoni extension will meet the low-to-moderate income (LMI) criterion
Landfill in St. Croix	Approximate cost of	Note: Funds are sought through CDBG-DR only for the design of New Landfill – Discussion regarding location ongoing.

(Location TBD)	$ 26M for the required size of landfill. Note that land acquisition cost could significantly affect the final cost; local cost adjustment factors are not included in the preliminary estimate.	 WMA is in the process of submission of the application. <u>Funds have NOT been approved.</u>

The second sub-category within Solid Waste infrastructure is Convenience Centers. Note that a total of five convenience center facilities replacing unmanned bin sites is anticipated to be funded with CDBG- DR funds – two located in St. Croix, two in St. Thomas, and one in St. John. WMA has been in discussions with HFA regarding these applications and will submit the final CDBG-DR applications in the week of Dec 21, 2020. Therefore, due to the likelihood of receiving CDBG-DR funding, the information regarding these five convenience center facilities is not included in this document.

Table 2 shows the unmet needs for Convenience Centers. A total of three facilities – one each on St. Croix, St. Thomas, and St. John constitute the current unmet needs. The National Objective will be established after the convenience center service areas' low- to moderate-income (LMI) data has been analyzed. The cost estimates included in this document are based on a preliminary design by a consulting firm.

Table 2: *Unmet Needs for Convenience Centers (Infrastructure and Public Facilities)*

Facility Name	Approximate Cost	Comment
St. Croix – Cotton Valley	$1.1 M	These convenience centers are not anticipated to be funded through CDBG-DR. **Note:** Land acquisition is required for St. Thomas (West End) and St. John (Cruz Bay) convenience centers.
St. Thomas – West End Area	$ 2.7 M	
St. John – Cruz Bay	$ 3.0 M (including approximately $1M for land acquisition)	

The third sub-category within Solid Waste infrastructure is Crushers. The costs provided in Table 3 are estimates for the average cost of crushers in the Territory.

Table 3: *Unmet Needs for Crushers (Infrastructure and Public Facilities)*

Facility Name	Approximate Cost	Comment

St. Croix District	$1.0 M	This cost estimate includes the cost of shipping and operationalizing the equipment. Note: St. Thomas and St. John District will meet the LMI criterion
St. Thomas and St. John District	$ 1.0 M	

In addition to the above the sub-categories within the solid waste infrastructure and public facilities categorization, WMA's needs that fit the Planning portion of the CDBG-MIT funding are discussed below.

Category: Planning

The planning component of the CDBG-MIT Action Plan (Nov 4 Draft) is integral to achieve long term resilience planning for various sectors. For solid waste, the development of an integrated solid waste master plan will provide an opportunity to not only assess the resilience of solid waste management in the Territory but also the sustainability of the sector. WMA will be submitting an Integrated Solid Waste Master Plan application for CDBG-MIT funding.

This master plan will assess the resilience of existing and planned facilities against future disasters. Many stressors affect the solid waste component – extreme wind and precipitation being the two most likely stressors that will affect various facilities.

In addition to the key aspects of resilience and sustainability, an integrated solid waste master plan will also review solid waste industry standards and best practices which will allow WMA to identify other interventions based on the various funding sources (including leveraging the 12-year timeframe of CDBG-MIT financing) available in the wake of the 2017 disaster. A preliminary cost estimate of $747,147 was developed for funding an integrated solid waste master plan through CDBG-DR. WMA would pursue a competitive bidding process after further defining the master plan's requirements, which could marginally increase the total cost.

It is essential for WMA to not only create a plan for long-term solid waste management, but also use the plan to develop guidance to become sustainable as a sector of the agency. The integrated solid waste master plan will also include a financial sustainability component, which will analyze the existing revenue generating activities, estimate the availability of all grant funding, and assist WMA in the development of a strategy to improve revenue generation capacity to fund essential operations.

Wastewater

The USVI Territorial Hazard Mitigation Plan (THMP) currently includes two types of wastewater facilities listed under the Utility category – wastewater pump stations and treatment plants. Additionally, wastewater infrastructure consists of a sub-surface network of gravity sewers and force mains that connect these critical facilities. An integrated approach to system repair and replacement wastewater system must also address these components.

As outlined in the CDBG-MIT Action Plan (Nov 4 Draft), toxins are being pumped by the sewers into urban and residential areas during extreme precipitation events. Untreated wastewater that is regularly and repeatedly discharged into the environment from the wastewater collection system in residential and urban areas poses significant public health risks as well as causing environmental damage to the

sensitive coastal ecosystems in the Territory. These discharges are caused by excessive stormwater entering the sanitary sewer, and insufficient capacity caused by clogging, debris, and sometimes collapsed pipes. These SSOs are documented by WMA based on the requirements of the TPDES permit and monitored by DPNR. Each instance of an SSO is documented using a Non-Compliance Event report submitted to DPNR, providing data-based evidence of the failing state of the wastewater infrastructure.

Therefore, it is imperative that CDBG-MIT match funding be made available not only for pump stations and wastewater treatment plants but also for all functionally dependent system components, including gravity sewers and force mains. Investments in the Territory's wastewater infrastructure will enable the system to have resilience to survive future disasters, including extreme precipitation events.

Leveraging FEMA PA Recovery Funding

Within the first few months of recovery after the disaster, the US Congress realized that replacing damaged infrastructure using conventional FEMA procedures is not an efficient use of federal dollars due to the dilapidated state of the Territory's existing infrastructure, including wastewater. Congress subsequently passed the Bipartisan Budget Act (BBA) detailed in: *Implementing Section 20601 of the 2018 Bipartisan Budget Act through the Public Assistance Program, FEMA Recovery Policy FP-104-009-5 Version 2.* The BBA presents a unique opportunity to evaluate the entire wastewater system for "prudent replacement" to industry standards using the FEMA-approved consensus-based codes and standards. Specifically, the BBA policy states: "The recovery funding provided by FEMA for critical infrastructure allows for the implementation of the Bipartisan Budget Act (BBA) – which enables the storm-damaged infrastructure facilities (including functionally dependent elements) to be restored to industry standards."

WMA continues working with FEMA to identify damage to the Territory's entire wastewater infrastructure system. Using data on the frequency of NCEs before and after the disasters, WMA submitted an application for the St. Croix wastewater system's prudent replacement. FEMA has accepted the prudent replacement request for St. Croix and is determining the appropriate next steps, including the development of projects that replace significant portions of the sewer system as detailed in the following sections. In parallel, WMA is developing prudent replacement requests for the wastewater infrastructure in St. Thomas and St. John.

WMA has already conducted a cost/benefit analysis to replace the St. Croix wastewater system using FEMA's Benefit-Cost Analysis toolkit, a CDBG-MIT program requirement for large projects. Note that while the replacement of the wastewater infrastructure is related to damage caused by the 2017 disasters (and therefore is applicable for use of CDBG-DR funding), it also represents an investment that will prevent future failures of the wastewater system in extreme precipitation events, and therefore mitigate the hazard risk to the facility, as well as protecting the health and safety of the residents on St. Croix.

The ability to use CDBG-DR and -MIT funds for the Territory's 10 percent (10%) required share ('match') of the total project costs presents an opportunity for WMA to receive funding for recovery and mitigation which is effectively ten times more than the quantum of funding available through CDBG-DR and -MIT. Therefore, WMA intends to leverage the CDBG-DR and -MIT funds for the match in the FEMA- funded prudent replacement of the wastewater infrastructure systems. To support the use of CDBG funding as the local match, FEMA and HUD issued "Joint Guidance" on Oct 14, 2020, titled *Implementation Guidance for Use of Community Development Block Grant Disaster Recovery Funds as Non-Federal Cost Share for FEMA's Public Assistance Program.* This guidance allows the use of CDBG funds regarding "flexible match" will reduce the administrative cost and streamline the use of CDBG funds to fulfill a portion of the local match requirements for FEMA's PA Program. Note that

while this comment is being explicitly submitted for CDBG-MIT Action Plan (Nov 4 Draft), WMA intends to utilize the “flexible match” mechanism for both CDBG-DR and MIT funds.

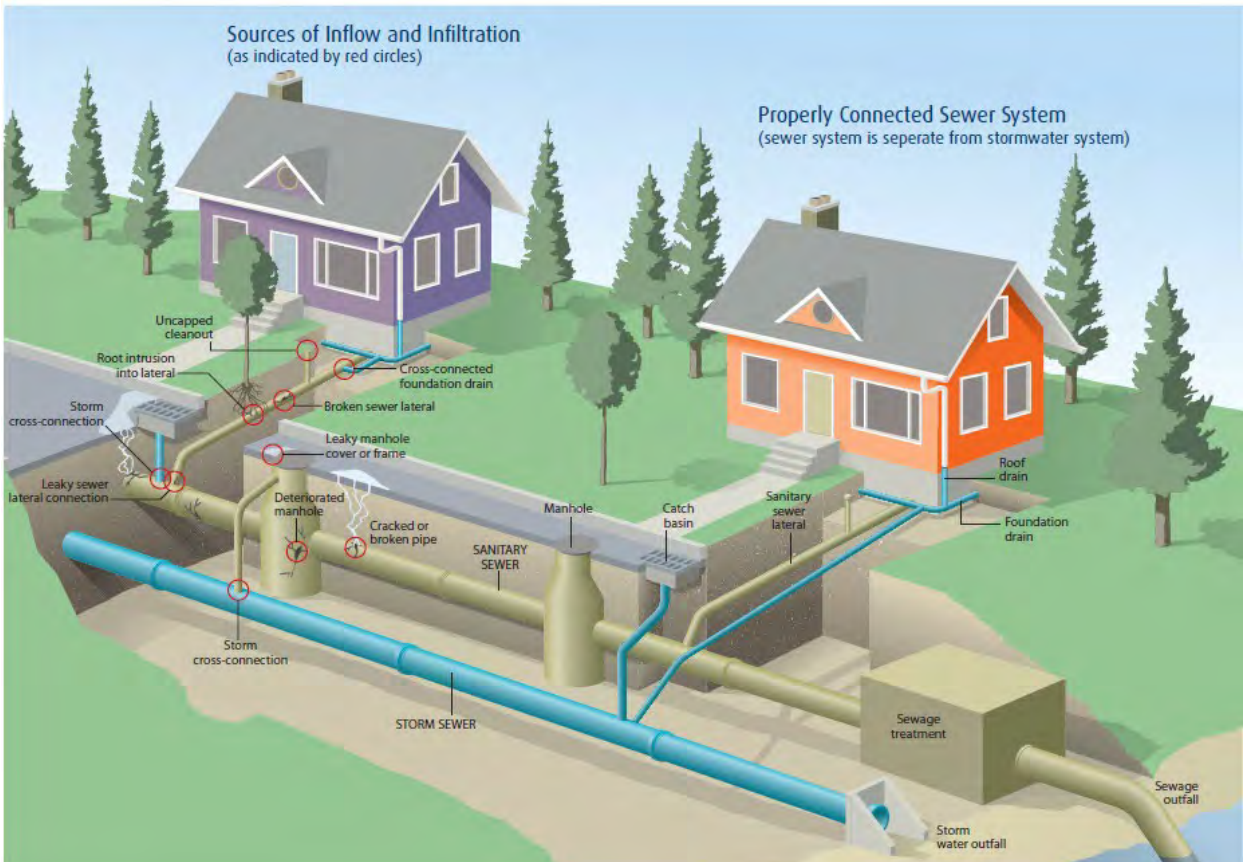
Role of Natural Infrastructure as part of Critical Infrastructure

The Territory’s wastewater system was not designed as a combined sewer system (i.e., an antiquated type of design that carries both stormwater and sanitary wastewater), however, it effectively functions as such due to excessive inflow and infiltration during wet weather events. Flowrates into the treatment plants rise several times the normal dry weather flow, indicative of stormwater entering the system via deficient, failing infrastructure and purposeful, though illicit, direct connections to the sewer. This immediate downstream indication of illicit stormwater conveyance does not even consider the flow lost from the system upstream as part of the SSOs (NCEs). The problem is, in fact, much worse than what is seen at the treatment works.

Drainage is therefore intrinsically linked to sanitary wastewater conveyance in the Virgin Islands and in the many communities on the mainland US that are plagued with excessive inflow and infiltration. Drainage improvement projects will be required in conjunction with sanitary sewer improvements to maintain not only sanitary sewer compliance but compliance with drainage standards as well. The links between the drainage system and the sanitary sewer are idealized in Figure 1.

(intentionally left blank)

Figure 1. *Idealized depiction of potential sources of stormwater entering a sanitary sewerage system (University of Connecticut, https://nemo.uconn.edu/ms4/pubs/i_amp_i_brochure.pdf).*



So-called "green" drainage infrastructure is generally a method to mimic and enhance natural drainage processes to achieve engineering goals. "Gray" infrastructure is the typical pipe-and-convey solution, essentially treating stormwater as a nuisance at best, something to be disposed of. Green infrastructure, on the other hand, treats water as a resource. By keeping it closer to the source, enhanced and well- design infiltration basins can achieve water quality benefits and enhance groundwater resources, reduce salt-water intrusion on coastal areas, and reduce irrigation demand co-benefits that increase the resilience of vulnerable coastal ecosystems. Both green and gray infrastructure have their place in an integrated plan. Generally, green systems have an upper limit, beyond which a gray solution is needed. This manifests in green systems designed to capture, store and infiltrate perhaps the first 0.5 inches of runoff. This represents the bulk of rain events, with adequate water quality and quantity control.

The approach defined here resembles a "One-Water" approach, one where water is managed throughout the built-environment and not segmented into one or other artificial categories by function, hazard, or jurisdiction. Integrated sanitary sewer improvements to achieve sustainable compliance with the Clean Water Act are intrinsically linked to drainage functions, water supply, groundwater, and water quality. Such nature-based solutions will be explored using the various consensus-based codes and standards that have been approved by FEMA and represent. In this regard, two important standards are

– Water Environment Federation – Prevention and Control of Sewer System Overflows (WEF MOP 17);

American Society of Civil Engineers – Climate-Resilient Infrastructure: Adaptive Design and Risk Management (ASCE MOP 140).

Unmet Needs Estimate

The unmet needs for wastewater infrastructure fall in two categories of CDBG-MIT Action Plan's Activity Categories– Infrastructure and Public Facilities (Resilient Critical & Natural Infrastructure) and Planning.

Category: Infrastructure and Public Facilities (Resilient Critical & Natural Infrastructure)

The cost to replace these facilities is substantial and will be based on FEMA's determination to address the subsurface wastewater infrastructure. Currently, FEMA is reviewing the status of the prudent replacement request for St. Croix's wastewater infrastructure. Simultaneously, other projects – many in the same cross-section where subsurface infrastructure is known to be broken – are being funded by FEMA and are in various stages of development.

Table 4: *Unmet Needs for Wastewater Infrastructure (Infrastructure and Public Facilities)*

Location (Island)	**Details of Wastewater Infrastructure**	**Cost Estimate and Basis**	**Percentage Cost for Match** **Funding (10%)**
St. Croix	126 Miles of sewer; 15 pump stations; 1 wastewater treatment plant	115 Miles of Sewer: $260 M ($2.25/Mile) Pump Stations, WWTP: **~$30M**	Sewer: **$26M** Pump Stations, WWTP: **~$3M**
St. Thomas	55 miles of sewer (Excluding ~25% additional sewers for which GIS length is not available); 11 pump stations; 5 wastewater treatment plants	60 Miles of Sewer: $150M ($2.5/Mile) Pump Stations, WWTP: **~$25M**	Sewer: **$15M** Pump Stations, WWTP: **~$2.5M**
St. John	4 miles of sewer; 4 pump stations; 2 wastewater treatment plants (Sewer length is an underestimate)	Estimate based on $2.5/Mile approx. **$10M** Pump Stations, WWTP approx. **$34M**	Sewer: **$1M** Pump Stations, WWTP: **~$3.4M**

SCADA System for Wastewater Infrastructure	Design and installation of SCADA architecture (including user interface, components to be installed on the various system components, and network connections).	Including equipment control capabilities and other required enhancements to the funds for installing telemetry system will cost approximately **$ 4M.**	Total Estimated Cost = **$ 4M**. All funding will be requested through CDBG-MIT.

Table 4 provides a description of the wastewater infrastructure, an estimated length of the subsurface infrastructure that will be replaced, a high-level cost estimate using unit cost per mile of sewer replacement, and a local match portion for the total cost. An estimate is used for other infrastructure (e.g., pump stations and wastewater treatment plants). A separate line item is added for a SCADA system, which will build upon the grant that WMA received to install telemetry equipment at pump stations. The SCADA system architecture will include a graphical user interface that integrated with the monitoring provided with the telemetry system being development. Additionally, various components of the data management system (e.g., servers, sensors, electric motor controls, etc.) will require to be integrated with the Authority's wastewater system components (e.g., valves, etc.). This will provide WMA the ability to remotely control the wastewater system that will be extremely valuable during a disaster and enhance the wastewater system's resilience.

The numbers included in this estimate exclude the Territory's cost adjustments and escalation factors. Additionally, some of this information, especially for the islands of St. Thomas and St. John, is based on incomplete information regarding the length of subsurface wastewater infrastructure. By 2021, WMA will have a better understanding and continue developing applications for CDBG funding accordingly.

Category: Planning

The planning component of the CDBG-MIT Action Plan (Nov 4 Draft) is integral to achieving long-term resilience planning that will help identify solutions to disaster risks and enable improved implementation of mitigation practices. For the wastewater sector, there are two areas where planning- related activities will improve WMA's ability to plan and manage the wastewater infrastructure and effectively respond during disaster:

- **Wastewater Master Plan** - The wastewater master plan will serve as an overarching guidance document, directing future work per approved industry standards by developing prioritized facility plans that will repair hurricane damage and sustainably lead the VIWMA system into eventual compliance with the Clean Water Act. Wastewater Master Plans typically attempt to foresee the future needs of the utility and the community it serves and plan improvements to maintain a sustainable level of service. The master plan will include service area characterization, identification of illicit connections, and base outputs on future population and system expansion projections for the wastewater collection system. Using these projects, the master plan will provide recommendations on future projects based on an assessment of mitigation needs and long-term risks to WMA's infrastructure. Additionally, the master plan will include a component on financial sustainability – including recommendations for implementation of fees for the provision of wastewater services.

- **Asset Management Plan (GIS) –** A key component of the sustainable performance of a utility is an operations and management program that includes asset management at its core. The development of an asset management plan will consist of a GIS-based asset inventory of the wastewater infrastructure owned by WMA, provisions to include service requests and provide key inputs to a capital improvement plan based on the state and age of various infrastructure components.

The combined cost of these two plans will be approximately $ 2M. Successful implementation of these planning-related programs will enable WMA to be prepared for future disasters and effectively respond using the inventory of its infrastructure, including asset-age, which will allow for a cost-effective and timely recovery.

Conclusion

The CDBG-MIT Action Plan includes $ 100M as currently planned allocation for WMA. However, based on the numbers included in this document, at least $128 M is required for solid waste improvements. Although the unmet need for wastewater infrastructure is higher than planned for application to CDBG- DR and CDBG-MIT, the anticipated FEMA funding for replacement of significant portions of the wastewater infrastructure and the ability of CDBG funds to be used as flexible match allow the opportunity to WMA to receive ten times funding as compared to directly applying for CDBG projects. As per the number included in this document, approximately $57 M will be required as match funding or for strategic investments for wastewater infrastructure (e.g., SCADA) or planning-related investments. Therefore, WMA requests a higher amount being made available for mitigation-related improvements to the wastewater system than is currently included in the CDBG-MIT Action Plan (Nov 4 Draft). The total anticipated funding requirement for WMA from CDBG funds is therefore approximately $185 M.

The state of the solid waste management and wastewater systems in the Territory requires significant investments to recover from the impact of 2017 hurricanes and become resilient to future disasters. The wastewater infrastructure is integral for public health and well-being. Some of the large high-impact investments for WMA have also been justified to FEMA using the benefit-cost analysis methodology. The state of landfills and frequent violations of the Clean Water Act due to SSOs create a public health situation that has deleterious long-term impacts on the communities in the Territory and should be addressed.

The Authority endeavors to work collaboratively with the VIHFA to ensure the public health and well- being of our population through the upgrades of the territory's Wastewater and Solid Waste infrastructures.

Sincerely,

Roger E. Merritt, Jr.

Roger E. Merritt, Jr.

Executive Director

Staff Response:

See summary above and general letter below.

Commenter 13

Comment Received:

CHANT Crucian Heritage and Nature Tourism, Inc.

#217 Custom House Street

Frederiksted, St. Croix, US Virgin Islands 00840

Telephone: (340) 277-4834 Email: info@chantvi.org

www.chantvi.org

December 21, 2020

TO: VIHFA

mitigation@vihfa.gov.

From: Frandelle Gerard, Executive Director

RE: CDBG – Mitigation Action Plan

Thank you for the opportunity to respond to the CDBG – Mitigation Action Plan proposed for the U.S. Virgin Islands as part of the recovery efforts and strategy following the impacts of Hurricanes Irma and Maria in 2017.

See Comments Below:

Page 1 Executive Summary – add the 3,000-year history of indigenous people (our history does not start with European arrival. (See page 16)

“Identified mitigation actions to be considered based upon the MNA include:

♣ Planning activities including studies and other products that can help local communities better understand their risks.

♣ Engagement with all territorial entities to identify available funding that could be used for mitigation and discuss opportunities to collaborate.

♣ Housing development to increase the resilience of housing and residents after disasters ♣ Infrastructure and public facilities”

Comment – The ranking of "Planning activities…" seems geared to benefit consultants and contracted planners rather than to benefit the community. The lived experiences of those who experienced two category 5 hurricanes informs their understanding of the risks of natural disasters. The lived experience of farmers, homeowners and resident's dependent on water catchment informs them of the risk of drought. (Community activists initiated the designation of drought in 2015 and forced the inclusion of the Virgin Islands in the drought data system with USDA.)

Public information campaigns disseminating the information can be done efficiently and cost effectively utilizing media outlets and social media.

The listing implies prioritization of planning where housing and the ability of residents to rebound after a disaster are, in my opinion, the most significant needs. If the listing is random rather than priority driven, I suggest revising it to reflect the human needs of the community.

Page 76, Paragraph 2 states: "As part of its coordination efforts, the VIHFA has partnered with VIHA, in consultation with the Government of the Virgin Islands and others, to convene an Urban Land Institute Advisory Panel to provide input on potential redevelopment areas. **The panel focuses on ways to support the transformation of St. Croix through the long-term recovery process including economic growth through equitable and entrepreneurially means.** The VIEDA Vision 2040 Plan, partially funded with CDBG-DR, functions as a long-term strategic economic recovery and development plan with economic growth, job creation and wealth generation as measurable deliverables, with a focus on improved quality of life for the Territory's residents."

COMMENT: The ULI Advisory Services Panel Report provides details on the opportunities to utilize FEMA, CDBG-DR and now CDBG-MIT financial resources to spur development from within. The identification of "Equitable Development Opportunities" and of "Creative Placekeeping" as viable community-based development strategies should be adapted and implemented by VIHFA. The traditional focus on external developers should be refocused to internal – development from within – strategies. As outlined in the report, community organizations are the backbone of sustainable and equitable development strategies. Harnessing the creativity and tested successes of our homegrown institutions will positively impact the success of economic development, innovative housing strategies and more.

It is imperative that the VIHFA take the opportunity to partner with community-based organizations to infuse capital investments into sustainable projects and programs that, without support, may cease to exist. The St. Croix Foundation for Community Development and the Non-Profit Consortium consisting of 30 VI non-profits work collaboratively to provide services to the community including training, housing, health services, social services, environmental education and more. These organizations consistently overproduce – maximizing the limited funding available to them.

CHANT, as a member of the non-profit consortium, has been able to forge collaborations with other non-profits and extend the reach our programing. Additionally, the collaborative relationships have empowered non-profits to create shared opportunities, investments and programing to best serve the community.

In addition to the above-mentioned study and plan, there is the Christiansted Town Plan, The Frederiksted Town Plan, The CEDS annual plan, the ongoing 2040 Vision. We have a draft, never approved Comprehensive Land and Water Use Plan and numerous agency specific plans within the local government and the Federal Government. All of these plans lack one major aspect – Implementation Plan. The proposed expenditure of $35million for planning outlined in the CDBG-MIT plan is too large. There are no proposed outcomes in the proposal for this planning budget and, the territory has a very bad track record vis a vis planning and implementation. Without a Planning Office with qualified city planners, the expectation that the VIG will have success in the planning process is questionable.

I recommend that the funds for planning be amended to include implementation strategies and budgets for implementation. All plans funded should be tied to specific outcomes and performance measures and, the projects should be funded.

The proposed expenditure categories places infrastructure hardening and resilience first. The allocation of $75,000,000 for Economic Resilience and Revitalization represents 10% of the overall plan – economic revitalization is the key to building a resilient community. The non-profit and private sectors are the economic drivers – investments into growing the private sector and improving the resilience of the private sector will lead to reduced dependence on Federal intervention at the time of a disaster and will build capacity within the community for response and recovery. We should not be dependent of outside contractors for restoration and mitigation activities post disaster.

Funds should be dedicated to training and to creating sustainable training facilities and institutions on the island. There are several non-profits that provide training and there are proposals for the creation of a training college and architectural school (VIAC) that would provide technical training specific to the construction needs of our community. The CHANT Building Arts Institute is also positioned to increase training capacity and to focus on the needed skill sets for historic restoration.

The focus on new and innovative construction for public and private buildings is implicit in the mitigation plans. However, we need to look at the performance of historic buildings in natural disasters. The design and building methods used in the 19th and 20th century are based on the hazards identified (hurricane, fire, flood) and have performed well even when buildings are in need of maintenance and repair. The focus on new negates the value of the old! Our ancestors engineering genius in seen in the small vernacular houses in our towns as well as the grand colonial buildings that still stand today.

I propose that the Town Plans for Christiansted, Frederiksted and Savant be included in the proposed mitigation phase of disaster recovery funding priorities. All of the plans require partnerships between government, the non-profit sector and the private sector. Addressing institutional limitations on funding for privately owned historic buildings – specifically those owned by families for generations, will promote the restoration of these homes (largely in LMI neighborhoods) and will highlight the beauty of our towns while preserving architectural gems of our islands. The preservation of smaller historic buildings – many built by the Free Black communities in the 18th and 19th century also preserves our culture and creates towns that are livable.

Innovative approaches to affordable housing should include local developers and ownership and not rely on external housing developers who capitalize on low-income tax credits, etc. The creation of a VI based public/private housing development entity that works with communities to build resilient housing while building healthy communities can be change agent in rebuilding community pride, while reducing crime and unemployment. Including community in the ownership, building and development of their housing creates sustainable communities.

EXAMPLES of Economic Resilience and Revitalization Projects to be considered:

1) Invisible Heritage – a CHANT project to restore 6 properties in historic Free Gut. ($2.5million) Will create 4 LMI rental units in Frederiksted

2) CHANT Building Arts Institute – providing training in the traditional building arts and deploying trainees to work on the restoration of the 6 properties in #1 ($1million-4years)

3) Agro/Production initiative – establishing a sustainable agriculture facility with fully integrated products. Crop will be planted, harvested and value-added production of high-end sustainable products will be manufactured for local distribution and export market. ($2.5million)

4) Virgin Islands Architecture and Craft College – restoration of Christiansted historic property, establishment of craft training, draftsmen/woman certification and training and architectural school ($10million)

5) Aldershville Community Center – restoration of historic property to be used as day center for seniors and as cultural training facility for the elders and youth of Frederiksted. ($3million)

6) St. Croix Foundation for Community Development – restoration of Sunday Market Square buildings including Alexander Theatre and adjoining shelter.

These are just a small example of projects being developed by the non-profit sector and the agricultural sector. The revitalization of Frederiksted buildings and communities will help to reverse the social and economic downturn of the town that has increased after Hurricane Maria. The lack of investment in the towns has led to increased unemployment, social dislocation and resulting crime. Investing in the people and their sustainability should be priority #1.

Community revitalization projects that are Placekeeping projects have long-term sustainable impacts on the quality of life of residents and visitors. Tourism growth requires healthy communities – Frederiksted should be the flagship of the VI with the most beautiful waterfront, and restored historic buildings for commercial and residential use.

Thank you for the opportunity to comment on the proposal. I look forward to working with the VIHFA and other partners to ensure that we maximize the impact of these funds by investing in our own and developing from within.

Staff Response:

See summary above and general letter below.

Commenter 14

Comment Received:

CORAL BAY COMMUNITY COUNCIL

Mail: 9901 Estate Emmaus, St. John, VI 00830 8-1 Estate Emmaus, Coral Bay, St. John, U.S. Virgin Islands CBCC@CoralBayCommunityCouncil.org Phone 340-776-2099

www.CoralBayCommunityCouncil.org

- CBCC is a 501(c)(3) nonprofit organization

December 22, 2020

CBCC Comments # 1 on Mitigation Action Plan draft 11 4 20 Delivered

to: Mitigation@vihfa.gov

Seasons Greetings and wishing you all well,

Re: Edits to Plan

The Coral Bay Community Council (CBCC) is a 17-year-old nonprofit 501 c (3) organization in Coral Bay, St. John, which acts as a watershed management agency and environmental protection and community services agency. In the wake of the terrible hurricanes of 2017, which destroyed all four building locations for large groups (churches, old school two public buildings), CBCC at the urging of the community moved into championing a new community center to increase resilience and provide and emergency shelter and a year-round location for various community services and gatherings. CBCC's current 2020 expenditures are approximately

$400,000. Full information on our work is at Coral Bay Community Council | Coral Bay Community Council on St. John in the US Virgin Islands

Thank you for the opportunity to present comments on the CDBG November 4th 2020 Mitigation Action Plan draft. These comments are related to editing individual components of the description, as an assistance to completion of the final version. A second letter is being sent with details of the needed safe room/shelter project for Coral Bay, St. John.

P. 25 of PDF (p. 17 of document), the single line hurricane track for Irma is shown much further north of St. John than we have seen in any other official source. According to other official sources,

it should be shown almost touching St. John's northeast shore near Coral Bay, as it went over the BVI islands right next to us. (The wind impact broader line would be more relevant and compelling to display too.) Coral Bay was in the eyewall for several hours that day, experiencing the worst winds of 185 mph and over in tornadoes. Here is the NWS summary which shows it much closer; Detailed Meteorological Summary on Hurricane Irma (weather.gov) Some much more compelling exhibits are in this report and other VI government reports than the current line drawings, if that would be useful.

P. 37 of pdf (p. 29 of document) - The blue and green dots on St. John's map outside of the town of Cruz Bay do not seem to correspond with known physical locations of buildings or services (with the exception of the Coral Bay Fire Station). This needs review, and possibly highlights the need for local experts with mapping knowledge in compiling these reports. CBCC would be happy to assist with its personnel and arc-gis mapping tools.

Page 2

P. 52 of PDF (p. 44 of document) – Looking at the flood hazard map of Coral Bay, St. John – a much better understanding is needed about actual potential inundation levels in a given area from rainwater. Given the topography of steep hills, certain areas of the hillsides can have vertical rushing torrents of stormwater destroying structures and road infrastructure that are outside of the flood zone – and highly dangerous – even though most of the shown flood zone might not be susceptible at all in the same storm conditions. This fact makes prudent planning for location of new facilities even more difficult. It is noted that landslides on steep slopes is discussed elsewhere, but that does not include vertical torrents of water than can take unpredictable paths in natural conditions. What steps should be taken to acknowledge and prepare for this hazard?

P. 62 of pdf (p. 54 of document) - It looks like the contents of Tables 22 and 23 have been reversed, as Table 23 shows highest wind speeds in Maria on St. John – not St. X – and vice versa.

P. 101 of PDF (p. 93 of document) - CBCC requests that the proposed new Coral Bay shelter and community center facility be added to the planned physical facilities for construction list, or a companion PPP list. A multipurpose community center building providing for emergency shelter and distribution of food, water and medical is needed in the remote Coral Bay Community. Also note that the population of this community is growing in contrast to rest of USVI, as more homes are being built in this area in last 10 years, including affordable housing that opened in 2010 and 11 after the census count. Note that it might be possible to repurpose the closed Guy H. Benjamin Elementary school and adjacent Port Authority land for this purpose. This acreage is some of the only publicly owned land in Coral Bay not directly in the FEMA flood plain. A separate comment letter with more detailed information about the community center concept is being submitted.

CBCC realizes the need to plan carefully for all the territory's needs, and respectfully submits that remote areas, with limited public infrastructure (including no public water or sewer) like Coral Bay may become most resilient and best handled with nonprofit organization leadership/partnership and multipurpose facilities. A local nonprofit agency can give attention to the details of management that the central territorial government simply cannot prioritize. In addition, CBCC has direct experience managing projects for stormwater management, road

paving, and natural infrastructure for erosion protection, and planning, as well as using federal grants and meeting federal requirements.

We look forward to participating in a number of recovery and resilience objectives. Thank you for your hard work.

Sincerely,



Sharon Coldren
President, CBCC

Staff Response:

See summary above and general letter below.

Commenter 15

Comment Received:

CORAL BAY COMMUNITY COUNCIL

Mail: 9901 Estate Emmaus, St. John, VI 00830 8-1 Estate Emmaus, Coral Bay, St. John, U.S. Virgin Islands CBCC@CoralBayCommunityCouncil.org Phone 340-776-2099

www.CoralBayCommunityCouncil.org

- CBCC is a 501(c)(3) nonprofit organization

December 20, 2020

CBCC Comments # 2 on Mitigation Action Plan draft 11 4 20 Delivered

to: Mitigation@vihfa.gov

Happy Holidays and wishing you all well,

Re: Emergency Shelter/Community Center for Remote Coral Bay St. John

This letter is to provide details about the need and concept for a Community Center/Emergency Shelter for our community as part of the Public Infrastructure portion of the Mitigation Action Plan. The building of a Community Center and shelter for 100 people in Coral Bay would position the residents of the remote east side of St. John (separated from the rest of St. John by 5 miles of road through the uninhabited National Park) to face any disaster knowing they have a gathering point in a safe location, with food, water, shelter, medical and other services, all within walking distance – or a few miles -- of their homes. Thus, the most significant community lifelines will be maintained in some fashion through a disaster and the direct impact will be substantially mitigated.

Thank you for the opportunity to present comments on the CDBG November 4th 2020 Mitigation Action Plan draft. This is the second of two comment letters. This one focuses exclusively on the Emergency Shelter needs in Coral Bay and a proposed solution, with the request that this new building project be considered for written inclusion in the final plan, even if it does not specify our organization's proposed role.

The Coral Bay Community Council (CBCC) is a 17-year-old nonprofit 501 c (3) organization in Coral Bay, St. John, which acts as a watershed management agency and environmental protection and community services agency. In the wake of the terrible hurricanes of 2017, which destroyed all four building locations for large groups (churches, old school two public buildings), CBCC at the urging of the community moved into championing a new community center to increase resilience and provide and emergency shelter and a year-round location for various community services and gatherings. CBCC's current 2020 expenditures are approximately

$400,000. Full information on our work is at Coral Bay Community Council | Coral Bay Community Council on St. John in the US Virgin Islands.

Below is a concept summary of the proposed community center project and attached are some supporting documents for the concept and location possibilities assembled over the last three years and shared with a number of VI Agencies during this time.

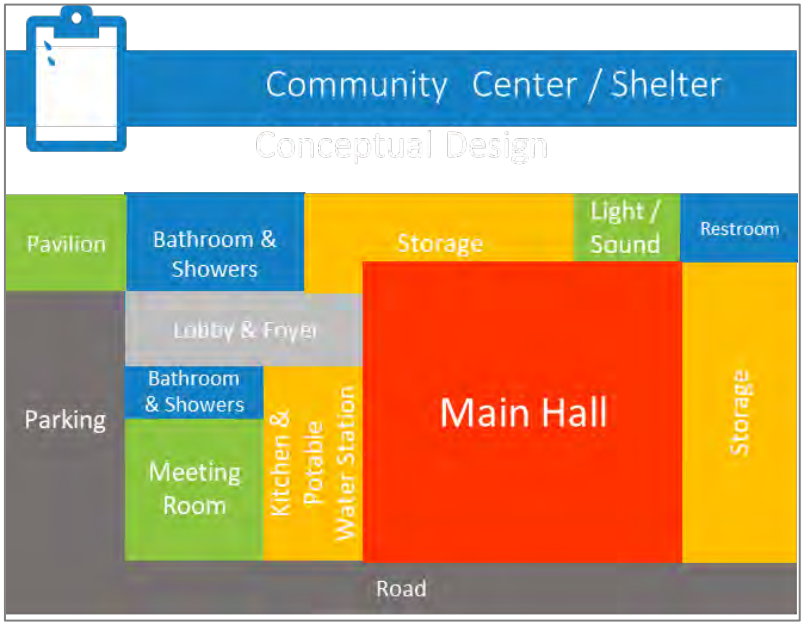
CBCC has been providing written descriptions of the need and the concept for the Community Center project to the CDBG-DR team at VIHFA since June of 2018, with a meeting in December 2018 and follow-up emails periodically since then, including attending and speaking at public comment meetings. Meetings have been held with other agencies in the VI government too, as well as with the community to help develop the project concept details and alternatives. We welcome critiques and further refinement of the concept and look forward to working with the government and other organizations to make this critically important community facility happen during the next 8 years.

(Blank intentional – continues on next page:)

Emergency Shelter/Community Center for Coral Bay Concept

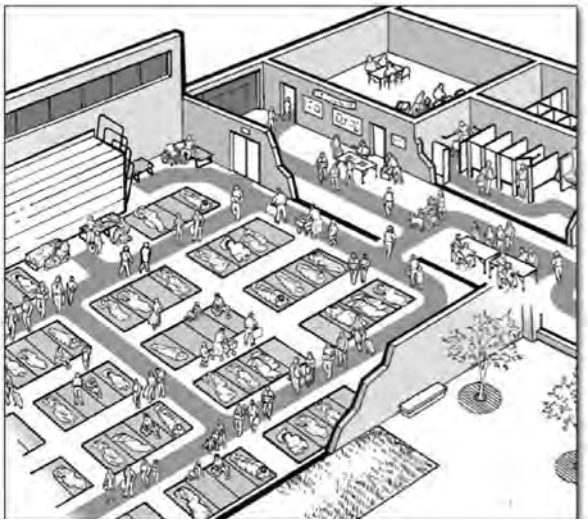
Due to its distance from the main population center on St. John and the challenging road conditions through the National Park, it is critical to have a functional emergency shelter and service center for the 1,500+ people who live in Coral Bay. This is a short brief of the characteristics of such a center, and the importance of its inclusion in the CDBG funding to the Virgin Islands. Some of the funding, including future long-term maintenance and operations could also be through private donations and user fees for nonemergency uses of the facility, if it is run year-round by a nonprofit agency, such as Coral Bay Community Council (CBCC).

Building a multi-purpose community center with the capacity for use as a shelter and safe room designed to withstand hurricane tornado-force winds and earthquakes will provide residents of the remote Coral Bay community with an accessible and comfortable location to take refuge during a disaster and receive coordinated services in the aftermath. When not being used as an Emergency Shelter, the facility will provide the community with a versatile public space for a variety of uses. The destruction of the 2017 hurricanes left Coral Bay without ANY functional public or private meeting spaces for large meetings/gatherings, except outdoor restaurants, and no functional public buildings. This can be an opportunity now to plan for the best kind of multipurpose public/private facilities to allow the population of Coral Bay to feel secure in event of a disaster and also have a year-round community center allowing for many activities.



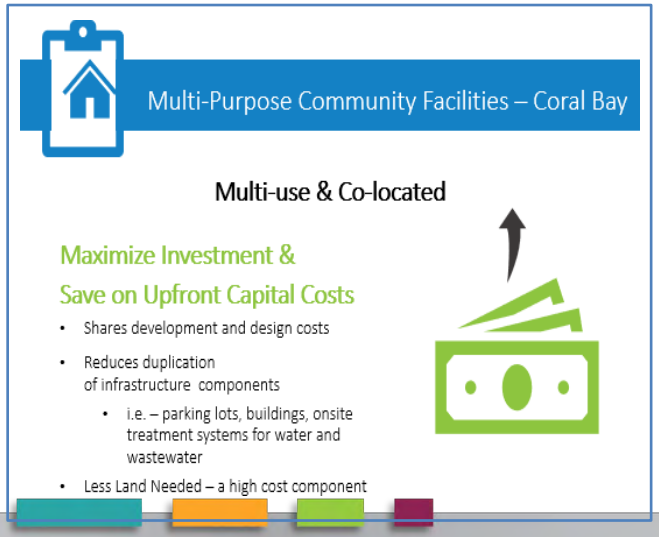
Conceptual Diagram for Emergency Shelter/Community Center

In event of a disaster, the new Emergency Shelter/Community Center facility would serve as a shelter for approximately 100 people and provide a space for coordinating assistance to the whole year-round population and visiting tourists and part time residents which may triple the population to almost 5,000 needing service in the aftermath if it is high season. The facility would incorporate bathrooms with showers, a kitchen, and a long-term storage area for supplies, a small medical clinic office, an office for visiting government services, and amenities that make the building useful year-round to the community.



Virtually every home in Coral Bay was damaged by Hurricane Irma, and some were not habitable. Some homes are very modest, simply a shelter from rain, and open air. An Emergency Shelter would provide safe refuge to residents whose homes are located on the steep hillsides and feel vulnerable to loss of their homes' functions during a storm, given the propensity for winds to strengthen when funneled up mountain slopes or at higher elevations. Earthquakes, fires, or other kinds of disasters can lead to the need to have people gather in one safer place for services and sleeping.

Given the remote location of Coral Bay, and local lack of fuel, public water/wastewater utilities, and the likely landslides, fallen trees and other interruptions to the road network linking the community to Cruz Bay town – 8 miles away - on the western side of St. John, the area is likely to be cut off after a storm or other emergency, with limited necessities. Therefore, it is difficult to bring in assistance for Coral Bay residents after a disaster, or to ask people to go there for help. Assistance should be pre-staged in Coral Bay. Construction of a local shelter/community center complex would assure functioning critical infrastructure and services after a disaster – and provide a space for use by the community during normal times. As illustrated in the Disaster Recovery Action Plan Version 3.0 this facility would benefit vulnerable lower income people, as more than 50 percent of households on St. John are considered low- and moderate-income households (VIHFA 2020).



Multi-Purpose: Developing facilities that are multi-purpose and incorporate multi-agency use allows for effective public facility development in a remote, rural area

like Coral Bay. Combining uses in a single facility reduces capital investment and operating costs and maximizes use of limited flat land and other resources. There

are few parcels that would be appropriate (i.e., outside of the floodplain, moderate slope) for use to construct a new community facility large enough to provide emergency shelter and a community center space in Coral Bay; as such, the value of developing multi-use facilities is intensified.

365-Day Use as a Community Center: When not functioning as a shelter, the facility would serve as a community center, with a large room that will hold more than 200 seated people for community meetings, public hearings, shows, religious services, and social gatherings. This space may be subdivided into smaller rooms with moveable partitions for community classes, workshops or other uses such as children's programs, exercise classes, adult education, support groups (i.e., AA), and vocational work/study tech classes. Through engagement with the Coral Bay community, a wide range of potential uses of a multi-use community center (including both indoor and covered outdoor space) have been identified. The community center could be run by CBCC, or a nonprofit established specifically for this purpose. The community center could be self-supported and maintained through multiple revenue streams and operational methods, including private event and services hosting. If built/run by a nonprofit, there would be potential for donated land, dollar donations and other nonprofit support. Local ownership would mean more flexibility in uses over time and would create local non-government jobs for its operation.

Design Considerations: The following are some considerations for designing an Emergency Shelter/Community Center for Coral Bay. These can be used in conjunction with professional and community input in an open design process.

- Shelter would be built to withstand up to 250 mph winds, such as those found in tornadoes and the extreme hurricane winds of over 185 mph during Hurricane Irma.
- Land for the facility should not be located within a flood plain or tsunami zone.
- The grade of the land would need to be moderate (e.g., up to 15% slope) to reduce the cost of building and risk of 'vertical flooding cascades.'
- Site would be centrally located and walkable from Coral Bay town center and bus routes.
- Building would be large enough to serve as a shelter for 100 people for a hurricane event (e.g., at least 2,000 sf floor area to meet criteria per FEMA P-361 3rd Edition (2015)).
- Building would incorporate bathrooms with showers, kitchen, and long-term storage area for supplies, and amenities that make the building useful year-round to the community.
- Building would meet FEMA's standards for safe room construction and meet all shelter specs in FEMA P-361 as well as other applicable standards.
- The site would be equipped with back-up power and fuel tanks and include a ramp (and elevator if two floors) for ADA compliance to accommodate the entire community.
- Wastewater treatment and potable water would be provided onsite or with co-located facilities (no public utilities are available in Coral Bay). Co-locating the site near the Fire Department and Emergency Services Center and other public services would enable shared site costs and function well in an emergency.

It may be necessary to purchase land for this facility as there is very limited publicly-owned land in Coral Bay. A key consideration is finding a site outside the flood zone (or the newly defined flood zone after the current study is completed). The old Guy Benjamin School site (Parcels # 1

and 2 Emmaus) is potentially well located for this use, if the adjacent Parcel 7 Emmaus owned by the Port Authority could be incorporated in the plan. There are also possibilities up Kings Hill Road on private land in Estate Carolina. The building itself could be owned by or leased to a nonprofit organization to operate. The first step is conceptual agreement that this kind of community center and emergency shelter is a high need in Coral Bay and for the overall infrastructure of St. John, and that it is a good fit for federal mitigation funds, primarily through the CDBG-DR program.

Population to be served: The population of this community is growing in contrast to rest of USVI, as more homes are being built in this area in last 10 years, including affordable housing that opened in 2010 and 11 after the 2010 Census count. Thus, although the LMI percentage is lower than some USVI communities, the number of qualified people to need this primary shelter service is probably qualifying.

FEMA Benefit Cost Analysis: To establish a quick FEMA Benefit Cost Analysis estimate, we took an earlier CDBG mitigation Action plan example estimate of the benefit of a safe room shelter for 500 people being $118 million and attributed the benefit for 100 people in Coral Bay to be 1/5 of that, or $23.6 million. This facility is estimated to cost less than that, probably by a wide margin – for the core safe room portion.

This a key action on St. John to fulfill HUD's mitigation objective. This project which will provide a physical place for a full range of government services will allow it to be possible in remote Coral Bay to provide "*those activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, … and suffering and hardship, by lessening the impact of future disasters."* as described in the Action Plan.

Thank you for reviewing this concept statement. We look forward to your comments and improvements.

Sincerely,



Sharon Coldren

President,

CBCC

Attachment

Why Multipurpose presentation

Community Center presentation: A Community Needs a Place to Gather

Staff Response:

Additional attachments are included herein by reference. See summary above and general letter below.

Commenter 16

Comment Received:

Good afternoon,

I reviewed the USVI CDBG-MIT Action Plan, and my company, Inner Urban, would be interested in working with the USVI Housing Finance Authority to implement its housing program. Inner Urban, a Skyland Development Group subsidiary, is an affordable housing developer and multi-round awardee of the HUD funding. Inner Urban's experience in this space encompasses over ten (10) years of acquiring, constructing, and rehabilitating housing for sale and lease to income-qualified individuals. Our project team's expertise includes CDBG, HOME, and tax credit financing.

My suggestion would be to incorporate a mixed-used development concept as part of the multifamily housing program. The combination of housing and commercial space presents an opportunity for economic diversification. For example, our company's mixed-used concept combines housing, coworking office space, and extended-stay hotel operation, resulting in a more resilient business model. Furthermore, a mixed-used concept enables a developer such as Inner Urban to address existing vulnerabilities and project sustainability.

Daniel Dabakaroff

Chief Development Officer

Direct: 954-245-2379

Staff Response:

See summary above and general letter below.

Commenter 17

Comment Received:



MAXCOM

Dec. 22, 2020 Dear VIHFA,

My name is Duane McNab, I am the owner and managing director MAXCOM, founded in 1989 by Charles Leeker McNab (My father). We are the leader in communications on the island of Roatan, the largest of the Bay Islands off the northern coast of Honduras which a very similar to the US Virgin Islands. Roatan has a population of over 60,000 residents and attracting over 1.2 million visitors annually pre-Covid. MAXCOM is dedicated to providing affordable, stable, and reliable intern et and essential DATA services to the community with a commitment and focus on low/moderate income households throughout the Island. Reliable and resilient communications services become essential to keep the most vulnerable population connected, informed and safe during natural disasters and have become even more imperative during the worldwide Covid-19 pandemic.

Our highly trained and community focused team provides our customers with the most modern and resilient data technology services available to keep them connected. Our experience and technology allow us to quickly respond during times of national crisis to effectively address emergency needs and meet all the demands of our customers following major disasters. Due to the rapid growth and acceptance of our services, MAXCOM maintains open operations in the Islands of Roatan and Utila; and we are expanding our services to other markets of the Caribbean including the US Virgin Islands. Today MAXCOM is the ISP (Internet Service Provider) with the greatest coverage and fastest growth on the Bay Islands of Honduras and we are committed to provide the same level of coverage to our future USVI customers. We were also the first island-wide company to provide affordable cable and Fiber to the home Technology primarily in areas with largest low/moderate income households. We have one of the most modern and resilient infrastructures currently in operation today, which allows us ensure that our users can always surf at any time of the day with an affordable, fast, reliable, accessible, secure service along with the best technical support in the region.

As an ISP operating in Central America that is also directly involved with the recovery from back-to- back storms in 2020, we are very aware of the need to mitigate and build resiliency in all risks areas to ensure full recovery and reduce any additional hardships

to lack of communication and unrelatable data access. MAXCOM ever committed to providing the most reliable service to our clients, quickly ran 160 miles of cabling through the jungle on mainland Honduras using helicopters to get back online in 2 days after the storms. During which time all bridges, roadways and major access points were all but completely destroyed.

Our team has reviewed the USVI proposed CDBG-Mitigation Action plan and would encourage you to provide funding towards the following initiatives:

Expanding the infrastructure to improve data access to low/moderate income areas.

Provide programmatic funding to improve access to lo w/ moderate households to ensure connection, data access and communications services such to allow for emergency notification, virtual learning, and improve access for virtual employment.

Fund public service programs that improve low/ moderate residents' access in public facilities

such as schools, libraries and other public buildings.

MAXCOM

Our team has over 30 years of experience in developing and providing affordable, reliable and resilient communications services for low/moderate income communities. As outlined in the CDBG-Mitigation Action Plan, communications is among the seven critical service areas where risk mitigation is vital. We believe that MAXCOM in partnership with the Virgin Island Housing Finance Authority and other local stakeholders can develop and implement capital projects, single-family household programs and public service programs to ensure the most vulnerable of the U.S Virgin Islands have access to reliable and affordable communications services. We look forward to additional discussion regarding the comments we have submitted.

Staff Response:

See summary above and general letter below.

Commenter 18

Comment Received:

Good day all! Thank you so much for holding your Mitigation hearing. It already feels like we're heading in the right direction!

My name is Chantel Hoheb and I am the new Executive Director at the VI Children's Museum. Below I will list some of the ways our museum can be a resource for the community before and after a disaster. Then I will give some suggestions I have for preparing for a disaster. I am a multi-generational Virgin Islander and most recently assisted Family Resource Center with distributing the Adopt A Family packages to communities on St. Thomas and St. John after Irma and Maria.

VI CHILDREN'S MUSEUM - www.vichildrensmuseum.org

Buccaneer Mall --

-We could provide a safe and convenient location to distribute Emergency/Relief Supplies to the community before and after a disaster

-Our location is accessible

-We could provide free admission to the museum to help provide educational fun for children

-Child Care Services

-There is a kitchen to help cook and provide meals

-We have space to assist other non-profits if their space was damaged

-We could activate a Mobile Museum Program

-We could provide library access to our book collection for reading or story time

-VICM is part of the National Museums for All program that makes museums accessible to the LMI population

My general suggestions --> most are PRE-disaster and to be activated once a disaster happens.

1.) Community Disaster Teams:

Establish contacts in the community to organize people with trucks and emergency equipment (chain saws etc) to help clean up their community and prepare for WAPA, VIFD or VIPD to enter. There should be funds available for each community to be funneled through the disaster contacts and walkie-talkies in the event that phones are down and they need to reach designated government contacts. Teams will need gas, water and food in addition to goods and info to distribute.

Community Training:

-Provide survival training to include water safety, gardening, health & wellness, conservation, waste reduction and disaster preparedness all within the communities.

2.) First Responders/Care-Givers

Assess their individual needs so that their emergency goods are Not mixed with the goods they intend to distribute. They have to be trained to make-safe their houses before helping others.

During these preparations, go through the Safety Plan for after a disaster. Our VIPD is severely Undertrained simply because it's not required. They must have a do-able safety plan to keep the shelters, homes and community spaces safe. Personally, my little cousin and his son were shot over a generator. They are ok now but totally unnecessary, especially since organizations like FRC were giving away donated generators.

VITEMA was a grave disappointment...there may have been people there but no one was answering the phone. They must be empowered with a plan and steps to take after a disaster. And not just staffed when a disaster is on the way.

Assess the needs of Hospitals, Nursing Homes and non-profits that take care of others on a bi-annual basis (after a hurricane and before). Prep Mobile Health Buses and designate areas and rules of operation. Share this info with the community beforehand so there's not a crazy rush or need to communicate after the disaster.

3.) Supplies:

Distribute emergency packs (with buckets, NOT THOSE 'MREs' that were So embarrassing) BEFORE a disaster. Also consider our vegetarian populations. Start after Carnival so there's not a crazy rush as hurricane season approaches. Establish community locations to pick up and distribute goods after a disaster (PRE-disaster).

4.) Ports:

The ports are usually closed so we should have a list of pre-approved boats and captains that are allowed into the territory if they're bringing relief supplies from neighboring islands.

5.) Homes/Insurance:

Coordinate between Insurance Agencies, Emergency Builders and Real Estate companies. Most rebuilding was put on hold because people didn't want to do anything out of fear that they wouldn't be paid for their insurance claims. Contractors started price gouging and taking on too many jobs because of the demand. All the while, there are 100s of houses sitting empty that our real estate agents have for sale.

Setup emergency insurance and building protocol. And request that the real estate agents identify multi-family homes that can be utilized by homeless families as their houses are made safe again. They can have rules and regulations of course; maybe the stays don't exceed 1-2 month. Obviously, funds could be made available to help these displaced families cover their stay at these empty houses.

And before the storm, educate people on getting the proper insurance, how to file a claim (taking photos etc.) and a list of reputable emergency builders to call.

I hope this helps and I wish you all the best in coming up with your comprehensive plan.

Thank you!

-Chantel

Sent via the Samsung Galaxy S10+, an AT&T 5G Evolution capable smartphone

Staff Response:

See summary above and general letter below.

Commenter 19

Comment Received:

Good Day,

See attached comments from VI Water and Power Authority – Water Department.

Brian F. Leonard

Design and Construction Manager

Water Distribution

Virgin Islands Water & Power Authority

9720 Estate Thomas

St. Thomas, USVI 00802

Phone: (340) 774-3552 ext. 2412

Cell: (340) 690-5963

brian.leonard@viwapa.vi

Letter below:

VIRGIN ISLANDS

WATER

AND POWER

AUTHORITY

PO BOX 1450
ST. THOMAS, US VIRGIN ISLANDS 00804

TEL: (340) 774-3552

December 22, 2020

Mr. Daryl Griffith, Director

Virgin Islands Housing Finance Authority
Community Development Block Grant 3438
Kronpindsens Gade I GERS Complex, 1st
Floor St. Thomas, VI 00802

Subject: Water and Power Authority's (WAPA) CDBG-MIT Action Plan Public Comments Related to the Water Distribution Infrastructure

Dear Executive Director Griffith,

The Virgin Islands Waste and Power Authority (WAPA) appreciates the opportunity to provide input and comments to the Virgin Islands Housing Finance Authority (VIHFA) on the Community Development Block Grant-Mitigation (CDBG-MIT) Action Plan. These comments present the best available description and estimate of unmet needs to increase the resilience of WAPA's water distribution infrastructure.

Introduction

The mission of Water and Power Authority (WAPA) is to provide safe, dependable, adequate, and economical water and electric service to its customers in the US Virgin Islands (hereafter referred to as "USVI" or "Territory"). This comment is for the water distribution component of WAPA. The water distribution system is maintained by the Water and Power Authority (WAPA), which receives water from Seven Seas owned and operated desalination plants in both St. Croix and St. Thomas. An underground pipe provides water from the St. Thomas water distribution system to the island of St. John.

WAPA's water distribution infrastructure was severely affected by the 2017 hurricanes (hereafter referred to as "disaster"). As identified in the Community Development Block Grant - Mitigation (CDBG- MIT) Action Plan (November 4 Draft), "the storms disabled reverse osmosis water facilities for two days in St. Croix and 10 days in St. Thomas, reducing potable water reserves to a three-day volume. Storage tanks and pumping stations were severely damaged." In addition to damage identified in the CDBG-MIT Action Plan (November 4 Draft), WAPA is working with FEMA to identify damage to the Territory's water distribution infrastructure, including subsurface infrastructure.

The water distribution network in the Territory also consists of the following:

- St. Croix – Eight storage tanks and approximately 146 miles of water mains, fire hydrants, valves, and booster pump stations.

- St. Thomas and St. John – Seven storage tanks and approximately 120 miles of water mains, fire hydrants, valves (including many pressure reducing valves), and booster pump stations.

Similar to the Community Development Block Grant Disaster Recovery (CDBG-DR) funding being an integral resource that WAPA is relying upon to fund improvements needed to the Territory's water distribution infrastructure, the CDBG-MIT funding is essential for the USVI to improve system resilience. Investing in projects that harden the water distribution infrastructure and maintain system

functionality when extreme events occur will add significant value to the water distribution infrastructure, which contains facilities such as water treatment plant and water pumping stations as listed in the USVI Territorial Hazard Mitigation Plan (THMP). The water distribution infrastructure is at the core of the "Food, water, sheltering" critical service area and CDBG-MIT funds will represent high impact investments that will improve the Territory's resilience during future disasters.

Water Distribution Infrastructure and CDBG-MIT Priorities

Water distribution infrastructure is categorized as critical infrastructure. The CDBG-MIT Action Plan (November 4 Draft) indicates the need for data to justify long-term mitigation approaches. As detailed in the previous section, our analysis indicates the effect of the 2017 disaster on the water distribution system, which not only increased the water loss per month but increased the number of pipe breaks that occurred each month after the disaster.

There are mitigation approaches that could enable WAPA to protect its infrastructure in disasters, which are likely to be more frequent and catastrophic in the future. WAPA intends to use the available funding for multiple hazard mitigation projects. Additionally, WAPA is working with the Naval Postgraduate School to assist WAPA in conducting a multi-hazard risk assessment. For example, future hurricanes could cause impacts to the water distribution system independently that will be amplified due to the electric grid shutdown, and appropriate measures require to be taken for the water distribution system to continue providing the critical service of water distribution to its customers.

According to the 2018 USVI Task Force Report, only one-quarter of residents are connected to the WAPA's water distribution system, and "Frequent dry spells and droughts often result in residents having to refill their cisterns with costly water obtained from private tanker trucks which serve as backup when rainwater is not available."

WAPA plans to invest in both hardening the existing infrastructure against future disasters and making the system more resilient so that the impact of failures is minimized. Some measures for hardening include having uncorroded and well-maintained tanks, having industry-standard protection for pumps, and installing redundant pumps and backup generators. For instance, the Kingshill tank is the only source of potable water in the system to the Western part of the island, including the urban area of Frederiksted. Installing the main transmission line from Richmond pump station (or from another appropriately engineered location) will increase the redundancy of the system in case a disaster affects Kingshill tank or the mainline along Centerline Rd that currently supplies water to Frederiksted.

There are also other alternatives that WAPA will consider to improve the resilience of the system. For example, WAPA purchases potable water from the two-reverse osmosis (RO) plants in St. Croix and St. Thomas. Currently, these RO plants are the only source of centralized potable water. Prior to having these RO plants, WAPA operated wells for extracting potable water. As a contingency plan, in case one of the reverse osmosis plants is affected by a disaster, it would be valuable for WAPA to continue maintaining the wells as a redundant source of water supply to mitigate the effect of a sudden lack of function of one of the RO plants in the Territory.

WAPA has a two-pronged approach to apply for CDBG-MIT funding:

- Seek CDBG-MIT funding for strategic, high-impact investments to improve the resilience of the water distribution system against future disasters. This would include both (i) strategic mitigation opportunities; and (ii) system expansion to increase system redundancy and provide alternative source potable water to the community. The ongoing collaboration with

the Naval Postgraduate School, who have engaged modelers from EPA and Sandia National Labs, will be integral to identify relevant projects based on the ongoing system modeling.

- Use FEMA Public Assistance (PA) funding for areas that constitute "functionally dependent" elements of the water distribution system that have been affected by the 2017 disaster. CDBG funding will be requested for local match for these FEMA PA projects. More details regarding FEMA PA recovery funding are provided in the following section.

FEMA PA Recovery Funding

Within the first few months of recovery after the disaster, the US Congress realized that replacing damaged infrastructure using conventional FEMA procedures is not be an efficient use of Federal dollars due to the dilapidated state of the Territory's existing infrastructure, including wastewater. Congress subsequently passed the Bipartisan Budget Act (BBA) detailed in: *Implementing Section 20601 of the 2018 Bipartisan Budget Act through the Public Assistance Program, FEMA Recovery Policy FP-104-009-5 Version 2;* the BBA presents a unique opportunity to evaluate the entire wastewater system for "prudent replacement" to industry standards using the FEMA-approved consensus-based codes and standards. Specifically, the BBA policy states: *The recovery funding provided by FEMA for critical infrastructure allows for the implementation of Bipartisan Budget Act (BBA) – which enables the storm- damaged infrastructure facilities (including functionally dependent elements) to be restored to industry standards.*

WAPA continues working with FEMA to identify damage to the Territory's subsurface water distribution system from the disaster. WAPA's analysis of the impact from the disaster has been completed for St.

Croix, and preliminary results indicate that:

- Based on data for unaccounted for water (UFW) between 2008 and 2020, UFW more than doubled after the disaster - increasing by approximately 30 million gallons per month (from 28.5 M-gal/month to 58.5 M-gal/month).
- The average pressure in the system dropped at nine out of 10 pressure sampling locations
- The frequency of pipe breaks increased by 91 percent: from 12.2 breaks per month pre-disaster to 23.3 breaks per month post-disaster.

In addition to the above disaster impacts, FEMA-approved consensus-based codes and standards also include criteria for items such as water quality, minimum system pressure, and fire flow requirements – many of which are not currently being met by the water distribution infrastructure.

A significant portion of the water distribution infrastructure that experienced leaks is made of old ductile iron pipe. Based on preliminary analysis of water quality data (available from 2001 to 2020), these ductile iron pipes are responsible for an increase in corrosion (complaints regarding "brown water") and/or a decrease in residual chlorine – which are the two more commonly violated water quality standards in the Territory. The industry-standard solution for this would be to replace the older ductile iron pipes, which will result in the replacement of a significant portion of the water distribution infrastructure in the Territory.

A similar analysis using water loss, pressure drop, pipe break frequency, water quality, and other pressure-related requirements in the system is ongoing for St. Thomas and St. John district. Preliminary findings indicate an increase in the frequency of pipe breaks and water loss since the

disaster and instances of violation in the water quality standards in multiple locations in the district. While the CDBG- MIT funds are available if a mitigation need is justified, for many projects, there is both damages caused by the disaster and investments that increase the resilience of water distribution infrastructure (hazard mitigation).

The ability to use CDBG-DR and -MIT funds for the Territory's 10 percent required share ('match') of the total project costs presents an opportunity for WAPA to receive funding for recovery and mitigation, which is effectively ten times more than the quantum of funding available through CDBG-DR and -MIT. Therefore, WAPA intends to leverage the CDBG-DR and -MIT funds for match funding where possible. To support the use of CDBG funding as the local match, FEMA and HUD issued "Joint Guidance" on October 14, 2020, titled *Implementation Guidance for Use of Community Development Block Grant Disaster Recovery Funds as Non-Federal Cost Share for FEMA's Public Assistance Program.* This guidance allows the use of CDBG funds regarding "flexible match" will reduce the administrative cost and streamline the use of CDBG funds to fulfill a portion of the local match requirements for FEMA's PA Program. Note that while this comment is being submitted specifically for CDBG-MIT Action Plan (November 4 Draft), WAPA intends to utilize the "flexible match" mechanism for both CDBG-DR and MIT funds.

Unmet Needs Estimate for Water Distribution System

The unmet needs for water distribution are presented separately for the two relevant categories in the CDBG-MIT Action Plan (November 4 draft): Infrastructure and Public Facilities, and Planning.

Category: Infrastructure and Public Facilities

As explained in the previous section, the unmet needs for water distribution infrastructure depend on the quantum of funding approved by FEMA. Since the analysis of disaster-related damage and discussions with FEMA are ongoing, this section provides groups of similar projects and provides either a unit cost estimate or a high-level estimate for the particular project or grouping of project types.

This section estimates the requirement of funding from CDBG-MIT for both - (i) requests for local match funding for anticipated FEMA PA recovery funds; and (ii) estimates for projects to increase system redundancy to increase the resilience of the system and provide customers with multiple potential sources of water during a disaster.

For St. Croix, Table 1 contains the relevant information to determine cost of a particular grouping of project types and the anticipated amount of funds that will be requested from CDBG.

Table 1: *Description of Unmet Needs for Water Distribution Infrastructure in St. Croix (Infrastructure and Public Facilities)*

Project Grouping	**Information Available to Determine Cost**	**Comments and Anticipated Funds to be Requested from CDBG**

Water line replacement or rehabilitation	$ 1.8M per mile; replacement of ~60 percent of water distribution infrastructure anticipated. The total length of the water distribution infrastructure in St. Croix is approximately 140 miles, and therefore approximately 84 miles of water distribution lines will be replaced, resulting in a total cost of **$151 M.** If rehabilitation is sufficient for specific portions of the water line, this cost will reduce.	Discussions with FEMA are ongoing regarding the replacement of significant portions of the water distribution system. This includes both replacement of rehabilitation for both mainline (typically 2" diameter or larger) and service lines (typically 2" diameter or smaller). For the majority of this replacement/rehabilitation, WAPA intends to apply for match funding from CDBG. The total estimated unmet need from CDBG-MIT would be **~$15.1 M**.
New water line expansion	Frederiksted Redundant Water Service: $25 M East End Road Water Service (Phase 1): $3.5 M East End Road Water Service (Phase 2): $24 M Southside Road Loop: $15.8 M	WAPA seeks the majority of this funding through CDBG-MIT. The total anticipated cost would be **$68.3 M.**
New tank Constructio n	The average cost of new tank construction in the Territory is $1 per million gallons (of tank size). There are	The new tank in East End is necessary for water service expansion. Unless the need for a new Concordia tank is indicated by
	two 5-Million-gallon tanks that WAPA intends to construct: • East End - $5M • Concordia - $5M	the hydraulic modeling, a CDBG-MIT application will be submitted for the Concordia tank as well. The total anticipated cost would be **$10 M.**

Pump Station Upgrades	Contentment, Concordia, and Richmond are the three pumps stations. All pump stations require upgrade to the facility ($0.5 M each); Richmond pump station requires an additional upgrade to the control system and flow monitoring in addition to the facility upgrade – an additional cost of $100k. The final amount of FEMA funding will be dependent on (i) review of FEMA-approved consensus-based codes and standards; (ii) outputs from EPA/WNTR modeling.	For industry-standard governed components, WAPA is seeking funding through BBA-industry standards. However, some of the disaster-related damage has already been obligated by FEMA, and discussions regarding "functionally dependent" infrastructure replacement are in the early stages. The current best estimate of need from CDBG-MIT is approximately **$1.6 M.**
Emergency standby generator	Required at Richmond Reverse Osmosis Plant **Total = $0.5 M** ($100k for external tank and housing, $400k for generator)	Since some of these upgrades may be required as per industry standards, WAPA is likely to seek match funding from CDBG. However, FEMA funding for privately owned facilities is unlikely. Therefore, the current best estimate of need from CDBG-MIT is approximately **$0.5 M.**
Tank rehabilitation	Metal Tanks (painting, corrosion control, rehabilitation including patching/welding) = $9M for 3 tanks Concrete Tanks (Cleaning/maintenance/OSHA rehab) = $1.5 M for 5 tanks **Total = $10.5 M**	Since some of these upgrades may be required as per industry standards, WAPA is likely to seek match funding from CDBG. However, only specific elements may be covered by FEMA (e.g., cleaning and maintenance; patching/welding will require additional assessments). Therefore, the total estimate for the need of CDBG-MIT funding is **$10 M.**

Tank telemetry and SCADA	WAPA has spent some money to install panels at pump stations. However, additional SCADA upgrades such as solenoid motors for valves and instrumentation system are required. **Total unmet need = $300k**	WAPA is likely to seek CDBG-MIT funding for telemetry and SCADA projects, which will increase the operability and adaptive capacity of the system to prevent against failures or significant impacts on the community during disasters. The total unmet need estimate is **$ 0.3M.**
Water lab upgrades	Currently the lab is housed in a trailer, which is in poor condition. WAPA anticipates a cost of **$400k** for constructing a concrete structure or having a modular lab. The amount listed here excludes the cost of purchasing or leasing a building.	Water quality testing is integral to water quality, which is likely to be significantly affected after a major disaster (contamination occurs through pipe breaks and significant changes in tank levels, etc.) and causes a risk to public health. The total unmet need estimate is **$ 0.4M.**

Grouping of relevant projects in St. Thomas and St. John district and the total unmet needs are included in Table 2 below.

Table 2: *Description of Unmet Needs for Water Distribution Infrastructure in St. Thomas and St. John (Infrastructure and Public Facilities)*

Project Grouping	**Information Available to Determine Cost**	**Comment**
Water line replacement or rehabilitation	$2.4M per mile; replacement of 5 miles water distribution infrastructure anticipated	Discussions with FEMA are ongoing regarding the replacement of significant portions of the water distribution system. This includes both replacement of rehabilitation for both mainline (generally 2” diameter or larger) and service lines (generally 2” diameter or smaller). For majority of this replacement/rehabilitation, WAPA is likely to seek match funding from CDBG **~ $1.2 M**

New water line expansion and expansion tanks	$2.4M per mile; Water Distribution has identified 25 miles of potable water expansion projects.	WAPA seeks the majority of this funding through CDBG- MIT. The total anticipated cost would be **$60 M.**
Emergency standby generator	Required at the Reverse Osmosis Plant **Total = $0.5 M** ($100k for external tank and housing, $400k for generator)	Since some of these upgrades may be required as per industry standards, WAPA is likely to seek match funding from CDBG. However, FEMA funding for privately owned facilities is unlikely, therefore the current best estimate of need from CDBG-MIT is approximately **$0.5 M.**
Tank Slope Stabilization	Severe foundation erosion is occurring at 3 tank sites. Slope stabilization for these tanks will be required, with an estimated cost of $2M.	WAPA is likely to seek full funding from CDBG. The total estimate for the need of CDBG-MIT funding is **$2 M.**
Tank Mixing System	$200,000 per tank This system keeps the tank de-stratified, provides uniform water age.	Some of these upgrades may be required as per industry standards to maintain water quality in the system, WAPA will seek full funding from CDBG. Therefore, the total estimate for the need of CDBG-MIT funding is **$2.6M.**
Piping Expansion joint system for Tanks and Pump Station	Piping expansion joints prevent water mains breaks at the point where the pipeline goes above ground during earthquakes. The approximate cost is $50,000 per tank and pump station site.	WAPA will seek full funding from CDBG. The total estimate for the need of CDBG-MIT funding is **$1M.**

Water lab upgrades	Currently the lab is housed within the Power Plant and needs to be relocated due to the proximity to the propane infrastructure. WAPA anticipates a cost of **$400k** for constructing a concrete structure or having a modular lab. The amount listed here excludes expanding an existing building in the water department.	Water quality testing is integral to water quality, which is likely to be significantly affected after a major disaster (contamination occurs through pipe breaks and significant changes in tank levels, etc.) and cause a risk to public health. The total unmet need estimate is **$ 0.4M.**

Category: Planning

The planning component of the CDBG-MIT Action Plan (November 4 Draft) is integral to achieve long term resilience planning for the water distribution system in the Territory.

1. A **Water Sector Resilience Plan** that will build upon the ongoing work that WAPA is doing with the Naval Postgraduate School and identify mitigation options. Specifically, the resilience plan will include the following components:

    - Phase 1: Study for mitigation options during hurricanes, including benefit-cost analysis using FEMA's BCA toolkit to support identified CDBG-MIT projects

    - Phase 2: Specific sub-components that allow WAPA to further develop hazard mitigation alternatives and emergency operation planning resources.

        - Planning for protecting the water distribution system during disasters: This could include items such as the water hammer hazard mitigation, similar to that developed and funded by FEMA after Hurricane Katrina in New Orleans.

        - Dynamic hydraulic modeling to develop a water rationing plan and a 72-hour pre- landfall playbook for pre-storm preparations to protect system components.

        - Training for system operators from experts in emergency planning.

2. **Master Plan Update**

The most recent WAPA Master Plan requires additional updates based on the dynamic EPANET model to determine the best use of funding to increase system resilience and have the system comply with industry standards.

Through WAPA's engagement with the Naval Postgraduate School, WAPA is developing a hydraulic (EPANET) model, which in 2021 is likely to also include outputs based on dynamic modeling to prioritize spending based on the system's requirements. Building upon this new model, update to the St. Croix and St. Thomas/St. John Master Plan will be valuable. This update will also include an asset management plan and identification of specific areas of system improvement to increase resilience of the system. WAPA will apply for CDBG-MIT funding to address this need for master plan update as necessary.

Summary of Unmet Needs

Table 3 summarizes the unmet needs for the water distribution infrastructure for the Territory.

Table 3: *Summary of Unmet Needs Estimate for Water Distribution Infrastructure (Infrastructure and Public Facilities)*

WAPA District	**Cost Details and Key Assumptions**	**Remaining Unmet Need for CDBG- MIT**
St. Croix Infrastructure	St. Croix Total Infrastructure Need including anticipated FEMA funding for "functionally dependent" disaster-damaged infrastructure: **$257 M**	St. Croix "remaining unmet need," including local match and CDBG-MIT projects: **$106.2 M**
St. Thomas and St. John Infrastructure	St. Thomas and St. John Total Infrastructure Need including anticipated FEMA funding for "functionally dependent" disaster-damaged infrastructure: **$12 M**	St. Thomas and St. John "remaining unmet need," including local match and CDBG-MIT projects: **$67.7 M**
Planning	(i) Water Sector Resilience Plan; (ii) Master Plan Update	Estimated to be **$ 2 M**

Conclusion

WAPA has already submitted some applications for funding under the CDBG-DR program. Between the CDBG-DR (Tranches 1 and 2) and CDBG-MIT (Tranche 3), there are multiple avenues for WAPA to seek funding to address the system based on different criteria. Most importantly, CDBG funding provides opportunities to increase the total funding received by ten times, if there is disaster related system damage from the 2017 disaster, which is the optimal use of CDBG-MIT funding from WAPA's perspective. Discussions are ongoing with FEMA regarding the extent of funding justifiably available based on disaster-related damage to the water distribution infrastructure and therefore the quantum of funding requested through CDBG-MIT will be adjusted accordingly.

WAPA therefore intends to strategically apply for CDBG-MIT funding to maximize the utility of these funds. For example, if projects are not approved by FEMA, WAPA plans to apply for funding from CDBG- MIT if the project meets the criteria for CDBG-MIT funding. On the other hand, if projects are eligible to restore the system to industry standards, then WAPA will seek CDBG-MIT funding for local match as needed.

CDBG-MIT provides opportunities for WAPA to apply for projects that represent high-impact investments that are needed not only to build the resilience of the system, but connect more communities to the water distribution system and build resilience in the Territory to enable these communities to respond to future disasters.

WAPA

The CDBG-MIT Action Plan includes $ 36.5 M as currently planned allocation for ~~WMA~~. However, based

on the estimated costs included in this document, at least $176 M

Similar to the ongoing collaboration regarding CDBG-DR applications, WAPA intends to work closely with VIHFA to ensure an increased resilience for the water distribution infrastructure in the Territory to support the public health and well-being of the community.

Sincerely,

Noel Hodge,

Chief Operating Officer – Water Systems

Staff Response:

See summary above and general letter below.

Commenter 20

Comment Received:

From: Leba Ola-Niyi <ola_minka@yahoo.com> via CDBG MITIGATION <mitigation@vihfa.gov>
Sent: Monday, December 28, 2020 8:32 AM
To: mitigation@vihfa.gov
Subject: Suggestions for the Inclusion of Middle-Income Homeowners

The Housing Program should expand and include the following middle-income home owners whose houses or homes were damaged or destroyed due two severe windstorms in September 2017:

* Homeowners who are ineligible for the litigation program managed by Envision Tomorrow (for example. due to their income and other factors related to their eligibility),

*Homeowners who are unable to construct, replace, and recover their houses and homes due to limited FEMA assistance, underinsurance, and/or lack of home insurance since 217.

* Homeowners who are vulnerable residents and need public and financial assistance from CDBG-D2 Housing Recovery Program,

* Homeowners whose needs and aspirations are unmet and need the assistance to build resilient houses and homes that would withstand the impact of natural disasters such as windstorms, earthquakes, and floods in the future.

Lastly, VIHFA and its federal partner such HUD should raise the income cap and adjust other criteria that are obstacles for middle income homeowners who suffer the devastation of climate change and should benefit from the Housing Recovery Program.

Staff Response:

See summary above and general letter below.

Commenter 21

Comment Received:

To: The United States Virgin Islands Housing Finance Authority (USVI-HFA),

Recently I came across the USVI webpage https://cdbgdr.vihfa.gov/cdbg-mitigation-action-plan-draft-

out-for-review-and-comment/ that discussed the Community Development Block Grant Mitigation Action Plan draft.

That page states that the public comment period for the action plan draft is open until December 22, 2020 and comments can be emailed to mitigation@vihfa.gov. So below is my public comment regarding the draft plan.

Having reviewed the draft of the plan, it is vital that the USVI have a detailed infrastructure resiliency strategy that focuses on modernizing and hardening critical assets against the impact of hurricanes and sea level rise. The draft discusses the impact of hurricanes and sea live rise on USVI infrastructure assets. As well as the lack of a strategy to address the size and island geography that make the USVI more vulnerable to such challenges. By creating a detailed strategy that focuses on modernizing and hardening infrastructure such as communications facilities, the USVI can not only survive but thrive by turning its size and island geography into assets.

Currently high-speed wireless communications infrastructure assets (ex: 5G) are being rolled out across the globe. Such assets offer higher speeds (ex: 1GB per second and above) but tend to work better in smaller areas. From the present time into the foreseeable future, communications infrastructure will play an even more critical role in education and commerce. Increasing agricultural, medical, industrial and other forms of production.

As the USVI receives HUD, FCC, other government and private sector investments to improve and protect infrastructure such as communications, it must ensure such investments modernize and harden the infrastructure. It needs a plan to protect government and private sector infrastructure assets. Especially for communications facilities such as data centers, mini-data centers aka edge centers, large cell towers, micro cell towers and fiber. Discussions should take place with government and private sector partners on how to protect critical infrastructure facilities. From burying power lines and fiber to the protection of data centers and wireless facilities.

With modern and hardened infrastructure facilities, the USVI increased Internet speeds and beautiful locations can be used to attract investments to upskill the 100,000+ strong all English-speaking US Citizenry of the USVI. Like Singapore, the USVI can turn size and location into an advantage through technology and education to transform into a strong economy. To do so, it needs a modern and strong infrastructure to serve as the foundation. The USVI should ensure that government and private sector investments will harden and modernize infrastructure assets. Upon building back better, the USVI should then have a plan to take full advantage of such assets.

In terms of credentials, my name is Alonzo Beyene and through my company Industry Assurance Consulting, Inc., I provide strategic advice to private sector infrastructure providers such as telecommunications carriers. Through my other company ICRE Ventures, Inc., I focus on using joint ventures, coalitions and green / environmentally friendly technologies to address the impact of climate change on critical infrastructure assets. With like-minded allies in government and the private sector, I also champion the upskilling and inclusion of disenfranchised communities as investments are made for new technologies and infrastructure projects.

All The Best,

Alonzo T. Beyene, Consultant

Industry Assurance Consulting, Inc.

6303 Blue Lagoon Drive, Suite 400, Miami, FL 33126

Office#: (786) 505-1862

Email: mailto: alonzo@iacadvice.com

Website: http://www.iacadvice.com/

Staff Response:

See summary above and general letter below.

Commenter 22

Comment Received:

Hello my name is Matthew Rose. I am a founder and chairman of the Romason Group. Our firm works to assist in preparedness and response, for public and private entities. With a strong team with decades of experience focusing on the areas of housing, healthcare, and habitability we have worked to provide resilient solutions for our clients in the United States and the Caribbean.

The Virgin Islands Housing Finance Authority is taking the right steps to address the issues being faced with the CDBG-Mitigation Action plan and we commend you for the efforts. As you consider additions to your plan there are a few areas that we recommend allocating as much funding as possible to achieve success.

1) Increase Capacity

2) Augment training

1) The nature of challenges being faced by the USVI has a level of unpredictability that leads to the best plan being one of built-up capacity that leads to the strengthening of the local workforce by improving their skills and opportunities to put the prowess developed to work.

This is why Romason recommends the development of a factory to build alternative methods of housing. The type of housing we would recommend would be modular homes based on the required standards for the USVI. A factory and training facility could lead not only to the provisions of jobs for the populace, an economic injection into the local and housing for the people but it could also lead to the USVI becoming a regional leader of supplying resilient housing options.

Additionally, Romason and its' partners have developed resilient housing that is being installed in some of the ravaged areas in the Caribbean. The push for resilient housing in the USVI should be at the forefront

2) In our experience training is a fundamental aspect of the preparedness and the mitigation exercise that needs a significant amount of attention. However, training is often considered as something to be provided to the local authorities however it is also something that needs to be provided to the general populace as well. With the many of the disasters that are faced, better programs need to be provided to prepare the people for what to do when disasters in the risk mitigation plan arise. The Romason Group has provided such training and has the capacity to provide and partner with the people of the USVI to engage in and benefit from such training.

Thank you for your efforts and we look forward to working with the USVI going forward.

Matthew Rose

(301) 537-2014

Staff Response:

See summary above and general letter below.

Commenter 23

Comment Received:

Good Day,

Thank you for taking comments on the CDBG-MIT Draft Action Plan. It is a comprehensive and data-driven document with the future in mind.

There are three areas of Hazard Mitigation suggested in the report important to me because of my background and interests:

#1 - Land use/zoning policies

#2 - Acquisition of flood-prone and environmentally sensitive lands

#3 - Improvement of warning and evacuation systems

And I would like to add to this list:

#4 - Pedestrian infrastructure

#1 As the Draft Plan points out, we do not have a Comprehensive Land and Water Use Plan legislated for the Territory although several versions have been worked on. We also already have plans for the two Historic Towns on St. Croix. As Mr. Griffith suggested, let's put the existing plans together, and as Frandelle Gerard said, let's put them into action. I'm glad to see the amount of funding suggested for planning is significant. Implementation is key. We may have an ideal candidate for organizing this work

in Ms. Claudette Hinds on St. Croix. We should also continue to work in conjunction with the Territorial Hazard Mitigation Planning team at UVI, get a real planning team at DPNR and try not to duplicate efforts in this area if plans already exist.

#2 - The Draft Action Plan also addresses the inevitability of climate change with more frequent and stronger storms predicted for the future. Acquisition of flood-prone and environmentally sensitive areas is key in this regard and provides an opportunity for green spaces and parks that will improve public health, protect infrastructure, and ultimately save lives. Our guts are clogged with debris from years past, and erosion has eaten away at the natural infrastructure that could slow stormwater down. A Riverine (guts or ghuts) are considered #2 on the Hazard Ranking list presented in the Draft Plan, and yet these areas are sold off to unsuspecting citizens at low prices. People tend to build in guts not only for the cheap prices but for access to water. However, in future large-scale flood events, a riverine can be a place that is highly dangerous to people and property, a dedicated green space is an answer.

#3 - Improvement of warning and evacuation systems is listed in the Draft Plan as an example of Hazard Mitigation. As I live on St. Croix, it is obvious to me that we do not have a system to address hazardous situations that could arise from the Limetree Refinery. Upon inquiring we have been told that any situation will be handled in-house by the refinery itself. Self-regulation may not be in the refinery's self-interest, and there could be an occasion where an event gets out of control like a large fire or explosion that is triggered by an accident, a Hurricane, Earthquake, or Tsunami. We have all smelled noxious odors from the facility on normal days and it is known that respiratory illnesses declined when the plant shut down in 2012. We have also all experienced traffic gridlock around the plant during morning and evening rush hours. We need a commonly known reporting system for unhealthy air events, a commonly known warning system for large, hazardous events, and a commonly known evacuation plan that works. I don't see how any Hazard Mitigation Plan for the Territory can ignore the Elephant in the Room - a gigantic, polluting, industrial complex that operates on its own terms with no clear outreach to the community.

Once again, as stated in the Draft Action Plan, the benefits of hazard mitigation include saving lives and protecting public health, preventing or minimizing property damage, and protecting and preserving infrastructure, to ensure that individuals have a safer place in which to live and thrive. We have to include possible hazards presented by the Limetree facility in any Action Plan.

#4 - Pedestrian infrastructure. There is always much talk in the USVI about our poor roads with little attention paid to the sides of the roads for infrastructure that can be used for walking, biking, wheelchairs, and strollers. After a hurricane or any other disaster, walking may be the only way people can get to food, water, and shelter until the roadways are cleared of debris. Let's make that possible. One of the maps of St. Croix in the Draft Plan shows a Community Lifeline running down the middle of the island. However, we do not have the pedestrian infrastructure to support LMI people without cars who need to traverse that community lifeline safely and securely.

Walking, hiking and biking also contribute to the overall health and well-being of our entire island population, making us more resilient by being healthier overall. Especially in times of Pandemic, when we need to socially distance and be outside, both children and adults need safe places to spend time in nature to play, grow, and heal.

It is encouraging to see the great work the VIHFA has already done on the Draft Action Plan. It is also good to know that VIHFA will ensure that all programs will be chosen and implemented based on

proven data and analysis to ensure that optimum actions are undertaken to increase resilience in the Territory.

We are on the right track. I hope to stay involved.

Sincerely,

Barbara Walsh

Virgin Islands Trail Alliance

Staff Response:

See summary above and general letter below.

Commenter 24

Comment Received:

Dear Commissioner Griffith,

I respectfully submit this proposal on behalf of my clients, The Virgin Islands Architecture Center for Built Heritage and Crafts, Inc. and the Virgin Islands Museum, Civic and Cultural Center, Inc. as commentary for the CDBG-MIT Action Plan Draft. We believe that cultural economic development has a role to play in the response to disaster mitigation and hope that this project can be a part of this community effort. We intend to apply for funding at the appropriate time. Thank you for the review of our comments.

Sincerely,

Monique Clendinen Watson

BlueGaulin Media Strategies, LLC

Public Relations Consultant

In Search of Identity Project

Virgin Islands Architecture Center for Built Heritage and Crafts, Inc.

Virgin Islands Museum, Civic and Cultural Center, Inc.

December 7, 2020

Daryl Griffith

Executive Director

Virgin Islands Housing Finance Authority

3202 Demarara Plaza

Suite 200

St. Thomas, Virgin Islands 00802-6447

Dear Director Griffith,

We have noted over the last several weeks that your agency, the Virgin Islands Housing Finance Authority has been seeking suggestions from the community on how to invest the **Community Development Block Grant Mitigation funds**. We respectfully submit our project, which will entail the renovation of the Jarvis School property on St. Thomas and the Old Barracks property on St. Croix into cultural centers which will serve as anchor properties for the creation of cultural economic development corridors in the towns of Charlotte Amalie and Christiansted.

Our project began as a Transfer Centennial collaboration between Virgin Islands and Danish architects, historians, and community activists known as the ***In Search of Identity Project.*** We ask that it be considered for funding as it aligns with the cultural heritage tourism, workforce development and training and small business development aspects of the prospective initiatives for the Community Development Block Grant Disaster Recovery Funds (CDBG/DR) as stated in the U.S. Virgin Islands' CDBG-DR Action Plan.

Estimated at $20 to $30 million, (10 million raised in Denmark and 10 – 20 million raised in the U.S. and the Virgin Islands) the project developed from community town hall meetings and town planning charettes/competitions executed by the Virgin Islands Economic Development Authority (VIEDA) Enterprise Zone Division. They are designed to develop cultural economic development and tourism corridors in the towns of Christiansted, St. Croix and Charlotte Amalie, St. Thomas. Based on the revitalized selected town plans, the project, is conceived to impact education, history, culture, and economic development. It will create major cultural tourism attractions on each island and provide small business opportunities for local entrepreneurs. It will foster cultural continuity and greater dialogue and discovery for Virgin Islands and Caribbean people around the questions of identity. In their full development, it will also address the issues of energy, sustainability, climate change and technology as we imagine the Virgin Islands future in the 21st century and beyond.

The project is spearheaded by three non-profits, created to facilitate the partnership between the U.S. Virgin Islands and Denmark. In the U.S. Virgin Islands, two non-profits, each in conjunction with fiduciary partner, the St. Croix Foundation, are developing education, cultural tourism entities that reflect

the history, culture, and arts of the islands, while at the same time serving as enhancements to the tourism product and economic development drivers in the towns that provide small business opportunities for residents. In Denmark, the third non-profit manages the collaboration on architecture, curriculum, education, fundraising, and public relations from that country.

On St. Croix, The Virgin Islands Architecture Center for Built Heritage and Crafts, Inc. (VIAC) is developing the Old Barracks property on Hospital Street, Christiansted as an urban campus and education lab within the architecture and historic building crafts traditions of the Virgin Islands, Denmark, and Ghana. VIAC recognizes that the built heritage of towns in the U.S. Virgin Islands reflect the design and craftsmanship of Danish, African and Virgin Islands people. The architectural center will train local, regional, and international students by providing curriculum, internships, and career pathways that both pay tribute to tradition and innovate, anticipate, and plan for current and future needs. In addition to classrooms and other educational facilities, an exhibition space, community café, amphitheater, research/archive, and artisan workshops will also be created. To learn more about VIAC, visit our website at www.viacstx.com.

The Virgin Islands Museum, Civic and Cultural Center, St. Thomas, Inc. is developing the historic J. Antonio Jarvis School Complex in Charlotte Amalie into a School for Arts and Culture. In conjunction with the adjacent lots, it will be developed into a Cultural Corridor. A modern Cultural/Civic Center and Museum will be constructed within the corridor. This space will feature the art, history, and culture of the Territory. It will provide artists, artisans, tradition bearers, cultural practitioners, storytellers, musicians, dancers, folkloric groups, and the community with a venue to express, share and cultivate traditions, wisdom, art, and talents. The Jarvis School will provide classroom settings for the advancement of the arts and cultural education. The Museum will provide a historic and modern chronology of the history and culture of the Territory, exhibition spaces for collections, art and cultural exhibitions, public areas, gift shop, lecture hall/theater and restaurant. While their website is currently under construction, when it goes live later this month, it can be found at www.virginislandsmuseumcivicandculturalcenter.org.

The **Association of Owners of Historic Houses** (BYFO) in Denmark, through its members on the Board of Directors, is the collaborating entity working with the Virgin Islands non-profits, providing resources, expertise, and funding. You can learn more about their efforts here at www.in-search-of-identity.org.

While the **In Search of Identity** project is being developed and administered by the non-profit community in the U.S. Virgin Islands, from its inception, the **U.S. Virgin Islands government has been a key player and has helped move this project forward**. The properties in question, the Old Barracks in Christiansted, St. Croix and the Danish Hospital/Jarvis School in Charlotte Amalie, St. Thomas are both properties of the Virgin Islands government. The town plans, which were community developed and approved were an initiative of the Virgin Islands Economic Development Authority. Seed money for the initiation of this project was provided through an appropriation of the Virgin Islands Legislature and the Danish government. We believe that the use of CDBG Mitigation funding for this project is an opportunity for the Virgin Islands to further the collaboration with the non-profit community to utilize existing cultural and historical assets to energize future economic development and growth in two Virgin Islands towns. It is an opportunity for the government to develop assets for its cultural and heritage tourism initiative through collaboration with the non-profit community and inclusion of the local population through use of its skills and talents and the development of its people through education, training, entrepreneurship, and economic development.

Our initial request is for Phase One of the project to be considered from VIHFA/Community Development Block Grant Mitigation funding. For this phase, we request $4 million, $2 million for each project site to cover the following:

- VIAC – St. Croix requires funds for:
  - Development of a Strategic Master Plan - $25,000 (create a plan that would include the development of both the design/construction plan and the curriculum that will be used)
  - Site Stabilization - $150,000 (stabilize Building One (the ruins) that has been degraded by age, neglect and the effects of several hurricanes)
  - Asbestos and Lead Paint Abatement - $195,000
  - Architecture & Engineering Fees Only (not including Construction Administration) -10 to 12% of the Business Plan building costs - $570,000 - $684,000 (create full architectural design for the entire property)
  - Curriculum Design - $20,000 - $50,000 (design of curriculum through collaboration of architectural educators in Denmark, Ghana, the United States and the Virgin Islands)
    - ST. CROIX TOTAL ESTIMATED COSTS - $960,000 - $1,104,000
- VIMCCC – St. Thomas requires funds for:
  - Development of a Strategic Masterplan - $30,000 (development of a conceptual masterplan for the cultural corridor)
  - Site Stabilization of 3 historic structures and auxiliary structures - $175,000 (Jarvis School I, II and III)
  - Acquisition of the site for the Civic/Cultural Center and Museum, Property Acquisition of adjacent private lot for the new construction of the Cultural/Civic Center and Museum - $1,000,000 ($800,000 requested)
  - Architecture & Engineering Fees - $1.5 Million ($750,000 requested) (Create full architectural design for the entire project properties)
    - ST. THOMAS TOTAL ESTIMATED COST - $1,755,000 - $2,705,000

TOTAL IN SEARCH OF IDENTITY PHASE ONE ESTIMATED COSTS – $2,715,000 - $3,809,000

In addition, we request that the project be considered for both current and future regular cycle local and federal funding in economic development, workforce development and small business development.

We have identified the areas in which we believe the **In Search of Identity** project aligns with CDBG-MIT draft plan.

Under **7.31 Community Resilience Centers & Public Facilities Construction**, if renovated and operational, both the Jarvis School Complex on St. Thomas and the Old Barracks Complex on St. Croix can serve as "centralized and well-equipped shelters for receiving resources, critical communications, charging phones and battery-operated equipment" that can serve "individuals, families and the most vulnerable who seek shelter." Our non-profits are eligible as 501(c)3 organizations and we would seek funding under the eligible activities of HCDA Section 105 (a) (4) Clearance, Rehabilitation, Reconstruction and Construction of Buildings and HCDA Section 105 (a) 12 Planning. Our project would align with CDBG-MIT priorities as they would be facilities that are operational and maintained in regular times as community facilities and be available for use in case of disaster. Our buildings have withstood weather events for centuries and their rehabilitation and renovation would re-purpose them for community use into the future.

Under **7.4 Economic Resilience and Revitalization**, our project would help to "revitalize economic centers like tourism and retail that are critical to job creation/retention and expanding economic opportunities for small businesses." Our objectives are to educate and train a workforce that can provide skilled labor in the construction and craft areas that can repair, renovate, and rehabilitate the buildings and structures in our Virgin Islands towns which have been impacted by age, neglect, and disaster. It is also our objective to provide small business and entrepreneurship training for our students. Both will help to upgrade the Virgin Islands tourism product by improving the aesthetics of our towns, while providing training and entrepreneurship and employment opportunities for our LMI population and ultimately contributing to the diversification of our local economy. We believe that our proposal aligns with CDBG-MIT's initiatives to address "the lack of a skilled labor force" to "preempt the relocation, growth and creation of new, high-value businesses." It is our hope that our LMI population can benefit from both the renovation and restoration of the Jarvis School and Old Barracks properties and from the workforce development and small business creation intended in the **In Search of Identity** project.

Under **7.4.1 Commercial Hardening & Financing Program,** our project would result in the "upgrade (of) private buildings and return them to productive business uses and ensure the stability for such facilities," by training the workforce that would be hired to perform the work. We would qualify under the eligible activities of HCDA 105 (a) (4) Clearance, Rehabilitation, Reconstruction, and Construction of Buildings; HCDA 105 (a) (14) Activities Carried Out through Nonprofit Development Organizations; HCDA 105 (a) (15) Eligible Non-profit Organizations and HCDA 105 (a) (12) Planning. We would align with CDBG-MIT Priorities by creating jobs for predominantly LMI individuals; stabilizing and growing the tourism industry through key infrastructure improvements to commercial areas; hardening infrastructure to mitigate against future disasters in commercial areas; and in conjunction with improvements, utilize job placement programs for trainees.

We respectfully submit our project for consideration and inclusion in the CDBG-MIT plan and look forward to submitting a formal application for funding in the future. We would also like to meet with you and your team in the future to answer or clarify any questions that you have about our project. We

have presented our project to the Governor, Delegate to Congress and the Virgin Islands Legislature and they are aware and supportive or this initiative. We are enthusiastic and energized at the possibilities for a collaboration that will have national and international implications and will create valuable assets in the areas of culture, history, arts and economic development for our beloved people and islands.

Sincerely,

Mary Dema

Chairman, Board of Directors

Virgin Islands Architecture Center for Built Heritage and Crafts, Inc. (VIAC)

Vice-Chair, Olaf (Bronco) Hendricks

Secretary, Michael Keldsen

Treasurer, Monica Marin

Advisory Member, Gerville Larsen

Advisory Member, Frandelle Gerard

Advisory Member, Roland Roebuck

Advisory Member, Chenzira Kahina

Bo Manderup Jensen

Chairman, Board of Directors

Virgin Islands Museum, Civic and Cultural Center, St. Thomas, Inc. (VIMMCC)

Vice-Chair, Senator Myron Jackson

Secretary, Michael Keldsen

Treasurer, Nadine Marchena Kean

Member, Nelson Petty

Advisory Member, Dion Parsons

Advisory Member, Gilchrist Sprauve

Advisory Member, Brian Turnbull

Advisory Member, Stacey Bourne

Advisory Member, Scott Bradley

Danish Advisory Members

Ulla Lunn

Arne Hoi

Mogens Morgen

Bente Ahlefeldt

Hildegunn Gronningstaer

Nana Weien Oklhom

Cc: Governor Albert Bryan

Congresswoman Stacy Plaskett Senate President Novelle E. Francis Tourism Commissioner Joseph Boschulte Labor Commissioner Gary Molloy



Staff Response:

See summary above and general letter below.

Commenter 25

Comment Received:

I have attached a few sentences describing the need for a Senior Center in Frederiksted. I hope you will consider funding the renovation and reopening of Aldershville Senior Center. I had the pleasure of speaking with individuals whose parents and even grandparents utilized services at Aldershville. They reminisce about the social interactions, the shared meals, the music and sense of community that so many enjoyed. I hope we can bring that back as you consider and identify current and future disaster risks and how to mitigate them. The wellbeing of seniors is often overlooked when doing such planning. Thank you for this opportunity..

warmest regards, Rev. Qiyamah A. Rahman - St. Croix Council of Elders

Aldershville Senior and Arts Center: Serving Frederiksted's Growing Senior Population

Aldershville Senior Center

27/27A Strand Street Frederiksted

St. Croix, VI 00841

Unlocking a quality of life for seniors residing in Frederiksted could be accomplished through reopening the Aldershville Senior Center using the CDBG – DR grant. With seniors living longer and more active lives, and with more than 77 million baby boomers turning 65 at a rate of 10,000 per day, our society is experiencing historic growth in the 65-plus demographic.

This growth is pressing communities to think differently and more broadly about a whole host of issues: housing, transportation, social services, cultural offerings, and health and wellness programs. The ultimate question is: Are we as individuals and communities ready for an aging population? One of the key factors to engaging seniors is recognizing the role of Senior Centers. Senior Centers are the social hub for many older individuals in society.

It is well documented that social activity for the elderly leads to increased longevity, improved health and happiness. Centers provide vital links to community services and social activities that help seniors lead active and healthy lives. Senior centers often include programming and events that are intergenerational, cross cultural, and interfaith as a way to engage and stimulate seniors. Integrating the vibrant vision of a senior center with the arts community in Frederiksted spawned the vision for the newly evolving concept of Aldershville Senior and Arts Center.

There is a critical need to reopen the Aldersville Senior Center in Frederiksted. Prior to the pandemic, seniors in Frederiksted were forced to travel to Richmond Senior Center in Christiansted for programs and activities that were previously available closer to home. For some, this was difficult; for other it was impossible to make the trip across island.

Aldershville could also be utilized as a shelter pre and post disasters. It includes a commercial kitchen, bathroom facilitities, storage and space for individuals and families.

I hope you will consider allocating funds for the renovation and reopening of Aldershville Senior Center in Frederiksted.

Rev. Qiyamah A. Rahman – St. Croix Council of Elders

Commenter 26

Comment Received:

Dear Virgin Islands Housing and Finance Authority,

Please accept these comments on behalf of the St. Croix Foundation for Community Development regarding the CDBG-MIT action plan, currently up for public comment.

We applaud VIHFA's approach to leveraging CDBG-MIT funds to positively and substantially impact our community's longstanding issue of inadequate services, programs, and facilities for people experiencing homelessness.

Like you, we hope that CDBG-MIT funds will help bring many projects to fruition which increase resilience and reduce risks posed by future disasters and the impending threats of climate change. We hope that these funds will be utilized in a way that creates lasting change for our community's most vulnerable residents and we implore VIHFA to root programmatic decisions in equity and sustainability.

We urge the VIHFA and the Territory to view nonprofit organizations as true partners and project champions in CDBG-MIT, and to develop program budgets and policies accordingly to meaningfully include nonprofits as potential subrecipients across all programs.

Below, we have identified several projects which St. Croix Foundation would be willing and capable of leading as subrecipients in order to serve our community. We submit these brief project overviews to you for consideration and encourage program design and budgets to be structured in a way which includes and prioritizes these projects.

1) Housing - Affordable Rental Housing for Low- to Moderate-Income Residents

The proposed project will lead to the development of seven (7) low- to moderate-income housing units. Housing will be located in Sunday Market Square, at 35 A & B King Street, and 39 Company Street. Housing will be located on the upper floors of existing, historic buildings at both addresses and in an additional new construction, two story structure adjacent to the existing historic building at 35 King Street. Existing and new structures will be hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied in to existing underground utilities, providing hurricane resilient housing for low- and moderate-income families in Christiansted town. Hardening the facilities will mean that they stand resiliently in the face of future storms and other disasters. Trying in to existing underground utilities in Sunday Market Square means residents will experience minimal downtime of critical utilities in the aftermath of a disaster. This project reduces risk to human life and reduces risk of property loss and damage. Furthermore, these properties are across the street from (extremely close proximity) to the Alexander Theater, which is a current FEMA Hazard Mitigation Grant Program project. This facility will serve as a disaster safe room and critical supply distribution point during and after a storm or other disaster. Therefore, the residents in these affordable rental units for low- to moderate- income individuals will benefit greatly from easy access to responders, food, water, and other lifesaving supplies. This project addresses an unmet need identified in the CDBG-MIT action plan by replenishing affordable rental housing for low- and moderate-income residents. These activities tie to the FEMA lifelines of shelter, food, and water.

This project substantially fulfills the HUD National Objective of *Activities Benefiting Low/Moderate Income Persons* as it is both *a Housing Activity* and an *Area Benefit Activity*. In addition to providing affordable rental housing for low- and moderate-income families, all properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income. 100% of those served by this project will be low- to moderate-income. This project

has the additional benefit of helping to redevelop properties currently blighted or in a state of disrepair in a critical corridor of commercial and tourism related activity.

Approximate cost: $3,000,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Budgeted in this amount are two ADA lifts, one each for Properties A & C where affordable housing will be located on the second floor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement.

2) **Economic Resilience & Revitalization - Affordable Commercial Space to Contribute to Economic Revitalization and Resiliency**

The proposed project will lead to the development of three (3) commercial spaces. Commercial space will be located on the ground floors at 35 King Street and 39 Company Street in Sunday Market Square. Existing structures will be hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied in to existing underground utilities, providing hurricane resilient, affordable commercial space for local businesses in Christiansted town and bringing businesses back into the Square after decades of blight. Hardening the facilities will reduce risk of property loss and tying in to existing underground utilities will reduce downtime in the aftermath of a storm, therefore helping to kickstart economic activity in the days (instead of months) following a disaster.

This project contributes to economic revitalization by replenishing affordable commercial space on the island, providing opportunity for small businesses to thrive. Historic Christiansted town is an important area in which to combat blight and doing so has positive implications for tourism and economic development. The building at 39 Company Street has stood in a severe state of disrepair since Hurricanes Hugo and Marilyn. These properties are both located in Sunday Market Square, a historically significant corridor of Christiansted town. Sunday Market Square once served as a center of economic vitality on St. Croix. It served as a center for trading among enslaved Crucians in the 1700's, the Square was a designated convening space where enslaved people were allowed to trade goods, connect with loved ones, and socialize in the marketplace on Sundays- their only day off from work. Through the years, Sunday Market Square remained a popular meeting place for residents through the 1900s. This project will result in three (3) units of affordable commercial space for lease in Sunday Market Square, facilitating the economic revitalization of this important corridor.

***This project fulfills the HUD National Objective of Activities Benefiting Low/Moderate Income Persons* as it is an *Area Benefit Activity*.** All properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income.

Approximate cost: $1,500,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement.

3) Public Services - Innovative Nonprofit Co-Working Space to Nurture Civic Sector Collaboration, Capacity Building, and Resilience

The proposed project will lead to the development of one Nonprofit Co-Working Space located at 10 Market Street in Sunday Market Square. This facility will provide meeting and convening space and affordable workspace for local nonprofit organizations who provide critical services to our community. This facility will house up to five nonprofit organizations and provide meeting and convening space for more. In the aftermath of a disaster drop-in space will be provided to enable even more nonprofit organizations to work from the site in order to reduce operational downtime after a disaster. This facility will enable the Foundation to better provide technical assistance to nonprofits to help them build capacity and will foster collaboration as organizations are co-located, increasing their effectiveness in collectively meeting the needs of our community's most vulnerable residents. The facility will include affordable access to technology and other resources that would otherwise be out of reach for many local organizations and improve their ability to provide services to people experiencing homelessness and other critical vulnerabilities. Existing structure will be rehabilitated and hardened and built to IBC 2018 ED AND V.I. TITLE 29 building codes and tied to existing underground utilities, providing hurricane resilient and affordable operating space for local nonprofit organizations so that they are more prepared and able to respond when our community needs them most before, during, and after a disaster.

For the purposes of the action plan, we encourage VIHFA to expand its scope of eligible activities under Public Services to include the capacity building necessary for nonprofit/civic sector organizations to scale in order to more adequately and effectively meet the needs of our community's most vulnerable. If considered an eligible activity, this project could also include training and capacity building services, provided by St. Croix Foundation, to aid the myriad of essential nonprofit organization's on St. Croix and in the Territory in improving and advancing their operations so as to be more capable and resilient in the face of future disasters. This will increase their capacity to meet the incredible unmet needs identified in the CDBG-MIT action plan and is an essential capacity building tool necessary to do so.

***This project fulfills the HUD National Objective of Activities Benefiting Low/Moderate Income Persons* as it is an *Area Benefit Activity*.** All properties included in this project are in Census Tract 9702, where more than 51% of the residents are low- to moderate-income. Furthermore, the services provided by the nonprofits which will be located on site overwhelmingly benefit (at least 80%) low- to moderate-income residents.

Approximate cost: $1,000,000. This includes all aspects of the project including: project management, grant administration, permitting and copying fees, and construction costs which include but are not limited to construction (including the architecture, plumbing, electrical, and mechanical costs for the project), hardening, site development, and the insurance/taxes/profit/fees/ payment and performance bond of the contractor. Also included are perimeter fencing for security, walkways and ramps for ADA accessibility, and lead paint and asbestos testing and abatement. If considered an eligible activity, this budget could also include the cost of capacity building training, services, and professional development for nonprofit organization's responsible for providing critical services to address unmet needs identified in the CDBG-MIT action plan, improving their ability to meet those objectives.

These projects substantially fulfill goals outlined in the CDBG-MIT action plan. They also align with creative placemaking and other recommended strategies outlined in the Urban Land Institute's 2018

study which outlines strategies for building a resilient and equitable St. Croix (available here: https://ia71z1oozio1p7cpp37o43o1-wpengine.netdna-ssl.com/wp-content/uploads/ULI-Documents/St.Croix_ASP_2018.pdf). This mixed-use development model reflects the historic nature of Christiansted town as it is how historic towns like ours originally functioned. This model of development increases walkability, livability, and a sense of vibrant community culture in the area. Since all properties will be hardened, tied in to existing underground utilities, these projects also reduce risk of loss of life and damage to property in future disasters, and reduce downtime for commercial and critical human service activities in the aftermath of a storm or other disaster. Taken together, these projects provide a model for holistic, sustainable community development and revitalization and they meet several HUD national objectives and VIHFA action plan goals for mitigation.

If funded by CDBG-MIT, these projects will be adjacent to and will compliment an existing FEMA Hazard Mitigation Grant Program funded project also located in Sunday Market Square for which St. Croix Foundation is the subrecipient. That project, the Alexander Theater Safe Room/Building Retrofit, is a top tier FEMA HMGP project, obligated at $1.6M for Phase 1 (currently under way) and awarded more than $10M for Phase 2. The Alexander Theater Safe Room/ Building Retrofit will lead to the development of downtown Christiansted's only disaster safe room/shelter for use during disasters, with capacity to safely house more than 300 residents. During blue skies, the Alexander Theater will serve as a performing arts center and convening space, vital for economic revitalization. The Alexander Theater shares Sunday Market Square with the properties that will be redeveloped under these CDBG-MIT projects, located directly across the street from properties mentioned herein. These two projects are complimentary, leveraging diverse philanthropic and federal recovery resources for holistic development that will finalize the transformation of this historic area, providing housing, a cultural and economic epicenter, and vibrant quality of life for St. Croix's residents, while increasing resilience to disasters and reducing or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters on residents and commercial enterprises located in the Square, and by providing resilient operating space for nonprofit organization to facilitate the critical, lifesaving services they provide to our community's most vulnerable residents.

Thank you for your leadership and service on this project.

Sincerely,

Deanna James, President

Haley Cutler, Project Manager

St. Croix Foundation for Community Development

hcutler@stxfoundation.org

Mobile: (954) 260-5601

www.stxfoundation.org

General Response Letter to All Commenters:

From: Daryl Griffith, Executive Director, Virgin Islands Housing and Finance Authority (VIHFA)

To: Commenter of the 2020 Draft Action Plan for the Virgin Islands (Plan)

The VIHFA would like to congratulate you for your robust and valuable participation in the Planning process for the mitigation funding. We are both elated and impressed with the volume and detail of the input that has been provided from all of our commenters to ensure the best and highest use of the 774-million-dollar HUD appropriation designed to both fortify and beautify the community.

Inasmuch as most of you have provided the level of depth and details that will require an elevated and extended period of consideration, we want to make sure that each of is are given the time to communicate your ideas; and that VIHFA imparts both the appropriate information and technical guidance necessary to ensure that each commenter is made aware of all the methods that are available to participate in the procurement and other processes that will follow the approval of the Plan.

Please understand that the projects and ideas that you presented (which may include, but are not limited to, programs aimed at mental health and family support to help heal from PTSD (Public Facilities, Public Services); job creation opportunities that among other things, bring energy efficiency enterprises to the VI (Economic Development); health and medical facilities representing safety and critical lifelines (Public Facilities, Public Service, Housing, etc.) present possibilities under all allocations currently proposed in the Plan.

The primary purpose of the Plan is to present allocations of the funding based upon an extensive outreach process as prescribed in the regulations. While we understand that comments also inform this process, we want to assure each commenter that the process will be continuous; and even in moving forward; if additional feedback is received that substantially alters the current narratives, the VIHFA will make any necessary substantial amendments to the Plan, based upon such additional feedback. This applies to any and all documentation that has already been submitted; but currently, may not be reflected in this Plan

Again, there are amounts allocated in the Plan for many of the activities enumerated in the collective comments. As you may be aware, some of the comments were actually proposals for projects. As Requests for Proposals roll out, VIHFA will ensure that you are contacted regarding procurement opportunities so that you will be able to fully participate. Further, please be assured that VIHFA will follow all of the federal rules of procurement for all projects that are selected.

Finally, thank you for your participation. We are also sending each commenter an individual letter by email or by U.S. mail, if we do not have an email address. We look forward to working with you over the coming years, to build a more resilient and beautiful Virgin Islands.

We wish to reiterate that all comments are being considered. Further, look forward to receiving an invitation to discuss your comments more fully with our officials.

Sincerely,

Daryl Griffith,

Executive Director

This page intentionally left blank.

D-8 Copies/ Screenshots of Citizen Participation/Public Notice

Public Comment Period November 4 – December 22, 2020

4 Key Ways to Participate

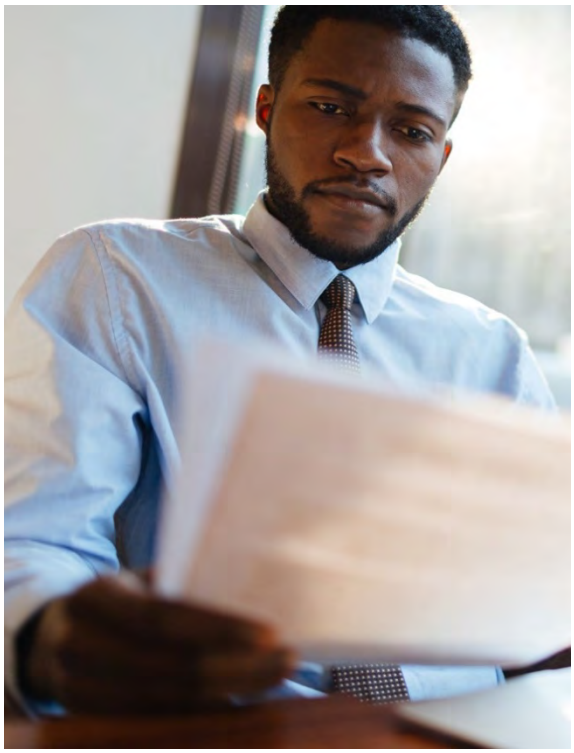
We want to hear from you as we go through this recovery process together. There are 4 ways built into the planning process to keep you in the loop and providing feedback.

READ THE CURRENT PLANS: Current and past versions are always available to you.

PROVIDE PUBLIC COMMENT: During certain phases of the planning process, drafts and amendments are open for public comment.

TAKE SURVEYS: When appropriate, we will release online surveys to get your opinion about process changes under consideration.

ATTEND MEETINGS: When appropriate, and generally during periods of public comment, we hold public meetings to get your feedback.



(1) Read the Plans

The U.S. Department of Housing and Urban Development requires that the Territory of the U.S. Virgin Islands develop a Consolidated Plan which is the result of the planning process that recipients of HUD funding must undertake as a condition of receiving funds. The programs covered include: The Community Development Block Grant (CDBG), Community Development Block Grant – Disaster Recovery (CDBG-DR), the Emergency Solutions Grant (ESG), the HOME Program, and other programs as may from time to time be made. The Consolidated Plan serves as a planning document which builds on citizen participation, as an application for federal funds under the above-mentioned HUD programs, as a strategy for the implementation of program activities, and finally, as a basis for assessing performance. The purpose of the Citizen Participation Plan is to describe how the Territory shall provide for and encourage citizen participation in the development of the 5- year Consolidated Plan, any amendments thereto, the Annual Action Plan, the annual performance evaluation report (CAPER), and any amendments to those plans. The Consolidated Planning process entails the assessment of needs, the establishment of priorities, and the development of strategies to address housing, community development, and homelessness. The Citizen Participation Plan shall be reviewed and revised, if necessary, every five (5) years as part of the consolidated planning process. The Territory's CDBG – Mitigation Action Plan to spend $774 million on housing; infrastructure & public facilities; economic resilience & revitalization; public services and planning is available for public review and comment. The CDBG-MIT Action Plan Draft can be found at: Mitigation- Virgin Islands Housing Finance Authority (vihfa.gov)

Any future substantial amendments will also be available for public comment, information for which will be available here.

(2) Provide Public Comment

(3) Surveys

When appropriate we will release public surveys to gain insight into public view on specific areas of interest. These surveys sometimes inform plan amendments and other times may result in changes to our internal processes

CDBG – Mitigation Survey

The disaster recovery perception survey will help the Mitigation Action Plan team identify and understand priority areas to focus on during a recovery and long-term mitigation efforts.

VIHFA Non-Profit Involvement Survey

This survey is now closed. For more information, please contact us at 340.777.4432 ext. 4221/4220



Attend the Meetings

CDBG – Mitigation Public Hearings

Thursday, November 12 | 6 p.m.

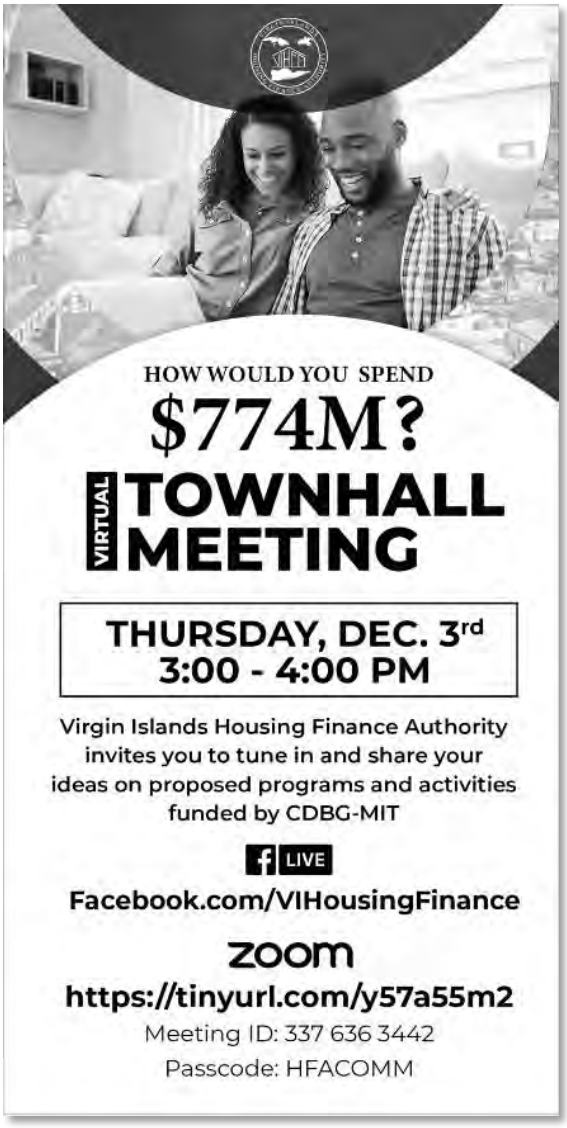
Thursday, November 19 | 6 p.m.

Thursday, December 3 | 3 p.m.

MITIGATION TOWNHALL PRESENTATION

Additional Advertising undertaken to encourage public input in conjunction with final CDBG-MIT Action Plan hearing:







Thank You/Follow-up Daily News Print Ad

Description:

Two Columns x 8” Ad Insertion Dates:

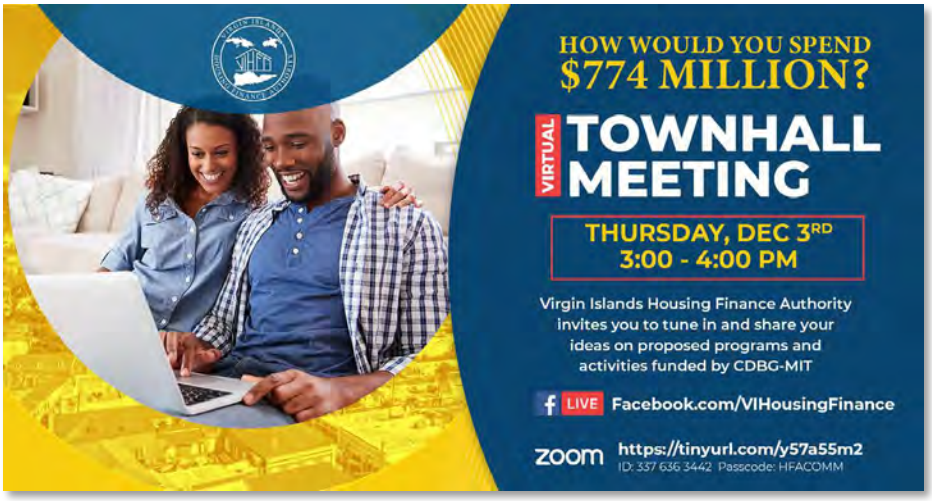
12/8, 12/11, 12/14, 12/17, 12/21

Description:

Two Columns x 8” Ad Insertion Dates: 11/28/2020, 11/30/2020,

12/3/2020

Digital Ads



Facebook Event Ad

Description:

Posted to VIHFA Page & Boosted



Email Invite

Description:

Sent to email contacts on PR List from Keva Muller

Insertion Dates: 12/2/2020



Facebook Live Now Post

Insertion Date: 12/3/2020; 3:01pm AST

Digital Ads



The Source Online Newspaper

Digital Ad (St. Thomas and St. Croix)

Insertion Dates: 11/24/2020 -12/3/2020

Placements (Tear Sheets)


season, a fundraising tradition dating back to 1891.

The origin of The Salvation Army red kettle is in California, regional coordinator of The Salvation Army for St. Thomas, St. Croix and St. John Capt. Wanda Rivera said.

"The Salvation Army captain in San Francisco had resolved, in December of 1891, to provide a free Christmas dinner to the area's poor persons. By Christmas 1895, the kettle was used in 30 Salvation Army locations in various sections of the west coast area," Rivera said.

Amid a global health crisis, Rivera said, volunteering to man a red kettle station will be different this year.

Advertising

"The red kettle will be different because people who used to donate can't go it for various reasons this year. Places that we used to stand we will not be able to do it. Because of COVID-19, we must start earlier," Rivera said.










us to take a moment to reflect on the good. The good in others, the good of the Virgin Islands, and the good in ourselves. Let us reflect on positive moments in our lives that serve as abundant blessings because we recognize the importance of unwavering faith.

The strength of the Virgin Islands lies in its people, and that strength is demonstrated by the faith and resilience that we display, no matter the challenges that arise. COVID-19 has forced a new way of life upon us all, but we will not lose sight of the things around us that give us hope and reasons to be thankful.

This Thanksgiving will include new practices to ensure the safety of our family, friends and loved ones. Although this is a time of the year when we are eager to gather together in camaraderie, we must be mindful of the need to practice social distancing and follow guidelines put in place for the well-being of everyone. Small precautions can yield significant results when it comes to dealing with this menacing virus.

Despite the modifications to our daily norm, we still hold onto memories that keep us connected in love, happiness, and kindness. There is much to be grateful for as we recognize our many blessings and keep faith present for a brighter tomorrow. Together we will overcome the obstacles and remain strong.

Advertising



Happy Thanksgiving!









TV Commercial & Video Ads



60 Second TV Commercial

Description:

Posted on Facebook on11/30/2020 and used as Promotional TV commercial placed on NBC and FOX

Insertion Dates:

11/30/2020 – 12/3/2020



20 Second TV Commercial

Description:

Promoted on Facebook on 12/2/2020 and Used as Promotional TV commercial placed on NBC and FOX

Insertion Dates:

11/27/2020 - 12/3/2020

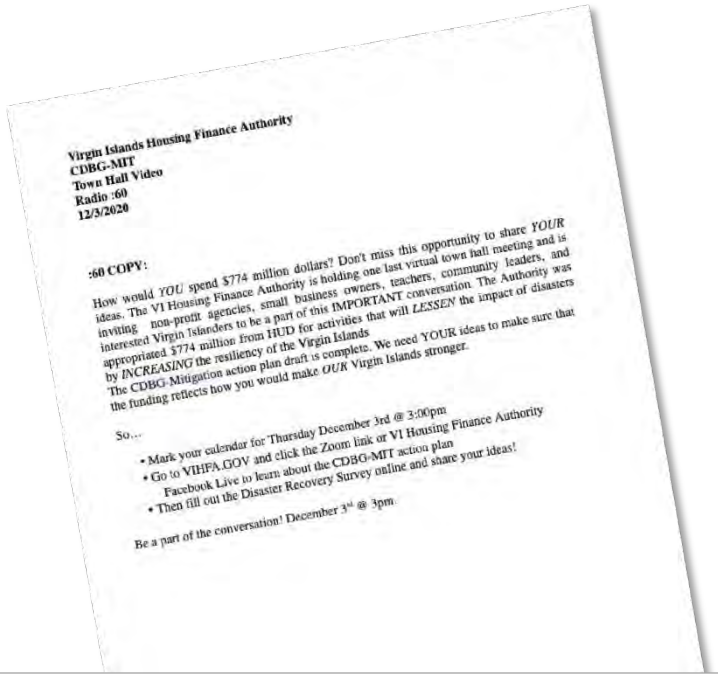


Follow-Up 20 Second Online Video Ad

Description:

Promoted on Facebook and Influencer Groups

Radio Ad



Virgin Islands Housing Finance Authority
CDBG-MIT
Town Hall Video
Radio :60
12/3/2020

:60 COPY:

How would *YOU* spend $774 million dollars? Don't miss this opportunity to share *YOUR* ideas. The VI Housing Finance Authority is holding one last virtual town hall meeting and is inviting non-profit agencies, small business owners, teachers, community leaders, and interested Virgin Islanders to be a part of this IMPORTANT conversation. The Authority was appropriated $774 million from HUD for activities that will *LESSEN* the impact of disasters by *INCREASING* the resiliency of the Virgin Islands
The CDBG-Mitigation action plan draft is complete. We need YOUR ideas to make sure that the funding reflects how you would make *OUR* Virgin Islands stronger.

So…

- Mark your calendar for Thursday December 3rd @ 3:00pm
- Go to VIHFA.GOV and click the Zoom link or VI Housing Finance Authority Facebook Live to learn about the CDBG-MIT action plan
- Then fill out the Disaster Recovery Survey online and share your ideas!

Be a part of the conversation! December 3rd @ 3pm

Description:

Promotional radio ad promoting webinar on Dec. 3rd placed on WSTA, NPR, JKC, and WSTX

Insertion Dates:

11/27/2020 – 12/3/2020

Radio Appearances CDBG-DR/CDBG-MIT



Morning Show Radio Tour

WSTX December 1, 2020

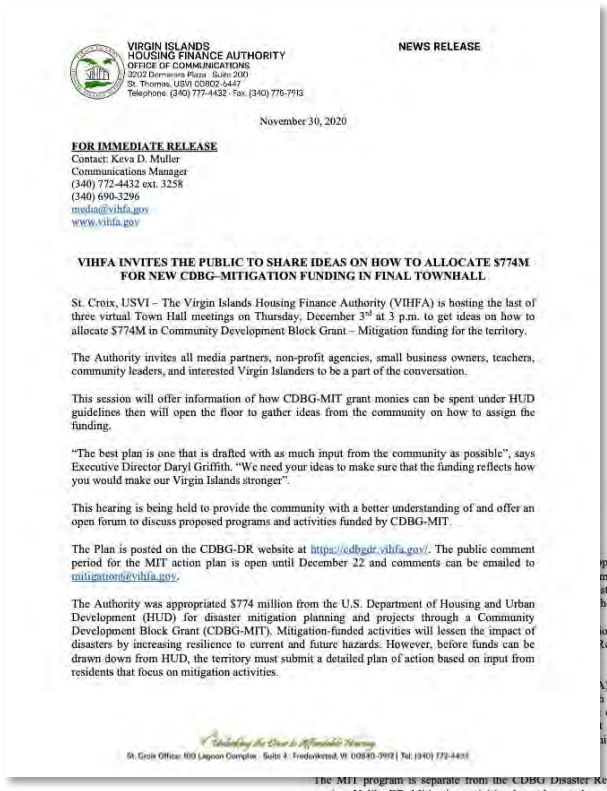
DaVybe December 1, 2020

Reef Broadcasting Dec 2, 2020

Caribbean Country Dec 2, 2020

WSTA Dec 3, 2020

Press Release



VIRGIN ISLANDS
HOUSING FINANCE AUTHORITY
OFFICE OF COMMUNICATIONS
3202 Demarara Plaza · Suite 200
St. Thomas, USVI 00802-5447
Telephone: (340) 777-4432 · Fax: (340) 775-7913

NEWS RELEASE

November 30, 2020

FOR IMMEDIATE RELEASE
Contact: Keva D. Muller
Communications Manager
(340) 772-4432 ext. 3258
(340) 690-3296
media@vihfa.gov
www.vihfa.gov

VIHFA INVITES THE PUBLIC TO SHARE IDEAS ON HOW TO ALLOCATE $774M FOR NEW CDBG–MITIGATION FUNDING IN FINAL TOWNHALL

St. Croix, USVI – The Virgin Islands Housing Finance Authority (VIHFA) is hosting the last of three virtual Town Hall meetings on Thursday, December 3rd at 3 p.m. to get ideas on how to allocate $774M in Community Development Block Grant – Mitigation funding for the territory.

The Authority invites all media partners, non-profit agencies, small business owners, teachers, community leaders, and interested Virgin Islanders to be a part of the conversation.

This session will offer information of how CDBG-MIT grant monies can be spent under HUD guidelines then will open the floor to gather ideas from the community on how to assign the funding.

"The best plan is one that is drafted with as much input from the community as possible", says Executive Director Daryl Griffith. "We need your ideas to make sure that the funding reflects how you would make our Virgin Islands stronger".

This hearing is being held to provide the community with a better understanding of and offer an open forum to discuss proposed programs and activities funded by CDBG-MIT.

The Plan is posted on the CDBG-DR website at https://cdbgdr.vihfa.gov/. The public comment period for the MIT action plan is open until December 22 and comments can be emailed to mitigation@vihfa.gov.

The Authority was appropriated $774 million from the U.S. Department of Housing and Urban Development (HUD) for disaster mitigation planning and projects through a Community Development Block Grant (CDBG-MIT). Mitigation-funded activities will lessen the impact of disasters by increasing resilience to current and future hazards. However, before funds can be drawn down from HUD, the territory must submit a detailed plan of action based on input from residents that focus on mitigation activities.

Unlocking the Door to Affordable Housing
St. Croix Office: 100 Lagoon Complex · Suite 4 · Frederiksted, VI 00840-3912 | Tel: (340) 772-4432

portunity for the U.S. Virgin Islands
mitigate or eliminate risks and reduce
ster risks, funds can assist with the
he territory.

on programs and activities to address
Resilience & Revitalization; Housing;

) of the Territory, which provides an
island, and the weaknesses in the
context of "Community Lifelines,"
a major obstacle to full recovery.
nications, safety & security and food,

The MIT program is separate from the CDBG Disaster Recovery (DR) program currently in motion. Unlike DR, Mitigation activities do not have to have a tie to the 2017 hurricanes and the timeline for expenditure of funds is twelve years from the date the grant agreement is signed.

Following a 45-day comment period, the Action Plan will be sent to HUD for review and approval.

In addition to the virtual public hearing, the mitigation team has a survey in circulation collecting responses on residents' opinions of priority items following a hurricane or declared natural disaster. The survey can be found on the VIHFA website at www.vihfa.gov.

Meeting Details:
Topic: CDBG- MIT Action Plan Discussion
Time: Thursday December 3, 2020 03:00 PM La Paz

Join Zoom Meeting
https://us02web.zoom.us/j/3376363442?pwd=S01QVigzYmlPWlJRRmVyb FRsTnEXUT09

Meeting ID: 337 636 3442 Passcode: HFACOMM

One tap mobile
+16699006833,,3376363442# US (San Jose)
+19292056099,,3376363442# US (New York)

Also join in VIHFA Facebook Live

###

Unlocking the Door to Affordable Housing
St. Croix Office: 100 Lagoon Complex · Suite 4 · Frederiksted, VI 00840-3912 | Tel: (340) 772-4432

Description:

Distributed to media contact list by Keva Muller on November 30, 2020

APPENDIX E: REFERENCES

U.S. Census Bureau. (n.d.). *Understanding the Population of the U.S. Virgin Islands*. Retrieved from https://www.census.gov/content/dam/Census/programs-surveys/sis/resources/2020/sis_2020map_usvi_k-12.pdf

Artiga, S., Hall, C., Rudowitz, R., & Lyons, B. (2018). Health Care in Puerto Rico and the U.S. Virgin Islands: A Six-Month Check-Up After the Storms. Retrieved from https://www.kff.org/medicaid/issue-brief/health-care-in-puerto-rico-and-the-u-s-virgin-islands-a-six-month-check-up-after-the-storms-report/

Austin, D. A. (2018). *Economic and Fiscal Conditions in the US Virgin Islands.* Washington, D.C.: Congressional Research Service. Retrieved from https://fas.org/sgp/crs/row/R45235.pdf

Blake, E. S. (2007). *The deadliest, costliest, and most intense United States tropical cyclones from 1985 to 2006 (and other frequently requested hurricane facts).* Miami, Florida: National Oceanic and Atmospheric Administration, National Weather Service, National Hurricane Center.

Caribbean Exploratory Research Center. (2019). *Community Needs Assessment: Understanding the Needs of Vulnerable Children and Families in the U.S. Virgin Islands Post Hurricanes Irma and Maria.* Retrieved from https://cfvi.net/wp-content/uploads/2019/03/CFVI-CERC-Community-Needs-Assessment-E-Report_February-2019_Bookmarked.pdf

Centers for Disease Control and Prevention. (2021). COVID-19. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/index.html

Centers for Disease Control and Prevention. (2021). *COVID-19 in the U.S. Virgin Islands*. Retrieved from https://wwwnc.cdc.gov/travel/notices/covid-unknown/coronavirus-usvirgin-islands

Centers for Disease Control and Prevention. (2021). U.S. Virgin Islands COVID-19 Travel Information. Retrieved from https://wwwnc.cdc.gov/travel/destinations/clinician/none/usvirgin-islands

Chowdhury, M. A. (2019). Health Impact of Hurricanes Irma and Maria on St. *American Journal of Public Health, 109*(12), 1725-1732. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6836793/

Community Research Services, LLC. (2015). *A Housing Demand Study – Territory of the Virgin Islands.* Retrieved from https://www.cr-services.com/wp-content/uploads/2015/06/Executive-Summary-USVI-Housing-Demand-Study-VIHFA.pdf

Federal Emergency Management Agency. (2001). Understanding Your Risks: Identifying Hazards and Estimating Losses. *State and Local Mitigation Planning How-toGuide*.

Federal Emergency Management Agency. (2004). Using HAZUS-MH for Risk Assessment: How-to. *FEMA 433*. Retrieved from http://www.fema.gov/media-library/assets/documents/5231?id=1985

Federal Emergency Management Agency. (2007). *Risk Management Series Design Guide for Improving Critical Facility Safety from Flooding and High Winds.* Retrieved from https://www.fema.gov/sites/default/files/2020-08/fema543_design_guide_complete.pdf

Federal Emergency Management Agency. (2009). Protecting Manufactured Homes from Floods. Retrieved from https://www.fema.gov/media-library-data/20130726-1502-20490-8377/fema_p85.pdf

Federal Emergency Management Agency. (2015). 2015 International Building Code. Retrieved from https://www.fema.gov/media-library-data/1488284217191-c97654abdef952a68a9c7e8fc9282b62/2015_IBC_compilaton_of_wind_resistanc_provisions.pdf

Federal Emergency Management Agency. (n.d.). FEMA Territory Plan Review Guide and FEMA Territory Plan Review Tool.

Federal Emergency Management Agency. (n.d.). Local Mitigation Planning Handbook. *5-1*. Retrieved from https://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf

Federal Emergency Management Agency. (n.d.). *Risk Management Series Design Guide for Improving Critical Facility Safety from Flooding and High Winds.* Retrieved from https://www.fema.gov/media-library-data/20130726-1557-20490-1542/fema543_complete.pdf

Giles, C., & Rodriguez, C. H. (2020, September 1). Tensions rise among residents and travelers as US island territories work to stop COVID-19 spread. *USA Today*. Retrieved from https://www.usatoday.com/story/travel/destinations/2020/08/31/puerto-rico-travel-us-virgin-islands-travel-economy-covid-19/5638122002/

Government of the United States Virgin Islands. (2021). *COVID-19 Timeline*. Retrieved from https://www.vi.gov/usvi-covid-19-timeline/

Johns Hopkins University & Medicine. (2021). *COVID-19 United States Cases by County*. Retrieved from Coronavirus Resource Center: https://coronavirus.jhu.edu/us-map

Leshem, E., Gastanaduy, P. A., Trivedi, T., Halpin, A. L., Pringle, J., Lang, F., . . . Hall, A. J. (2016). Norovirus in a United States virgin islands resort: outbreak investigation, response, and costs. *Journal of Travel Medicine*. Retrieved from https://academic.oup.com/jtm/article/23/5/taw040/2579312

McGuire, J. W. (1925). Geographic dictionary of the Virgin Islands of the United States. *103*. (W. G. Office, Ed.) Department of Commerce. Retrieved from http://www.columbia.edu/cu/libraries/inside/projects/ebooks/prd/testing/Islands/html/pages/FID3.html

Mohammed, H., Ramos, M., Armstrong, J., & Muñoz-Jordán, J. L. (2010). An outbreak of dengue fever in St. Croix (US Virgin Islands). *PLoS ONE, 5*(e13729). Retrieved from https://www.researchgate.net/publication/47718787_An_outbreak_of_dengue_fever_in_St_Croix_US_Virgin_Islands_2005

National Centers for Environmental Information. (2019). Billion-Dollar Weather and Climate Disasters: Table of Events. National Oceanic and Atmospheric Administration. Retrieved from https://www.ncdc.noaa.gov/billions/events

National Oceanic and Atmospheric Administration. (2013). Storm Surge Overview. National Hurricane Center. Retrieved from https://www.nhc.noaa.gov/surge/

National Oceanic and Atmospheric Administration. (2020). Saffir-Simpson Hurricane Wind Scale. National Hurricane Center. Retrieved from https://www.nhc.noaa.gov/aboutsshws.php

National Oceanic and Atmospheric Administration. (n.d.). *FAQ - Tide Predictions and Data.* Retrieved from https://tidesandcurrents.noaa.gov/faq2.html

National Oceanic and Atmospheric Administration. (n.d.). *FAQ – Tide Predictions and Data.* Retrieved from https://tidesandcurrents.noaa.gov/faq2.html

National Oceanic and Atmospheric Administration. (n.d.). *Tides and Currents Data.* Wilmington, NC. Retrieved from https://tidesandcurrents.noaa.gov/waterlevels.html?id=8658120&units=standard&bdate=19500101&edate=20171231&timezo ne=GMT&datum=MSL&interval=m&action=data

National Resources Conservation Service Caribbean Area. (n.d.). Dealing with Drought. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/pr/technical/?cid=nrcseprd390019#:~:text=In%202015%2C%20Puerto%20Rico%20and,Rico%2C%20eastern%20parts%20of%20St.&text=Over%2086%25%20of%20Puerto%20Rico,increased%20the%20threat%20of%20wildfires

National Resources Conservation Service Caribbean Area. (n.d.). Farmland Classification. Retrieved from https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd1569436&ext=pdf

National Resources Conservation Service Caribbean Area. (n.d.). USDA & National. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detail/pr/newsroom/features/?cid=nrcseprd1257018

New Jersey Office of Emergency Management. (2019). 2019 New Jersey State Hazard Mitigation Plan Update. Retrieved from http://ready.nj.gov/mitigation/2019-mitigation-plan.shtml

Pearce, L. D. (2000). *An Integrated Approach for Community Hazard Impact, Risk and Vulnerability Analysis: HIRV.* Doctoral Dissertation, University of British Columbia.

Smith, K. (1996). *Environmental Hazards: Assessing Risk and Reducing Disaster.* London and New York: Routledge.

Southeast Climate Adaptation Science Center. (2020). 2020 Drought Conditions in the U.S. Retrieved from https://secasc.ncsu.edu/2020/07/22/2020-drought-conditions-in-the-u-s-carribbean/

STARRII. (2018, August 14). US Virgin Islands Advisory Data and Products: Post-Hurricanes Irma and Maria. *Contract No. HSFE60-15-D-0005*(Task Order 70FBR218F00000074). Retrieved from https://feedback.region2coastal.com/NationalDisasters/HurricaneMaria/Data/Advisory/USVI/Report/USVI_Report_(Final).pdf

The St. John Source. (2020). Dengue's V.I. Reappearance Makes Mosquito Control Paramount. Retrieved from https://stjohnsource.com/2020/01/02/dengues-v-i-reappearance-makes-mosquito-control-paramount/

U.S. Department of Housing and Urban Development. (2017). United States Virgin Islands Comprehensive Housing Market Analysis. Retrieved from https://www.huduser.gov/portal/publications/pdf/USVI-comp.pdf

U.S. Department of Housing and Urban Development. (2018). Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Disaster Recovery Grantees. Retrieved from https://www.federalregister.gov/documents/2018/08/14/2018-17365/allocations-common-application-waivers-and-alternative-requirements-for-community-development-block

U.S. Energy Information Administration. (2020). U.S. Virgin Islands Territory Profile and Energy Estimates. Retrieved from https://www.eia.gov/state/analysis.php?sid=VQ

U.S. Global Change Research Program. (n.d.). Chapter 20: U.S. Caribbean. In *Fourth National Climate Assessment.* Retrieved from https://nca2018.globalchange.gov/chapter/20/

U.S.V.I. Bureau of Economic Research. (2018). U.S. Virgin Islands Annual Tourism Indicators. Retrieved from http://usviber.org/wp-content/uploads/2016/11/TOUR18-2.pdf

United States Army Corps of Engineers. (n.d.). *American Recovery and Reinvestment Act of 2009 Civil Works Construction.* Retrieved from https://www.usace.army.mil/Portals/2/docs/recovery/ComprehensiveConstruction.pdf

United States Census Bureau. (2013). Table 4a. Population, Housing Units, Land Area, and Density by Island and Census Subdistrict for the U.S. Virgin Islands: 2010. Retrieved from https://www.census.gov/data/tables/time-series/dec/cph-series/cph-t/cph-t-8.html

United States Census Bureau. (2019). TIGER/Line Shapefile, 2017, state, United States Virgin Islands, Current Estate State-based Shapefile (U.S. Virgin Islands only). Retrieved from https://catalog.data.gov/dataset/tiger-line-shapefile-2017-state-united-states-virgin-islands-current-estate-state-based-shapefi

United States Department of Agriculture. (n.d.). Disaster Assistance Programs. Retrieved from https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/

United States Geological Survey. (n.d.). *The Modified Mercalli Intensity Scale.* Retrieved from https://www.usgs.gov/natural-hazards/earthquake-hazards/science/modified-mercalli-intensity-scale

United States Government Accountability Office. (2019). 2017 Hurricane Season Federal Support for Electricity Grid Restoration in the U.S. Virgin Islands and Puerto Rico. *Report to Congressional Requesters*(GAO-19-296). Retrieved from https://www.gao.gov/assets/gao-19-296.pdf

United States Government Publishing Office. (2018). Federal Register. Retrieved from https://www.govinfo.gov/content/pkg/FR-2018-08-14/pdf/2018-17365.pdf

United States Virgin Islands Housing Finance Authority. (2018). Community Development Block Grant Disaster Recovery Program Action Plan. Retrieved from https://cdbgdr.vihfa.gov/wp-content/uploads/2020/03/USVI-CDBG-DR-Initial-Action-Plan.pdf

US Geological Survey. (2003). Puerto Rico Seismic Hazard Map. Retrieved from https://www.usgs.gov/media/images/puerto-rico-seismic-hazard-map

US Geological Survey. (2020). Caribbean Tsunami and Earthquake Hazards Studies. Retrieved from https://www.usgs.gov/centers/whcmsc/science/caribbean-tsunami-and-earthquake-hazards-studies?qt-science_center_objects=0#qt-science_center_objects

USVI Hurricane Recovery and Resilience Task Force. (2018). Report 2018. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/USVI%20Task%20Force%20Initial%20Report.pdf

USVI Office of Disaster Recovery. (2019). *2019 Territorial Hazard Mitigation Plan.* Retrieved from https://www.usviodr.com/wp-content/uploads/2019/09/2019-Territorial-Hazard-Mitigation-Plan_Revisions_29May2020-6.12.20.pdf

VIHFA Virgin Islands Community Disaster Response Mitigation Survey. (n.d.). Retrieved from https://tinyurl.com/y7t35cpf

Virgin Islands Source. (2020). Virgin Islands Drought is Over. Retrieved from https://stthomassource.com/content/2020/09/03/virgin-islands-drought-is-over/

World Health Organization. (2021). Coronavirus. Retrieved from https://www.who.int/health-topics/coronavirus#tab=tab_1

APPENDIX F: SUMMARY OF VIHFA OUTREACH WITH STAKEHOLDERS TO ALIGN AND COORDINATE EFFORTS

University of the Virgin Islands (UVI)

2/19/2021 – Virtual FEMA Coordination Meeting to discuss HUD comments on CDBG-MIT Action Plan with focus on alignment with current HMP and future updates, including Dr. Derval Petersen, Mr. Robert Tranter, Ms. Sandra Lashley, Mr. John Heide, Ms. LaTanya Carlos, Ms. Kamal Russell, and Ms. Susan Julius from FEMA, plus Dr. Greg Guannel and Dr. Kim Waddell from the University of the Virgin Islands (UVI), Director Daryl Griffith and Mr. Mario Leonard from the Virgin Islands Housing Finance Authority (VIHFA), plus Ms. Bonnliyn Thomas from the Virgin Islands Office of Disaster Recovery (ODR) and VITEMA's Ms. Graciela Rivera (Virgin Islands Territorial Hazard Mitigation Officer)

1/26/2021 – Virtual meeting via Teams on UVI Hazard Mitigation Discussion with focus and on discussing the available data, approach, and lessons learned in preparing the CDBG-MIT Action Plan submitted to HUD with Dr. Greg Guannel

12/3/2020 – Email Invitation to participate in CDBG-MIT Action Plan Townhall Discussion, which Dr. Greg Guannel subsequently participated in, making clarifying comments and notes within the chat during the meeting

11/5/2020 – Email communications on updated maps and data with Dr. Greg Guannel, sharing link to draft of CDBG-MIT Action plan published on the VIHFA website for his feedback

11/5/2020 – Participation in the 3rd Annual USVI Hazard Mitigation and Resilience Workshop hosted by the University of the Virgin Islands and moderated by Dr. Greg Guannel

10/15/2020 – Email communications on efforts to gather details on UVI efforts and data related to potential climate change impact, with goal of looking at the CDBG-MIT Action Plan's Mitigation Needs Assessment

8/25/2020 – Email communications on 2014 and 2019 Risk Assessment Methodology with Dr. Greg Guannel, with goal of connecting with Regina Brown at VITEMA and Jeff Euwema, who provided a detailed data source list from the HMP Appendix

8/16/2020: Participation in recurring meetings with the Naval Graduate Business school representatives, UVI contacts, and others within the territory on GitLab data planning and resource sharing to look at data sources and updates being done as part of 2021 HMP update

8/5/2020: Email communication to invite Dr. Greg Guannel to next CDBG-MIT Action Plan public outreach meeting

8/4/2020: Email communication to Dr. Greg Guannel following up on 2014 HMP drought data and available resources for planned use in CDBG-MIT Action Plan

8/3/2020: Participation in recurring meetings with the Naval Graduate Business school representatives, UVI contacts, and others within the territory on GitLab data planning and resource sharing to look at data sources and updates being done as part of 2021 HMP update

7/30/2020: Email communication with Dr. Greg Guannel on available data from completed 2014 and 2019 HMP, including also Regina Browne and Graciela Rivera from VITEMA to ensure most updated data factored into planned CDBG-MIT Action Plan Mitigation Needs Assessment

7/27/2020: Participation in recurring meetings with the Naval Graduate Business school representatives, UVI contacts, and others within the territory on GitLab data planning and resource sharing to look at data sources and updates being done as part of 2021 HMP update

7/24/2020: Email communication with Dr. Greg Guannel on available data from completed 2014 and 2019 HMP, including also Regina Browne and Graciela Rivera from VITEMA to ensure most updated data factored into planned CDBG-MIT Action Plan Mitigation Needs Assessment

7/14/2020: Participation in recurring meetings with the Naval Graduate Business school representatives, UVI contacts, and others within the territory on GitLab data planning and resource sharing to look at data sources and updates being done as part of 2021 HMP update

7/8/2020: Email communication to Dr. Greg Guannel and Dr. Kim Waddell inviting them to the upcoming CDBG-MIT Town Hall Meeting

6/30/2020: Email communication with Dr. Greg Guannel on arranging call on USVI Data Questions for CDBG MIT Action Plan

6/26/2020: Teams meeting with Dr. Greg Guannel on GIS Needs for CDBG-MIT Action Plan Mitigation Needs Assessment section and potential data sources

6/26/2020: Follow up email communication with Dr. Greg Guannel on arranging a meeting on USVI Data Questions for planned CDBG MIT Action Plan

6/25/2020: Participation in recurring meetings with the Naval Graduate Business school representatives, UVI contacts, and others within the territory on GitLab data planning and resource sharing to look at data sources and updates being done as part of 2021 HMP update

6/23/2020: Email communication with Dr. Greg Guannel on arranging a meeting on USVI Data Questions for planned CDBG MIT Action Plan

6/19/2020: Introductory email communication with Dr. Greg Guannel to arrange a meeting on USVI Data Questions for planned CDBG MIT Action Plan

5/21/2020: Participation in data collection and discussion plans with particular focus on Mapping Existing Utilities and Roadways UVI and Naval Business College representatives, plus VIHFA contacts and other USVI representatives on coordination plans

5/18/2020: Email communication with Dr. Greg Guannel, plus Ms. Graciela Rivera, Ms. Regina Browne, and Mr. Ozzie Bradshaw on importance of guiding structure and objectives established for planned CDBG-MIT funds being coordinated with FEMA's Hazard Mitigation Grant Program (HMGP) for the territory

4/29/2020: Participation in virtual meeting on data collection and discussion with UVI and Naval Business College representatives on the Territory-wide mapping that is needed by the Lt. Governor's office and FEMA

4/9/2020: Participation in virtual Utilities Mapping meeting led by Peter George from USVI Lt. Governor's office, with discussion on geospatial data gathering and sharing as a key piece of coordinated planning for the territory

3/13 – 3/18/2020, Tetra Tech as VIHFA representatives conducted interviews with targeted USVI agencies, departments, and offices representatives, to include the following:

- Virgin Islands Energy Office (VIEO): Mr. Kyle Fleming
- Virgin Islands Housing Finance Authority (VIHFA): Ms. Rochelle Benjamin, Ms. Antionette Fleming, Mr. Mario Leonard, Mr. David Martin, Ms. Leslie Raymer, Ms. Lisa Richards, Mr. Darin Richardson
- Virgin Islands Territorial Emergency Management Agency (VITEMA): Mr. Ozzie Bradshaw; Ms. Regina Browne, and Ms. Graciela Rivera (Virgin Islands Territorial Hazard Mitigation Officer)
- Virgin Islands Waste Management Authority (VIWMA): Mr. Michael Monteleone
- Virgin Islands Water and Power Authority (WAPA): Mr. Vernon Alexander, Ms. Ashley Bryan, Ms. Akeyla Christian, Mr. Kevin Harrigan, Ms. Cordell Jacob, Mr. Kevin Smalls, and Mr. Neil Vanterpool

3/17/2020: Go To Meeting virtual meeting on CDBG-MIT Action Plan deliverables and next steps, including planned timeline and potential input needs with Ms. Graciela Rivera and Ms. Regina Browne (VITEMA)

3/16/2020: Email communication with Ms. Graciela Rivera on planned CDBG-MIT Action Plan for the territory, outlining planned deliverables, to include a detailed and customized Disaster Recovery plan

3/13/2020: Email with Dr. Greg Guannel, connecting local Tetra Tech team members with VITEMA

3/12/2020: In person meeting with Dr. Greg Guannel and Dr. Kim Waddell at UVI to discuss CDBG-MIT Action Plan for the territory, outlining planned deliverables, to include a detailed and customized Disaster Recovery plan

3/6/2020: Email communication to Dr. Greg Guannel and Dr. Kim Waddell following Enterprise Resiliency coordination meeting on STT

3/4/2020: UVI STX Campus Meeting and Presentation with Enterprise on community resilience, with Dr. Greg Guannel as one of the presenters

2/27/2020: Participation as representatives of the VIHFA in Zoom Meeting on USVI HMP community engagement with UVI and VITEMA, with Dr. Gregory Guannel, Mr. Jeffrey Euwema, Ms. Janet Turnbull-Krigger, Ms. Graciela Rivera, Ms. Regina Browne, and Ozzie Bradshaw of VITEMA also invited.

1/17/2020: In person meeting between USVI Office of Disaster Recovery Director Adrienne L. Williams-Octalien at ODR and VIHFA representative Mr. Mike Spletto in at the ODR offices in STX

12/19/2020: In person meeting with Dr. Greg Guannel on most recent Hazard Mitigation Plan, reviewing resources and data sources for potential use in CDBG-MIT Action Plan. Address planned

efforts to update the current Hazard Mitigation plan, identifying stakeholders and targets for additional meetings to get input, given application to CDBG-MIT Action Plan project and its required MNA

Other USVI Coordination/Outreach Efforts with ODR, VITEMA, and Others

2/13/2020: In person meeting with the Community Foundation of the Virgin Islands (CFVI) on CDBG-MIT Action Plan ideas and suggested contacts within the territory who should also be contacted for input and potential coordination

2/14/2020: In person meeting with Department of Public Works (DPW) on CDBG-MIT Action Plan ideas and suggested contacts within the territory who should also be contacted for input and potential coordination

2/15 – 17/2020: Participation at Agricultural Festival in STX with community input survey to get input from public on CDBG-MIT Action Plan ideas and priorities

2/25/2020: Virtual meeting with the representatives of the architectural firm Dover Kohl on Action Plan ideas and suggested contacts within the territory who might provide input and potential coordination, in light of prior work done previously on Charlotte Amalie neighborhood design proposal

2/27/2020: Zoom Meeting on USVI HMP community engagement with UVI and VITEMA, with Dr. Greg Guannel, Dr. Kim Waddell, Ms. Kaisa Prentise and Ms. Janet Turnbull-Krigger from UVI also invited, plus Jeffrey Euwema (now with Info Plan Group) as well as Ms. Graciela Rivera, Ms. Regina Browne, and Ozzie Bradshaw from VITEMA

2/28/2020: Teleconference with USVI Continuum of Care Group, introducing the CDBG-MIT Action Plan, in order to seek idea and suggested contacts within the territory who should also be contacted for input and potential coordination on potential project ideas and opportunities

3/9/2020: Virtual meeting with VI Waste Management Authority (WMA or VIWMA) on potential CDBG-MIT funding and ongoing discussions on needs for funding under CDBG-DR, gathering input and suggestions for additional input and potential coordination moving forward, including need for additional specifics and details on planned WMA budget and scope, plus discussion on ideas and further meetings as part of information gathering and coordination efforts

3/9/2020: In person meeting with Senator Marvin Blyden and his former chief of staff Ms. Sheraine Spivey on potential CDBG-MIT funding, gathering input and suggestions for additional input and potential coordination moving forward, answering questions on HUD requirement and expectations moving forward

3/12/2020: In person meeting with Mr. Kyle Fleming with the VI Energy Office on the CDBG-MIT Action Plan deliverables to gather input and suggested contacts within the territory who should also be contacted for input and potential coordination, focusing on disaster recovery experiences and observations

3/13/2020: In person meeting with Dr. Greg Guannel and Dr. Kim Waddell at the University of the Virgin Islands (UVI) on the CDBG-MIT Action Plan deliverables to gather input and suggested contacts within the territory who should also be contacted for input and potential coordination, focusing on disaster recovery experiences and observations, given the key role played by both gentlemen in the HMP for the territory

3/16/2020: Virtual meeting with the Virgin Islands Power and Water Authority (WAPA) via Go To Meeting platform on the CDBG-MIT Action Plan deliverables to gather input and suggested contacts within the territory who should also be contacted for input and potential coordination, focusing on disaster recovery experiences and observations, with Mr. Mario Leonard at the VIHFA involved in discussing potential project funding and planned CDBG funding tranches, with Mr. Vernon Alexander, Ms. Ashley Bryan, Ms. Akeyla Christian, Mr. Kevin Harrigan, Ms. Cordell Jacob, Mr. Kevin Smalls, and Mr. Neil Vanterpool with WAPA

3/17/2020: Go To Meeting video meeting with UVI and VITEMA contacts on planned CDBG-MIT Action Plan deliverables and next steps, including planned timeline and efforts for further meetings and coordination

3/17/2020: Virtual meeting with VI Waste Management Authority (WMA) on CDBG-MIT Action plan deliverables, focusing on disaster recovery plans, experiences, and input into improving Disaster Recovery plan for the territory

4/8/2020: Virtual meeting with Virgin Islands Police Department (VIPD) on the CDBG-MIT Action Plan and potential project ideas given current policing and enforcement needs within the territory

4/9/2020: Telephonic meeting with the University of the Virgin Islands' Research and Technology (RT) Park on the CDBG-MIT Action Plan with discussion on potential projects to consider and suggested contacts within the territory who should also be contacted for input and potential coordination

4/20/2020: Virtual meeting with the United States Virgin Islands Economic Development Authority (USVIEDA) on CDBG Revitalization/Incubator funding and potential discussions related to CDBG-MIT Action Plan

5/1/2020: Virtual meeting with Mr. Robert Graham at the US Virgin Islands Housing Authority (VIHA) on CDBG-MIT Action Plan deliverables, gathering input and suggestions for potential coordination and project development within the territory

5/4/2020: Virtual meeting with the United States Virgin Islands Economic Development Authority (USVIEDA) on potential for Vertical Farming projects in light of potential for the territory and given HUD requirements under CDBG-MIT

5/5/2020: Virtual meeting on Project Good Hope, discussing potential community hub on STX which would serve as a shelter, community center, and educational training location, with desalinization unit in light of potential for the territory and given HUD requirements under CDBG-MIT

5/18/2020: Email communication with Dr. Greg Guannel at UVI, plus Ms. Graciela Rivera, Ms. Regina Browne, and Ozzie Bradshaw at VITEMA touching on the importance of guiding structure and objectives established for CDBG-MIT funds being coordinated with FEMA's Hazard Mitigation Grant Program (HMGP) for the territory

5/19/2020: Virtual meeting UVI Research and Technology (RT) Park on CDBG-MIT Action Plan and ideas for potential funding, including discussion on identified CDBG-DR projects and identified RT Park initiatives

5/21/2020: Virtual meeting on Mangrove Eco Boutique Hotel and Training Institute idea and potential fit under HUD requirements for CDBG-MIT Action Plan

5/21/2020: Virtual VIHA meeting on potential CDBG-MIT funding and fit with planned housing initiatives, including potential developments, timelines and next steps

5/21/2020: Virtual VIPD meeting on potential CDBG-MIT funding and fit with planned housing initiatives, providing analysis and support on potential CDBG-MIT Action plan funding and HUD guidelines

6/5/2020: Virtual VIHA meeting on potential CDBG-MIT funding and fit with planned housing initiatives, given current funding and development plans

6/5/2020: Virtual Department of Public Works (DPW) Teams meeting on potential CDBG-MIT funding and fit with planned road initiatives and present funding opportunities

6/9/2020: Virtual WAPA meeting via Teams on potential CDBG-MIT funding and fit with planned road initiatives and present funding opportunities

6/10/2020: Virtual WAPA Water meeting via Teams on potential CDBG-MIT funding and fit with planned road initiatives and present funding opportunities

6/15/2020: Virtual meeting with Mr. Sammuel Sames, Administrator for STX, on potential CDBG-MIT funding and fit with planned road initiatives and present funding opportunities, with interest in addressing homeless shelter opportunity and other likely options for STX

6/16/2020: Virtual meeting with DPNR Fish and Wildlife Division on potential CDBG-MIT funding and fit with identified initiatives and present funding opportunities, discussing potential concerns for fisheries and more recent accumulation of sargassum seaweed

6/19/2020: Virtual VIHA meeting on potential CDBG-MIT funding and fit with planned housing initiatives and present funding opportunities

6/29/2020: Virtual meeting with UVI via Teams on MNA needs for current data and next steps for CDBG-MIT Action plan

6/30/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera on arranging virtual meeting on USVI Data Questions for CDBG MIT Action Plan

6/30/2020: Virtual VIHA meeting on potential CDBG-MIT funding and fit with planned housing initiatives, given current funding and development plans

7/2 – 7/6/2020: Email communications with FEMA on available data for CDBG-MIT Action Plan MNA, including both Mr. Patrick Tuohy and Mr. Jack Heide

7/7/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera on USVI Data Questions for CDBG MIT Action Plan and calendaring options for virtual meeting

7/14/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera of VITEMA on USVI Data Questions for CDBG MIT Action Plan

7/17/2020: Virtual meeting with VIWMA on potential CDBG-MIT funding and fit with planned landfill initiatives and present funding opportunities

7/20/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera on USVI Data Questions for CDBG MIT Action Plan

7/22/2020: Virtual meeting with Waste Management (VIWMA) on potential CDBG-MIT funding and fit with planned landfill initiatives and present funding opportunities

7/22/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera of VITEMA on USVI data questions and updated sourcing for CDBG MIT Action Plan

7/23/2020: Email communication with Ms. Regina Browne and Ms. Graciela Rivera of VITEMA on USVI Data Questions for CDBG MIT Action Plan

7/29/2020: Virtual meeting with DPNR on potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities

8/3/2020: Virtual meeting with UVI Research and Technology (RT) Park on potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities

8/4/2020: Virtual meeting on potential for Mangrove Hotel training facility via Zoom hosted by Richard BV on potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities

8/4/2020: : Virtual meeting via Zoom hosted by Richard BV on potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities for medical private-public partnership

8/5/2020: Research and Technology (RT) Park RT Park via Zoom on potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities for private-public partnerships

8/24/2020: Virtual meeting with VIHA on housing initiatives and timelines, given HUD requirements and potential CDBG-MIT funding and fit with identified needs for the territory and present funding opportunities for targeted housing developments

8/24/2020: Meeting with Senator Marvin Blyden on CDBG-MIT Action plan and key timing events, given HUD requirements and potential CDBG-MIT funding

8/27/2020: Virtual meeting with CFVI on CDBG-MIT Action plan and key timing events, given HUD requirements and potential CDBG-MIT funding

8/28/2020: Meeting with USVI Department of Planning and Natural Resources (DPNR) at Krum Bay with MS. Kitty Edwards and Ms. Jessica Magras-Parris to see area and discuss potential CDBG-MIT funding, providing analysis and answering questions

9/1/2020: Virtual meeting with USVI Governor and invited staff via Teams on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured based on funding percentages, including plans for future selection of potential projects via competitive application submissions

9/4/2020: Virtual meeting with Director Adrienne L. Williams-Octalien, plus Ms. Bernita Boxill, Ms. Malinda Vigilant, and Ms. Laurissa Ellis with ODR via Teams on CDBG-MIT Action plan, with focus on

Disaster Recovery Plan deliverable in order to update plans and better prepare the territory for a coordinated response to future disasters in any form

9/11/2020: Virtual DPNR meeting with Ms. Jeneva Lawrence and Mr. Jean-Pierre Oriol via Teams on CDBG-MIT Action plan, with primary focus on Disaster Recovery Plan deliverable in order to update plans and better prepare the territory for a coordinated response to future disasters in any form

9/24/2020: Teams meeting on USVI Department of Human Services Recovery Planning coordination

10/1/2020: Virtual VI Department of Labor (DOL)/ U.S. Economic Development Administration (USEDA) meeting via Teams on potential initiatives and federal funding opportunities

10/6/2020: Participation in ODR's UVI Wastewater Taskforce videoconference meeting with focus on FEMA funding and efforts to improve current challenges within the territory with water lines

10/9/2020: Virtual meeting with Virgin Islands Waste Management Authority (VIWMA) via Teams on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

10/13/2020: Virtual meeting with DPNR via Teams on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

10/15/2020: Telephone inquiry to Ms. Graciela Rivera of VITEMA on request to connect in order to discuss FEMA data and MNA planning

10/16/2020: Virtual meeting with WAPA via Teams on CDBG-MIT Action Plan and basics of potential VITOL propane acquisition, discussing HUD guidelines, potential structure of the transaction and whether this could be a fit in light of how the plan is likely to be structured

10/16/2020: Email communication on interest in connecting with Ms. Graciela Rivera to discuss FEMA data and MNA planning

10/19/2020: Virtual meeting with St Croix Foundation via Teams on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured and existing nonprofit organizations, reviewing past actions, successes, and potential projects to be considered

10/22/2020: Virtual meeting with ODR on CDBG-MIT Action plan updates, with a focus on Disaster Recovery planning and coordination

10/22/2020: Virtual meeting with WAPA via Teams on CDBG-MIT Action Plan and potential for VITOL propane acquisition, discussing HUD guidelines, potential structure of the transaction and whether this could be a fit in light of how the plan is likely to be structured

10/23/2020: Virtual meeting via Teams with Mr. Charles Knight, the Governor's Chief of Staff, on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and feedback on potential projects

10/26/2020: Follow up email communication with Ms. Graciela Rivera of VITEMA to arrange meeting time to discuss FEMA data and MNA planning

10/26/2020: Virtual meeting with VITEMA on CDBG-MIT Action plan updates, with a focus on Disaster Recovery planning and coordination

10/26/2020: Virtual meeting with USVI EDA on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

10/27/2020: Virtual meeting with USVI Department of Health (DOH) on CDBG-MIT funding and planned initiatives, with a focus on Disaster Recovery planning and coordination

10/28/2020: Virtual meeting via Teams with Bonnilyn Thomas (ODR), Mr. Daryl Jaschen, Ms. Barbara Petersen, Ms. Graciela Rivera, and Ms. Regina Browne at VITEMA to review documents and data for the Disaster Recovery Plan draft in an effort to coordinate and harmonize goals with what fits for the territory

10/29/2020: Virtual meeting with DPNR on CDBG-MIT Action plan updates, with a focus on Disaster Recovery planning and coordination and next steps

10/30/2020: Virtual meeting with RT Park via Teams on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

11/4/2020: Virtual meeting with VI Department of Human Services (DHS) on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

11/17/2020: Participation in virtual Virgin Islands Interagency Council on Homelessness meeting

11/17/2020: Email communication inviting Ms. Graciela Rivera to 11/19 public hearing on CDBG-MIT Action Plan, as well as sharing prior publication materials shared with public to encourage participation and share details of planned virtual town hall gathering

11/25/2020: Email communication with Director Daryl Jaschen, Ms. Graciela Rivera (THMO), and Ms. Regina Browne on VITEMA document revisions related to Disaster Plan deliverable, seeking feedback and review of prepared documents to ensure proper alignment with disaster recovery plans and goals

12/4/2020: Email communication with VITEMA Director Daryl Jaschen, plus Ms. Graciela Rivera (Territorial Hazard Mitigation Officer) and Ms. Regina Browne on VITEMA review and comments on updated Disaster Plan deliverable

12/11/2020: Virtual meeting with USVI Governor and selected staff, including Director Adrienne L. Williams-Octalien, via Teams on prepared CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

12/15/2020: Virtual meeting with Community Foundation of the Virgin Islands (CFVI) on CDBG-MIT Action Plan, discussing timelines, HUD guidelines, identified format and potential projects in light of how the plan is likely to be structured

12/21/2020: Virtual meeting with VI Department of Education (DOE) on CDBG-MIT Action plan updates, with a focus on Disaster Recovery planning and coordination

2/11/2020: Virtual meeting via Teams with Director Adrienne L. Williams-Octalien and Ms .Bonnliyn Thomas from the Virgin Islands Office of Disaster Recovery (ODR) on CDBG-MIT Action Plan analysis and next steps

2/19/2021 – Virtual FEMA Coordination meeting discussion given CDBG-MIT Action plan comments from HUD with focus on alignment with current HMP and future updates with Dr. Greg Guannel and Dr. Kim Waddell from the University of the Virgin Islands (UVI), including participation from Dr. Derval Petersen, Mr. Robert Tranter, Ms. Sandra Lashley, Mr. John Heide, Ms. LaTanya Carlos, Ms. Kamal Russell, and Ms. Susan Julius from FEMA, plus, Director Daryl Griffith and Mr. Mario Leonard from the Virgin Islands Housing Finance Authority (VIHFA), plus Ms .Bonnliyn Thomas from the Virgin Islands Office of Disaster Recovery (ODR) and Graciela Rivera (VITEMA)

2/17/2021 – FEMA CDBG-MIT Action Plan comments meeting with Dr. Derval Petersen, Ms. LaTanya Carlos, and Ms. Susan Julius from FEMA to discuss prior and additional coordination efforts informing the CDBG-MIT Action Plan and next steps

3/15/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Graciela Rivera, Daryl Griffith, Antoinette Fleming, Dr. Gregory Guannel, Neal Rackleff, Giovanni Moss, Linda Maratea, Regina Browne, Chrissie Angeletti and Bonnilyn Thomas

3/23/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Antoinette Fleming, Brian Kemph, Graciela Rivera, Linda Maratea, Chrissie Angeletti, Dr. Gregory Guannel, Andrew Thorley and Giovanni Moss.

3/29/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Graciela Rivera, Linda Maratea, Antoinette Fleming, Andrew Thorley, Giovanni Moss, Dr. Gregory Guannel, Brenna Minor, and Chrissie Angeletti

3/30/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Graciela Rivera, Linda Maratea, Antoinette Fleming, Daryl Griffith, Gregory Guannel, Rackleff, Neal Brenna Minor, and Chrissie Angeletti

5/3/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and MIT-AP edits to the MIT-AP with participation by Daryl Griffith, Antoinette Fleming, Ann Hanley, Brenna Minor, Neal Rackleff, and Andrew Thorley.

5/10/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Daryl Griffith, Antoinette Fleming, Ann Hanley, Brenna Minor, Giovanni Moss, and Andrew Thorley.

6/10/2021 – Virtual Coordination Meeting to continue discussion on alignment with THMP and additional edits to the MIT-AP with participation by Daryl Griffith, Antoinette Fleming, Ann Hanley, Brenna Minor, Neal Rackleff, and Andrew Thorley.

6/11/2021 - Virtual Coordination Meeting to continue discussion on alignment with THMP and targeted edits to the MIT-AP with participation by Daryl Griffith, Antoinette Fleming, Ann Hanley, Graciela

Rivera, Linda Maratea, Dr. Gregory Guannel, Dr. Kim Waddell, Bonnilyn Thomas, Neal Rackleff, and Andrew Thorley.

NOTE: While the above lists do not reflect all meetings and details of meetings, it serves as a snapshot of ongoing efforts to coordinate with and listen to stakeholders and agencies in developing a CDBG-MIT Action Plan for the territory that is a fit with input from Virgin Islanders and matches HUD requirements

APPENDIX G: PROPOSED PROJECTS LIST FOR POTENTIAL CONSIDERATION UNDER CDBG-MIT FUNDING

Grantee has vigorously engaged in carefully evaluating potential MIT-AP projects and will continue to do so in accord with 84 FR 45840 which states:

> "The Administration cannot emphasize strongly enough the need for grantees to fully and carefully evaluate the projects that will be assisted with CDBG–MIT funds. One of the goals of CDBG–MIT is to set a nationwide standard that will help guide not just future Federal investments in mitigation and resilience activities—to include the mitigation of community lifelines, but state and local investments as well. The level of CDBG– MIT funding available to most grantees cannot address the entire spectrum of known mitigation and resilience needs. Accordingly, HUD expects that grantees will rigorously evaluate proposed projects and activities and view them through several lenses before arriving at funding decisions, including ensuring that already committed public or private resources are not supplanted by CDBG– MIT funds."

Various departments of the USVI Territorial Government have expressed interest in using CDBG-MIT funds for projects that reduce risks to indispensable services. Grantee has been engaged with such departments in examining potential projects, with continuing discussions ongoing in order to gather additional details on how such proposals fit within the defined MIT-AP Activity Categories, which are Infrastructure and Public Facilities, Economic Resilience and Revitalization, Housing, Public Services, Planning and Administration.

However, most of such proposed "department driven" projects are in the early stages of development, meaning that a need has been identified and a desire for the project expressed, but because funding has not yet been committed to such projects, the detailed design work necessary to generate clear and accurate pricing has not yet occurred. Therefore, the projected costs of such projects are only rough estimates and careful vetting by the grantee will be necessary as ideas are developed further, before final decisions are made. The varied nature of potential activities under the general project categories are such that applications will be reviewed in detail by the Grantee, given the competitive nature and variety of possible mitigation activity options.

Grantee believes the USVI will be best served by establishing general project categories targeted on reducing risks to indispensable services and then utilizing a fully open and fair procurement program to provide competition to all applicants—whether they are government departments or competitively procured private/public partnerships. Such an approach is consistent with federal procurement standards and will provide the best leveraging of federal resources. Such general project categories are defined in the MIT-AP.

Grantee is including this list of some of the many projects that have been recommended by departments of the Territorial government and other community leaders and stakeholders.

Section 3 of the MIT-AP, entitled "Connection of Mitigation Programs to Identified Risks" provides very relevant insights into the connection between programs and identified risks—projects that are eventually chosen through the procurement process will be required to have such direct connections to risks identified in the MIT-AP.

With some potential projects that have been identified, some details have been provided, which are reflected in the following chart. Potential projects that have been identified and require additional information prior to being considered further include:

No.	Potential Projects	Risk and Mitigation Needs
1	**Kidney Dialysis Center**(s) for the Territory	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs and could be set up as a public-private partnership with adequate resources that would allow operations after a hurricane or similar disaster, rather than having to transport all patients off island following a disaster.
2	**Training Hotel(s)** to educate local workforce on hospitality industry, which the proposed project would promote economic growth and employment in the Territory and with facilities designed to provide additional options for shelter during emergencies	*This project could mitigate risk to Food, Water, Shelter Lifeline.* This project aligns with other reported stakeholder needs, and addresses lack of educational options in this field in the territory, with facility potentially to be designed to also serve as a community center and/or shelter during hurricanes or similar disaster.
3	Further support to the ongoing **GIS/Naming project**	This project aligns with other reported stakeholder needs, and would add to work currently being coordinated through the Lt. Governor's Office to allow U.S. government entities, visitors, and territorial government to have better and more complete information
4	Dual purpose **parking garages** for Charlotte Amalie and Christiansted that could be designed as hardened facilities to house communications cell trailers and essential emergency vehicles	*This project could mitigate risk to Transportation and Communications Lifelines.* This project aligns with other reported stakeholder need and could provide a key resource for sheltering stored equipment that will be needed following disasters.
5	**Sargassum seaweed removal program** to address the large volume of foreign seaweed that has been more regularly appearing on beaches	*This project could mitigate risk to Safety and Security.* This project aligns with other reported stakeholder needs and could be seen as beneficial to economic growth by improving beaches and potentially generating new jobs, as well as the benefit of removing the vast amounts of the seaweed in order to prevent impediments to search and rescue activities.
6	**Investing in paths and walking trails** to improve options for safe walking and biking within the Territory	*This project could mitigate risk to both the Health and Medical and Transportation Lifelines.* This project aligns with other reported stakeholder needs, and potentially improves access to portions of the Territory, especially for LMI individuals who may

		rely less on motor vehicles for transportation and may benefit from being able to have safer walking and biking corridors.
7	**Hardened Solar Powered Agricultural Storage Facilities** to provide options for storing essential foodstuffs for use in emergencies	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and addresses potential food security issues within the territory that have been identified following previous disasters.
8	**Mobile kitchens** for community use that can be stored in secure locations and then deployed following disasters	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and empowers communities to work together to be more self-sufficient and self-sustaining following a disaster, as identified by the public following previous disasters.
9	**Restoring water catchment systems** in the territory	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and facilitates mitigation by storing additional water resources in advance of disasters to further supplement what is already being done by WAPA.
10	**Mobile communications centers** to establish cell connections and facilitate planning following disasters, potentially on trailers or otherwise similarly portable to make deploying them easier	*This project could mitigate risk to Communications and Health and Medical Lifelines.* This project aligns with other reported stakeholder needs, and addresses identified issues with communication that have been made clear following prior disasters when cell coverage has been severely impacted, preventing timely medical assistance and rescue efforts.
11	**St Thomas Skate Park and Recreational Facility**, likely to be engineered to use features in the park as means for better drainage and flood control	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs and could be a means for better controlling potential flood zones through careful planning as well as providing healthy recreational opportunities to youth looking for activities, especially when options are more limited following a disaster.
12	**WAPA Vitol Acquisition** of propane facilities, structured in such a way as to better position WAPA to control costs and potentially pass along rate savings to customers	*This project could mitigate risk to the Energy Lifeline.* This project aligns with other reported stakeholder needs and could lower energy costs, although more extensive mitigation activities in this area are anticipated for the Territory electrical grid once HUD releases the pertinent guidance that is anticipated.

13	**Acquiring satellite phones and radios** for communication within the VIHFA organization following disasters and in preparing for them	*This project could mitigate risk to Communication Lifeline.* This project aligns with other reported stakeholder needs, and addresses concerns that arose from lost communication options following prior hurricanes being an impediment to necessary services, including rescue coordination and recovery services.
14	**Mobile task force** that can aid in the safety of the vulnerable population before, during and after disasters	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs and addresses a vulnerable population that can be forgotten and face the perils of disasters because of their limitations.
15	**A recycling plant or similar program** could have significant benefits beyond job creation - Although costly to ship waste and other recycling products of the island, building a program for handled the products within the Territory and reused in the community should be explored	*This project could mitigate risk to Hazardous Materials lifeline.* This project aligns with other reported stakeholder needs and could be a study undertaken to further consider feasibility.
16	**Improve/restore drainage "guts"** to mitigate flooding while also controlling runoff and erosion	*This project could mitigate risk to Food Water Lifeline.* This project aligns with other reported stakeholder needs, and improves natural infrastructure to mitigate future risks, given identified deficiencies in the current system within the Territory.
17	**Coral Bay STJ Fire Station Relocation** to provide adequate space and facilities for those protecting STJ residents	*This project could mitigate risk to Safety Lifeline.* This project aligns with other reported stakeholder needs and would provide support to a key population center on St. John.
18	**Repair/construct downtown housing to** provide for a larger population in walking distance will produce 24-hour activity, supporting businesses and improving safety on St. Thomas and potentially St. Croix as well.	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and could encourage economic growth while providing additional housing option for LMI individuals.
19	**Construct new or improved public open spaces** (parks, plazas) that can provide for community gathering and also be designed to hold water and act as drainage/stormwater solutions through proper landscaping and design. This could involve converting parking lots to public green spaces in the waterfront area on St. Thomas is part of this idea	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs and could encourage economic growth while providing space for exercise and community activities.

20	**Community education and enforcement** of erosion safeguards and proper use of retaining walls and drainage systems	*This project could mitigate risk to Safety and Food Water Shelter Lifelines.* This project aligns with other reported stakeholder needs, while encouraging safe building and compliance.
21	**Behavioral Health Care Facility** given lack of current options and limitations within current medical facilities in the Territory	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs and supports vulnerable populations in the Territory.
22	**Power grid hardening** as the system would be more effective and efficient if the power grid were placed underground territory wide	*This project could mitigate risk to Energy Lifeline.* This project aligns with other reported stakeholder needs but may need to be addressed when new power grid regulations are released by HUD.
23	**Initiative to improving home inspections and enforcement of requirements**, including more stringent inspection requirements	*This project could mitigate risk to Health and Medical Lifeline.* This project aligns with other reported stakeholder needs, while encouraging safe building and compliance.
24	**Ready-made and locally built shipping container shelters**, with stock available on each major island within the territory while homeowners are making repairs following an event	*This project could mitigate risk to Food Water Shelter Lifeline.* This potential public-private partnership project aligns with other reported stakeholder needs, encouraging advance planning to mitigate housing risks and engages the community in building them.
25	**Dredging harbors** on St. Croix and St. Thomas for Quantum class ships	*This project could benefit economic growth by encouraging additional visits each year.* This project aligns with other reported stakeholder needs and identified priorities within the USVI government.
26	**Vertical Gardening** centers as a means of improving agricultural efficiency and better securing local food supply	*This project could mitigate risk to Food Water Shelter Lifeline and contribute to economic revitalization by creating new jobs.* This project aligns with other reported stakeholder needs, and potentially improves food security in the territory.
27	**St Croix Ambulatory Center to** serve as potentially expanded surgery center and medical facilities as potential public-private partnership	*This project could mitigate risk to Health and Medical Lifeline.* This potential public-private partnership project aligns with other reported stakeholder needs, providing residents with additional medical support during

		times of crisis when community facilities may be overwhelmed.
28	**Krum Bay clean up and infrastructure improvements,** to include DPNR enforcement facility and educational center, plus likely public-private partnership for marine industrial facilities	*This project could mitigate risk to Food Water Shelter Lifeline and contribute to economic revitalization by creating new jobs.* This project aligns with other reported stakeholder needs, and potentially improves commerce while encouraging economic growth, providing another site for offloading emergency supplies, and storing boats and other assets during storm events, while also better protecting the WAPA water intake location on St. Thomas.
29	**Supportive Housing** for homeless that can serve as a shelter for this key population during storm events and provide CoC services	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and relatively few resources exist for the homeless population in the Territory, who are particularly vulnerable during hurricanes. With support services to be provided on site to provide a continuum of care to the population is important, especially with no mental hospitals or similar facilities currently in place.
30	**Landfill Funding** for St. Thomas and St. Croix facilities	*This project could mitigate risk to Food Water Shelter Lifeline and Hazardous Materials Lifeline.* This project aligns with other reported stakeholder needs and can assist in closing the landfills located on St. Croix and St. Thomas and begin transition to new sites has been identified as a priority for the Territory. With limited budgetary resources and court orders mandating action, the ability to handle debris and waste following hurricanes is essential, especially given the logistical complications and costs that arise from shipping it off-island.
31	**Critical Road Improvements,** to include Queen Mary Highway on St. Croix, Hospital Gade/Mafolie Road on St. Thomas, Bolongo Road on St. Thomas and Centerline Road on St. Croix.	*This project could mitigate risk to Transportation Lifeline.* This project aligns with other reported stakeholder needs and In identifying roads that are heavily used for improvements, sidewalks and buried utilities and/or resurfacing current roads with a view of coordinating efforts to account for future development will be considered, with goal of preventing additional repairs or cutting in the future.
32	**Water Pipe improvements/replacement across the Territory** to modernize the system to improve efficiency and consistent pipe diameters to facilitate maintenance	*This project could mitigate risk to Food Water Shelter Lifeline.*

		This project aligns with other reported stakeholder needs and could include both rehab and extensions to identified areas, to both increase pipe size and make the overall system more functional, with consistent pipe diameters that facilitate flow and lessen likelihood of failure, further supporting some improvements already contemplated using non CDBG-MIT funding sources.
33	**Multipurpose Sports Facility on St. Croix** that also is designed to serve as a shelter and supplies distribution hub during times of emergency	*This project could mitigate risk to Food Water Shelter and Health Lifelines.* This project aligns with reported stakeholder needs and could provide an important alternative shelter option to be used instead of schools in disaster events while also providing a site that could safely be used for recreational health activities.
34	**Homeless Study** to better analyze the existing population and identify potential action items to better support this key population	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and will enable better support of the unique homeless population in the Territory, who are particularly vulnerable during hurricanes.
35	**Veterans Drive Road Extension** on St. Thomas	*This project could mitigate risk to Transportation Lifeline.* This project aligns with other reported stakeholder needs. Extending Veterans Drive on St. Thomas from the Coast Guard Station to Frenchtown will raise the seawall area in a portion of Charlotte Amalie that floods with some regularity and faces the main harbor; the design also provides an extension of the public space that is used regularly by visitors and locals alike for exercise and recreation and improves underground infrastructure below the road; part of the goal in extending waterfront improvements beyond downtown is to prepare for sea level rise and better control persistent flooding in this key commercial area, which will lessen the impact of future disasters by reducing the risk of damage to and loss of property in this key commercial area on St. Thomas. This project aligns with current improvements already in place, extending the work done through a key corridor that links downtown Charlotte Amalie to the airport and port facilities
36	**Providing gap financing** to high-impact economic development projects	*This project could mitigate risk to Communications and Energy Lifelines.* This project aligns with other reported stakeholder needs and meets an unmet need within the Territory

		to support small business growth and public private partnerships that could improve Energy and Communications resources in particular.
37	**Mobile task force** that can aid in the safety of the vulnerable population before, during and after disasters	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs as often these populations are forgotten and face the perils of disasters because of their limitations.
38	**St. Croix Sunday Market Square LMI housing Units** for affordable co-working and commercial space	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and provides additional housing options to LMI individuals.
39	**Youth Activities Center on St. Croix** with various outdoor recreational activity options to engage youth and provide positive opportunities to be active outside that could serve as a shelter during emergency events.	*This project could mitigate risk to Food Water Shelter and Health and Medical Lifelines.* This project aligns with other reported stakeholder needs and meets a key need identified within the community while also providing an alternative venue to shelter LMI individuals and others that is not an existing school.
40	**St. Thomas Fisherman's Association** facility improvement and expansion to provide storage for traps and better options for selling locally caught fish, potentially with additional sites for centralized sales/processing of fish and ideally better facilitating locally caught fish at USVI markets	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and enables fishermen to be better prepared to provide food shortly after a disaster, as well as getting their catch more widely distributed.
41	**VI Multifamily Housing Developments –** additional projects beyond those previously identified and slated for CDBG-DR	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and provides housing options to LMI individuals given identified needs within the Territory.
42	**Infill Scattered Site Single Family Housing –** additional sites on STT, STX, and STJ that require site work and further development planning	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and provides additional housing options to LMI individuals given identified needs within the Territory, beyond those already contemplated.
43	**Homes for the Aged** Improvements on both St. Thomas and St. Croix	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and provides housing to a vulnerable population in the Territory.

44	**Cultural Arts and Music Center on St. Thomas - Virgin Islands Center for Arts and Technology** would be a nonprofit initiative technology center focused on Vocational Education in film, music and hospitality	This project aligns with other reported stakeholder needs and addresses an identified need within the community, providing education and support to a key population.
45	**Small Business Loans** and programs to strengthen entrepreneurship	*This project could mitigate risk to Food Water Shelter Lifeline.* This project aligns with other reported stakeholder needs and supports economic development that in turn can benefit LMI populations and help the Territory attract new business.
46	**Hardened Bunker Facility** (and possibly new VITEMA center) for strategic operations during disasters, which could also house VIPD and other essential personnel as a communications hub	*This project could mitigate risk to Food Water Shelter and Safety & Security Lifelines.* This project aligns with other reported stakeholder needs and provides additional resources to key organizations to better support LMI populations and others in the Territory from a location that is secure during emergency events.
47	**VIHFA Rental Properties Improvements** for Retaining Walls on St. Thomas	*This project could mitigate risk to Food Water Shelter and Safety & Security Lifelines.* This project aligns with other reported stakeholder needs and supports safe housing options to LMI individuals on St. Croix by hardening existing infrastructure against erosion and runoff risks on properties identified on St. Thomas.
48	**Territory Planning Initiatives** for improving codes and planning standards or implement Territory-wide land use plans	*This project could mitigate risk to Food Water Shelter Safety & Security Lifelines.* This project aligns with other reported stakeholder needs and could support land use planning that has stalled previously. In addition, efforts to support education and training about Form-Based Codes (FBC), to assist with adoption and implementation of the draft code within the territory, looking at how new or repaired housing could be built to higher/green standards to be resilient and better withstand future storms, plus looking at the urban design guidance of the draft Form-Based Code to be consistent with the community vision and historic setting, plus conducing community outreach and education on understand and use these codes, and conducting community-based visioning to plan future development could be contemplated.
49	**Improvements/Repairs to St. John Community Health Clinic,** given its proximity and importance to the local population due to the distance from hospital facilities on St. Thomas	*This project could mitigate risk to the Health and Medical Lifeline.*

		This project aligns with other reported stakeholder needs and addresses a key need for those in the Territory who reside on St. John and must travel to St. Thomas or elsewhere for medical care.
50	**Leveraging CDBG-MIT funding for Local Match**, to take full advantage of funding opportunities for the Territory	*This project could mitigate risk to all Lifelines.* This project aligns with reported stakeholder needs and enables the Grantee to take full advantage of existing funding to address the many identified mitigation needs within the Territory.

APPENDIX H: ACRONYMS AND AGENCIES

ADA – Americans with Disabilities Act

AMI – Area Median Income

DR-4335 – Major Disaster Declaration for Hurricane Irma

DR-4340 - Major Disaster Declaration for Hurricane Maria

DRGR – Disaster Recovery Grant Reporting System

DR-4340 - Major Disaster Declaration for Maria

DRGR – Disaster Recovery Grant Reporting System

CDBG-DR - Community Development Block Grant Disaster Recovery

CDBG-MIT – Community Development Block Grant Mitigation

CoC – Virgin Islands Continuum of Care

DHS – Virgin Islands Department of Human Services

DOA – Virgin Islands Department of Agriculture

DOB – Duplication of Benefits

DOC – U.S. Department of Commerce

DoD – U.S. Department of Defense

DOE – Virgin Islands Department of Energy

DOF – Virgin Islands Department of Finance

DOI – U.S. Department of the Interior

DOL – Virgin Islands Department of Labor

DPNR – Virgin Islands Department of Planning and Natural Resources

DPP – Virgin Islands Department of Property and Procurement

DPW – Virgin Islands Department of Public Works

DSPR – Virgin Islands Department of Sports, Parks and Recreation

ED – U.S. Department of Education

EDA – U.S. Economic Development Administration [part of the U.S. Department of Commerce]

EIA – U.S. Energy Information Administration

EPA – U.S. Environmental Protection Agency

FEMA – Federal Emergency Management Agency [part of the U.S. Department of Homeland Security]

FEMA IA – FEMA's Individual Assistance Program

FEMA PA – FEMA's Public Assistance Program

FHWA-ER – U.S. Federal Highways Administration Emergency Relief Program

FVL – Full Verified Loss

GDP – Gross Domestic Product

GIS – Geographic Information Systems

HAZUSMH – FEMA's Hazards U.S. Multi-Hazard

HCDA – Housing and Community Development Act of 1974

HCV – Housing Choice Voucher

HMGP – [FEMA] Hazard Mitigation Grant Program

HMIS – Homeless Management Information System

HQS – Housing Quality Standards

HUD – U.S. Department of Housing and Urban Development

IHP – Individual and Household Programs

ISP – Internet Service Provider

LEP – Persons of limited-English proficiency

LIHTC – Low Income Housing Tax Credit

LMA – Low- to Moderate- income Area

LMI – Low- to Moderate- income Individual

LMR – Land Mobile Radio

LTRG – Long Term Recovery Group

MIT-AP – CDBG-MIT Action Plan

MNA – Mitigation Needs Assessment

NFIP – National Flood Insurance Program

PAAP – FEMA Public Assistance Alternatives Procedures

PDM – FEMA Pre-Disaster Mitigation Grant Program

PFA – Virgin Islands Public Finance Authority

PP FVL – Personal Property Full Verified Loss

PW – [FEMA] Project Worksheet

QPR – Quarterly Performance Report

SBA – U.S. Small Business Administration

STEP – FEMA's Sheltering and Temporary Essential Power Program

STJ – Shorthand for St. John

STT – Cyril E. King International Airport, also shorthand for St. Thomas

STX – Henry E. Rohlsen Airport, also shorthand for St. Croix

THMP – Territorial Hazard Mitigation Plan

TIGER - U.S. Department of Transportation's Transportation Investment Generating Economic Recovery Grants

URA – Uniform Relocation Assistance and Real Property Acquisition Policies Act

USACE – U.S. Army Corps of Engineers

USDA – U.S. Department of Agriculture

UVI – University of the Virgin Islands

VICS – Virgin Islands Community Survey

VIDE – Virgin Islands Department of Education

VIHA – Virgin Islands Housing Authority

VIHFA – Virgin Islands Housing Finance Authority

VITEMA – Virgin Islands Territorial Emergency Management Agency

VIPA – Virgin Islands Port Authority

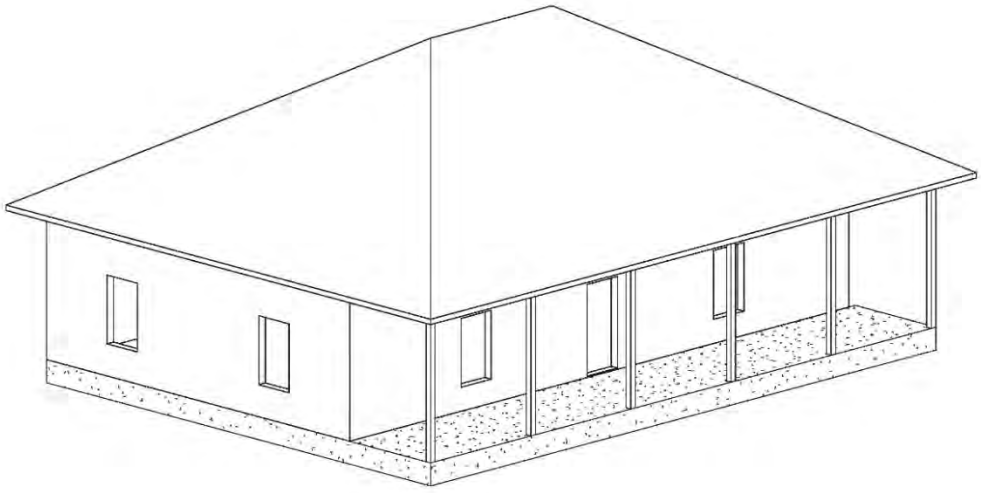
WAPA – Virgin Islands Water and Power Authority

WMA – Virgin Islands Waste Management Authority

APPENDIX I: *CONSTRUCTION INFORMATION FOR A STRONGER HOME*

CONSTRUCTION INFORMATION
for a
STRONGER HOME

4th EDITION APRIL 2018
WITH
APPENDIX
INCLUDING SPAN TABLES
REPLACES ALL PREVIOUS EDITIONS



THIS IS A GUIDANCE DOCUMENT ONLY. REFERENCED BY THE U.S.V.I. BUILDING CODE.

ALL CONSTRUCTION MUST COMPLY WITH THE U.S.V.I. BUILDING CODE.

YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

SIGNED AND SEALED DRAWINGS FOR PERMIT MUST BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES (DPNR) DIVISION OF PERMITS.

STRUCTURES LOCATED IN SPECIAL FLOOD HAZARD AREAS SHALL BE DESIGNED BY A U.S.V.I. REGISTERED DESIGN PROFESSIONAL AND CERTIFIED TO COMPLY WITH ASCE 24-14 FLOOD RESISTANT DESIGN AND CONSTRUCTION.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: TITLE SHEET

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-01
Sheet Number 1 of 63

PREFACE

THE U.S. VIRGIN ISLANDS (USVI) AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) DEVELOPED CONSTRUCTION INFORMATION FOR A STRONGER HOME TO SUPPORT NATURAL HAZARDS RESILIENT HOME CONSTRUCTION IN USVI. THE 2ND EDITION OF THIS DOCUMENT WAS PUBLISHED IN DECEMBER OF 1995 FOLLOWING HURRICANE MARILYN, WITH THE 3RD EDITION BEING PUBLISHED IN FEBRUARY OF 1996. THE RECENT HURRICANE DISASTERS OF HURRICANE IRMA AND HURRICANE MARIA HAVE CAUSED SIGNIFICANT DAMAGE TO USVI AND THIS 4TH EDITION CONTINUES TO ADVANCE RESIDENTIAL CONSTRUCTION MITIGATION MEASURES AND RESILIENCE TECHNIQUES. THE 4TH EDITION STRONGER HOME DOCUMENT USES THE LATEST ADVANCEMENTS IN BUILDING CODE DEVELOPMENT BY REFERENCING THE LATEST BUILDING CODES OF THE 2018 INTERNATIONAL RESIDENTIAL CODE (2018 IRC), 2018 INTERNATIONAL BUILDING CODE (2018 IBC), AND THE AMERICAN SOCIETY OF CIVIL ENGINEERS ASCE/SEI 7-16 (ASCE 7-16): MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES, WHEREAS THE PREVIOUS EDITION WAS BASED UPON THE 1995 COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO) ONE AND TWO STORY FAMILY DWELLING CODE AND THE 1994 UNIFORM BUILDING CODE (UBC).

THE STRONGER HOMES DOCUMENT SERVES AS A GENERAL RECOMMENDATION GUIDANCE FOR RESIDENTIAL CONSTRUCTION. THIS DOCUMENT DOES NOT SATISFY ALL THE BUILDING DESIGN REQUIREMENTS. HOMES DESIGNED USING THIS DOCUMENT MUST FALL UNDER THE PARAMETERS STATED BELOW. ***ALL DESIGN WORK INCLUDING THAT COVERED BY THIS DOCUMENT SHALL BE DESIGNED BY A REGISTERED DESIGN PROFESSIONAL SUCH AS A REGISTERED PROFESSSIONAL STRUCTURAL ENGINEER OR LICENSED ARCHITECT IN U.S.V.I.*** WHEN THESE GUIDANCE DRAWINGS ARE USED FOR A PROJECT, THEY SHOULD BE MODIFIED AS NEEDED IN ORDER TO COMPLY WITH ALL OF THE APPLICABLE CODE REQUIREMENTS FOR A GIVEN PROJECT SITE, THEN SIGNED AND SEALED IN ACCORDANCE WITH U.S.V.I. LAWS, BUILDING CODE, AND DPNR PERMIT REQUIREMENTS.

THE FOLLOWING BOUNDARY CONDITIONS SHALL BE MET IN ORDER TO USE THESE DOCUMENTS. THESE DOCUMENTS ARE NOT VALID IF THE PROJECT PARAMETERS ARE OUTSIDE OF THESE BOUNDARY CONDITIONS:

1. MEAN ROOF HEIGHT OF 30 FEET OR LESS.
2. GABLE OR HIP ROOFS WITH SLOPES RANGING FROM 2:12 TO 12:12 PITCH.
3. ROOF OVERHANG AT EACH SIDE OF BUILDING CANNOT EXCEED 2 FEET.
4. BUILDING WIDTH OF 24 FEET TO 40 FEET.
5. BUILDING LENGTH OF 40 FEET TO 52 FEET.
6. MAXIMUM STORY HEIGHT OF 11 FEET 6 INCHES.
7. BUILDING LOCATED IN THE FOLLOWING TOPOGRAPHY CONDITIONS:
   - A. EXPOSURE B WITH NO ABRUPT CHANGES IN GENERAL TOPOGRAPHY AS DEFINED IN ASCE 7-16.
   - B. EXPOSURE D WITH NO ABRUPT CHANGES IN THE GENERAL TOPOGRAPHY AS DEFINED IN ASCE 7-16.
   - C. EXPOSURE B WITH TOPOGRAPHIC EFFECTS CAUSED BY ABRUPT CHANGES IN TOPOGRAPHY AS DEFINED IN ASCE 7-16, WITH THE BUILDING CONSTRUCTED ON THE UPPER ONE-HALF OF A HIIL, RIDGE, OR ESCARPMENT OR NEAR THE CREST OF AN ESCARPMENT.
8. BUILDING IS ROUGHLY RECTANGULAR IN SHAPE WITH RELATIVE UNIFORM DISTRIBUTION OF SHEAR RESISTANCE THROUGHOUT THE STRUCTURE.
9. BUILDING HAS NO SIGNIFICANT STRUCTURAL DISCONTINUITIES.

THIS FOURTH EDITION STRONGER HOMES REVISION HAS SIGNIFICANT CHANGES THROUGH THE INCORPORATION OF THE LATEST BUILDING CODE DESIGN REQUIREMENTS. SOME OF THE SPECIFIC REVISIONS INCLUDE: HIGHER ULTIMATE DESIGN WIND SPEED CRITERIA AND CONSIDERATIONS FOR SEISMIC DESIGN AS STIPULATED IN ASCE 7-16, AS WELL AS CURRENT REFERENCES TO THE LATEST STRUCTURAL WOOD CONNECTORS. THIS DOCUMENT ALSO INCLUDES AN EXPANDED STRUCTURAL NOTES SECTION AND ADDITIONAL TYPICAL DETAILS. AN UPDATED APPENDIX WITH TABLES AND REFERENCES IS PROVIDED AT THE END OF THIS REVISION WITH DESIGNS IN ACCORDANCE WITH THE LATEST CODES AND STANDARDS (2018 IBC AND ASCE 7-16).

SPECIFICALLY, MOST OF THE SIGNIFICANT CHANGES ARE:

A. MULTIPLE WIND EXPOSURE AND TOPOGRAPHIC EFFECTS ARE CONSIDERED: EXPOSURE B Kzt = 1.0, EXPOSURE B Kzt = 2.0, EXPOSURE D Kzt = 1.0.

B. HIGHER COMPONENTS AND CLADDING (C&C) LOADS ARE CONSIDERED IN AGREEMENT WITH ASCE 7-16.

C. SOUTHERN YELLOW PINE VALUES ARE THE LATEST DESIGN VALUES WHICH WERE RECENTLY REDUCED TO ACCOUNT FOR THE REDUCTION IN STRENGTH THAT HAS BEEN OBSERVED IN FAST GROWTH CULTIVATED TIMBER.

D. MORE SIZES OF LUMBER ARE ANALYZED THAN TYPICAL ON THE MAINLAND ALLOWING FOR MORE CUSTOMIZATION SPECIFIC TO LOADS ENCOUNTERED ON THE ISLANDS.

E. THE RAFTER, ROOF BEAM, AND STUD SPANS ARE TYPICALLY 10% TO 15% SHORTER THAN PREVIOUS EQUIVALENTS.

F. HIGHER ULTIMATE WIND SPEED CRITERIA IN ACCORDANCE WITH ASCE 7-16 COMPARED TO THE 3RD EDITION.

G. ENCLOSURE CLASSIFICATION COVERS BOTH ENCLOSED BUILDINGS AND PARTIALLY OPEN BUILDINGS.

H. RAFTER SPACING LIMITED TO 24" O.C. MAXIMUM.

I. METAL ROOF PANELS HAVE 24 GAUGE THICKNESS, MINIMUM.

J. TWO STORY STRUCTURES IN EXPOSURE B WITH Kzt = 2.0 ARE RECOMMENDED TO BE CONSTRUCTED OF REINFORCED MASONRY WALLS OR REINFORCED CONCRETE WALLS, AND NOT CONSTRUCTED USING WOOD WALLS.

K. MASONRY WALLS TO USE #5 VERTICAL BARS AT 24" O.C. IN GROUTED CMU CELLS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: PREFACE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-02

Sheet Number 2 of 63

DRAWING INDEX

SHEET NUMBER	SHEET NAME
S-01	TITLE SHEET
S-02	PREFACE
S-03	DRAWING INDEX
S-04	CONSTRUCTION GUIDE
S-05	STRUCTURAL NOTES
S-06	STRUCTURAL NOTES CONTINUED
S-07	STRUCTURAL NOTES CONTINUED
S-08	STRUCTURAL NOTES CONTINUED
S-09	COMMON ABBREVIATIONS
S-10	CONSTRUCTION CONSIDERATIONS
S-11	WOOD FRAMING ISOMETRIC VIEW AND CONNECTION DETAILS
S-12	**ROOFS**
S-13	FRAMING PERSPECTIVE
S-14	PLYWOOD ROOF SHEATHING
S-15	ROOF COMPONENT ATTACHMENTS
S-16	CORRUGATED ROOF DETAIL
S-17	ROOF NAILER LAYOUT-GABLE
S-18	ROOF NAILER LAYOUT-HIP
S-19	TRUSS/RAFTER CONNECTORS
S-20	RAFTER BEARING
S-21	ROOF GUTTER AT EAVE
S-22	RAKE AND RIDGE DETAILS
S-23	GABLE END FRAMING DETAIL
S-24	GABLE END BRACING WITH KNEEBRACE
S-25	COLLAR TIE TO RAFTERS
S-26	POST CAP CONNECTIONS
S-27	TYPICAL HIP ROOF FRAMING
S-28	**WALLS**
S-29	TOP PLATE TO STUD CONNECTORS
S-30	STRUCTURAL WALL SHEATHING
S-31	WOOD WALL OPENING
S-32	WIND BORNE DEBRIS PROTECTION AT OPENINGS
S-33	SHUTTER STYLES
S-34	CMU WALL CONSTRUCTION
S-35	CMU WALL OPENING
S-36	TYPICAL CMU DETAILS
S-37	**FLOORS**
S-38	FLOOR FRAMING
S-39	FLOOR JOIST FRAMING
S-40	FLOOR FRAMING CONNECTIONS
S-41	WOOD NOTCHING AND BORING LIMITS
S-42	**FOUNDATIONS**
S-43	HEIGHT DEFINITIONS
S-44	WOOD FRAMING FOUNDATIONS
S-45	TYPICAL FOUNDATION DETAILS
S-46	TYPICAL FOUNDATION DETAILS
S-47	TYPICAL FOUNDATION DETAILS
S-48	SILL PLATE ANCHORAGE
S-49	CMU WALL FOUNDATIONS
S-50	CMU PIER FOUNDATION
S-51	POST ANCHORAGE
S-52	FOUNDATION HOLDOWNS
S-53	**CONNECTOR DESIGN TABLES**
S-54	FRAMING CONNECTOR CONVERSION CHART
S-55	WOOD WALL-ENDZONE RAFTER TIE DESIGN TABLE
S-56	WOOD WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE
S-57	CMU WALL-ENDZONE RAFTER TIE DESIGN TABLE A
S-58	CMU WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE B
S-59	CMU WALL-ENDZONE RAFTER TIE DESIGN TABLE C
S-60	CMU WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE D
S-61	ENDZONE WALL FRAMING UPLIFT DESIGN TABLES
S-62	INTERIOR ZONE WALL FRAMING UPLIFT DESIGN TABLES
S-63	WOOD WALL-BAND JOIST UPLIFT DESIGN TABLES
	APPENDIX

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: DRAWING INDEX

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-03

Sheet Number 3 of 63

CONSTRUCTION GUIDE FOR HURRICANE AND SEISMIC RESISTANT ONE AND TWO FAMILY DWELLING CONSTRUCTION IN THE U.S. VIRGIN ISLANDS

THE FOLLOWING CONSTRUCTION DRAWINGS ARE FOR GENERAL USE. THEY ARE NOT SPECIFIC HOME DESIGNS.

THE SUGGESTED SPECIFICATIONS ARE RELATED TO THE STRUCTURAL QUALITIES OF THE NOTED MATERIALS. THE DETAILS PREDOMINANTLY SHOW A WOOD STRUCTURE WITH SHEET METAL ROOFING SUPPORTED BY WOODEN OR MASONRY WALLS, A WOOD OR CONCRETE SLAB-ON-GRADE, AND A CONTINUOUS FOUNDATION AND INDIVIDUAL FOOTINGS FOR A SINGLE FAMILY ONE AND TWO STORY RESIDENCES.

THE DESIGNS, FASTENERS, AND SUGGESTED CONSTRUCTION METHODS COMPLY WITH THE 2018 INTERNATIONAL BUILDING CODE AND ASCE/SEI 7-16, "MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES".

THESE SPECIFICATIONS ARE APPLICABLE TO COMMON VIRGIN ISLAND RESIDENTIAL CONSTRUCTION METHODS. ALL DRAWINGS, INCLUDING DRAWINGS CREATED WITH THESE SPECIFICATIONS, WILL NEED TO BE STAMPED AND SIGNED BY A U.S.V.I. REGISTERED PROFESSIONAL STRUCTURAL ENGINEER OR LICENSED U.S.V.I. ARCHITECT.

ALL CONSTRUCTION MUST COMPLY WITH THE U.S.V.I. BUILDING CODE. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

WIND DESIGN CRITERIA

ASCE 7-16, USING A BASIC WIND SPEED OF 165 MILES PER HOUR, A MEAN ROOF HEIGHT OF 30 FEET, A ROOF SLOPE BETWEEN 2:12 AND 12:12 FOR HIP OR GABLE ROOFS AND AN ENCLOSURE CLASSIFICATION OF ENCLOSED OR PARTIALLY OPEN USING AN INTERNAL PRESSURE COEFFICIENT OF 0.18 WITH A BUILDING WIDTH OF 24 FEET TO 40 FEET, AND BUILDING LENGTH OF 40 FEET TO 52 FEET USING A MAXIMUM OVERHANG OF 2 FEET. IT IS ASSUMED THAT NEW OR EXISTING OUTLOOKERS AT GABLE END OVERHANGS ARE A MAXIMUM OF 16 INCHES ON CENTER. HOUSES WHICH FALL OUTSIDE OF THESE PLAN DIMENSIONS MUST HAVE ALL DESIGNS WITHIN THIS DOCUMENT CHECKED BY A DESIGN PROFESSIONAL BECAUSE THE FORCES INVOLVED MAY REQUIRE THESE DESIGNS TO BE ALTERED.

WIND DESIGNS ARE GIVEN FOR BUILDINGS LOCATED IN EXPOSURE B WITHOUT WIND SPEED-UP EFFECTS, AND EXPOSURE D WITHOUT WIND SPEED-UP EFFECTS, AND EXPOSURE B THAT ARE SUBJECTED TO WIND SPEED-UP EFFECTS CAUSED BY ABRUPT CHANGES IN THE GENERAL TOPOGRAPHY (AS DEFINED IN ASCE 7-16). A HILL, RIDGE, OR ESCARPMENT WITH LESS THAN 60 FEET IN ELEVATION CHANGE FOR EXPOSURE B IS NOT CONSIDERED AN ABRUPT CHANGE IN TOPOGRAPHY AND WOULD NOT NEED TO CONSIDER TOPOGRAPHIC EFFECTS. GIVEN THE VARIETY OF TOPOGRAPHY WITHIN THE U.S. VIRGIN ISLANDS, AN ESTIMATED TOPOGRAPHIC FACTOR, Kzt, OF 2 WAS UTILIZED IN DETERMINING THE WIND PRESSURES FOR BUILDINGS BUILT ON THE UPPER ONE-HALF OF A HILL, RIDGE, OR ESCARPMENT OR NEAR THE CREST OF AN ESCARPMENT.

IF THE EXPOSURE IS D WITH TOPOGRAPHIC EFFECTS, CALCULATIONS WILL NEED TO BE PERFORMED AND APPROPRIATE CRITERIA DETERMINED. A HILL, RIDGE, OR ESCARPMENT WITH LESS THAN 15 FEET IN ELEVATION CHANGE FOR EXPOSURE D IS NOT CONSIDERED AN ABRUPT CHANGE IN TOPOGRAPHY AND WOULD NOT NEED TO CONSIDER TOPOGRAPHIC EFFECTS.

SEISMIC DESIGN CRITERIA (TO BE VERIFIED BY A REGISTERED DESIGN PROFESSIONAL IN U.S.V.I.)

CODE: ASCE 7-16

SAINT CROIX

SITE SOIL CLASSIFICATION:	SITE CLASS D-"STIFF SOIL"		
RISK CATEGORY:	II		
SEISMIC DESIGN CATEGORY:	D		
S_S = 0.861g	S_{MS} = 0.861g	S_{DS} = 0.574g	
S_1 = 0.312g	S_{M1} = 0.312g	S_{D1} = 0.208g	

SAINT THOMAS

SITE SOIL CLASSIFICATION:	SITE CLASS D-"STIFF SOIL"		
RISK CATEGORY:	II		
SEISMIC DESIGN CATEGORY:	D		
S_S = 1.236g	S_{MS} = 1.236g	S_{DS} = 0.824g	
S_1 = 0.431g	S_{M1} = 0.431g	S_{D1} = 0.287g	

SAINT JOHN

SITE SOIL CLASSIFICATION:	SITE CLASS D-"STIFF SOIL"		
RISK CATEGORY:	II		
SEISMIC DESIGN CATEGORY:	D		
S_S = 1.245g	S_{MS} = 1.245g	S_{DS} = 0.830g	
S_1 = 0.434g	S_{M1} = 0.434g	S_{D1} = 0.289g	

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CONSTRUCTION GUIDE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-04

Sheet Number 4 of 63

STRUCTURAL NOTES

1.0 GENERAL

1.01 DRAWINGS SHOW TYPICAL AND CERTAIN SPECIFIC CONDITIONS ONLY. FOR DETAILS NOT SPECIFICALLY SHOWN, PROVIDE DETAILS SIMILAR TO THOSE SHOWN.

1.02 VERIFY ALL EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS BEFORE STARTING WORK. NOTIFY DESIGNER OF RECORD OF ANY DISCREPANCY.

1.03 THE DESIGN, ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC., IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

1.04 ANY BRAND SPECIFIC MATERIALS MAY BE SUBSTITUTED W/ AN EQUIVALENT PRODUCT BY AN ALTERNATE MANUF. IF APPROVED BY THE DESIGNER OF RECORD.

2.0 GEOTECHNICAL

2.01 A QUALIFIED GEOTECHNICAL ENGINEER SHALL VERIFY CONDITION AND/OR ADEQUACY OF ALL SUBGRADES, FILLS AND BACKFILLS BEFORE PLACEMENT OF FOUNDATIONS, FOOTINGS, SLABS, WALLS, FILLS, BACKFILLS, ETC.

3.0 REINFORCED CONCRETE

3.01 PRIOR TO CASTING FOUNDATIONS, PREPARE THE SITE IN ACCORDANCE WITH PLANS, SPECIFICATIONS AND REQUIRED COMPACTION.

3.02 ALL CONCRETE WORK SHALL CONFORM TO ACI 301-16, SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS. DESIGN IS BASED ON ACI 318-14, BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

3.03 UNLESS NOTED OTHERWISE, ALL CONCRETE SHALL BE NORMAL WEIGHT AND HAVE THE FOLLOWING MINIMUM 28-DAY COMPRESSIVE STRENGTHS:

	f'c
FOUNDATIONS	3,000 PSI
SLABS-ON-GRADE	3,000 PSI
WALLS	4,000 PSI

3.04 USE OF CALCIUM CHLORIDE, CHLORIDE IONS OR OTHER SALTS IN CONCRETE IS NOT PERMITTED.

3.05 CHAMFER OR ROUND ALL EXPOSED CORNERS MINIMUM 3/4".

3.06 DETAIL CONCRETE REINFORCEMENT AND ACCESSORIES IN ACCORDANCE WITH SP-066(04): ACI DETAILING MANUAL-2004.

3.07 REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.

3.08 WELDED WIRE FABRIC (MESH) SHALL CONFORM TO ASTM A185 AND SHALL BE PROVIDED IN FLAT SHEETS. LAP EDGES 3 CROSS WIRES MINIMUM.

3.09 PROVIDE CONTINUOUS REINFORCEMENT WHEREVER POSSIBLE; SPLICE ONLY AS SHOWN OR APPROVED; STAGGER SPLICES WHERE POSSIBLE; USE FULL TENSION SPLICE (CLASS "B") FOR CONTINUOUS REINF. AND MATCHING DOWELS U.N.O. LAP SPLICES SHALL BE 57 BAR DIAMETERS FOR BARS SMALLER THAN #7 AND 72 BAR DIAMETERS FOR #7 & LARGER.

3.10 REINFORCING STEEL SHALL HAVE THE FOLLOWING CONCRETE COVER UNLESS NOTED OTHERWISE:

A. CONCRETE CAST AGAINST EARTH (NOT FORMED)	3"
B. FORMED CONCRETE EXPOSED TO THE EARTH OR WEATHER	
#6 THROUGH #18 BARS	2"
#5 BARS AND SMALLER	1½"
C. CONCRETE NOT EXPOSED TO EARTH OR WEATHER	
SUSPENDED SLABS AND WALLS	
#11 BARS AND SMALLER	1"
BEAMS (STIRRUPS) AND COLUMNS (TIES)	1½"

3.11 DO NOT PLACE PIPES OR DUCTS EXCEEDING ONE-THIRD THE SLAB OR WALL THICKNESS WITHIN THE SLAB OR WALL UNLESS SPECIFICALLY SHOWN AND DETAILED ON STRUCTURAL DRAWINGS. ANY PIPES SHALL BE BETWEEN THE OUTER HORIZONTAL AND VERTICAL LAYERS OF REINFORCMENT.

3.12 DO NOT WELD OR TACK WELD REINFORCING STEEL UNLESS APPROVED OR DIRECTED BY THE STRUCTURAL ENGINEER.

3.13 ALL REINFORCING STEEL PLACEMENT SHALL BE INSPECTED PER IBC 2018.

3.14 REINFORCE SLAB-ON-GRADE AT ALL PENETRATIONS AND AT RE-ENTRANT CORNERS. PLACE THREE #3 BAR x 3'-0 AROUND FLOOR DRAINS. PLACE #4 BAR x 4'-0" (MIN.) AT RE-ENTRANT CORNERS. HOLD REINFORCING 1" CLEAR FROM TOP OF CONCRETE.

3.15 WALLS AND OTHER INTERSECTING ELEMENTS SHALL HAVE CORNER BARS TO PROVIDE CONTINUITY. USE CONCRETE REINFORCING STEEL INSTITUTE (CRSI) STANDARDS OR AS SHOWN ON THE DRAWINGS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: STRUCTURAL NOTES

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-05

Sheet Number 5 of 63

4.0 SAWN LUMBER

4.01 DESIGN STANDARDS:

AMERICAN FOREST AND PAPER ASSOCIATION, "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" (ANSI/AF&PA NDS-2018) WITH "NDS SUPPLEMENT", 2018 EDITION.

AMERICAN SOFTWOOD LUMBER STANDARD VOLUNTARY PRODUCT STANDARD PS20-15.

APA E30– THE ENGINEERED WOOD ASSOCIATION, "ENGINEERED WOOD CONSTRUCTION GUIDE", AND D510 "PANEL DESIGN SPECIFICATION", LATEST EDITIONS.

STRUCTURAL COMPOSITE LUMBER (SCL): EVALUATED IN CONFORMANCE WITH ASTM D 5456 WITH DESIGN VALUES RECOGNIZED IN EVALUATION REPORTS BY ICC EVALUATION SERVICE (ICC-ES) OR PRODUCT REPORTS ISSUED BY APA- THE ENGINEERED WOOD ASSOCIATION.

4.02 ALL WOOD FRAMING MEMBERS INCLUDING BUT NOT LIMITED TO WALL STUDS AND JOISTS, ARE INTENDED TO ACT AS A SYSTEM AS DETAILED IN THE STRUCTURAL DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE SAFETY AND STABILITY OF THE WOOD FRAMING SYSTEMS (I.E. TEMPORARY BRACING IF REQUIRED) DURING CONSTRUCTION.

4.03 ALL SAWN LUMBER SHALL CONFORM TO THE AMERICAN SOFTWOOD LUMBER STANDARD, PS20-15. LUMBER SHALL BE OF THE SPECIES AND GRADE SHOWN BELOW, UNLESS NOTED OTHERWISE:

MEMBER	GRADE	SPACING
WALL STUDS	PRESSURE TREATED: SOUTHERN YELLOW PINE/DOUGLAS FIR No.1 or No.2	REF. APPENDIX
RAFTERS/JOISTS	PRESSURE TREATED: SOUTHERN YELLOW PINE/DOUGLAS FIR No.1 or No.2	REF. APPENDIX
POST/COLUMNS	PRESSURE TREATED: SOUTHERN YELLOW PINE/DOUGLAS FIR No.1 or No.2	REF. APPENDIX
SILL PLATE	PRESSURE TREATED: SOUTHERN YELLOW PINE/DOUGLAS FIR No.1 or No.2	CONTINUOUS
DOUBLE TOP PLATE	PRESSURE TREATED:SOUTHERN YELLOW PINE/DOUGLAS FIR No.1 or No.2	CONTINUOUS

4.04 ALL ATTACHMENTS OF WOOD FRAMING SHALL NOT BE LESS THAN THAT DESCRIBED IN TABLE 2304.10.1 "FASTENING SCHEDULE" WITHIN THE INTERNATIONAL BUILDING CODE, 2018.

4.05 STORAGE OF ALL LUMBER AND TIMBER ON SITE SHALL BE KEPT OFF OF THE GROUND, UNDER COVER, WITH ADEQUATE AIR FLOW, AND PROTECTED FROM DAMAGE.

4.06 ALL LUMBER SHALL BE PRESSURE TREATED IN ACCORDANCE WITH THE LATEST GUIDANCE FROM THE AMERICAN WOOD PRESERVERS ASSOCIATION AND HANDLED IN ACCORDANCE WITH THE MANUFACTURER'S SAFETY DATA SHEETS (MSDS).

4.07 FASTENERS FOR PRESERVATIVE-TREATED AND FIRE-RETARDENT-TREATED WOODS SHALL BE HOT-DIPPED GALVANIZED OR STAINLESS STEEL AND SHALL FOLLOW CURRENT MANUFACTURER'S GUIDELINES BASED ON WEATHER EXPOSURE. STAINLESS STEEL OR HOT-DIPPED GALVANIZED FASTENERS SHALL BE USED TO MATCH THE CONNECTOR TYPE. AT A MINIMUM ALL FASTENERS SHALL BE HOT-DIPPED GALVANIZED MEETING ASTM A153. WHEN FASTENERS ARE USED AT PERMANENTLY EXPOSED EXTERIOR AREAS, FASTENERS SHALL BE STAINLESS STEEL.

4.08 ALL METAL HARDWARE AND FRAMING ACCESSORIES SHALL BE MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, MITEK USP, OR APPROVED EQUAL. ALL ITEMS SHALL BE INSTALLED PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS. ALL CONNECTORS SHALL BE MINIMUM HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A653, ASTM A123, OR HIGHER STANDARDS. STAINLESS STEEL CONNECTORS MAY ALSO BE USED IN LIEU OF HOT-DIP GALVANIZED CONNECTORS. ALL NAIL/BOLT HOLES SHALL BE FILLED WITH THE RECOMMENDED FASTENER UNLESS NOTED OTHERWISE. SUBSTITUTIONS MAY BE MADE WITH APPROVAL FROM THE ENGINEER OF RECORD (E.O.R.).

4.09 WHERE FRAMING HANGERS OR WOOD CONNECTIONS ARE REQUIRED BUT HAVE NOT BEEN SPECIFIED ON THE STRUCTURAL DRAWINGS, CONTACT THE E.O.R. FOR THE APPROPRIATE CONNECTOR TO UTILIZE.

4.10 ALL WALLS SHALL HAVE DOUBLE TOP PLATES AND SHALL BE SPLICED PER THE TYPICAL TOP PLATE SPLICE DETAIL, UNLESS NOTED OTHERWISE. TOP PLATES AT WALL INTERSECTIONS SHALL BE LAPPED AND NAILED WITH (3) 16d NAILS.

4.11 WHERE ROOF MEMBERS OR ROOF TRUSSES ARE CONNECTED TO EXTERIOR WALLS OR WALLS W/ PLYWOOD SHEATHING, THE SPECIFIED HURRICANE CLIP SHALL BE PLACED ON THE SIDE OF THE WALL WITH SHEATHING.

4.12 HOLES FOR BOLTS SHALL BE DRILLED WITH A BIT OF THE SAME NOMINAL DIAMETER AS THE BOLT + 1/16". LEAD HOLES FOR LAG SCREWS SHALL BE DRILLED PER NDS-2018. LEAD HOLES FOR WOOD SCREWS LOADED IN WITHDRAWAL AND LOADED LATERALLY SHALL BE BORED IN ACCORDANCE WITH THE NDS-2018.

4.13 ALL BOLTS, CARRIAGE BOLTS, LAG SCREWS, EXPANSION BOLTS, AND EPOXY BOLTS SHALL BE INSTALLED WITH STANDARD CUT WASHERS AND NUTS THAT BEAR DIRECTLY ON THE WOOD. ALL NUTS SHALL BE TIGHTENED AT THE TIME OF INSTALLATION AND RE-TIGHTENED IF NECESSARY, DUE TO WOOD SHRINKAGE, PRIOR TO CLOSE-IN OR AT THE COMPLETION OF THE PROJECT. BOLTS AND LAG SCREWS SHALL CONFORM TO ANSI/ASME STANDARD B18.2.1. WOOD SCREWS SHALL CONFORM TO B18.6.1. ALL BOLTS SHALL CONFORM TO ASTM A307 GRADE A UNLESS NOTED OTHERWISE.
THE MINIMUM STRENGTHS FOR LAG SCREWS AND WOOD SCREWS SHALL BE AS FOLLOWS:

WOOD SCREW DIAMETER-INCHES	MIN. BENDING YIELD STRENGTH (PSI)
0.138 (#6)	100,000
0.151 (#7)	90,000
0.164 (#8)	90,000
0.177 (#9)	90,000
0.190 (#10)	80,000
0.216 (#12)	80,000
0.246 (#14)	70,000
LAG SCREW DIAMETER-INCHES	**MIN. BENDING YIELD STRENGTH (PSI)**
1/4"	70,000
5/16"	60,000
3/8" AND GREATER	45,000

PENETRATION DEPTHS OF THE THREADED PORTION OF THE FASTENER INTO THE MAIN MEMBER SHALL BE A MINIMUM OF 7 TIMES THE SHANK DIAMETER (7D) FOR WOOD SCREWS AND 8 TIMES THE SHANK DIAMETER (8D) FOR LAG SCREWS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: STRUCTURAL NOTES CONTINUED

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-06

Sheet Number 6 of 63

4.0 SAWN LUMBER CONT'D.

4.14 WOOD STUDS IN EXTERIOR WALLS AND BEARING PARTITIONS MAY BE CUT OR NOTCHED TO A DEPTH NOT EXCEEDING 1/4 OF ITS WIDTH, PROVIDED NOT MORE THAN TWO SUCCESSIVE STUDS ARE NOTCHED OR CUT. BUNDLED STUDS UNDER POINTS OF CONCENTRATED LOADS SHALL NOT BE CUT OR NOTCHED. CUTTING AND NOTCHING OF STUDS TO A DEPTH NOT GREATER THAN 40% OF THE WIDTH OF THE STUD IS PERMITTED IN NON-BEARING PARTITIONS SUPPORTING NO LOADS OTHER THAN THE WEIGHT OF THE PARTITION.

4.15 A HOLE MAY BE BORED IN A WOOD STUD UP TO A DIAMETER OF 33% OF THE STUD WIDTH. BORED HOLES NOT GREATER THAN 60% OF THE WIDTH OF THE STUD ARE PERMITTED IN NON-BEARING PARTITIONS OR IN ANY WALL WHERE EACH BORED STUD IS DOUBLED, PROVIDED NOT MORE THAN TWO SUCCESSIVE DOUBLE STUDS ARE BORED. IN NO CASE, SHALL THE EDGE OF THE BORED HOLE BE NEARER THAN 5/8" TO THE EDGE OF THE STUD. BORED HOLES SHALL NOT BE LOCATED AT THE SAME SECTION OF THE STUD AS A CUT OR NOTCH.

4.16 END NOTCHES NOT EXCEEDING 1/4 THE DEPTH ARE PERMITTED FOR 2X FLOOR JOISTS OR RAFTERS. TAPER CUT FROM THE REDUCED DEPTH OF THE MEMBER TO THE FULL DEPTH AT A MINIMUM SLOPE OF (1) HORIZ/(1) VERT. DO NOT SQUARE CUT AN END NOTCH.

4.17 INTERIOR NOTCHES NOT EXCEEDING 1/6 THE DEPTH OF A 2X FLOOR JOISTS OR RAFTER SHALL BE PERMITTED ONLY IN THE OUTER THIRD OF ANY SPAN. NOTCHED ARE NOT PERMITTED IN THE MIDDLE THIRD OF ANY SPAN NOR IN ANY LINTEL MEMBERS.

4.18 THE LENGTH OF NOTCHED IN FLOOR JOISTS SHALL NOT EXCEED 1/3 THE JOIST DEPTH.

4.19 HOLES BORED IN FLOOR JOISTS OR RAFTERS SHALL NOT BE WITHIN 2 INCHES OF THE TOP OR BOTTOM AND THE DIAMETER OF ANY SUCH HOLE SHALL NOT EXCEED 1/3 THE DEPTH OF THE MEMBER. HOLES SHALL NOT OCCUR WITHIN 12" OF THE EDGE OF ANY BEARING SUPPORT OR CONNECTION.

4.20 NOTCHING OF STRUCTURAL COMPOSITE LUMBER (SCL) BEAMS IS NOT PERMITTED. UP TO 3 ROUND HOLES MAY BE BORED WITHIN THE MIDDLE THIRD OF SPAN AND MIDDLE THIRD OF DEPTH ONLY. CLEAR DISTANCE BETWEEN ANY TWO HOLES SHALL BE NO LESS THAN 2 TIMES THE DIAMETER OF THE LARGER HOLE. MAXIMUM HOLE DIAMETER SHALL NOT EXCEED 1/5 THE BEAM DEPTH NOR 2 INCHES, WHICHEVER IS LESS. HOLES ARE NOT PERMITTED IN CANTILEVERS.

4.21 WHEN NAILS ARE USED AT PERMANENTLY EXPOSED EXTERIOR AREAS, NAILS SHALL BE STAINLESS STEEL (TYPE 316). NAILS THAT ARE NOT EXPOSED TO THE ELEMENTS BUT IN CONTACT WITH PRESERVATIVE TREATMENT LUMBER SHALL BE MINIMUM HOT-DIPPED GALVANIZED MEETING ASTM A153. ALL NAILS FOR STRUCTURAL WORK SHALL BE COMMON WIRE NAILS UNLESS NOTED OR DETAILED OTHERWISE MEETING ASTM F1667. HOLES SHALL BE PRE-DRILLED WHERE NECESSARY TO PREVENT SPLITTING. NAILS SHALL HAVE THE MINIMUM PROPERTIES SPECIFIED IN THE TABLE BELOW:

NAIL TYPE	SHANK DIAMETER-INCHES	MIN. PENETRATION-INCHES	MIN. BENDING YIELD STRENGTH (PSI)
6d	0.113	1.13	100,000
8d	0.131	1.31	100,000
10d	0.148	1.48	90,000
12d	0.148	1.48	90,000
16d	0.162	1.63	90,000
20d	0.192	1.92	80,000

5.0 WOOD STRUCTURAL PANELS

5.01 STRUCTURAL WOOD PANELS SHALL CONFORM TO THE REQUIREMENTS OF ONE OF THE FOLLOWING STANDARDS AND PUBLICATIONS:

A. U.S. PRODUCT STANDARD PS1-09 FOR CONSTRUCTION AND INDUSTRIAL PLYWOOD.
B. U.S. PRODUCT STANDARD PS2-10 PERFORMANCE STANDARD FOR WOOD BASED STRUCTURAL USE PANELS.
C. APA PRP-108 PERFORMANCE STANDARDS.

5.02 ROOF AND WALL PANELS SHALL BE APA RATED, SEE SHEETS S-15 AND S-30 FOR THICKNESS REQUIREMENTS. 5 PLY PLYWOOD WITH A MIN. 32/16 SPAN RATING UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL SHEATHING SHALL BE PRESSURE TREATED.

5.03 FLOOR SHEATHING SHALL BE TONGUE AND GROOVE APA RATED PRESSURE TREATED 5 PLY 3/4" PLYWOOD SHEATHING WITH MIN. 48/24 SPAN RATING. PROVIDE A-C GRADE PLYWOOD AT ALL DECK SHEATHING LOCATIONS.

5.04 ALL FLOOR AND ROOF SHEATHING SHALL BE INSTALLED WITH THE FACE GRAIN PERPENDICULAR TO THE SUPPORTS.

5.05 ALL SHEATHING PANELS SHALL BE INSTALLED WITH END JOINTS STAGGERED UNLESS NOTED OTHERWISE.

5.06 WHERE BLOCKING IS NOT SPECIFICALLY REQUIRED FOR THE ROOF SHEATHING, PLY CLIPS OR TONGUE AND GROOVE PLYWOOD SHALL BE USED.

5.07 SUB-FLOOR SHEATHING SHALL BE UNBLOCKED UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS. SUB-FLOOR SHALL BE GLUED DOWN TO THE SUPPORTING MEMBERS AND GLUED AT THE THE TONGUE AND GROOVE JOINTS.

5.08 ALL NAILS SHALL BE COMMON NAILS. STAINLESS STEEL (TYPE 316) NAILS SHALL BE USED AT PERMANENTLY EXPOSED EXTERIOR AREAS. ALL SCREWS AND NAILS THAT ARE NOT EXPOSED TO THE ELEMENTS BUT IN CONTACT WITH PRESERVATIVE TREATMENT LUMBER SHALL BE MINIMUM HOT-DIPPED GALVANIZED MEETING ASTM A153.

5.09 BLOCKING SHALL BE PROVIDED AT PLYWOOD SHEATHED INTERIOR AND EXTERIOR WALLS. BLOCKING SHALL BE INSTALLED AT ALL WALL PANEL EDGES PERPENDICULAR TO FRAMING MEMBERS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: STRUCTURAL NOTES CONTINUED

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-07

Sheet Number 7 of 63

6.0 GLUE LAMINATED MEMBERS

6.01 GLUE LAMINATED MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF ONE OF THE FOLLOWING STANDARDS AND PUBLICATIONS:

A. AMERICAN NATIONAL STANDARD FOR STRUCTURAL GLUED LAMINATED TIMBER
B. ANSI A190.1-2017 AND ASTM D3737-12

6.02 THE MINIMUM GLUE LAMINATED TIMBER GRADES SHALL BE AS FOLLOWS.

MEMBER	GRADE
SIMPLE SPAN	24F-V4
CONT. SPAN/CANTILEVER	24F-V8

6.03 ALL STRUCTURAL GLUE LAMINATED MEMBERS NOTED ON DRAWINGS AS WELL AS ALL MEMBERS EXPOSED TO WEATHER SHALL BE PRESSURE TREATED.

6.04 NO NOTCHING OR BORING OF HOLES IS ALLOWED WITHOUT APPROVAL FROM E.O.R.

6.05 GLUE SHALL BE WET USE EXTERIOR WATERPROOF GLUE.

6.06 WHERE HANGERS ARE REQUIRED BUT NOT SPECIFICALLY SIZED, SIMPSON GLT HANGERS OR USP HGLT HANGERS SHALL BE USED. SUBSTITUTION OF HARDWARE IS ALLOWED WITH APPROVAL FROM E.O.R. ALL ITEMS SHALL BE INSTALLED PER THE MANUFACTURER'S REQUIREMENTS

7.0 COMPOSITE MEMBERS

7.01 COMPOSITE WOODS SHALL BE MANUFACTURED BY TRUSS JOIST, OR AN APPROVED EQUAL AND BE OF THE TYPE AND SIZE SHOWN ON THE DRAWINGS. THE MATERIAL TYPE AND GRADE SHALL BE AS FOLLOWS:

MEMBER	TYPE	GRADE
BEAM	LSL	E = 1,550,000 PSI, Fb = 2,325 PSI
	LVL	E = 1,900,000 PSI, Fb = 2600 PSI
	PSL	E = 2,000,000 PSI, Fb = 2900 PSI
POST	LSL	E = 1,300,000 PSI, Fb = 1,700 PSI, Fcll = 1,400 PSI
	LVL	E = 1,800,000 PSI, Fb = 2,400 PSI, Fcll = 2,500 PSI

7.02 STRUCTURAL COMPOSITE LUMBER SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM D5456, NO CUTS, NOTCHES, OR BORED HOLES ARE ALLOWED WITHOUT APPROVAL BY E.O.R. WHERE LAMINATED STRAND LUMBER (LSL) MEMBERS ARE UTILIZED AS RIM JOIST, THE MIN. THICKNESS SHALL BE 1 3/4".

8.0 MASONRY

8.01 CONCRETE MASONRY DESIGN AND CONSTRUCTION SHALL CONFORM TO TMS 402/602 BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES, 2016.

8.02 PROVIDE NORMAL WEIGHT, HOLLOW, LOAD-BEARING CONCRETE MASONRY UNITS (CMU) CONFORMING TO ASTM C90, GRADE N, TYPE II.

8.03 PROVIDE MASONRY CONSTRUCTION WITH MINIMUM COMPRESSIVE STRENGTH, $f'm$ = 1,500 PSI.

8.04 PROVIDE TYPE "S" MORTAR IN ACCORDANCE WITH ASTM C270.

8.05 VERTICAL REINFORCING SHALL BE HELD IN POSITION WITH BAR POSITIONERS AT TOP OF THE GROUT POUR AT SPACINGS AS SHOWN ON THE PLANS.

8.06 PROVIDE HORIZONTAL JOINT REINFORCEMENT COMPLYING WITH ASTM A82, NO. 9 GAUGE OR HEAVIER, LADDER TYPE, ZINC COATED, PLACED 8" ON CENTER BELOW GRADE AND 16" ON CENTER ABOVE GRADE, UNLESS NOTED OTHERWISE. LADDER RUNGS SHALL BE POSITIONED TO COMPLETELY CLEAR CELL OPENINGS. LAP JOINT REINF. 1 FULL CROSS WIRE SPACING PLUS 2" (16" MIN FOR CROSS WIRE SPACING OF 16" OC), BUT NOT LESS THAN 12".

8.07 PROVIDE RUNNING BONDS WITH VERTICAL JOINTS LOCATED AT CENTER OF MASONRY UNITS IN THE ALTERNATE COURSE BELOW.

8.08 PROVIDE FOUNDATION DOWELS W/ HOOKS SIZED AND SPACED TO MATCH CMU VERTICAL REINFORCING. DOWELS SHALL LAP WALL VERTICALS 48 BAR DIAMETERS, UNLESS NOTED OTHERWISE.

8.09 REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.

8.10 PROVIDE FINE GROUT FOR REINFORCED MASONRY IN ACCORDANCE WITH ASTM C476 WITH MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 2,000 PSI. GROUT SHALL BE OF FLUID CONSISTENCY, WHICH MEANS AS FLUID AS POSSIBLE FOR POURING WITHOUT SEGREGATION OF THE CONSTITUENT PARTS. GROUT SLUMP SHALL BE 8 TO 10 INCHES. WATER CEMENT RATIO SHALL BE REDUCED AND WATER REDUCERS USED AS REQUIRED TO MAINTAIN SLUMP WHEN PLACED IN LOW ABSORPTION CMU. FILL ALL CELLS BELOW GRADE WITH GROUT. ALL GROUT SHALL BE CONSOLIDATED AT THE TIME OF POURING BY VIBRATING AND THEN RECONSOLIDATED AGAIN BY PUDDLING LATER, BEFORE PLASTICITY IS LOST. TYPICALLY WITHIN 10 TO 15 MINUTES. WHEN GROUTING IS STOPPED FOR ONE HOUR OR LONGER, CONSTRUCTION JOINTS SHALL BE FORMED BY STOPPING THE POUR OF GROUT 1 1/2" BELOW THE TOP OF THE UPPERMOST UNIT.

8.11 CLEANOUT CELLS SHALL BE PROVIDED AT THE BOTTOM OF ALL CELLS TO BE FILLED AT EACH GROUT POUR. ANY OVERHANGING MORTAR OR OTHER OBSTRUCTION OR DEBRIS SHALL BE REMOVED FROM THE INSIDES OF SUCH CELL WALLS. THE CLEANOUTS SHALL BE SEALED BEFORE GROUTING AND AFTER INPSECTION.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: STRUCTURAL NOTES CONTINUED

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-08
Sheet Number 8 of 63

COMMON ABBREVIATIONS

ARCH.	ARCHITECT
B/	BOTTOM OF
BRG.	BEARING
BOTT.	BOTTOM
C/C	CENTER-TO-CENTER
C.J.	CONTROL JOINT
CLR.	CLEAR
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONT.	CONTINUOUS
COORD.	COORDINATE
CMU	CONCRETE MASONRY UNIT
DIM.	DIMENSION
DIA.	DIAMETER
DIST.	DISTANCE
DWGS.	DRAWINGS
EL.	ELEVATION
E.F.	EACH FACE
EMBED.	EMBEDMENT
ENG.	ENGINEER
E.O.R.	ENGINEER OF RECORD
EQ.	EQUAL
E.S.	EACH SIDE
E.W.	EACH WAY
EXP.	EXPANSION
EXT.	EXTERIOR
FABR.	FABRICATOR
F.F.	FINISHED FLOOR
FFE	FINISHED FLOOR ELEVATION
FTG.	FOOTING
GA.	GAUGE
GALV.	GALVANIZED
HKD.	HOOKED
HORIZ.	HORIZONTAL
H.S.	HEADED STUD
IN.	INCHES
INFO.	INFORMATION
INT.	INTERIOR
K	KIPS
KSI	KIPS PER SQUARE INCH
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
L.W.	LONG WAYS
MANUF.	MANUFACTURER
MAX.	MAXIMUM
MECH.	MECHANICAL
MIN.	MINIMUM
PL.	PLATE
PREFAB.	PREFABRICATED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
P.T.	PRESSURE TREATED
QTY	QUANTITY
REF.	REFERENCE
REINF.	REINFORCED OR REINFORCING
SCH.	SCHEDULE
S.F.	STEPPED FOOTING
SQU.	SQUARE
STL.	STEEL
STRUC.	STRUCTURAL
S.W.	SHORT WAYS
T/	TOP OF
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VCJ	VERTICAL CONTROL JOINT
VMCJ	VERTICAL MASONRY CONTROL JOINT
W/	WITH
WWF	WELDED WIRE FABRIC

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: COMMON ABBREVIATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-09

Sheet Number 9 of 63

CONSTRUCTION CONSIDERATIONS

1. HIP ROOFS ARE AERODYNAMICALLY MORE RESISTANT TO UPLIFT AND GENERALLY PERFORM BETTER IN STRONG WINDS THAN GABLE ROOFS.
2. TIE THE HOUSE DOWN FROM TOP TO BOTTOM WITH HURRICANE/SEISMIC RESISTANT CONNECTORS AND OR THE APPROPRIATE MASONRY/CONCRETE REINFORCIING.
3. SOFFIT AND GABLE END OVERHANGS SHOULD BE ELIMINATED OR REDUCED TO TWO FEET OR LESS.
4. WOOD WALLS MUST BE PERMANENTLY CONNECTED AND PROPERLY BRACED. MASONRY WALLS MUST BE VERTICALLY AND HORIZONTALLY REINFORCED.
5. ALL WOOD MEMBERS, INCLUDING SHEATHING, SHALL BE PRESSURE TREATED.
6. PORCH ROOFS SHOULD BE INDEPENDENTLY FRAMED AND NOT AN EXTENSION OF THE MAIN ROOF SYSTEM.
7. WINDOW AND DOOR OPENINGS MUST BE PROTECTED FROM WIND LOADS AND DEBRIS IMPACT. USING PERMANENT SHUTTERS OR TEMPORARY PLYWOOD OR METAL PANELS.
8. ALL CONSTRUCTION MUST COMPLY WITH THE LATEST BUILDING CODE. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE U.S.V.I. DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

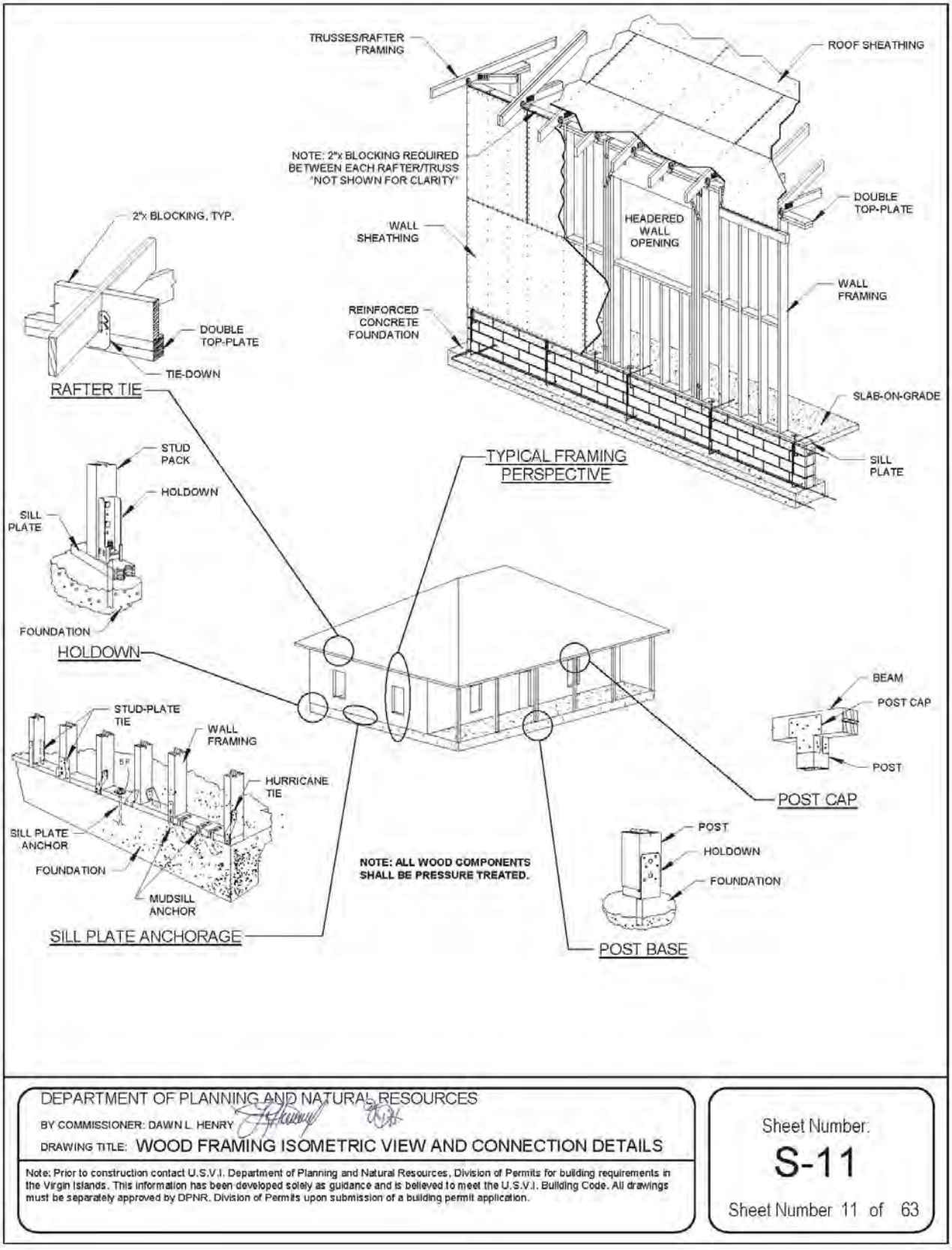
DRAWING TITLE: CONSTRUCTION CONSIDERATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-10

Sheet Number 10 of 63



DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WOOD FRAMING ISOMETRIC VIEW AND CONNECTION DETAILS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-11

Sheet Number 11 of 63

ROOFS

ROOFS ARE ONE OF THE PORTIONS OF THE RESIDENCE MOST PRONE TO HURRICANE DAMAGE. PROPER ROOF CONSTRUCTION IS ESSENTIAL. ALL LUMBER USED IN ROOF CONSTRUCTION SHOULD BE PRESSURE TREATED, STRUCTURAL GRADE MATERIAL. ADEQUATELY FASTEN CORRUGATED METAL ROOFING. THE SEPARATION OF ONE SHEET COULD LEAD TO FAILURE OF OTHER SHEETS AND EXPOSURE OF THE INTERIOR OF THE HOME TO WIND AND RAIN; THUS RISKING DAMAGE TO PERSONAL PROPERTY AND INJURY TO THE OCCUPANTS.

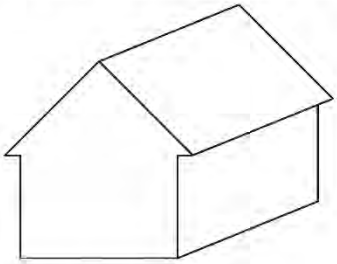
THERE ARE TWO SUGGESTED METHODS OF ROOF CONSTRUCTION. THE FIRST EMPLOYS RAFTERS, THE SECOND TRUSSES. THESE FRAMING MEMBERS ARE TIED TO THE EXTERIOR WALLS AND IN SOME CASES TO THE INTERIOR WALLS OF THE HOUSE. THE ROOF SYSTEM IS COMPLETED WITH PLYWOOD SHEATHING COVERED BY UNDERLAYMENT, USED FOR ADDITIONAL MOISTURE PROTECTION, AND THEN COVERED BY A CORRUGATED METAL ROOFING SYSTEM. THE RECOMMENDED UNDERLAYMENT IS A SELF-ADHERING MODIFIED BITUMEN, COMPLYING WITH ASTM D1970 THAT IS INTENDED FOR USE UNDERNEATH METAL ROOF PANELS. A MORE ECONOMICAL, BUT LESS RELIABLE UNDERLAYMENT MATERIAL IS ASTM D226 TYPE II (#30) OR ASTM D4869 TYPE IV FELT. A TWO LAYER APPLICATION IS RECOMMENDED WHERE THE ROOF SLOPE IS LESS THAN 4:12. PRIOR TO INSTALLATION OF THE FELT, IT IS RECOMMENDED THAT THE PLYWOOD SHEATHING JOINTS BE TAPED WITH SELF-ADHERING MODIFIED BITUMEN TAPE (4 INCHES WIDE, MINIMUM), ROLL TAPE WITH A ROLLER. THE APPROVED CORRUGATED METAL ROOFING SYSTEM SHALL HAVE A TRIPLE OVERLAP OF CORRUGATIONS AT SIDELAPS. A LIQUID APPLIED MEMBRANE ROOFING SYSTEM MAY BE USED IN LIEU OF THE CORRUGATED METAL ROOFING SYSTEM (NOTE: DO NOT INSTALL MODIFIED BITUMEN TAPE AT SHEATHING JOINTS WHERE LIQUID APPLIED MEMBRANE ROOFING OPTION IS INSTALLED).

THE WOOD ROOF STRUCTURE AND CORRUGATED METAL ROOFING CAN BE LIFTED AND SEPARATED FROM THE STRUCTURE BY WIND FORCES CREATED BY A HURRICANE, STRAIGHT LINE WINDS OR OTHER HIGH WIND EVENTS. IF THE METAL ROOFING IS PROPERLY ATTACHED TO THE STRUCTURE BUT THE STRUCTURE IS NOT PROPERLY ATTACHED TO THE WALLS THE ENTIRE ROOF OR PARTS OF THE ROOF MAY BE REMOVED BY THE WIND FORCES. TO AVOID THIS IT IS IMPORTANT TO ADEQUATELY ATTACH THE ROOF TO THE WALLS. IN HOMES WITH WOOD FRAMED WALLS THIS IS ACHIEVED BY USING METAL CONNECTORS TO ATTACH THE TRUSSES OR RAFTERS TO THE TOP PLATES AND THE STUDS, THE STUDS TO THE BOTTOM PLATES, AND TO THE FLOOR SYSTEM AND FOUNDATION. IN MASONRY WALLS, STEEL REINFORCING BARS MAY BE USED IN CONJUNCTION WITH METAL CONNECTORS TO ATTACH THE ROOF STRUCTURE TO THE REINFORCED MASONRY WALLS, FLOOR, AND FOUNDATION.

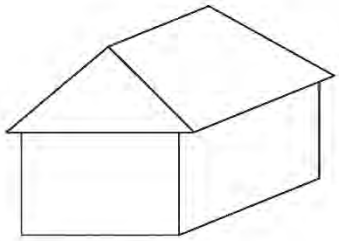
DESIGNS PROVIDED IN THE MAIN BODY OF THIS DOCUMENT USE A STRUCTURAL ROOF BEAM AT THE RIDGE, KNOWN AS A RIDGE BEAM. THIS BEAM MUST BE VERTICALLY SUPPORTED BY COLUMNS, EXTERIOR WALLS, INTERIOR WALLS, OTHER BEAMS, OR A COMBINATION OF THESE METHODS. THE USE OF A BOARD (RATHER THAN A BEAM) AT THE RIDGE REQUIRES SPECIFIC DESIGN CONSIDERATIONS INCLUDING, BUT NOT LIMITED TO THE HORIZONTAL THRUST IMPOSED BY RAFTERS ON SUPPORTS. CEILING JOISTS OR RAFTER TIES ARE REQUIRED AND SHALL BE PROPERLY DESIGNED TO RESIST THRUST LOADS IF RIDGE BOARDS ARE USED IN LIEU OF RIDGE BEAMS.

ATTIC SPACE SHOULD HAVE ADEQUATE VENTILATION TO REMOVE HUMIDITY. THESE VENTS SHOULD BE PROPERLY SIZED AND STRATEGICALLY LOCATED AND INCORPORATE CROSS VENTILATION.

ALL CONSTRUCTION MUST COMPLY WITH THE LATEST ADOPTED BUILDING CODE IN THE U.S.V.I. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.



GABLE ROOF



HIP ROOF

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

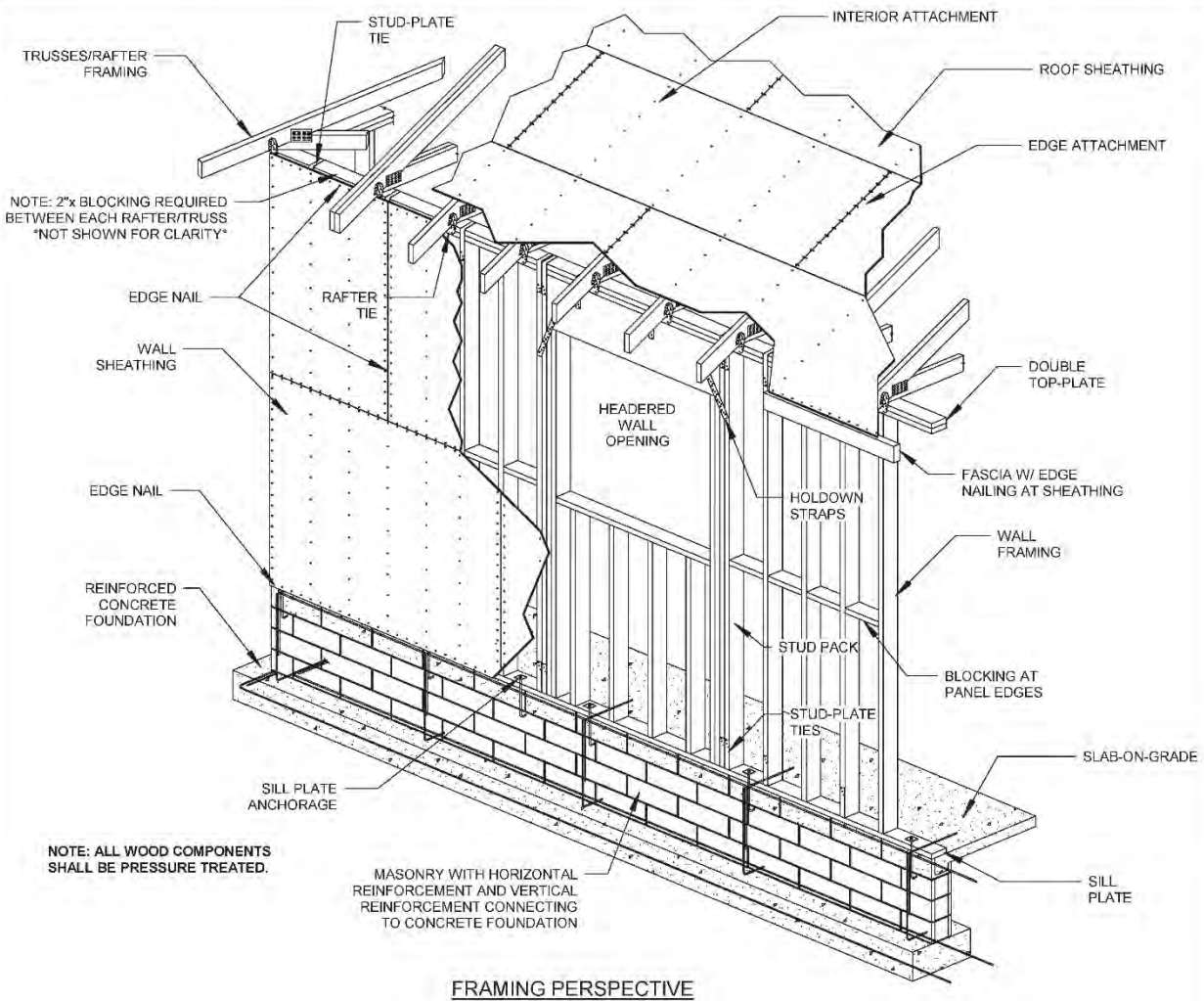
DRAWING TITLE: ROOFS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-12

Sheet Number 12 of 63



FRAMING PERSPECTIVE

COMMON SENSE MEASURES THAT COULD PREVENT LOSSES:

A HOUSE IS ONLY AS STRONG AS ITS WEAKEST CONNECTION. TO BE EFFECTIVE EACH CONNECTION IN THE LOAD PATH MUST BE STRONG ENOUGH TO TRANSFER LOADS WITHOUT FAILURE. IN A TYPICAL RESIDENTIAL HOME, THE LOAD PATH FOR GRAVITY LOADS AND LATERAL LOADS INVOLVES THE FOLLOWING STRUCTURAL ELEMENTS:

1. ROOF SHEATHING ATTACHMENT.
2. ROOF FRAMING-TO-WALL CONNECTIONS.
3. WALL SHEATHING ATTACHMENT.
4. WALL FRAMING ATTACHMENT (TOP PLATE, STUDS, AND HEADERS).
5. IF APPLICABLE, FLOOR-TO-FLOOR ATTACHMENT FOR TWO STORY RESIDENCES.
6. SILL PLATE ANCHORAGE TO FOUNDATIONS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

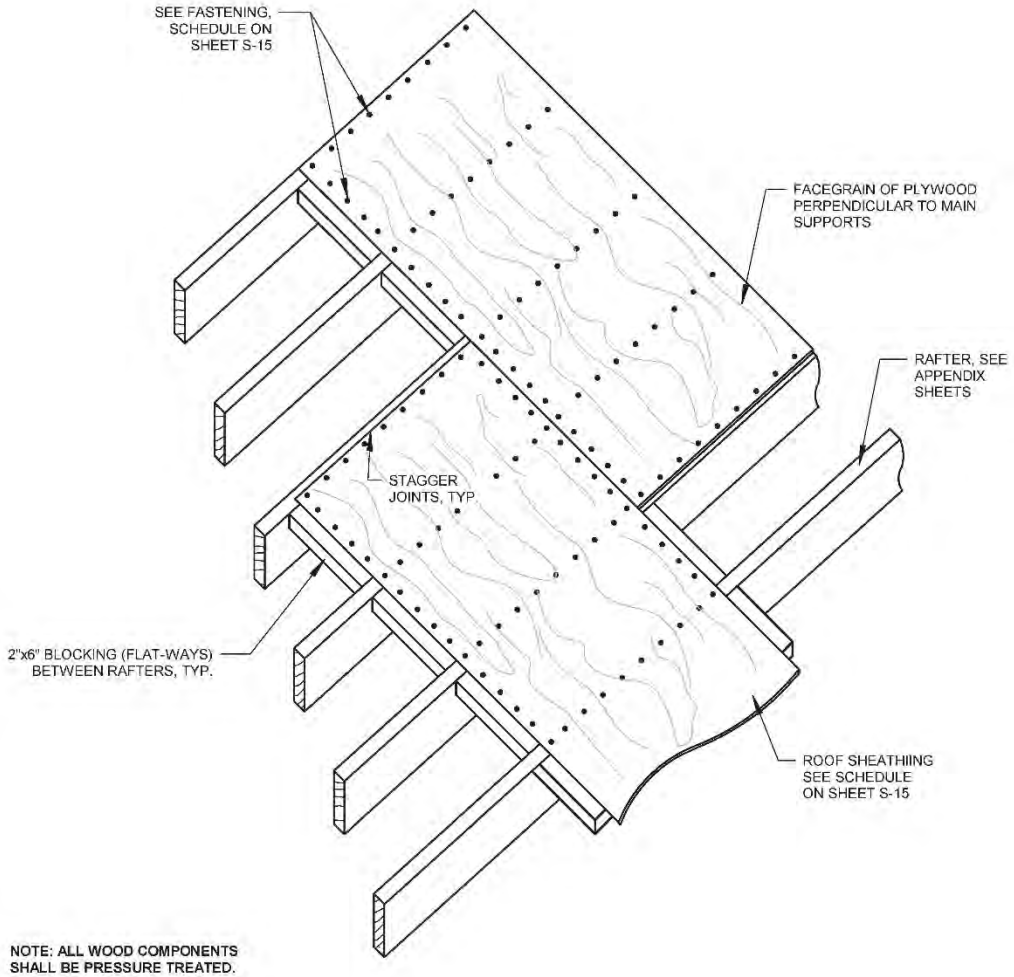
DRAWING TITLE: FRAMING PERSPECTIVE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-13

Sheet Number 13 of 63



NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

ROOF SHEATHING

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: PLYWOOD ROOF SHEATHING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-14

Sheet Number 14 of 63

NOTE: TABLE BASED UPON RAFTERS WHICH ARE SPACED AT 2'-0" O.C. MAXIMUM.

ROOF COMPONENT DESIGNS	WIND EXPOSURE B ON UPPER HALF OF A HILL, RIDGE, OR ESCARPMENT OR NEAR THE CREST OF AN ESCARPMENT	WIND EXPOSURE B	WIND EXPOSURE D
METAL ROOF PANEL FASTENER SPACING ALONG NAILER	5-1/3" O.C. (EVERY OTHER CORRUGATION)	10-2/3" O.C. (EVERY 4TH CORRUGATION)	8" O.C. (EVERY 3RD CORRUGATION)
NAILER SPACING	SEE ROOF PLANS	SEE ROOF PLANS	SEE ROOF PLANS
NAILER FASTENERS INTO OUTLOOKERS AT OVERHANGS	#14 x 5" LONG STAINLESS STEEL WOOD SCREW @ 6" O.C.	#12 x 4-1/2" LONG STAINLESS STEEL WOOD SCREW @ 12" O.C.	#14 x 5" LONG STAINLESS STEEL WOOD SCREW @ 6" O.C.
NAILER FASTENERS AT EACH RAFTER INTERSECTION	TWO #14 x 5" LONG STAINLESS STEEL WOOD SCREWS	TWO #12 x 4-1/2" LONG STAINLESS STEEL WOOD SCREWS	TWO #14 x 5" LONG STAINLESS STEEL WOOD SCREWS
BLOCKING FOR SHEATHING	BLOCKING SHALL BE INSTALLED UNDER THE UNSUPPORTED EDGE OF ALL ROOF SHEATHING WHICH HAS A LIQUID APPLIED MEMBRANE	BLOCKING SHALL BE INSTALLED UNDER THE UNSUPPORTED EDGE OF ALL ROOF SHEATHING WHICH HAS A LIQUID APPLIED MEMBRANE	BLOCKING SHALL BE INSTALLED UNDER THE UNSUPPORTED EDGE OF ALL ROOF SHEATHING WHICH HAS A LIQUID APPLIED MEMBRANE
SHEATHING SIZE: THICKNESS MAY BE DECREASED BY 1/8" IF TEXTURED PLYWOOD IS REPLACED WITH REGULAR PLYWOOD. HOWEVER, MINIMUM THICKNESS SHALL NOT BE LESS THAN 5/8-INCH.	STRUCTURAL 1 TYPE 7/8" TEXTURED PLYWOOD WITH 48/24 SPAN RATING	STRUCTURAL 1 TYPE 23/32" TEXTURED PLYWOOD WITH 32/16 SPAN RATING	STRUCTURAL 1 TYPE 3/4" TEXTURED PLYWOOD WITH 40/20 SPAN RATING
SHEATHING FASTENERS	#14 x 3-1/2" LONG STAINLESS STEEL WOOD SCREWS AT 3" O.C. AT ALL SUPPORT MEMBERS	#12 x 3" LONG STAINLESS STEEL WOOD SCREWS AT 5" O.C. AT ALL SUPPORT MEMBERS	#14 x 3-1/2" LONG STAINLESS STEEL WOOD SCREWS AT 3" O.C. AT ALL SUPPORT MEMBERS

ROOF SHEATHING, NAILER, AND ATTACHMENTS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

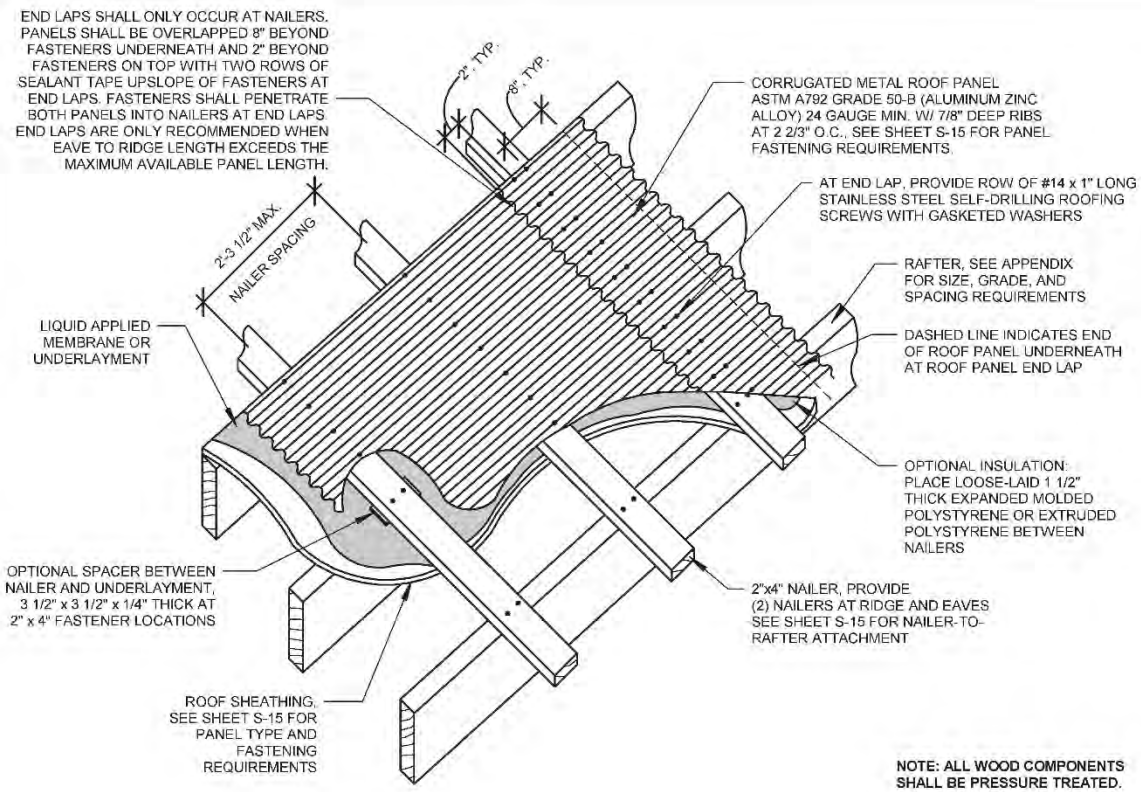
DRAWING TITLE: ROOF COMPONENT ATTACHMENTS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

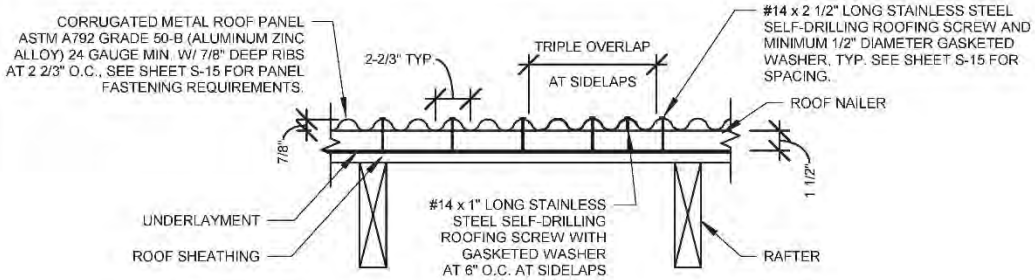
Sheet Number:

S-15

Sheet Number 15 of 63



ROOF COVERING ISOMETRIC VIEW



ROOF COVERING SECTION VIEW

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED WOOD USED UNDER THE METAL ROOFING TO HAVE USE CATEGORY OF UC3A FOR ABOVE GROUND INSTALLATION AND SHALL BE MANUFACTURED IN ACCORDANCE WITH THE AMERICAN WOOD PROTECTION ASSOCIATION.

NOTE: PROVIDE A MINIMUM OF THREE OVERLAPPING CORRUGATIONS (TRIPLE OVERLAP) AT SIDELAPS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

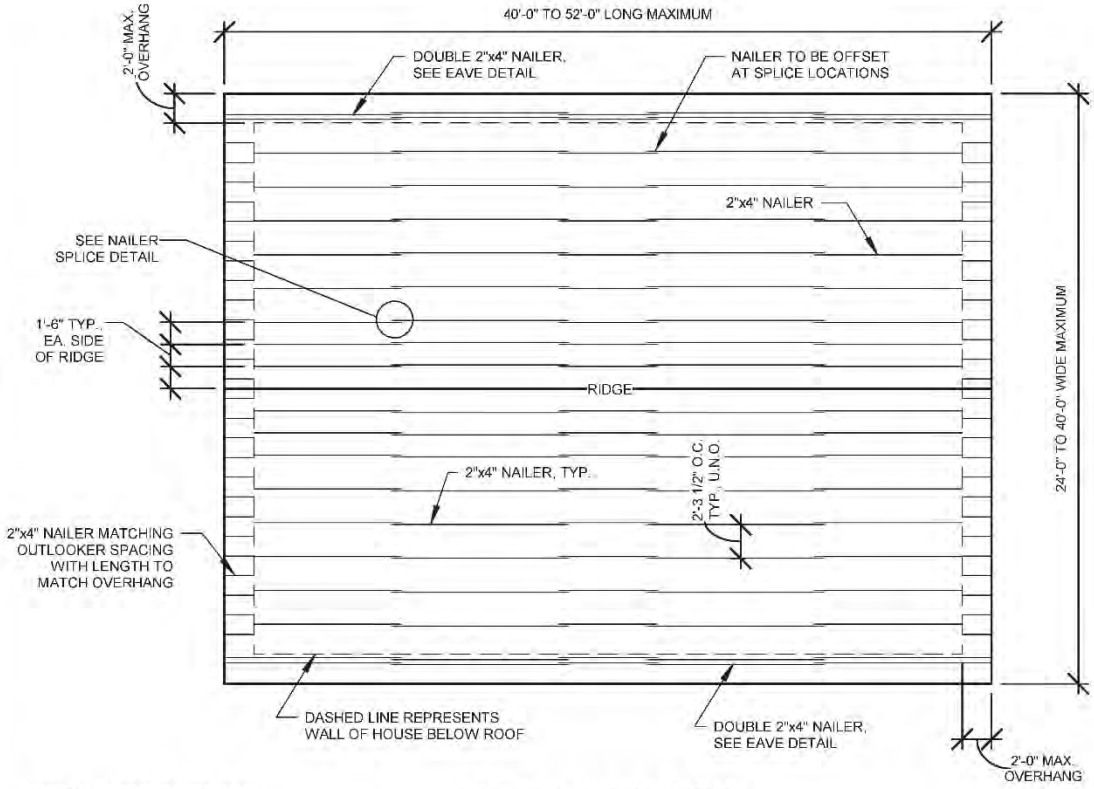
DRAWING TITLE: CORRUGATED ROOF DETAIL

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

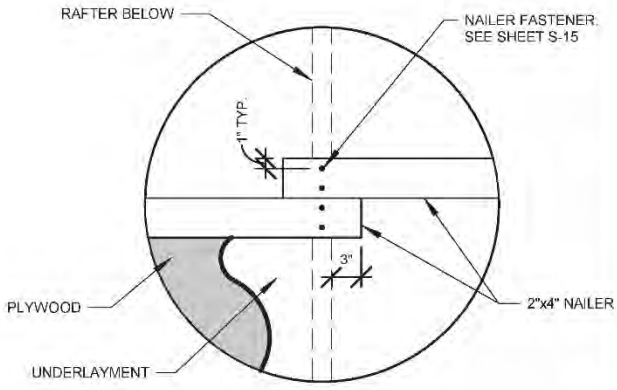
S-16

Sheet Number 16 of 63



NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

ROOF NAILER LAYOUT-GABLE



NAILER SPLICE DETAIL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

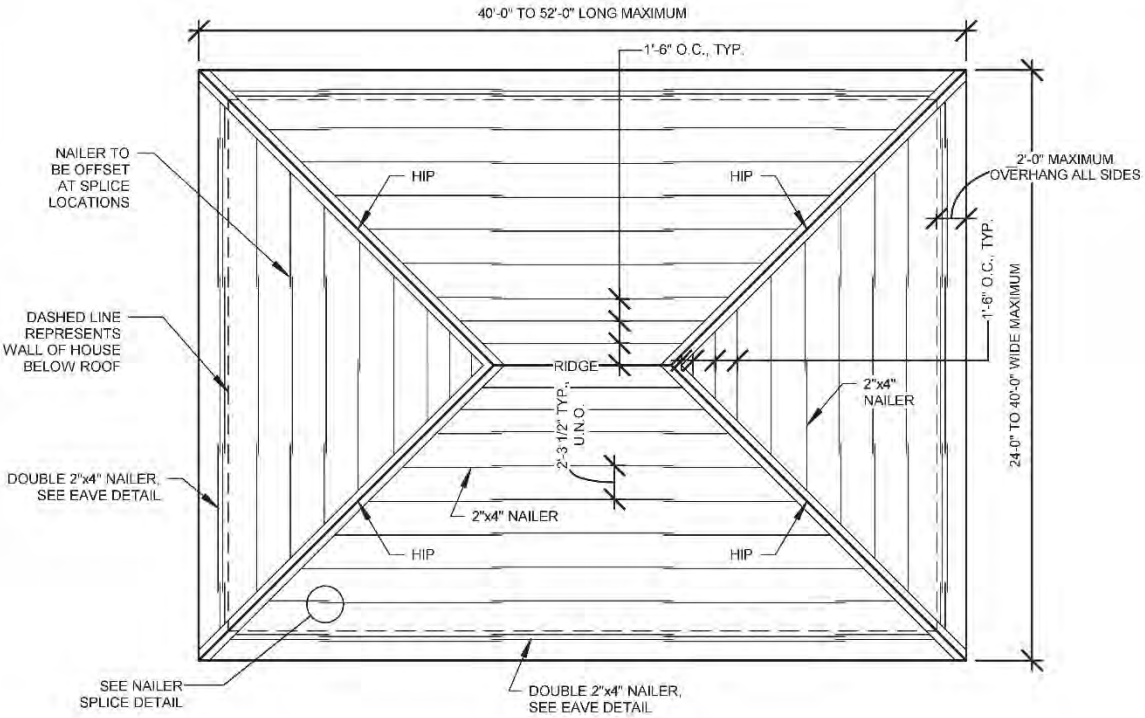
DRAWING TITLE: ROOF NAILER LAYOUT-GABLE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

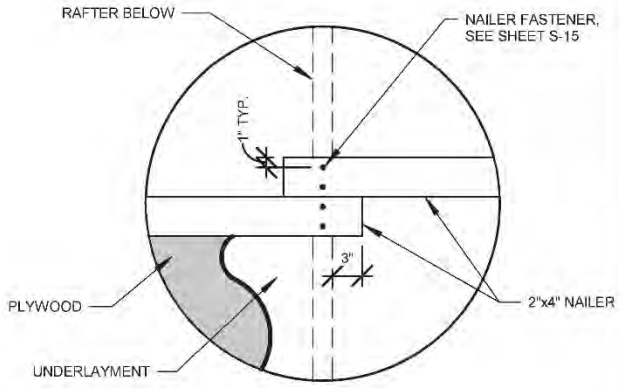
S-17

Sheet Number 17 of 63



NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

ROOF NAILER LAYOUT-HIP



NAILER SPLICE DETAIL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

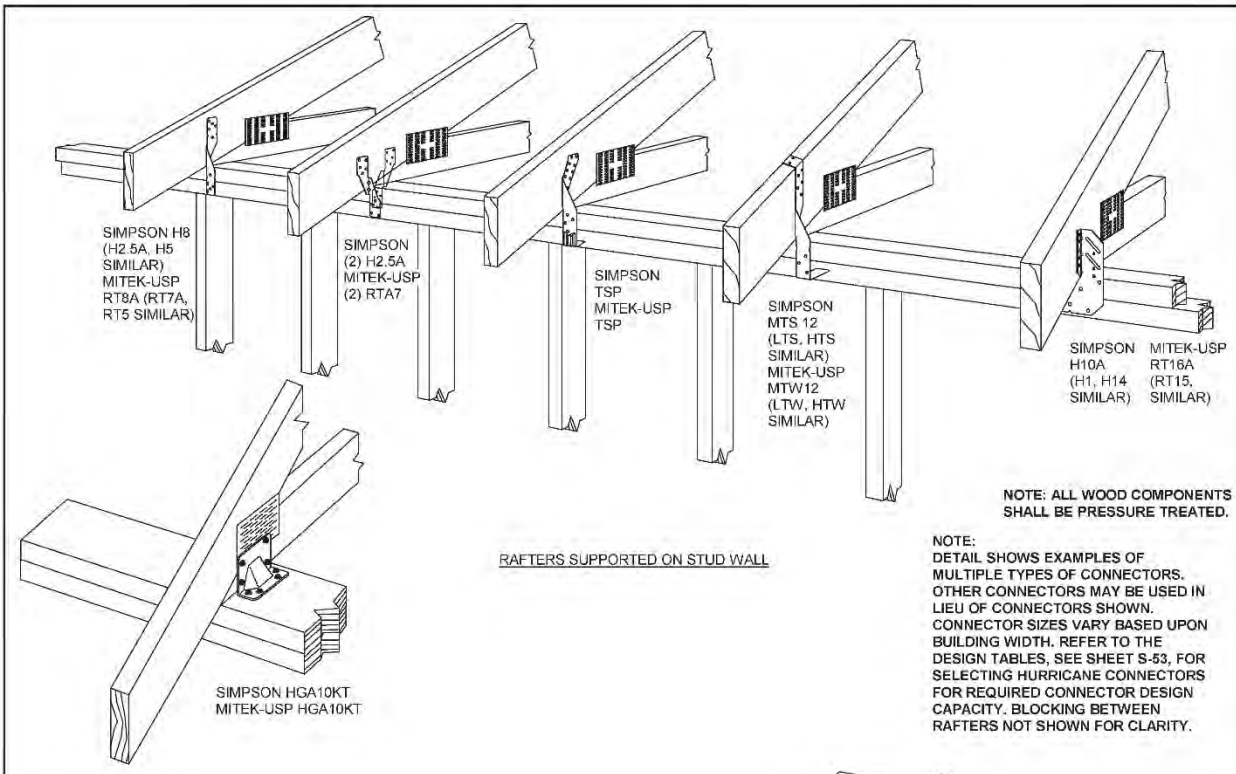
DRAWING TITLE: ROOF NAILER LAYOUT-HIP

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-18

Sheet Number 18 of 63

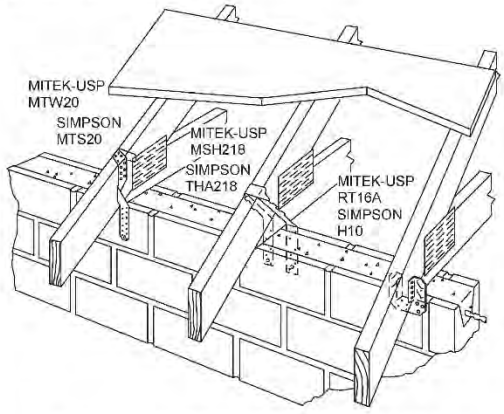


RAFTERS SUPPORTED ON STUD WALL

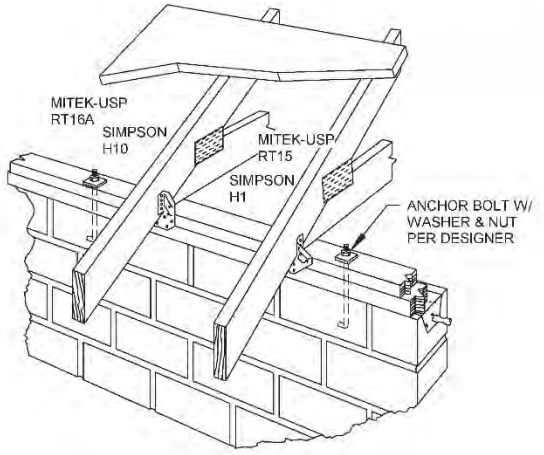
NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

NOTE:
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN. CONNECTOR SIZES VARY BASED UPON BUILDING WIDTH. REFER TO THE DESIGN TABLES, SEE SHEET S-53, FOR SELECTING HURRICANE CONNECTORS FOR REQUIRED CONNECTOR DESIGN CAPACITY. BLOCKING BETWEEN RAFTERS NOT SHOWN FOR CLARITY.

DETAILS COURTESY OF THE SIMPSON STRONG-TIE COMPANY



RAFTERS SUPPORTED ON CMU WALL W/O TOP PLATES



RAFTERS SUPPORTED ON CMU WALL W/ TOP PLATES

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

RECOMMENDED RAFTER CONNECTORS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

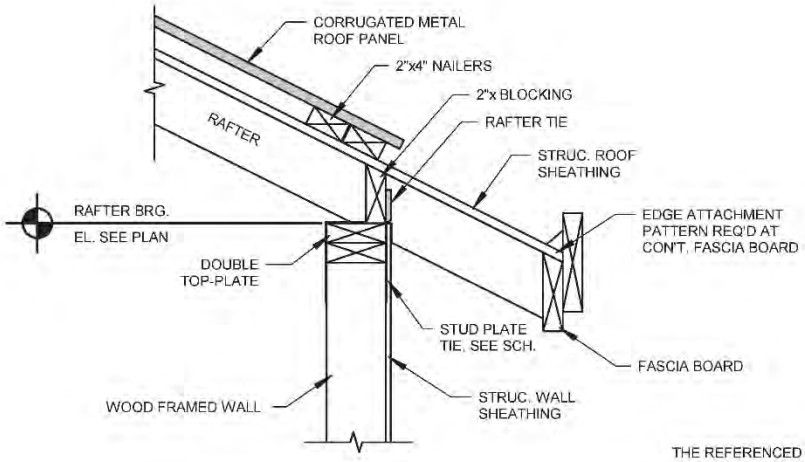
DRAWING TITLE: TRUSS/RAFTER CONNECTORS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-19

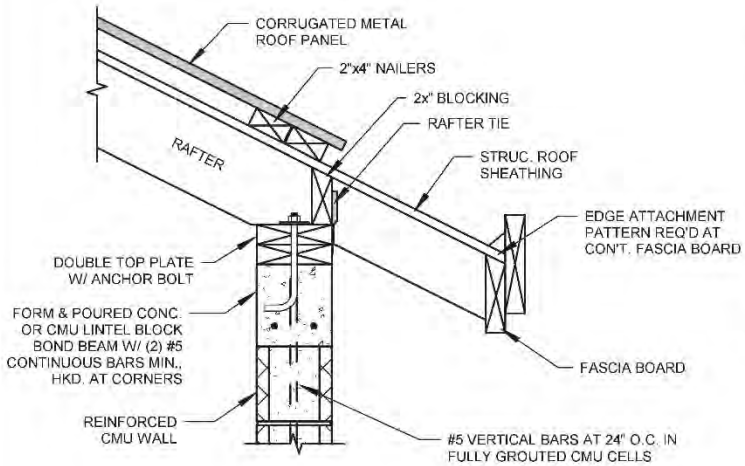
Sheet Number 19 of 63



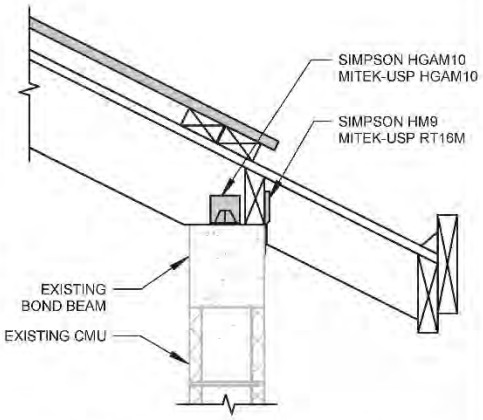
RAFTER BEARING AT WOOD FRAMED WALL

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



RAFTER BEARING AT CMU WALL



RETROFIT OF EXISTING BOND BEAM

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

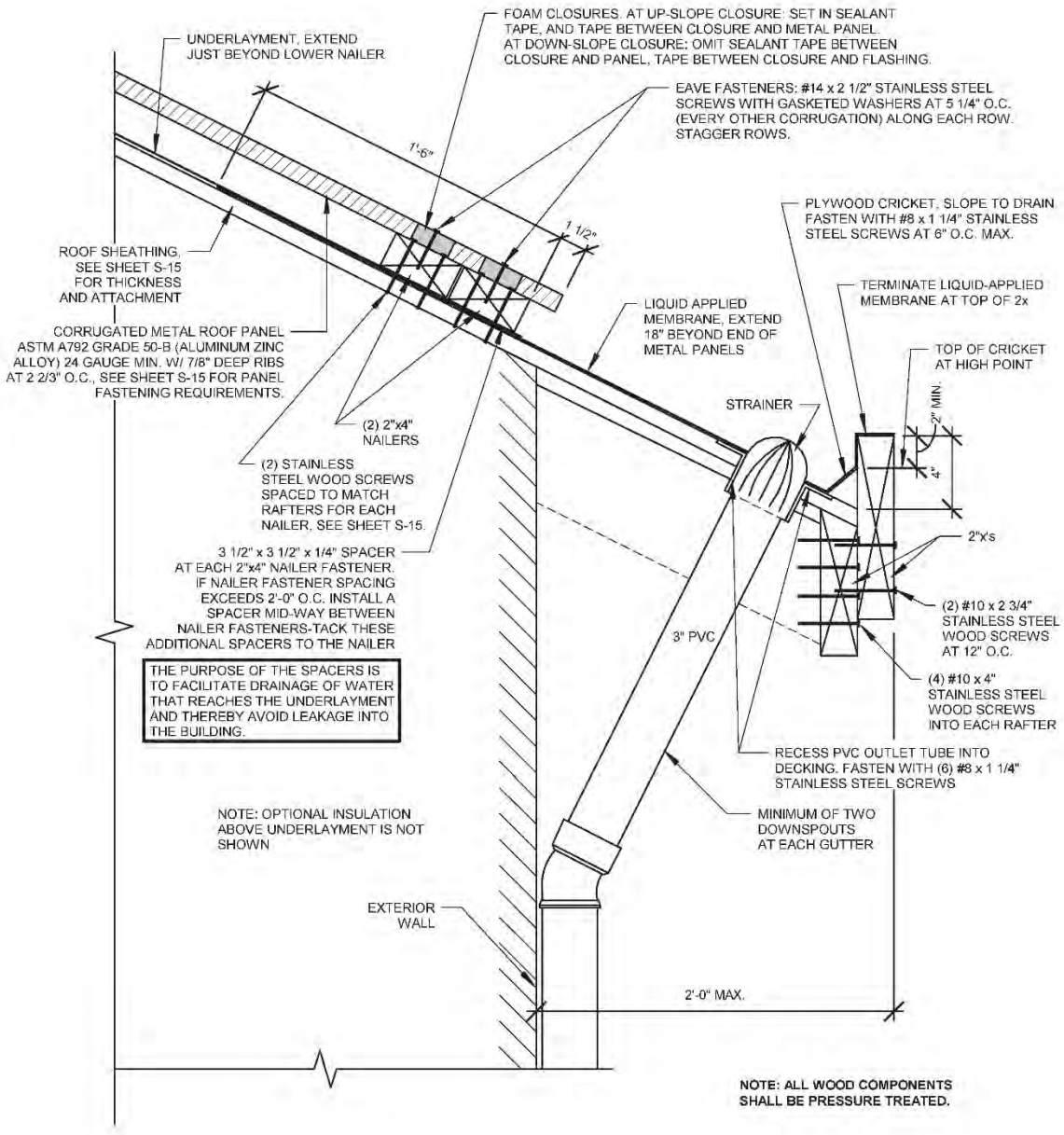
DRAWING TITLE: RAFTER BEARING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-20

Sheet Number 20 of 63



EAVE DETAIL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

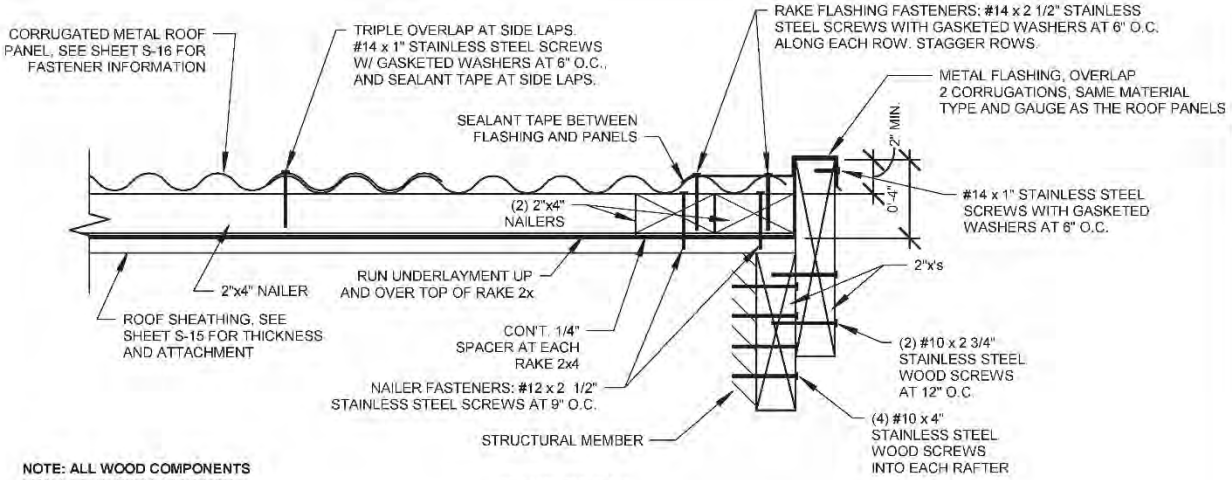
DRAWING TITLE: ROOF GUTTER AT EAVE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

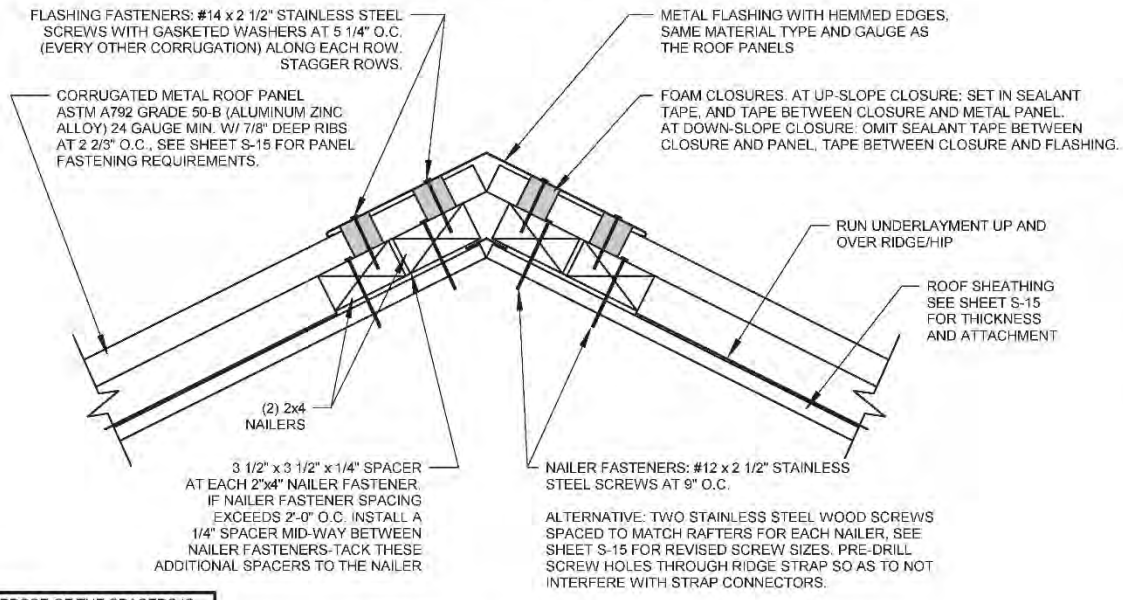
S-21

Sheet Number 21 of 63



NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

RAKE DETAIL



THE PURPOSE OF THE SPACERS IS TO FACILITATE DRAINAGE OF WATER THAT REACHES THE UNDERLAYMENT AND THEREBY AVOID LEAKAGE INTO THE BUILDING.

RIDGE DETAIL (HIP SIMILAR)

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

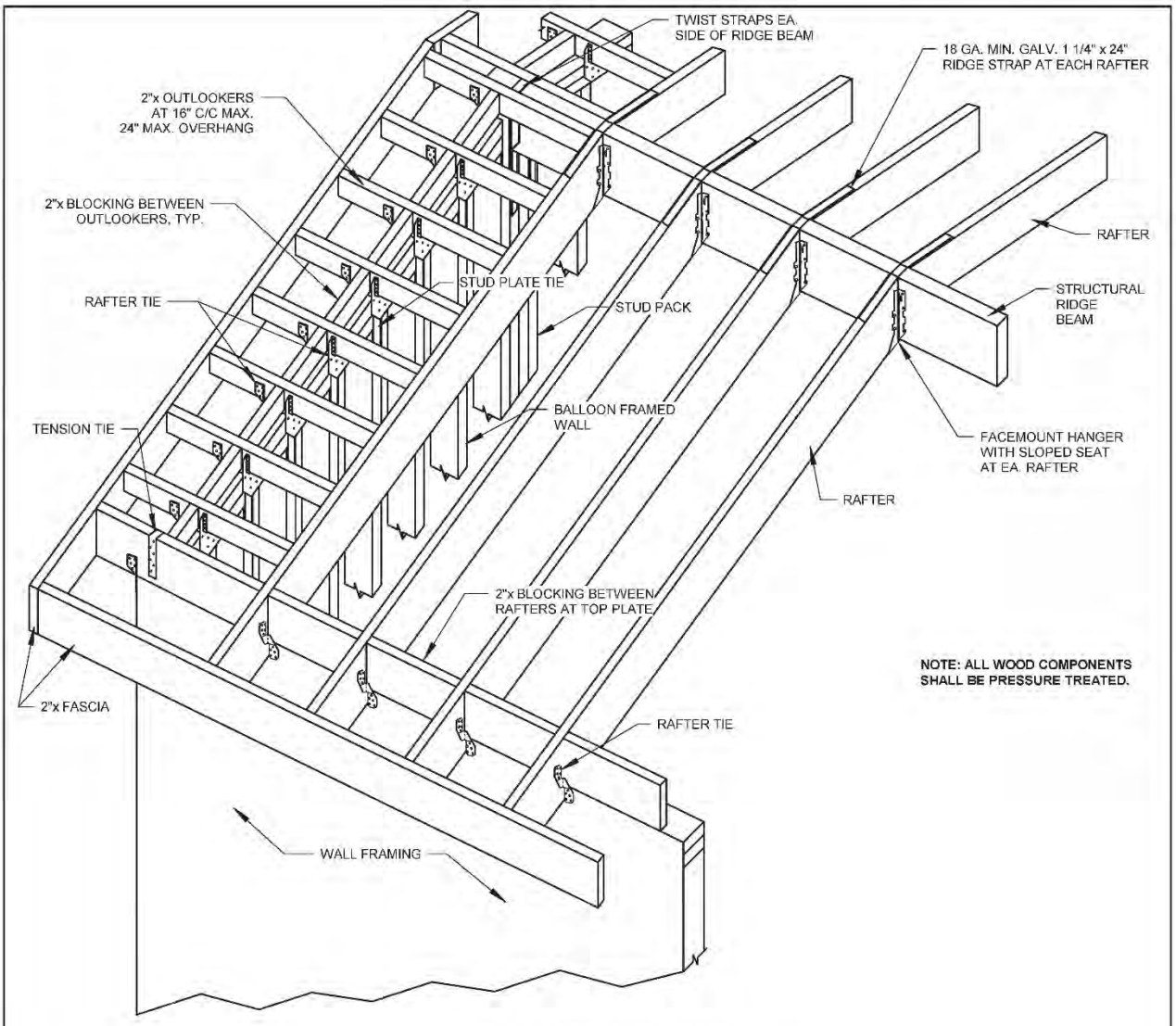
DRAWING TITLE: RAKE AND RIDGE DETAILS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-22

Sheet Number 22 of 63



GABLE END FRAMING DETAIL

NOTES:

1. FOR GABLE END WALL CONSTRUCTED OF MASONRY, PROVIDE SLOPED BOND BEAM WITH SIMILAR OUTLOOKER FRAMING.
2. FOR BALLOON FRAMED WALLS WHICH EXCEED 14'-3" IN HEIGHT, PROVIDE ANGLED KNEEBRACES. REFERENCE SHEET S-24.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

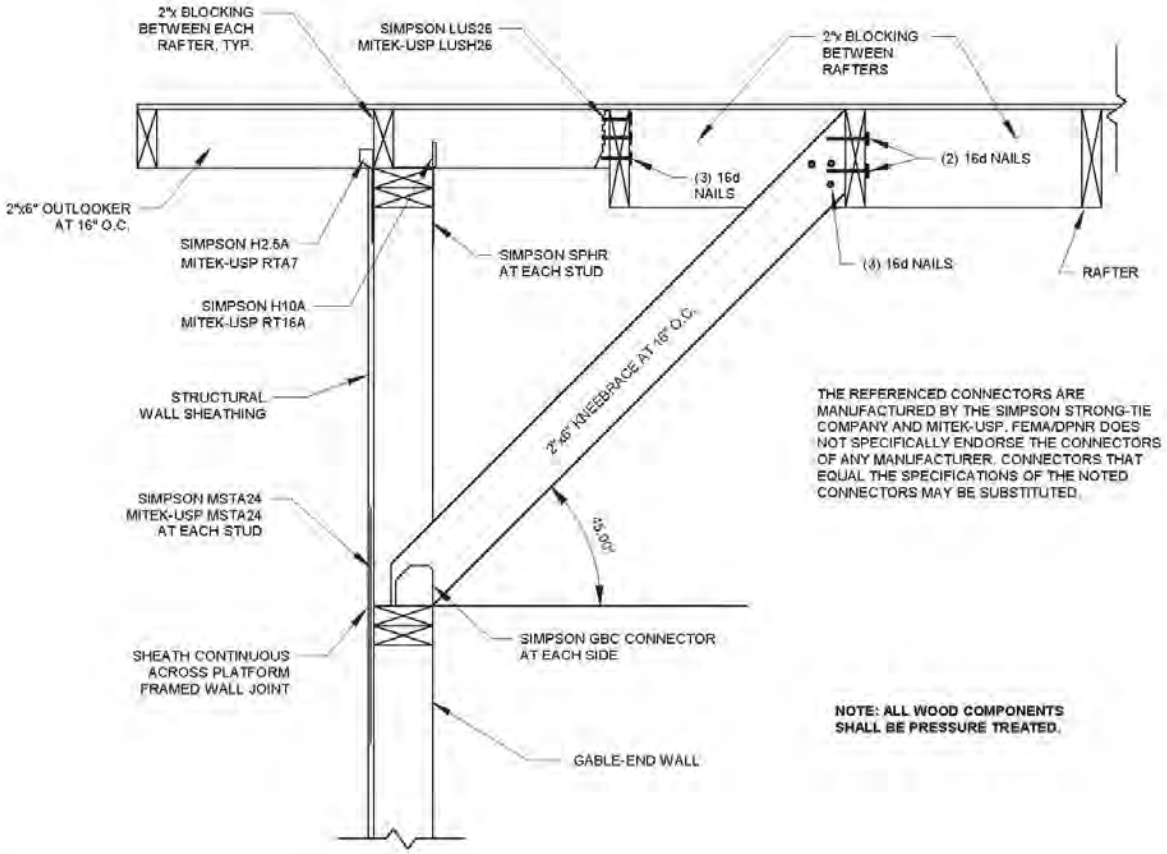
DRAWING TITLE: GABLE END FRAMING DETAIL

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-23

Sheet Number 23 of 63



KNEEBRACE DETAIL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

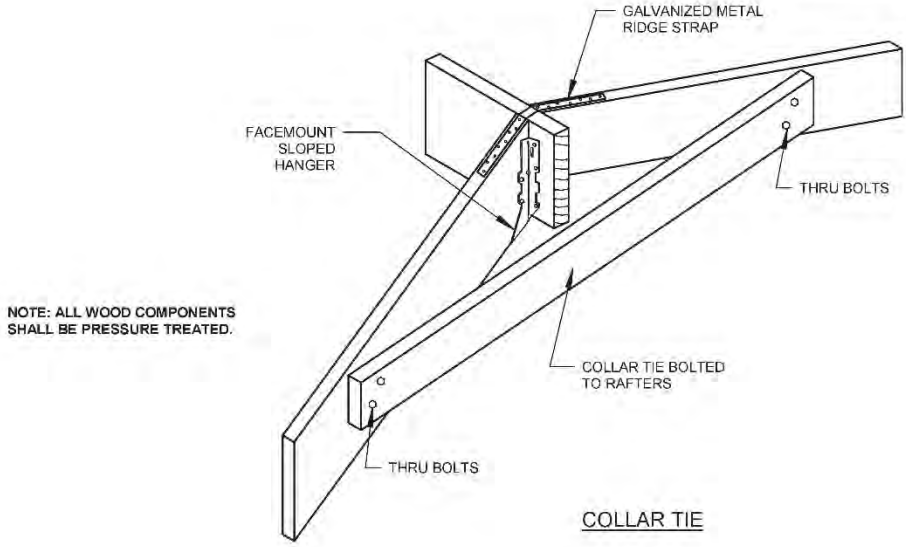
DRAWING TITLE: GABLE END BRACING WITH KNEEBRACE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

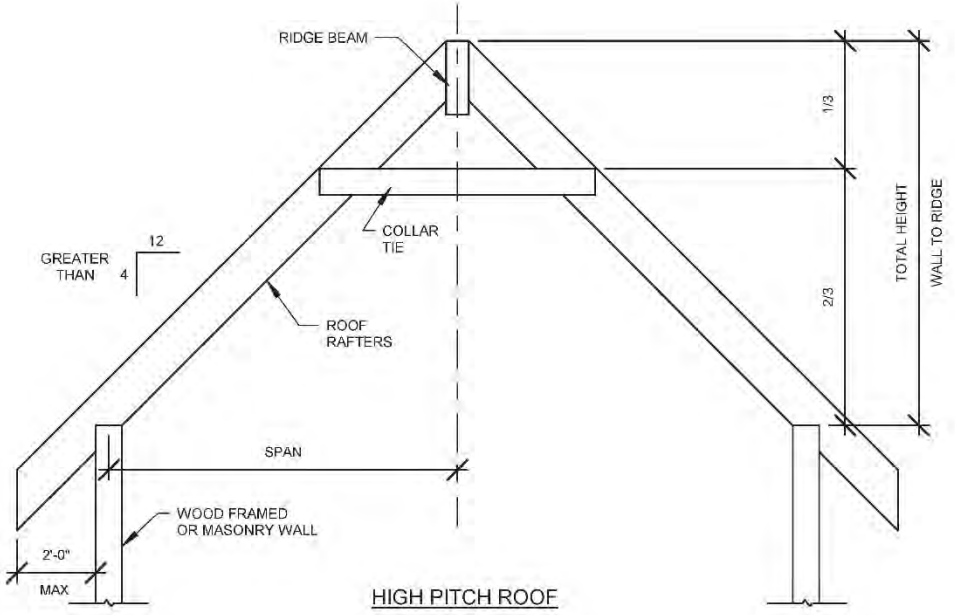
Sheet Number:

S-24

Sheet Number 24 of 63



COLLAR TIE



HIGH PITCH ROOF

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

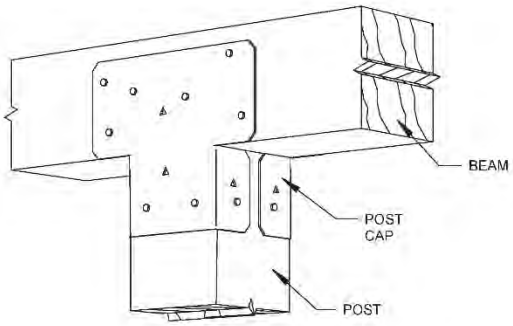
DRAWING TITLE: COLLAR TIE TO RAFTERS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

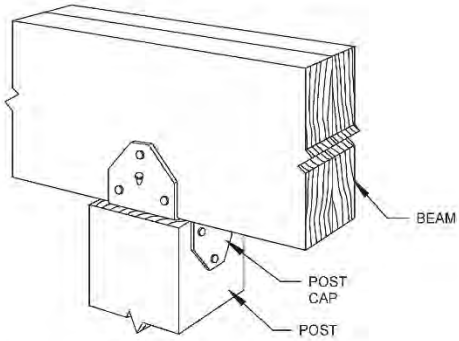
Sheet Number:

S-25

Sheet Number 25 of 63



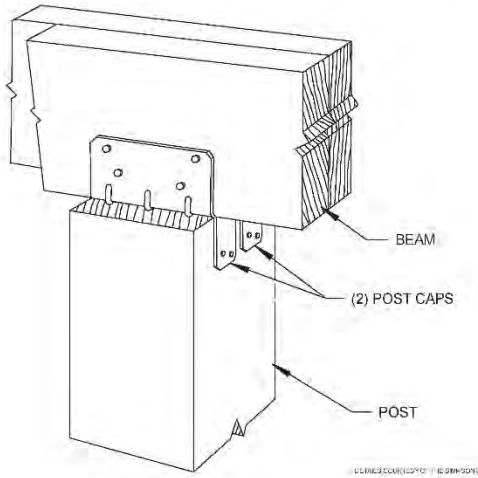
SIMPSON AC
MITEK PBS



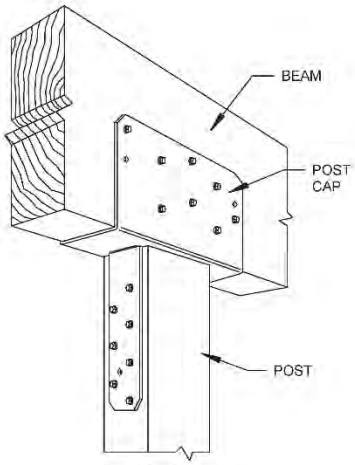
SIMPSON BC/BCS
MITEK BC/C

NOTE
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN. REFER TO THE DESIGN TABLES FOR SELECTING HURRICANE CONNECTORS FOR REQUIRED CONNECTOR DESIGN CAPACITY

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



SIMPSON LPC
MITEK PB



SIMPSON CCQ
MITEK KCCQ

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

RECOMMENDED POST CAP ANCHORAGE

DETAILS ARE FOR INFORMATIVE PURPOSES ONLY AND NOT RELATED TO A SPECIFIC DESIGN.

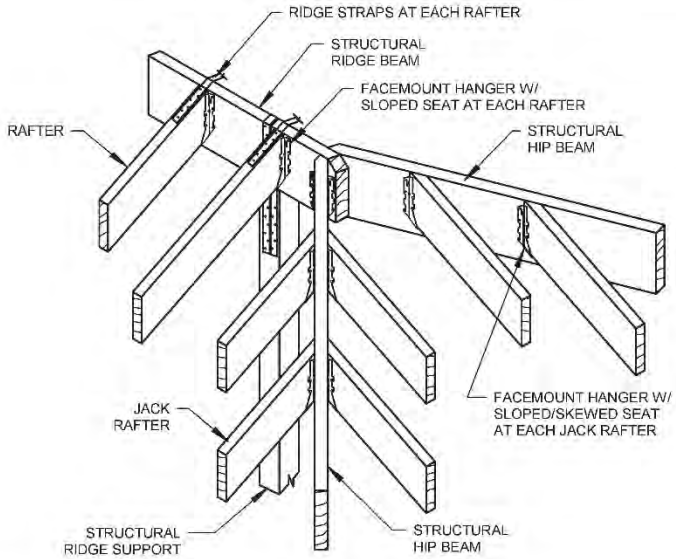
DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: POST CAP CONNECTIONS

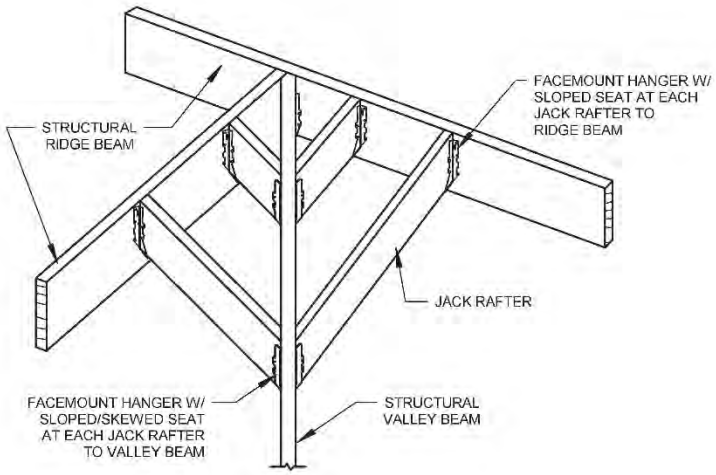
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-26
Sheet Number 26 of 63



NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

HIP RAFTER ROOF FRAMING



VALLEY RAFTER ROOF FRAMING

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: TYPICAL HIP ROOF FRAMING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-27

Sheet Number 27 of 63

WALLS

CONSTRUCT THE HOUSE WALLS TO RESIST ALL APPROPRIATE HAZARD LOADS, INCLUDING BUT NOT LIMITED TO WIND, FLOOD, AND SEISMIC LOADS. THE EXTERIOR WALLS AND IN SOME CASES THE INTERIOR WALLS, ARE DESIGNED TO TRANSFER WEIGHT AND LOADING TO THE FOUNDATION. ADEQUATE WALL TO FLOOR TO FOUNDATION CONNECTORS ARE ESSENTIAL TO TIE THE HOUSE TOGETHER.

IN WOOD HOMES USE PROPERLY ATTACHED METAL CONNECTORS TO TIE ROOF TO WALL AND THE WALL TO THE FLOOR STRUCTURE AND FOUNDATION. EMPLOY PROPERLY SIZED AND SPACED ANCHOR BOLTS TO SECURE THE MUDSILL TO THE CONCRETE OR BLOCK FOUNDATION WALL.

MASONRY HOME WALLS REQUIRE PROPERLY SIZED AND SPACED VERTICAL AND HORIZONTAL STEEL REINFORCEMENT AND IN CEMENT BLOCK CONSTRUCTION, ADEQUATE CONCRETING OF BOND BEAMS AND VERTICAL BLOCK CELLS.

IN LIEU OF A SITE SPECIFIC DESIGN FOR SHUTTERS, WINDOWS, AND EXTERIOR DOORS, THIS DOCUMENT INCLUDES WIND DESIGNS FOR BUILDINGS LOCATED IN EXPOSURE B WITHOUT WIND SPEED-UP EFFECTS, AND EXPOSURE D WITHOUT WIND SPEED-UP EFFECTS, AND EXPOSURE B THAT ARE SUBJECTED TO WIND SPEED-UP EFFECTS*.

IT IS RECOMMENDED SHUTTERS RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 PSF OR GREATER IN ACCORDANCE WITH ASTM E1886 AND ASTM E1996 USING MISSILE D.

WINDOWS WITHOUT SHUTTER PROTECTION MUST USE IMPACT RESISTANT GLAZING. THE IMPACT RESISTANT GLAZING IS RECOMMENDED TO RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 PSF OR GREATER IN ACCORDANCE WITH ASTM E1886 AND ASTM E1996 USING MISSILE D. WINDOWS TO BE TESTED IN ACCORDANCE WITH ASTM E330 TO RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 OR GREATER. METAL JALOUSIE WINDOWS AND OTHER WINDOWS, IF PROTECTED BY A SHUTTER, NEED ONLY BE TESTED IN ACCORDANCE WITH ASTM E330 TO RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 PSF OR GREATER.

EXTERIOR DOORS TO BE TESTED IN ACCORDANCE WITH ASTM E330 TO RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 PSF OR GREATER. THE IMPACT RESISTANT GLAZING OF EXTERIOR DOORS IS REQUIRED TO RESIST AN ALLOWABLE DESIGN WIND PRESSURE OF +72/-72 PSF OR GREATER IN ACCORDANCE WITH ASTM E1886 USING MISSILE D.

*BUILDINGS LOCATED IN EXPOSURE C WITH WIND SPEED-UP EFFECTS, AND IN EXPOSURE D WITH WIND SPEED-UP EFFECTS REQUIRE A SITE SPECIFIC DESIGN.

ALL CONSTRUCTION MUST COMPLY WITH THE LATEST U.S.V.I. BUILDING CODE. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

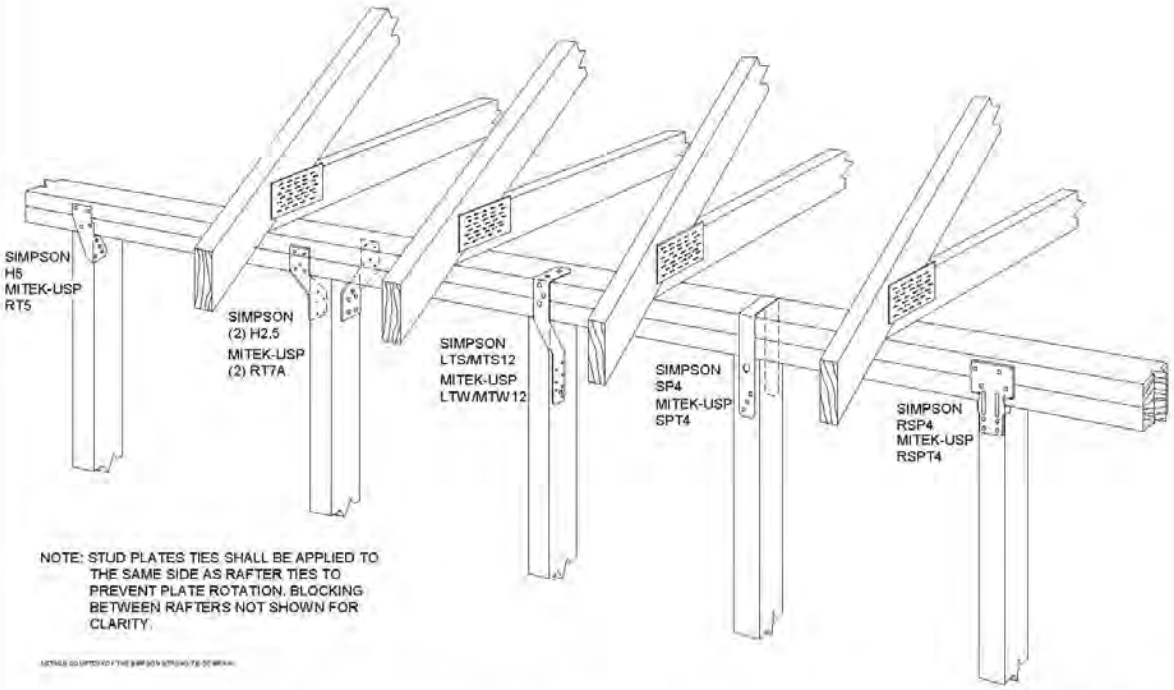
DRAWING TITLE: WALLS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-28

Sheet Number 28 of 63



NOTE: STUD PLATES TIES SHALL BE APPLIED TO THE SAME SIDE AS RAFTER TIES TO PREVENT PLATE ROTATION. BLOCKING BETWEEN RAFTERS NOT SHOWN FOR CLARITY.

RECOMMENDED TOP PLATE TO STUD CONNECTORS

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

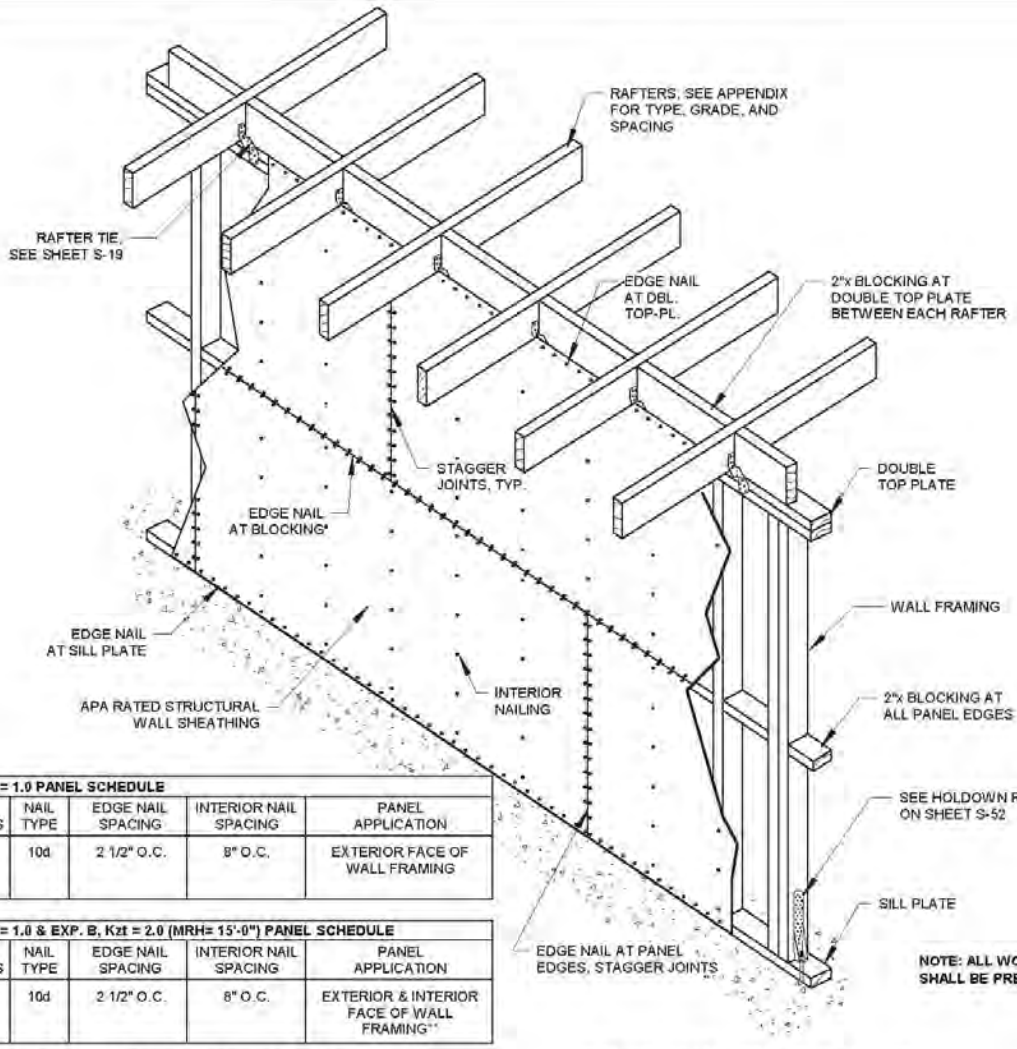
DRAWING TITLE: TOP PLATE TO STUD CONNECTORS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-29

Sheet Number 29 of 63



EXP. B, Kzt = 1.0 PANEL SCHEDULE				
PANEL THICKNESS	NAIL TYPE	EDGE NAIL SPACING	INTERIOR NAIL SPACING	PANEL APPLICATION
15/32"	10d	2 1/2" O.C.	8" O.C.	EXTERIOR FACE OF WALL FRAMING

EXP. D, Kzt = 1.0 & EXP. B, Kzt = 2.0 (MRH= 15'-0") PANEL SCHEDULE				
PANEL THICKNESS	NAIL TYPE	EDGE NAIL SPACING	INTERIOR NAIL SPACING	PANEL APPLICATION
15/32"	10d	2 1/2" O.C.	6" O.C.	EXTERIOR & INTERIOR FACE OF WALL FRAMING**

** INTERIOR SHEATHING ONLY REQUIRED AT FIRST FLOOR LEVEL.

STRUCTURAL WALL SHEATHING

NOTES

1. WALL PANEL BASIS OF DESIGN:
   A. MEAN ROOF HEIGHT (MRH) = 30'-0" MAX., U.N.O.
   B. MAX. WALL HEIGHTS FOR 2-STORY STRUCTURE = 9'-6"
   C. MAX. ROOF PITCH = 12/12 (ROOF ANGLE = 45 DEGRESS).
   D. MAX. BUILDING LENGTH = 52'-0"
   E. MIN. USEABLE SHEAR WALL LENGTH (WALL LENGTH-WALL OPENINGS) PER SIDE = 24'-0".
   F. MAX. USEABLE SHEAR WALL ASPECT RATIOS (h/b) SHALL BE 3.5:1, (HEIGHT: WIDTH).
   G. WALL FRAMING (WALL STUDS AND PLATES) SHALL BE SOUTHERN PINE OR DOUGLAS-FIR-LARCH WITH MIN. NOMINAL THICKNESS OF 2 INCHES.
2. INTERIOR SHEAR WALLS ARE NOT CONSIDERED IN THE DESIGN, IF APPLICABLE. CONTACT ENGINEEER LICENSED IN THE U.S. VIRGIN ISLANDS FOR FURTHER ANALYSIS.
3. FOR TWO-STORY STRUCTURES LOCATED IN EXPOSURE B Kzt = 2.0, PROVIDE REINFORCED MASONRY WALL CONSTRUCTION.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

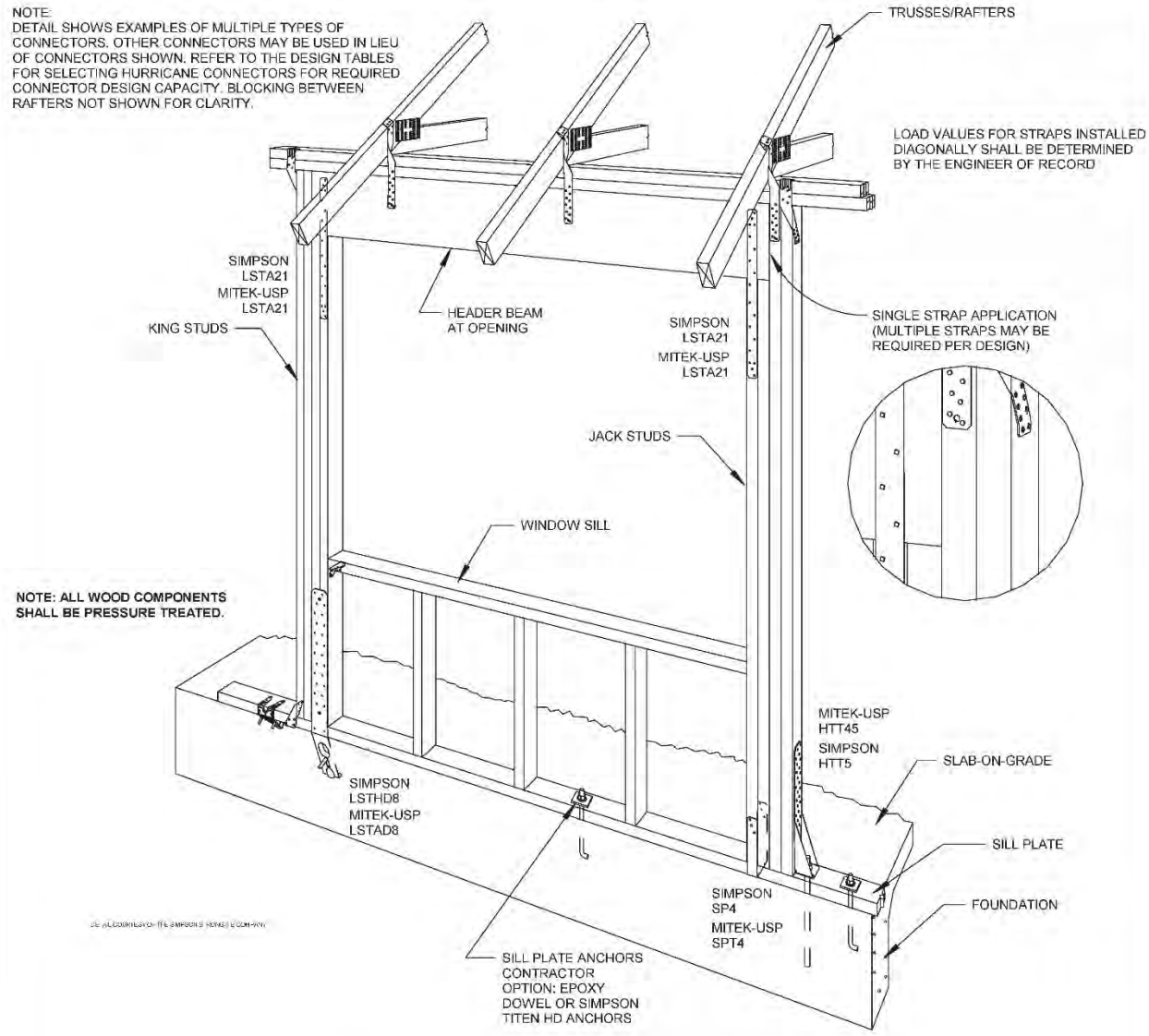
BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: STRUCTURAL WALL SHEATHING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-30
Sheet Number 30 of 63

NOTE:
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN. REFER TO THE DESIGN TABLES FOR SELECTING HURRICANE CONNECTORS FOR REQUIRED CONNECTOR DESIGN CAPACITY. BLOCKING BETWEEN RAFTERS NOT SHOWN FOR CLARITY.



RECOMMENDED WALL OPENING ANCHORAGE

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

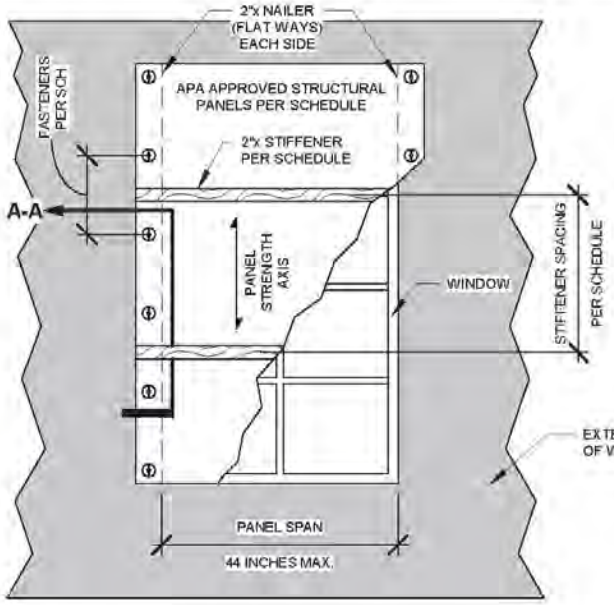
DRAWING TITLE: WOOD WALL OPENING

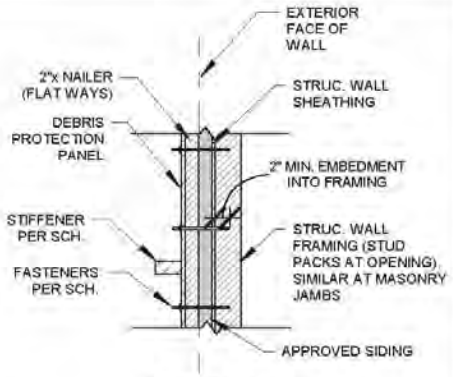
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-31

Sheet Number 31 of 63





SECTION A-A

WIND-BORNE DEBRIS PROTECTION FOR GLAZED AND JALOUSIE WINDOW OPENINGS

NOTES:

1. THE DETAIL'S INTENDED USE IS TO PROVIDE PROTECTION FROM WIND-BORNE DEBRIS. THE PREFERRED METHOD OF PROTECTION IS APPROVED IMPACT RESISTANT GLAZING OR APPROVED IMPACT RESISTANT COVERINGS (i.e. SHUTTER SYSTEM).
2. THE WOOD PANEL OPTION ONLY APPLIES TO OPENINGS WHICH DO NOT EXCEED 44 INCHES IN WIDTH. OPENINGS GREATER THAN 44 INCHES WIDE SHALL BE PROTECTED BY ONE OF THE PREFERRED METHODS MENTIONED IN THE ABOVE NOTE (NOTE #1).
3. DETAILS ARE ONLY APPLICABLE FOR ONE & TWO STORY BUILDINGS WITH A MEAN ROOF HEIGHT OF 30 FEET OR LESS.
4. ALL FASTENERS AND HARDWARE SHALL BE PERMANENTLY INSTALLED AND SHALL BE STAINLESS STEEL.
5. MIN. 3/4" DIAM. WASHER REQUIRED AT EXTERIOR PANEL ATTACHMENT.
6. MIN. 2" EMBEDMENT OF SCREW THREADS INTO WOOD WALL FRAMING.
7. STRUCTURAL PANELS SHALL BE APA RATED CDX PLYWOOD.
8. PANELS SHALL BE PRE-CUT AND PRE-DRILLED FOR INSTALLATION EFFICIENCY.
9. THE HOMEOWNER SHALL BE RESPONSIBLE FOR ROUTINE INSPECTION AND MAINTENANCE OF THE SYSTEM TO ENSURE FUNCTIONALITY FOR THE INTENDED PURPOSE DURING A STORM EVENT.
10. PANELS ATTACHED TO MASONRY SHALL BE ATTACHED USING VIBRATION-RESISTANT ANCHORS HAVING AN ULTIMATE WITHDRAWAL CAPACITY OF NOT LESS THAN 1,500 POUNDS.
11. MASONRY ANCHORS SHALL BE A MINIMUM OF 2.5 INCHES AWAY FROM WINDOW AND DOOR EDGES.
12. FASTENERS SHALL BE LOCATED NOT LESS THAN 1 INCH FROM THE EDGE OF THE PANEL.

DEBRIS PROTECTION-STRUCTURAL PANEL SCHEDULE REQUIREMENTS

STRUCTURAL COMPONENT		PANEL SPAN MAX. STRUCTURAL PANEL SPAN = 44 INCHES
WOOD FRAMED	PANEL	5/8" APA RATED PRESSURE TREATED PLYWOOD
	FASTENER	1/4" DIAMETER LAG SCREWS AT 12" O.C.
	STIFFENER	2"x4" SYP No.2 PRESSURE TREATED AT 16" O.C.
MASONRY	PANEL	5/8" APA RATED PRESSURE TREATED PLYWOOD
	FASTENER	1/4" DIAMETER MASONRY SCREWS AT 12" O.C.
	STIFFENER	2"x4" SYP No.2 PRESSURE TREATED AT 16" O.C.

NOTES:

1. PANEL REQUIREMENTS SHOWN IN TABLE ABOVE ALSO CAN BE APPLIED AT DOOR OPENINGS WHICH DO NOT EXCEED 44 INCHES IN WIDTH.
2. FOR VENTED OPENINGS NOT EXCEEDING 2'-0" x 2'-0", PROVIDE PANEL WITH FASTENERS AS INDICATED IN TABLE ABOVE. STIFFENERS ARE NOT REQUIRED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WIND BORNE DEBRIS PROTECTION AT OPENINGS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-32

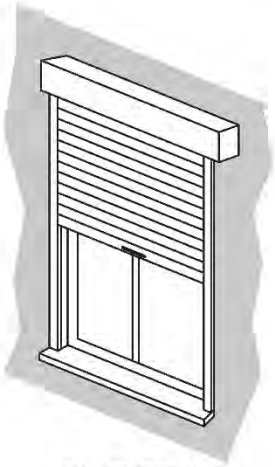
Sheet Number 32 of 63



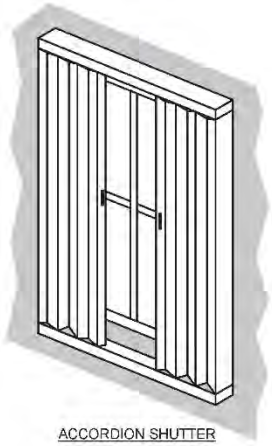
COLONIAL SHUTTERS



BAHAMA SHUTTER



ROLL-UP SHUTTER



ACCORDION SHUTTER

RECOMMENDED SHUTTER STYLES

A VARIETY OF SHUTTER STYLES ARE AVAILABLE FROM THE MOTOR DRIVEN TO THE ROLL-UP STYLE SHUTTER SYSTEM. FOR HOMES WITH NON-STANDARD SHAPED WINDOWS WHICH COULD REQUIRE CUSTOM SHUTTERS, AS AN ALTERNATIVE DUE TO CUSTOM SHUTTER COST, SUCH WINDOWS MAY BE FABRICATED WITH LAMINATED IMPACT-RESISTANT GLASS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

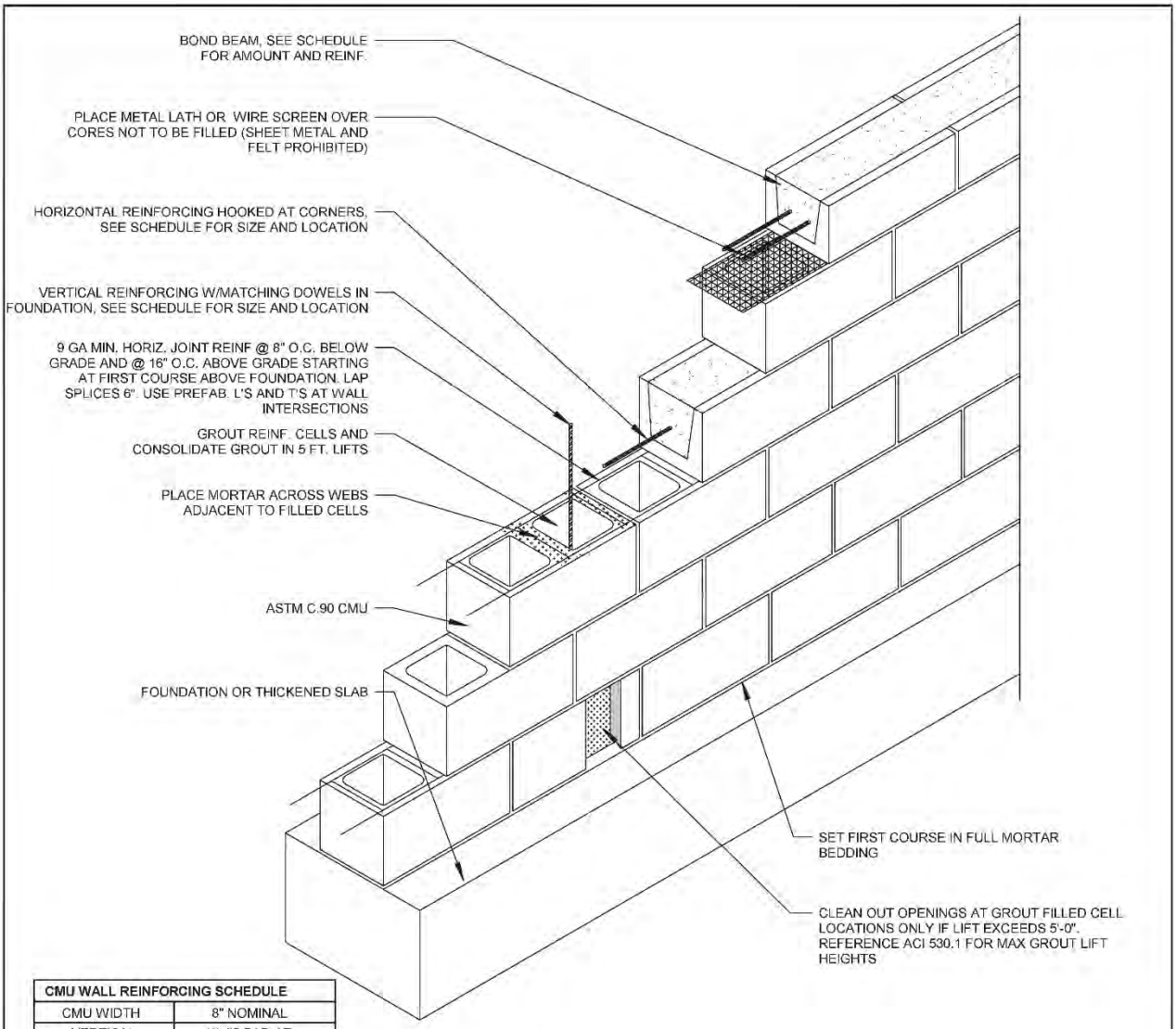
DRAWING TITLE: SHUTTER STYLES

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-33

Sheet Number 33 of 63



CMU WALL REINFORCING SCHEDULE	
CMU WIDTH	8" NOMINAL
VERTICAL REINFORCEMENT	(1) #5 BAR AT 24" O.C.
HORIZONTAL REINFORCEMENT	(1) #4 BAR AT 48" O.C.
BOND BEAM REINFORCEMENT	(2) #5 BARS CONTINUOUS
HORIZ. JOINT REINFORCEMENT	#9 GAUGE AT 8" O.C. BELOW GRADE AND 16" O.C. ABOVE GRADE

TYPICAL MASONRY WALL CONSTRUCTION

NOTES:

1. MAXIMUM UNBRACED WALL HEIGHT SHALL NOT EXCEED 11'-6".
2. FULLY GROUT REINFORCED CELLS.
3. HOOK CONTINUOUS HORIZONTAL REINFORCEMENT AT CORNERS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

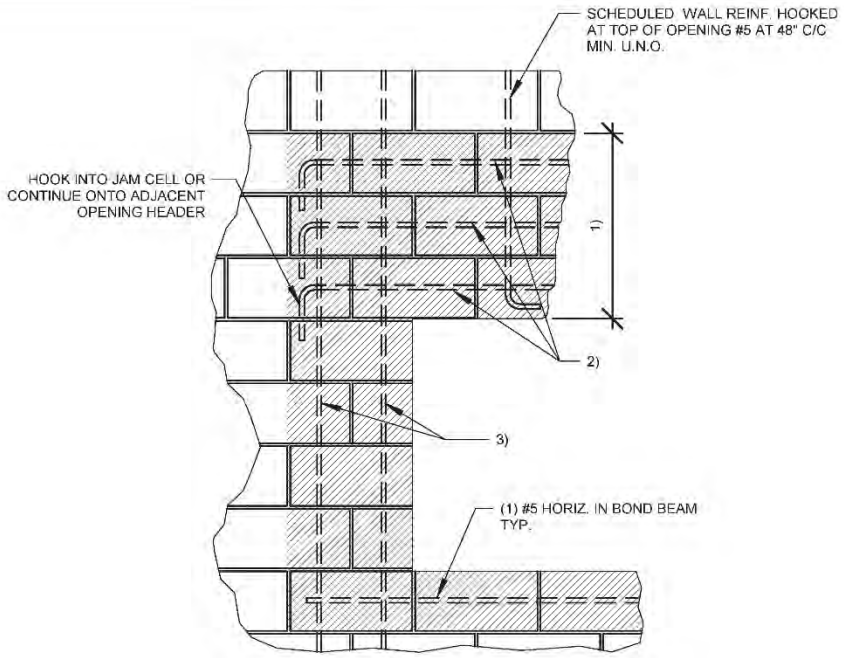
DRAWING TITLE: CMU WALL CONSTRUCTION

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-34

Sheet Number 34 of 63



CMU PILASTER

CMU LINTEL/JAMB SCHEDULE				
MAX OPENING SPAN	CMU WIDTH	1) MIN. DEPTH OF FULL GROUTED CELLS	2) HORIZONTAL BOTT. REINF. U.N.O. (1 HORIZ.) PER COURSE	3) MIN. ADJACENT FULLY GROUTED CELLS AND REINF. (1 VERT.) PER CELL U.N.O.
≤ 4'-4"	8"	8"	(1) #5 BOTT.	8" #5
4'-0" < OPNG. ≤ 6'-0"	8"	16"	(1) #5 BOTT.	16" (2) #5
6'-0" < OPNG. ≤ 8'-0"	8"	24"	(1) #5 BOTT.	16" (2) #6
8'-0" < OPNG. ≤ 10'-0"	8"	32"	(2) #5 BOTT.	16" (2) #6

NOTES:

1. #6 VERT. SHALL START ABOVE FOOTING WITH A MINIMUM LAP LENGTH OF 30".
2. VERIFY ALL CMU OPENINGS W/ ARCHITECT DWG'S.
3. ALL CMU LINTEL BEAMS ABOVE BOTTOM COURSE SHALL BE CONSTRUCTED OF OPEN BOTTOM LINTEL UNITS, OR STRETCHER COURSES WITH 1/2 WEB CUT OUT.
4. COORDINATE W/ SECTIONS, DETAILS, & GENERAL NOTES.
5. PRE-CAST CONCRETE LINTEL MAY BE USED IN LIEU OF LINTEL BLOCK.
6. REFER TO PLANS FOR FULLY GROUTED AREAS.

CMU LINTEL/JAMB DETAIL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

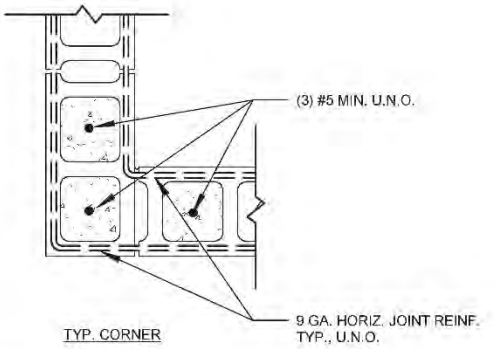
DRAWING TITLE: CMU WALL OPENING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

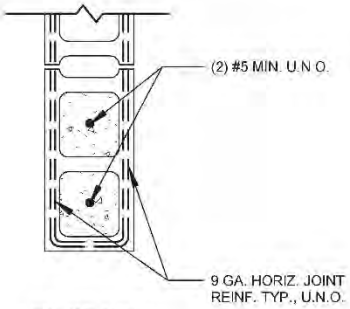
Sheet Number:

S-35

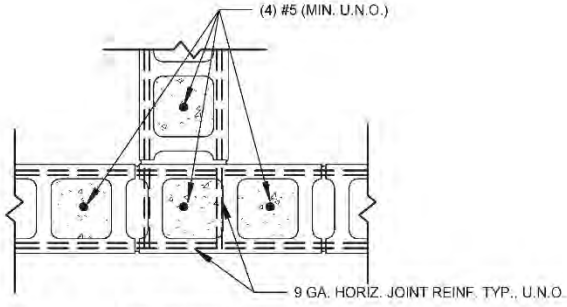
Sheet Number 35 of 63



TYP. CORNER



TYP. END (U.N.O.)



INTERSECTION

NOTE:

MINIMUM REINFORCING SHOWN APPLIES UNLESS SHOWN OTHERWISE ON PLANS OR SECTIONS.

USE BAR POSITIONERS.

DO NOT INTERLOCK LOAD BEARING AND NON-LOAD BEARING WALLS.

TYPICAL CMU DETAILS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: TYPICAL CMU DETAILS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-36

Sheet Number 36 of 63

FLOORS

MOST WOOD FLOOR SYSTEMS CONSIST PRIMARILY OF JOISTS SUPPORTED BY INTERNAL BEAMS AND PERIMETER CONCRETE OR BLOCK WALLS. PLYWOOD SHEATHING FASTENED TO THE JOISTS PROVIDES THE SUBFLOOR. CONCRETE SLAB FLOORS THICKENED AND REINFORCED AT BEARING POINTS AND WALLS ARE A CONSTRUCTION ALTERNATIVE.

WOOD FLOORS SHOULD BE A MINIMUM OF EIGHTEEN INCHES (18") ABOVE THE SOIL. THERE SHOULD BE ADEQUATE VENTILATION UNDER THE HOUSE, A VAPOR BARRIER OVER THE SOIL AND ENOUGH SPACE FOR MAINTENANCE WORK TO BE PERFORMED. ALL LUMBER USED IN FLOOR CONSTRUCTION SHOULD BE PRESSURE TREATED, STRUCTURAL GRADE MATERIAL.

WIND AND OR FLOOD WATER CAN SEPARATE THE FLOOR FROM THE FOUNDATION IF THE CONNECTIONS BETWEEN THE TWO ARE INADEQUATE. ALL COMPONENTS OF THE FLOOR SYSTEM MUST BE STRUCTURALLY ADEQUATE AND PROPERLY SIZED.

ALL CONSTRUCTION MUST COMPLY WITH THE LATEST U.S.V.I. BUILDING CODE. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

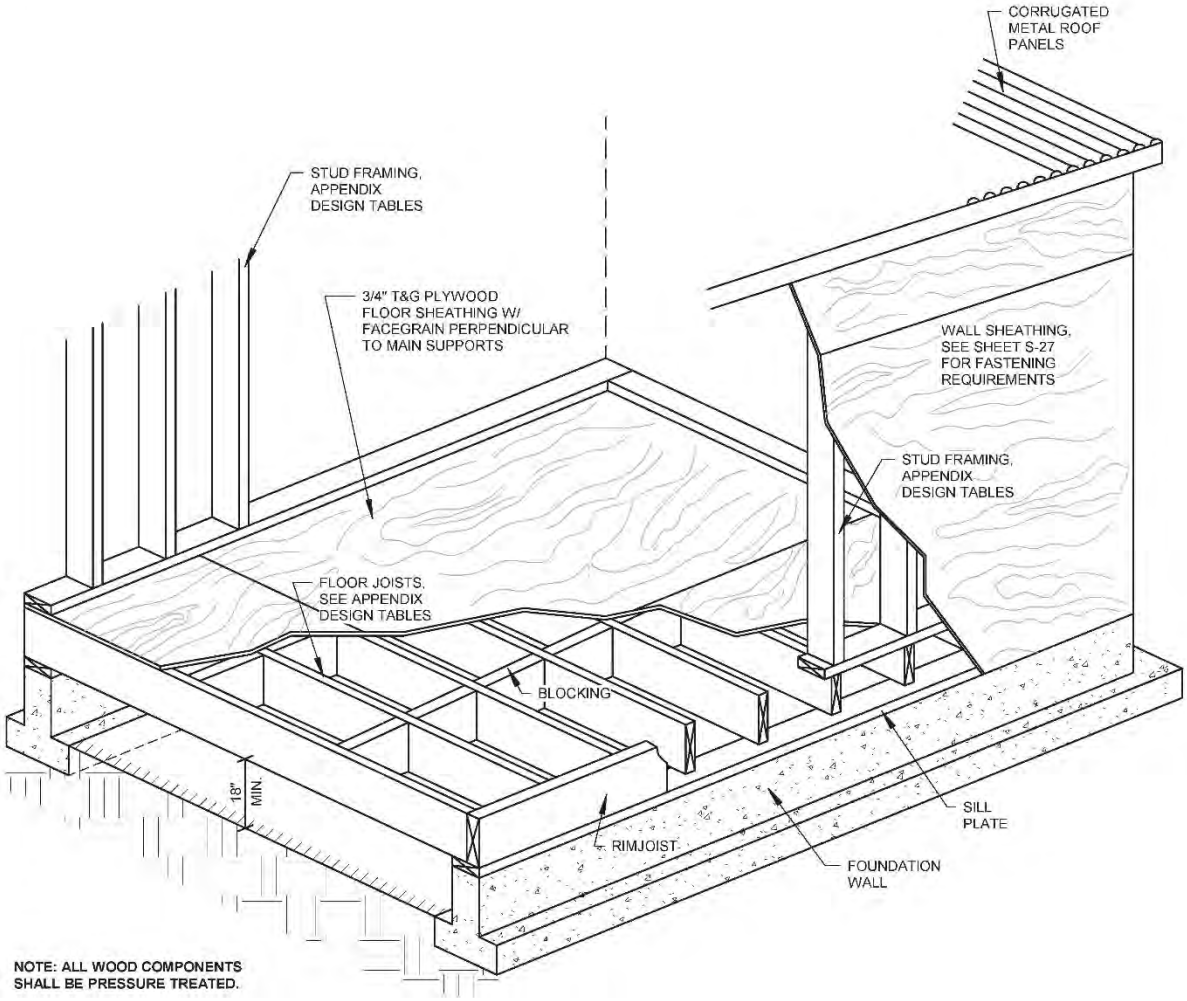
DRAWING TITLE: FLOORS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-37

Sheet Number 37 of 63



FLOOR FRAMING

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

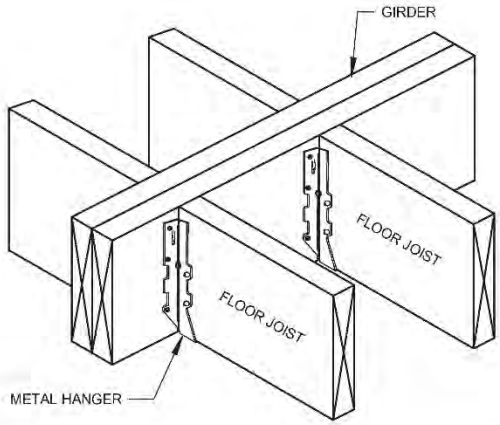
DRAWING TITLE: FLOOR FRAMING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

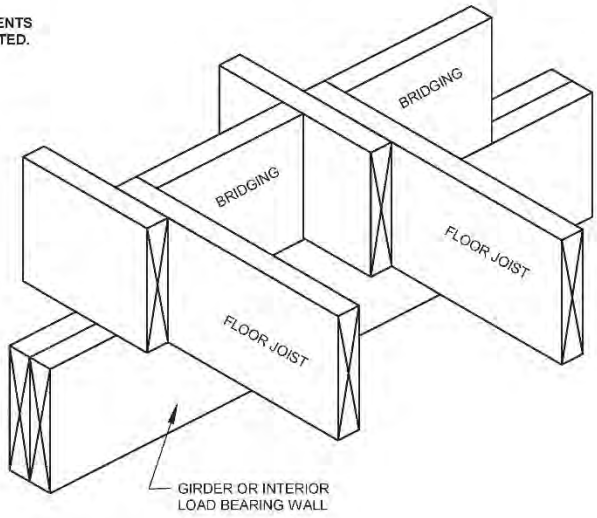
S-38

Sheet Number 38 of 63



JOISTS SUPPORTED BY FACE MOUNT HANGERS

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



JOISTS BEARING ON GIRDER OR INTERIOR LOAD BRG. WALL

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

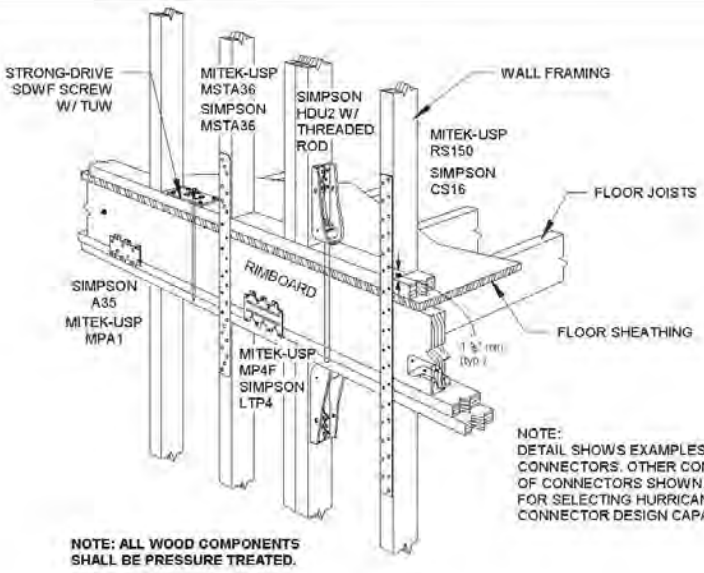
DRAWING TITLE: FLOOR JOIST FRAMING

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

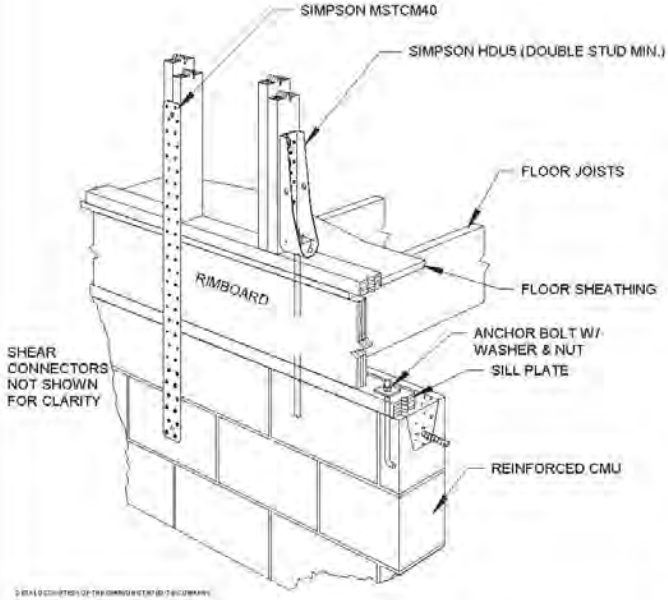
Sheet Number:

S-39

Sheet Number 39 of 63

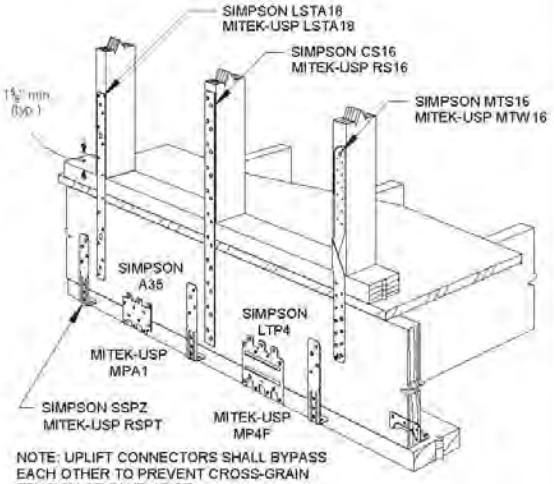


RECOMMENDED FLOOR -TO-FLOOR CONNECTORS



RECOMMENDED FLOOR -TO-CMU CONNECTORS

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.



NOTE: UPLIFT CONNECTORS SHALL BYPASS EACH OTHER TO PREVENT CROSS-GRAIN TENSION OF BAND JOIST

RECOMMENDED STUD-TO-RIMBOARD CONNECTORS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

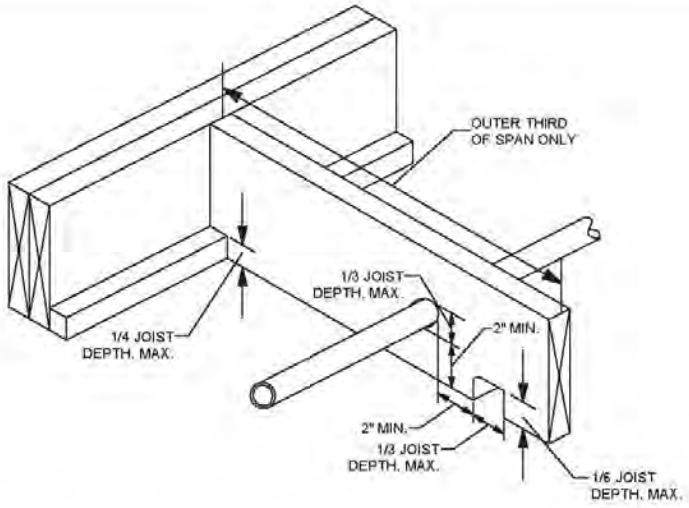
DRAWING TITLE: FLOOR FRAMING CONNECTIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

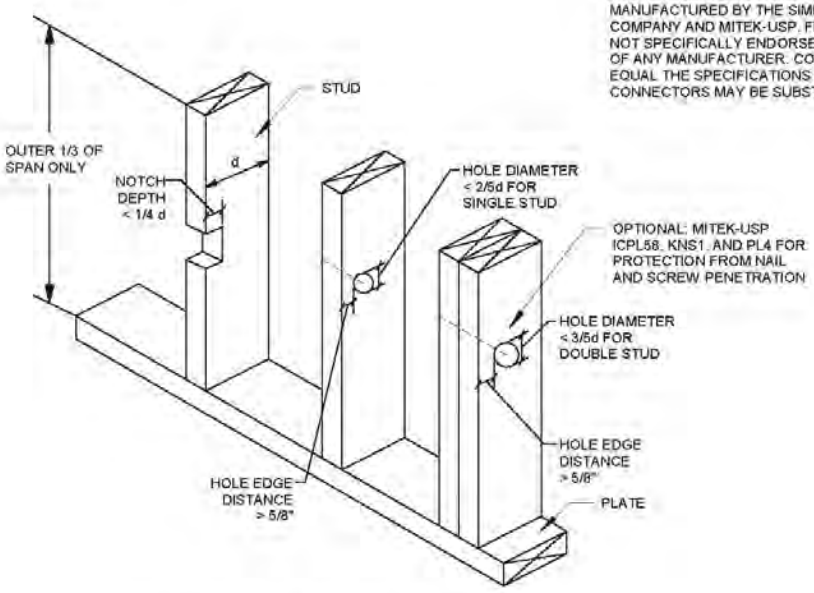
S-40

Sheet Number 40 of 63



SOLID SAWN JOIST AND RAFTER NOTCHING AND BORING LIMITS

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.



STUD NOTCHING AND BORING LIMITS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WOOD NOTCHING AND BORING LIMITS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-41

Sheet Number 41 of 63

FOUNDATIONS

THE FOUNDATION ANCHORS THE HOUSE AND TRANSFERS THE WEIGHT AND LOADING OF THE STRUCTURE TO THE GROUND. LOCATE THE FOOTINGS ON SOLID, UNDISTURBED SOIL OR ENGINEERED FILL AT THE REQUIRED DEPTH. ANTICIPATE SOIL EROSION WHEN DETERMINING EXCAVATION DEPTH. CLAY AND ROCKY SOILS ARE APPROPRIATE FOR THE USE OF CONTINUOUS FOUNDATIONS, AND INDIVIDUAL FOOTINGS. UNSTABLE AND UNCOMPACTED SOILS ARE UNSUITABLE FOR FOUNDATIONS. QUESTIONABLE SOIL CONDITIONS REQUIRE ANALYSIS BY REGISTERED GEOTECHNICAL ENGINEER.

USE ELEVATED FOUNDATIONS/FLOOR SYSTEMS TO ELEVATE THE FLOOR ABOVE THE BASE FLOOD ELEVATION (BFE) PLUS 1 FOOT OR DESIGN FLOOD ELEVATION (DFE), WHICHEVER IS HIGHER OR WHEN THERE IS UNEVEN GROUND. THE FLOOD INSURANCE RATE MAPS (FIRM) INDICATE REGULATED SPECIAL FLOOD HAZARD AREAS (SFHA). IT'S IMPORTANT TO NOTE, AREAS OUTSIDE OF THE SFHA MAY STILL BE SUSCEPTIBLE TO FLOODING.

WOOD POSTS MUST BE PRESSURE TREATED, STRUCTURALLY ADEQUATE AND PROPERLY SIZED.

CONCRETE BLOCK COLUMNS REQUIRE ADEQUATE STEEL REINFORCMENT.

INSTALL REINFORCED CONCRETE COLUMNS ON FOOTINGS A MINIMUM OF 30" DEEP.

WOOD POSTS, CONCRETE AND CONCRETE BLOCK COLUMNS MUST BE DESIGNED TO COMPLY WITH THE WIND AND SEISMIC REQUIREMENTS OF THE BUILDING CODE. CONSULT A LICENSED ENGINEER OR ARCHITECT FOR DESIGN AND SPECIFICATIONS.

ALL CONSTRUCTION MUST COMPLY WITH THE LATEST U.S.V.I. BUILDING CODE. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

HOUSES BUILT ON THE SIDES OF STEEP SLOPES REQUIRE SPECIAL DESIGN GUIDANCE. THESE HOMES ARE OFTEN SET ON EXPOSED POSTS OR COLUMNS. WALLS, POSTS, AND COLUMNS SHALL BE PROPERLY BRACED TO PREVENT COLLAPSE DURING AN EARTHQUAKE. FOUNDATIONS SHALL BE PROPERLY EMBEDDED IN CONSIDERATION OF ALL DESIGN FORCES AND POTENTIAL IMPACTS OF EROSION. CONSULT A U.S.V.I. LICENSED PROFESSIONAL ARCHITECT OR ENGINEER FOR DESIGN GUIDANCE IN SUPPORTING A HOME ON A STEEP SLOPE. IT IS RECOMMENDED TO PROVIDE ADDITIONAL ANCHORAGE FOR EACH FLOOR SYSTEM TO THE UPHILL FOUNDATION AND SUPPLEMENTAL ANCHORAGE, STRAPPING, AND BRACING OF CRIPPLE WALLS.

SLOPE STABILITY ANALYSIS SHALL BE PERFORMED ON STEEP SLOPES AND ADDITIONAL STABILIZING DESIGN OF KNEEWALLS OR WIDER GRADE BEAMS MAY BE REQUIRED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

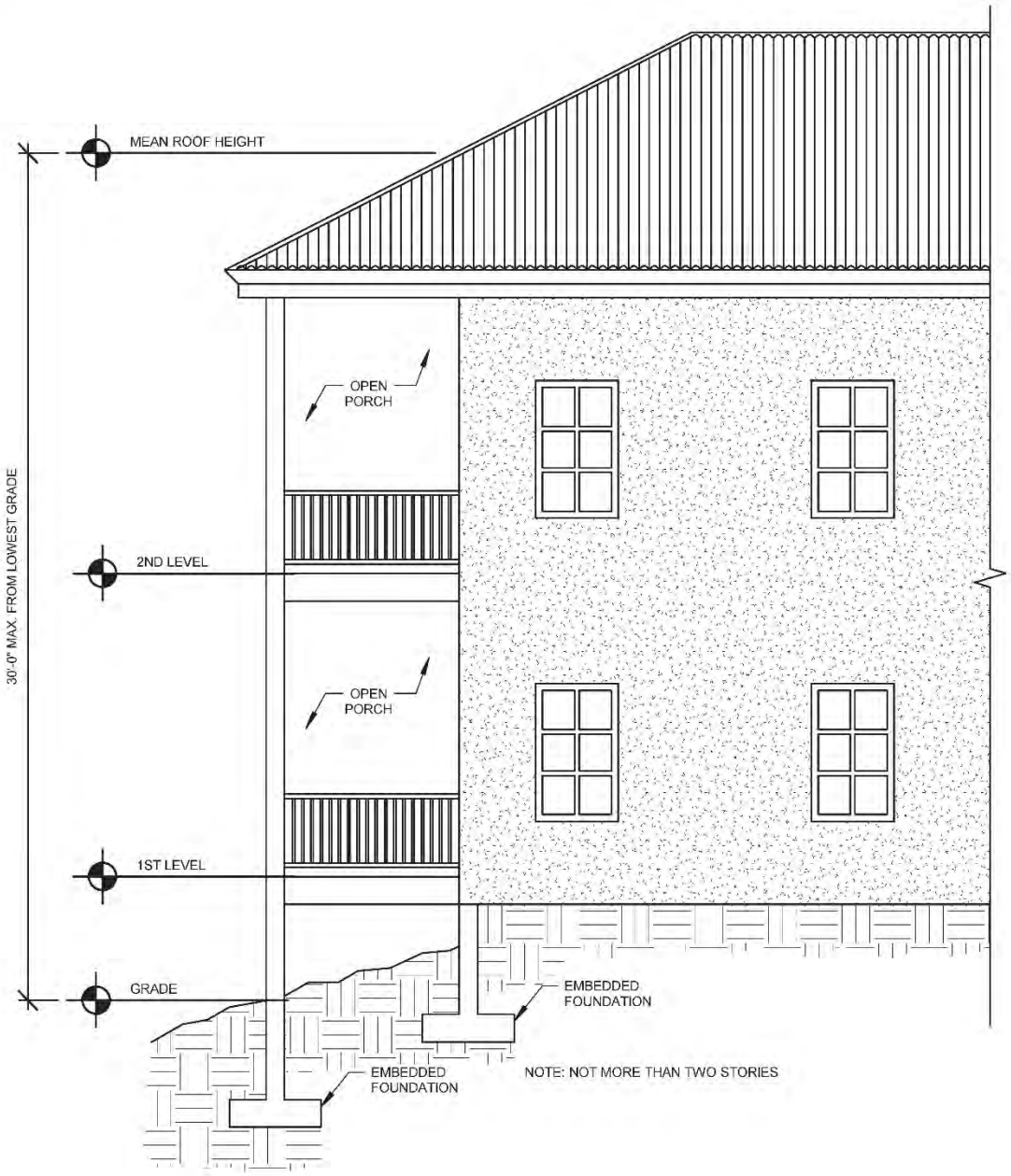
DRAWING TITLE: FOUNDATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-42

Sheet Number 42 of 63



DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

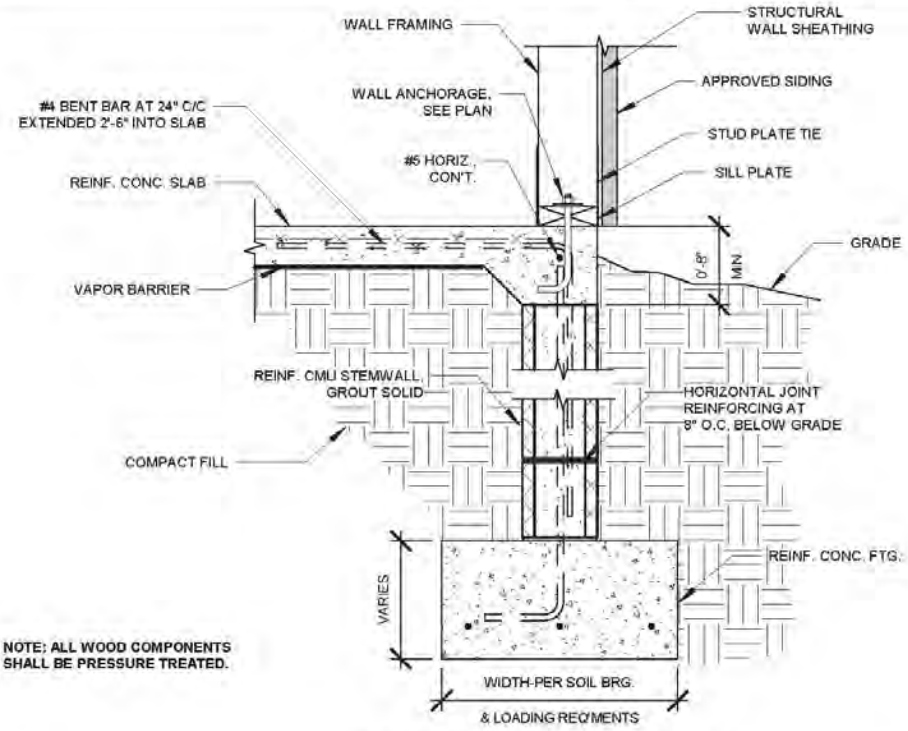
DRAWING TITLE: HEIGHT DEFINITIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

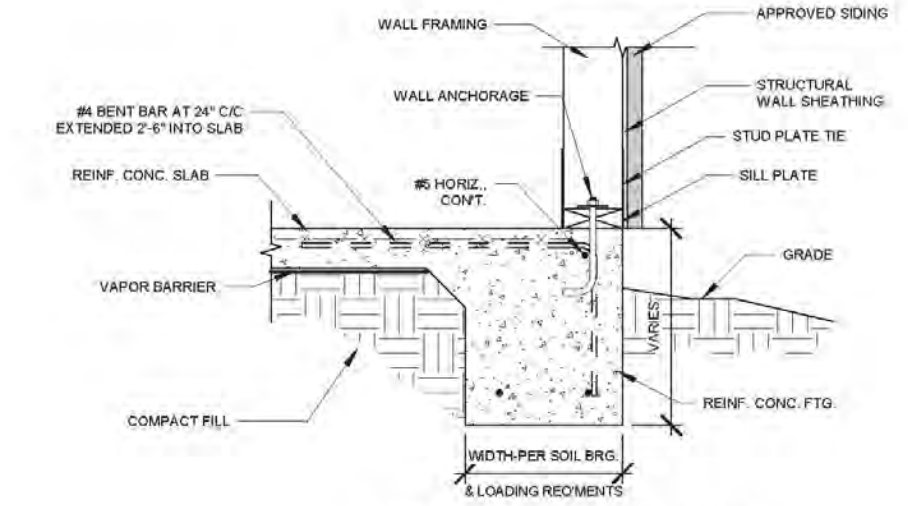
Sheet Number:

S-43

Sheet Number 43 of 63



TYPICAL CMU STEMWALL FOUNDATION



TYPICAL MONOLITHIC FOUNDATION

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

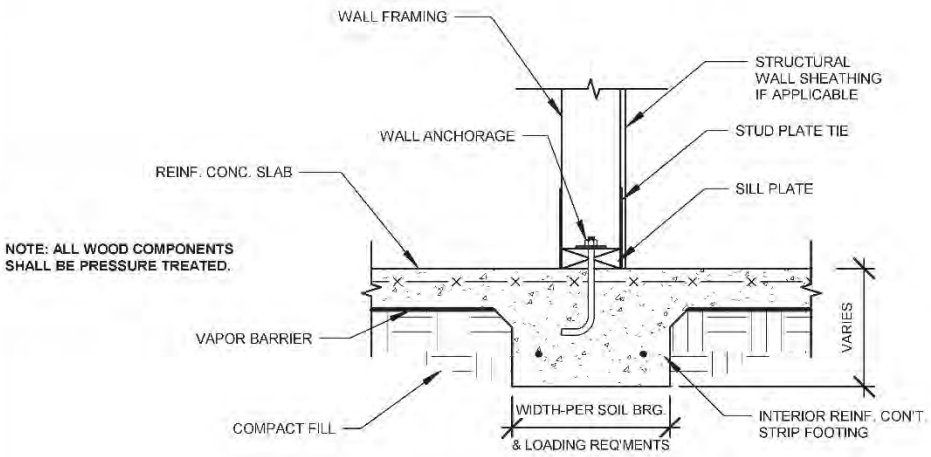
DRAWING TITLE: WOOD FRAMING FOUNDATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

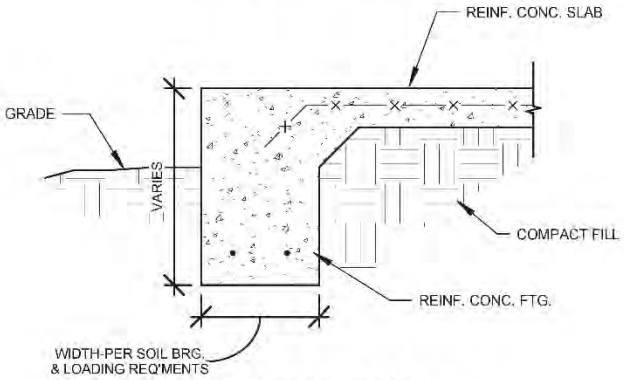
Sheet Number:

S-44

Sheet Number 44 of 63



TYPICAL INTERIOR STRIP FOOTING



SLAB EDGE AT PORCH

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: TYPICAL FOUNDATION DETAILS

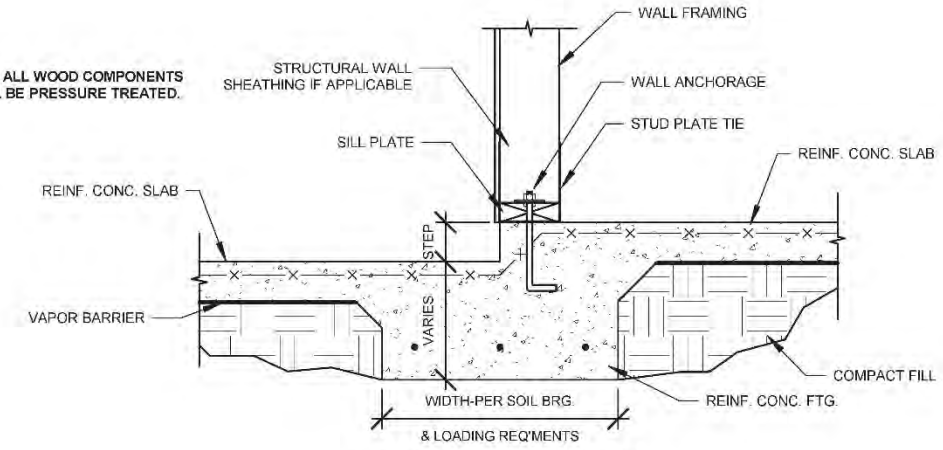
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

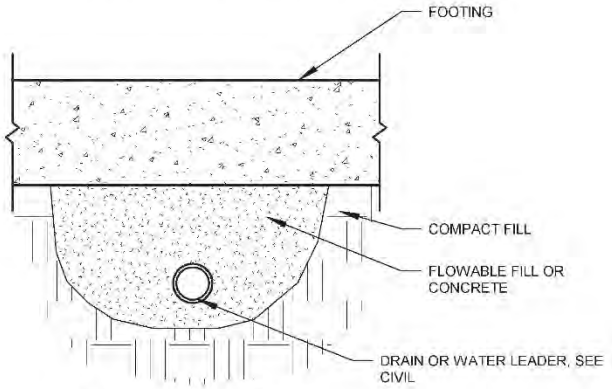
S-45

Sheet Number 45 of 63

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



FOUNDATION STEP DOWN



DRAIN UNDER FOOTING

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

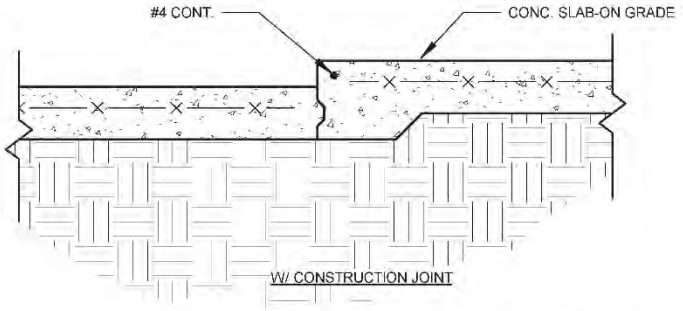
DRAWING TITLE: TYPICAL FOUNDATION DETAILS

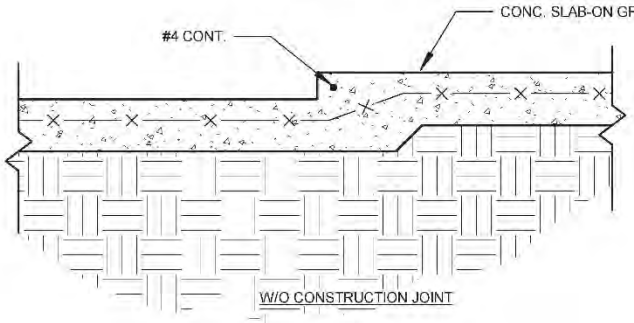
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

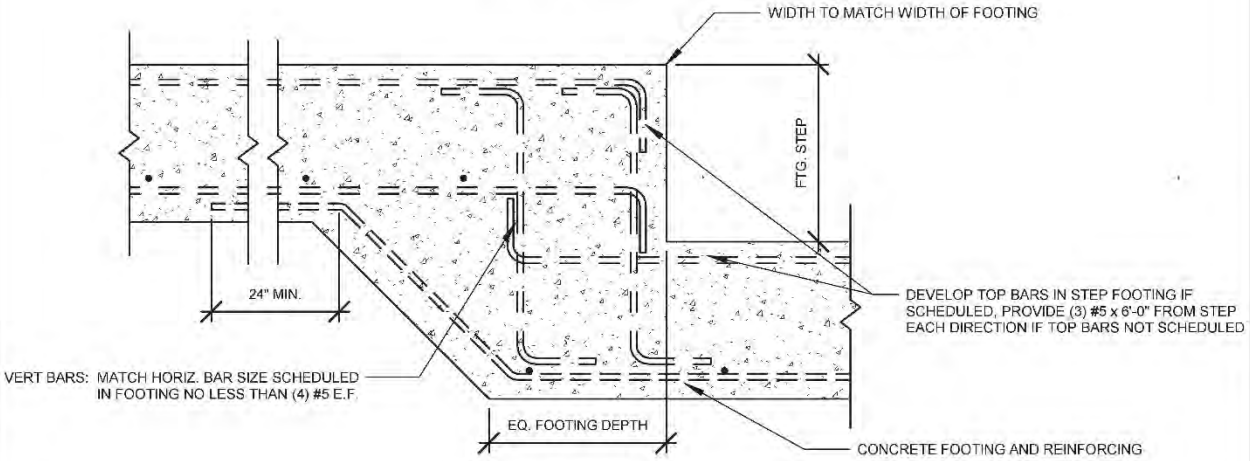
S-46

Sheet Number 46 of 63





TYPICAL SLAB RECESS DETAILS



TYPICAL STEPPED FOOTING

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: TYPICAL FOUNDATION DETAILS

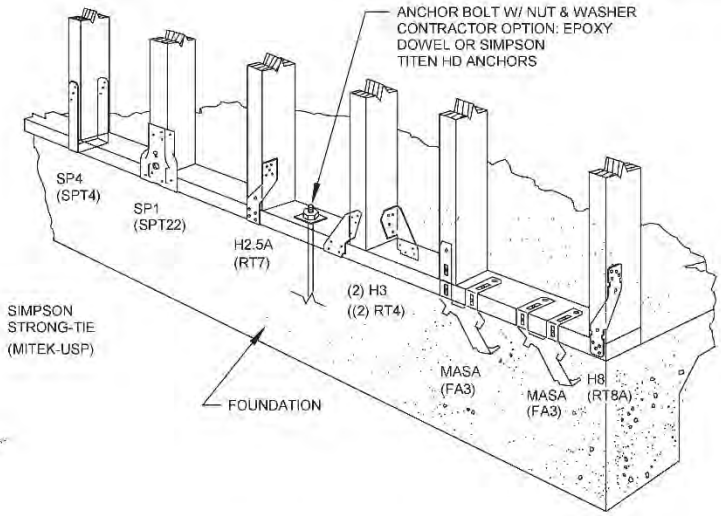
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-47

Sheet Number 47 of 63

NOTE:
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN. REFER TO THE DESIGN TABLES FOR SELECTING HURRICANE CONNECTORS FOR REQUIRED CONNECTOR DESIGN CAPACITY.



DETAIL COURTESY OF THE SIMPSON STRONG-TIE COMPANY

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

RECOMMENDED SILL PLATE ANCHORAGE

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

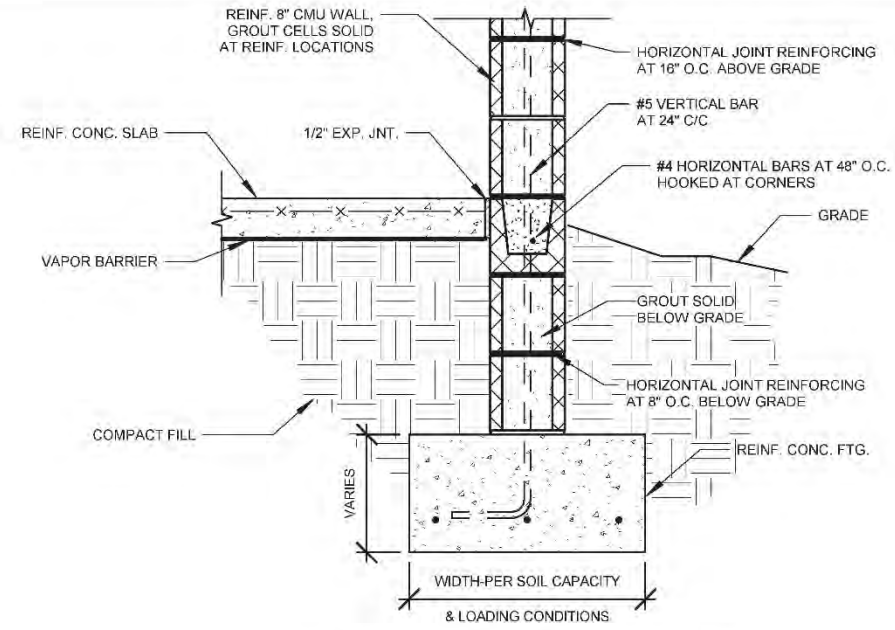
DRAWING TITLE: SILL PLATE ANCHORAGE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

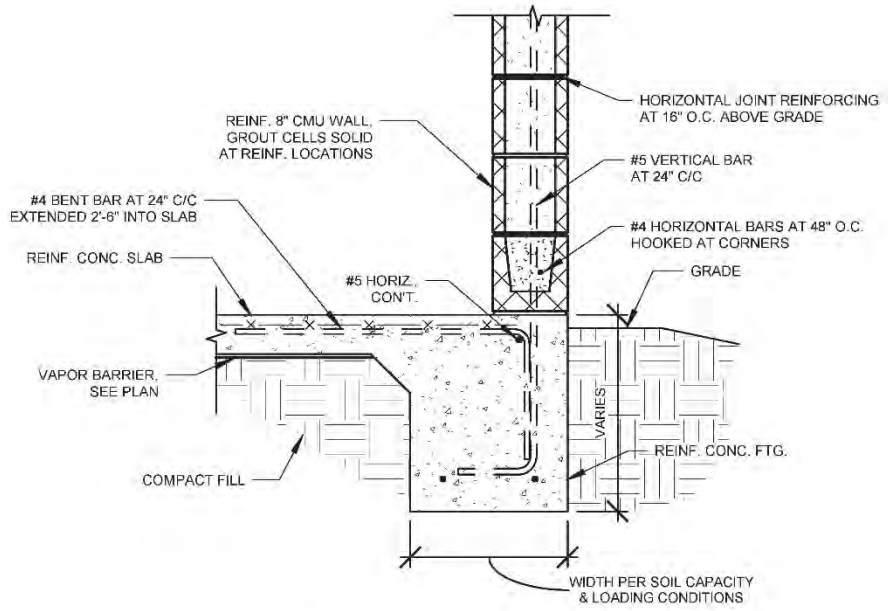
Sheet Number:

S-48

Sheet Number 48 of 63



TYPICAL CMU WALL W/ STRIP FOOTING



TYPICAL CMU WALL W/ MONOLITHIC FTG.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

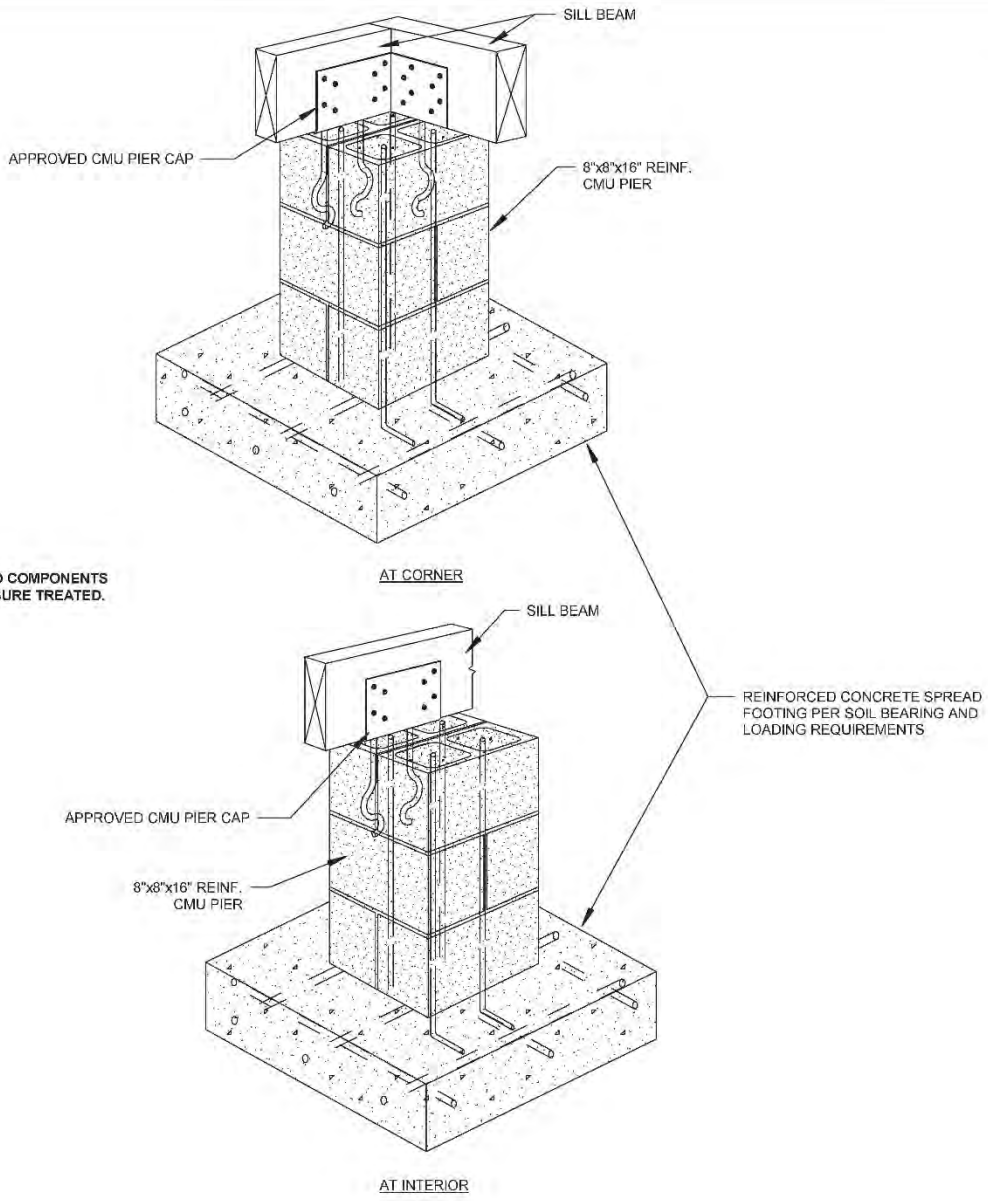
DRAWING TITLE: CMU WALL FOUNDATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-49

Sheet Number 49 of 63



CMU PIER FOUNDATIONS

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

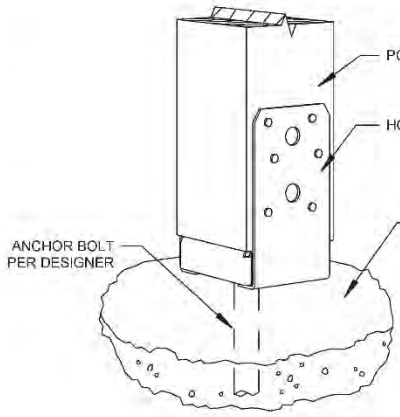
DRAWING TITLE: CMU PIER FOUNDATION

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-50

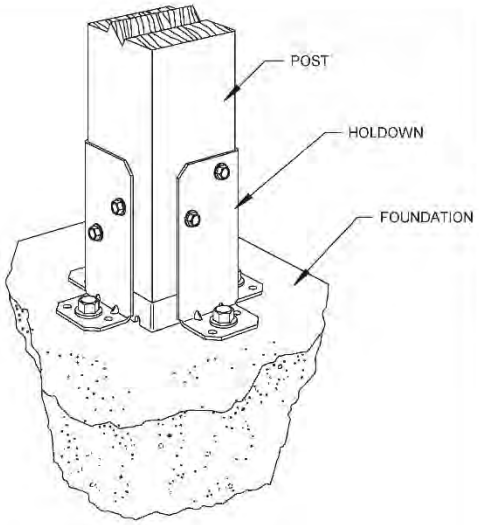
Sheet Number 50 of 63



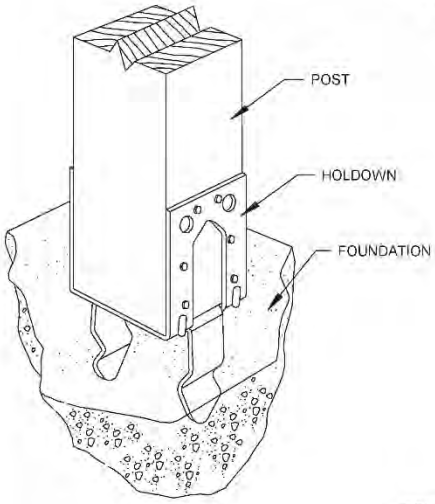
SIMPSON ABU
MITEK-USP PAU

NOTE:
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN. REFER TO THE DESIGN TABLES FOR SELECTING HURRICANE CONNECTORS FOR REQUIRED CONNECTOR DESIGN CAPACITY.

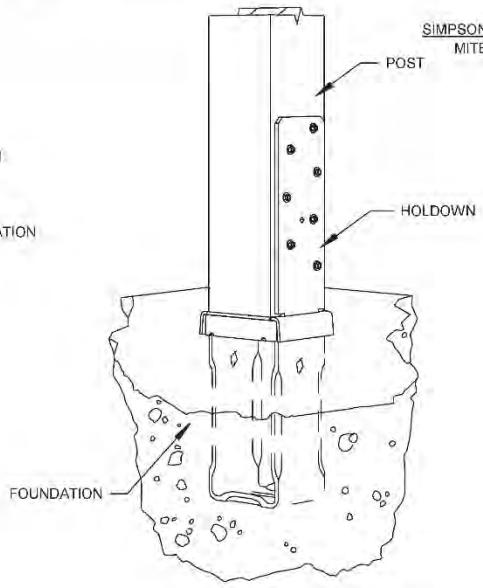
NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



SIMPSON RPBZ (RETROFIT)
MITEK-USP RPB



SIMPSON PB
MITEK-USP WE



SIMPSON CBSQ
MITEK-USP CBSQ

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

RECOMMENDED POST BASE HOLDOWNS

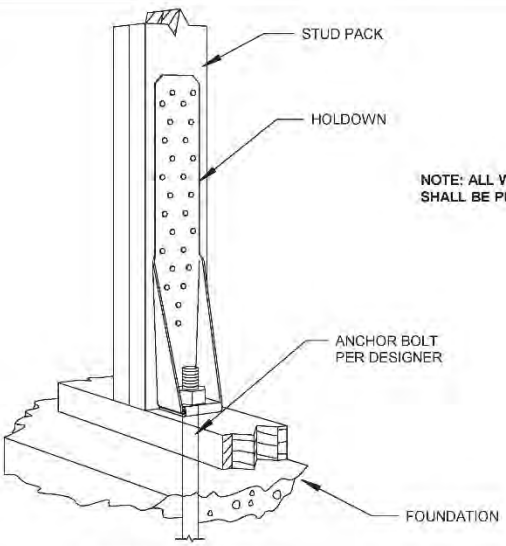
DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: POST ANCHORAGE

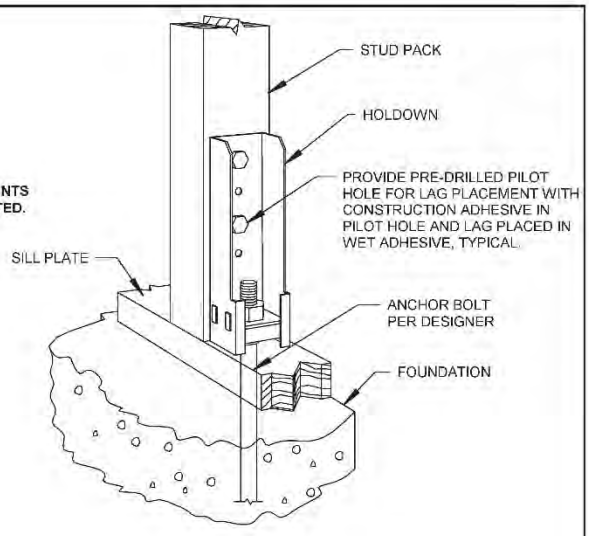
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-51
Sheet Number 51 of 63



SIMPSON HTT TENSION TIE
MITEK-USP HTT

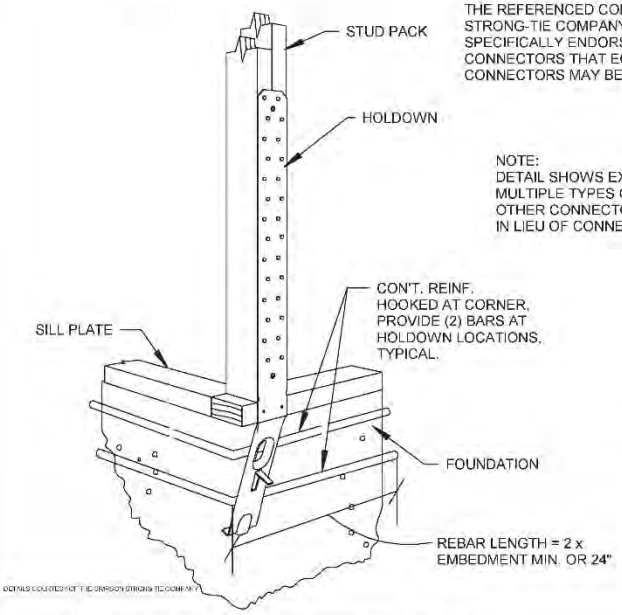
NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.



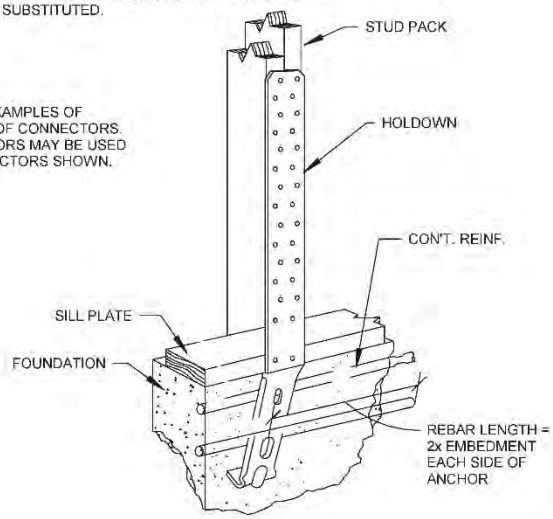
SIMPSON HD HOLDOWN
MITEK-USP TD

THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY AND MITEK-USP. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

NOTE:
DETAIL SHOWS EXAMPLES OF MULTIPLE TYPES OF CONNECTORS. OTHER CONNECTORS MAY BE USED IN LIEU OF CONNECTORS SHOWN.



SIMPSON LSTHD/STHD STRAP-TIE HOLDOWN (CORNER INSTALLATION)
MITEK-USP LSTAD/STAD STRAP-TIE HOLDOWN (CORNER INSTALLATION)



SIMPSON LSTHD/STHD STRAP-TIE HOLDOWN (EDGE INSTALLATION)
MITEK-USP LSTAD/STAD STRAP-TIE HOLDOWN (EDGE INSTALLATION)

FOUNDATION HOLDOWNS

NOTES:

1. RECOMMENDED HOLDOWN: SIMPSON HD12 OR EQUIVALENT WITH 1 1/8" DIAMETER HEADED ANCHOR BOLT (16" MIN. EMBEDMENT), 7-1/4 INCH MIN. WOOD MAIN MEMBER THICKNESS AND 4 INCH MIN. EDGE DISTANCE. PROVIDE ANCHORS AT THE END OF ALL WALL SEGMENTS AND AT EACH CORNER.
2. CONSULT ENGINEER REGISTERED IN U.S.V.I. FOR FURTHER ANALYSIS BASED ON STRUCTURE GEOMETRY FOR OPTIONAL HOLDOWNS TYPES AND PLACEMENT.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: FOUNDATION HOLDOWNS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
S-52
Sheet Number 52 of 63

DESIGN TABLES
FOR
SELECTING HURRICANE CONNECTORS

THE FOLLOWING WOOD FRAME CONNECTOR TABLES REFERENCE CONNECTORS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, MITEK-USP, AND TAMLYN. CONNECTOR REFERNCES ARE BASED UPON MANUFACTURER SUPPLIED INFORMATION AS OF MARCH, 2018 AND ARE SUBJECT TO CHANGE BY THE MANUFACTUER. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED. ALL CONNECTORS SHALL BE MINIMUM HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A653, ASTM A123, OR HIGHER STANDARDS. STAINLESS STEEL CONNECTORS MAY ALSO BE USED IN LIEU OF HOT-DIPPED GALVANIZED CONNECTORS.

ALL CONSTRUCTION MUST COMPLY WITH THE LATEST ADOPTED BUILDING CODE IN THE U.S.V.I. YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

ALL CONNECTOR DESIGNS ARE BASED UPON SPECIFIC DESIGN PARAMETERS AS SHOWN BELOW. THE FOLLOWING BOUNDARY CONDITIONS SHALL BE MET IN ORDER TO USE THESE CONNECTOR TABLES. THESE CONNECTOR TABLES ARE NOT VALID IF THE PROJECT PARAMETERS ARE OUTSIDE OF THESE BOUNDARY CONDITIONS.

NOTES

1. CONNECTION BASIS OF DESIGN:

WIND SPEED.....165 MPH (ULTIMATE)	RISK CATEGORY.....II
EXPOSURE CATEGORY.....B	BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
TOPOGRAPHIC FACTOR (Kzt).....2.0	INTERNAL PRESSURE.....+/-0.18
ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)	WALL PLATE HEIGHT.....11'-6"
MEAN ROOF HEIGHT (MRH).....30'-0"	

2. UPLIFT AND LATERAL LOADS SHOWN IN TABLES ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM (MWFRS) NOMINAL WIND LOADS.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CONNECTOR DESIGN TABLES

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-53

Sheet Number 53 of 63

FRAMING PRODUCT CONNECTOR CROSS REFERENCE TABLES

TAMLYN	SIMPSON	USP
AAE44L	ABU44	PAU44
AAE66L	ABU66	PAU66
AAE88L	ABU88	PAU88
AD15	HD15	TD15
AD12	HD12	TD12
AD9	HD9	TD9
AD7	HD7	TD7
AD5	HD5	TD5
AP45	A35	MPA1
BC44	CC44	KCC44
BC66	CC66	KCC66
DJ410	LUS210-2	JUS210-2
DJ46	LUS26-2	JUS26-2
DJ48	LUS28-2	JUS28-2
EPB4	ACE4	PBES44
ETAH20	HETA20	HTA20
ETAM12	META12	HTA16-18
ETAM16	META16	HTA16-18
ETAM18	META18	HTA20-18
ETAM20	META20	HTA20-18
FA3	A34	MP34
FA36	A35	MPA1
GTH2	HGT2	HUGT2
GTH3	HGT3	HUGT3
GTH4	HGT4	HUGT4
GTL2	LGT2	LUGT2
HA44	CB44	KCB44
HA66	CB66	KCB66
HA88	CB88	KCB88
HDTP210	HUS210	HUS210
HDTP26	HUS26	HUS26
HDTP28	HUS28	HUS28
HT10-2	H10-2	RT16-2
HT12	LTS12	LTW12
HT4	H4	RT3
HT5	H5	HDCP
HT6	H6	LFTA6
HT7	H7	RT20
HT8	H8	

TAMLYN	SIMPSON	USP
HTF210	HU210TF	HDO210
HTF212	HU212TF	HDO212
HTF214	HU214TF	HDO214
HTF24	HU24TF	HDO24
HTF26	HU26TF	HDO26
HTF28	HU28TF	HDO28
HTW16	HTS16	HTW16
HTW20	HTS20	HTW20
HTW24	HTS24	HTW24
HTW28	HTS28	HTW28
HTW30	HTS30	HTW30
LSS210	LSSU210	LSSH210
LSS26	LSSU26	LSSH26
LSS28	LSSU28	LSSH28
MTS27	MST27	KST227
MTS37	MST37	KST237
MTS48	MST48	KST248
MTS60	MST60	KST260
MTW16	MTS16	MTW16
MTW18	MTS18	MTW18
MTW20	MTS20	MTW20
MTW30	MTS30	MTW30
MTW48	MTS48	MTW48
PAM44	LCB44	CBE44
PAM66	LCB66	CBE66
PB4	AC4	PBS44
PB6	AC6	PBS66
PC44	BC4	C44
PC66	BC6	C66
PC88	BC8	C88
PTC4	LPC4	PB44-6
PTC6	LPC6	PB66-6
RT1	H3	RT12
RT15	H1	RT15
RT16	H10	RT16
RT2A	H2.5A	RT7A
RT2LR	H2.5	RT7
S210	U210	SUH210
S210-2	U210-2	SUH210-2

TAMLYN	SIMPSON	USP
S210-3	U210-3	SUH210-3
S24	U24	SUH24
S24-2	U24-2	SUH24-2
S26	U26	SUH26
S26-2	U26-2	SUH26-2
SJQ210	LU210	JL210
SJQ24	LU24	JL24
SJQ26	LU26	JL26
SJQ28	LU28	JL28
SPT4	SP4	SPT4
SPT6	SP6	SPT6
SS12	LSTA12	LSTA12
SS18	LSTA18	LSTA18
SS24	LSTA24	LSTA24
SS30	LSTA30	LSTA30
SS36	LSTA36	LSTA36
SSAD10	STHD10	STAD14
SSAD14	STHD14	STAD14
TSA12	MSTA12	MSTA12
TSA15	MSTA15	MSTA15
TSA18	MSTA18	MSTA18
TSA21	MSTA21	MSTA21
TSA24	MSTA24	MSTA24
TSA30	MSTA30	MSTA30
TSA36	MSTA36	MSTA36
TSTP210	LUS210	JUS210
TSTP24	LUS24	JUS24
TSTP26	LUS26	JUS26
TSTP28	LUS28	JUS28

NOTES

1. ALL FRAMING CONNECTORS/HARDWARE SHALL BE MITEK-USP, SIMPSON STRONG-TIE, TAMLYN, OR APPROVED EQUAL.
2. SUBSTITUTIONS MUST BE SUBMITTED FOR REVIEW. REQUESTS FOR ALTERNATE BRANDS MUST BE SUBMITTED IN WRITING WITH COPIES OF THE MANUFACTURER'S PRODUCT INFORMATION WHICH INLCUDES ESR'S/CODE APPROVALS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY, MITEK-USP, AND TAMLYN. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: FRAMING CONNECTOR CONVERSION CHART

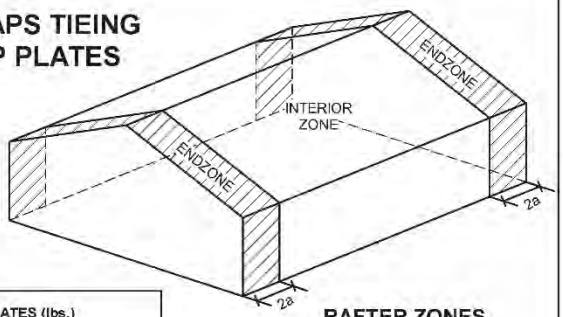
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-54

Sheet Number 54 of 63

TABLES FOR SIZING ENDZONE HURRICANE STRAPS TIEING RAFTERS TO WOOD FRAMED WALL DOUBLE TOP PLATES



RAFTER ZONES

ENDZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL DOUBLE TOP PLATES (lbs.)					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	398/248	441/248	484/248	528/248	572/248
16	532/330	588/330	646/330	704/330	762/330
19.2	638/396	706/396	775/396	845/396	915/396
24	798/495	882/495	969/495	1056/495	1143/495

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 2X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
16	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
19.2	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
24	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 3X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H11Z	H11Z	H11Z	H11Z	H11Z
16	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT
19.2	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT
24	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 4X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT
16	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT
19.2	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT
24	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt) 2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WOOD WALL-ENDZONE RAFTER TIE DESIGN TABLE

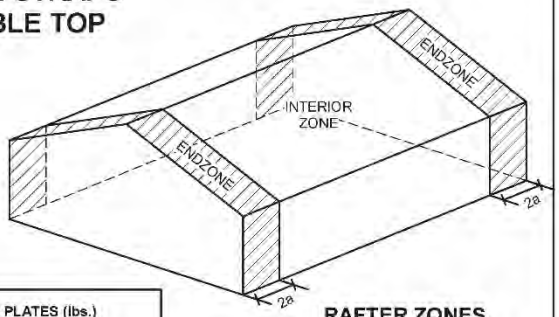
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-55

Sheet Number 55 of 63

TABLES FOR SIZING INTERIOR ZONE HURRICANE STRAPS TIEING RAFTERS TO WOOD FRAMED WALL DOUBLE TOP PLATES



RAFTER ZONES

INTERIOR ZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL DOUBLE TOP PLATES (lbs.)					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	263/179	287/179	311/179	336/179	361/179
16	350/238	382/238	415/238	448/238	482/238
19.2	420/286	459/286	498/286	538/286	578/286
24	525/357	573/357	622/357	672/357	722/357

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 2X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H10A	H10A	H10A	H10A	H10A
16	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A
19.2	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A
24	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 3X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H11Z	H11Z	H11Z	H11Z	H11Z
16	H11Z	H11Z	H11Z	H11Z	H11Z
19.2	H11Z	H11Z	H11Z	H11Z	H11Z
24	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 4X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	HGA10KT	HGA10KT	HGA10KT	HGA10KT
16	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT
19.2	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT
24	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT	MTS16 + HGA10KT

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WOOD WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE

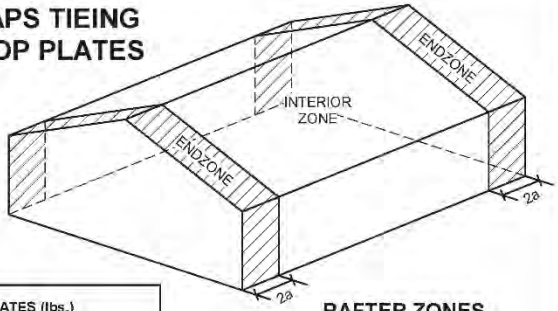
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-56

Sheet Number 56 of 63

TABLES FOR SIZING ENDZONE HURRICANE STRAPS TIEING RAFTERS TO CMU WALL WITH WOOD DOUBLE TOP PLATES



RAFTER ZONES

ENDZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL DOUBLE TOP PLATES (lbs.)

RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	398/248	441/248	484/248	528/248	572/248
16	532/330	588/330	646/330	704/330	762/330
19.2	638/396	706/396	775/396	845/396	915/396
24	798/495	882/495	969/495	1056/495	1143/495

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 2X RAFTERS AT WALL DOUBLE TOP PLATES

RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
16	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
19.2	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT
24	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 3X RAFTERS AT WALL DOUBLE TOP PLATES

RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H11Z	H11Z	H11Z	H11Z	H11Z
16	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT
19.2	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT
24	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT	H11Z + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 4X RAFTERS AT WALL DOUBLE TOP PLATES

RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT
16	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT
19.2	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT
24	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CMU WALL-ENDZONE RAFTER TIE DESIGN TABLE A

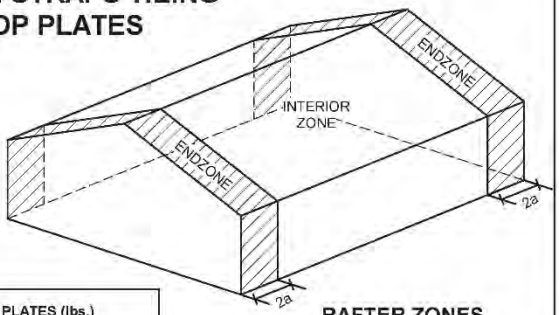
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-57

Sheet Number 57 of 63

TABLES FOR SIZING INTERIOR ZONE HURRICANE STRAPS TIEING RAFTERS TO CMU WALL WITH WOOD DOUBLE TOP PLATES



RAFTER ZONES

INTERIOR ZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL DOUBLE TOP PLATES (lbs.)					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	263/179	287/179	311/179	336/179	361/179
16	350/238	382/238	415/238	448/238	482/238
19.2	420/286	459/286	498/286	538/286	578/286
24	525/357	573/357	622/357	672/357	722/357

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 2X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H10A	H10A	H10A	H10A	H10A
16	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A
19.2	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A	H10A + H2.5A
24	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT	H10A + HGA10KT

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 3X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H11Z	H11Z	H11Z	H11Z	H11Z
16	H11Z	H11Z	H11Z	H11Z	H11Z
19.2	H11Z	H11Z	H11Z	H11Z	H11Z
24	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A	H11Z + H2.5A

RECOMMENDED HURRICANE TIE CONNECTORS-INTERIOR ZONE 4X RAFTERS AT WALL DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	HGA10KT	HGA10KT	HGA10KT	HGA10KT	HGA10KT
16	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT
19.2	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT
24	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT	(2) HGA10KT

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CMU WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE B

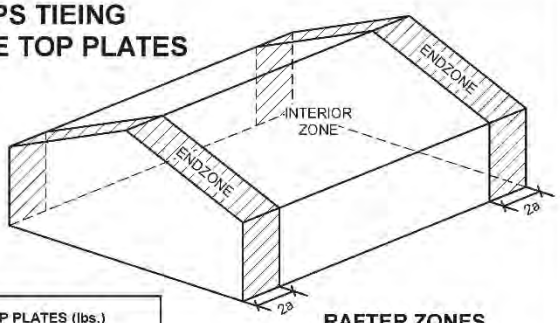
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-58

Sheet Number 58 of 63

TABLES FOR SIZING ENDZONE HURRICANE STRAPS TIEING RAFTERS TO CMU WALL WITHOUT WOOD DOUBLE TOP PLATES



RAFTER ZONES

ENDZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL WITHOUT DOUBLE TOP PLATES (lbs.)					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	398/248	441/248	484/248	528/248	572/248
16	532/330	588/330	646/330	704/330	762/330
19.2	638/396	706/396	775/396	845/396	915/396
24	798/495	882/495	969/495	1056/495	1143/495

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 2X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA
24	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 3X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA
24	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA

RECOMMENDED HURRICANE TIE CONNECTORS-ENDZONE 4X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA
24	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA	LTA2+HGAM10KTA

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CMU WALL-ENDZONE RAFTER TIE DESIGN TABLE C

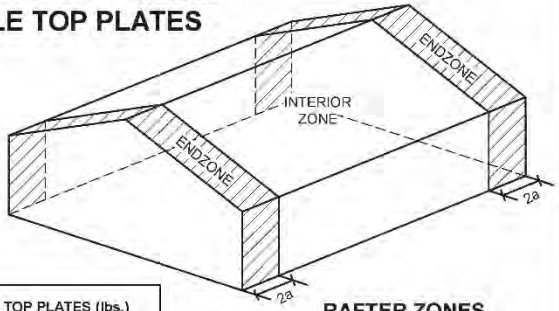
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-59

Sheet Number 59 of 63

TABLES FOR SIZING INTERIOR ZONE HURRICANE STRAPS TIEING RAFTERS TO CMU WALL WITHOUT WOOD DOUBLE TOP PLATES



RAFTER ZONES

INTERIOR ZONE WIND FORCES ON RAFTER HURRICANE TIES AT WALL WITHOUT DOUBLE TOP PLATES (lbs.)					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL	UPLIFT/LATERAL
12	263/179	287/179	311/179	336/179	361/179
16	350/238	382/238	415/238	448/238	482/238
19.2	420/286	459/286	498/286	538/286	578/286
24	525/357	573/357	622/357	672/357	722/357

RECOMMENDED HURRICANE TIE CONNECTORS-INT. ZONE 2X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2	LTA2	LTA2	LTA2	LTA2
24	LTA2	LTA2	LTA2	LTA2	LTA2

RECOMMENDED HURRICANE TIE CONNECTORS-INT. ZONE 3X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2	LTA2	LTA2	LTA2	LTA2
24	LTA2	LTA2	LTA2	LTA2	LTA2

RECOMMENDED HURRICANE TIE CONNECTORS-INT. ZONE 4X RAFTERS AT WALL WITHOUT DOUBLE TOP PLATES					
RAFTER SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	LTA2	LTA2	LTA2	LTA2	LTA2
16	LTA2	LTA2	LTA2	LTA2	LTA2
19.2	LTA2	LTA2	LTA2	LTA2	LTA2
24	LTA2	LTA2	LTA2	LTA2	LTA2

NOTES

1. RAFTER CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT AND LATERAL LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: CMU WALL-INTERIOR ZONE RAFTER TIE DESIGN TABLE D

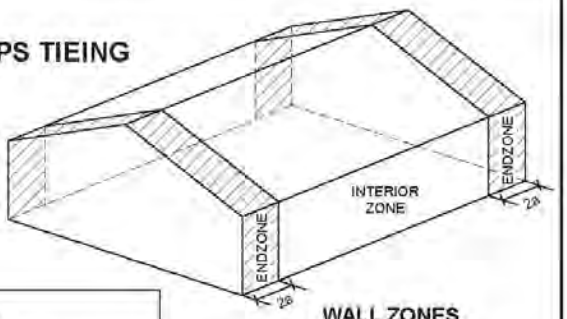
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-60

Sheet Number 60 of 63

TABLES FOR SIZING ENDZONE HURRICANE STRAPS TIEING WALL STUDS TO TOP PLATES AND SILL PLATES



WALL ZONES

ENDZONE WIND UPLIFT FORCES ON PLATE TIES AT WALL FRAMING (lbs.)					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT	UPLIFT	UPLIFT	UPLIFT	UPLIFT
12	398	441	484	528	572
16	532	588	646	704	762
19.2	638	706	775	845	915
24	798	882	969	1056	1143

RECOMMENDED CONNECTORS-ENDZONE 2X4 DOUBLE TOP PLATES AND SILL PLATES W/ 2X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	SP2	SP2	SP2	SP2	SP2
16	SP2	SP2	SP2	SP2	SP2
19.2	SP2	SP2	SP2	SP2	SP2
24	SP2	SP2	SP2	SP2 + H3	SP2 + H3

RECOMMENDED CONNECTORS-ENDZONE 2X6 DOUBLE TOP PLATES AND SILL PLATES W/ 2X,3X, & 4X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H2.5A	H2.5A	H2.5A	H2.5A	H2.5A
16	H2.5A	H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
19.2	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
24	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A

RECOMMENDED CONNECTORS-ENDZONE 2X8 DOUBLE TOP PLATES AND SILL PLATES W/ 2X,3X, & 4X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	H2.5A	H2.5A	H2.5A	H2.5A	H2.5A
16	H2.5A	H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
19.2	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
24	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A

NOTES

1. STUD CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. FOR INSTANCES WHERE TWO CONNECTORS ARE SPECIFIED, CONNECTORS SHALL BE INSTALLED DIAGONALLY FROM EACH OTHER ON OPPOSITE FACES OF THE WALL FRAMING.
4. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ENDZONE WALL FRAMING UPLIFT DESIGN TABLES

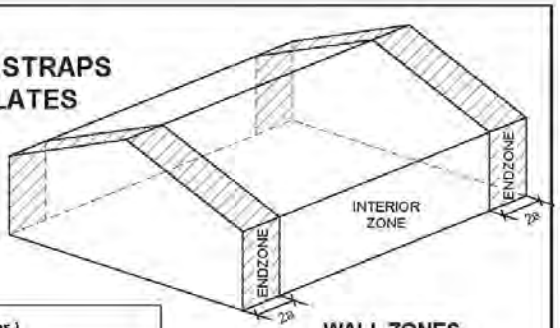
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-61

Sheet Number 61 of 63

TABLES FOR SIZING INTERIOR ZONE HURRICANE STRAPS TIEING WALL STUDS TO TOP PLATES AND SILL PLATES



WALL ZONES

INTERIOR ZONE WIND UPLIFT FORCES ON PLATE TIES AT WALL FRAMING (lbs.)					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT	UPLIFT	UPLIFT	UPLIFT	UPLIFT
12	263	287	311	336	361
16	350	382	415	448	482
19.2	420	459	498	538	578
24	525	573	622	672	722

RECOMMENDED CONNECTORS-INTERIOR ZONE 2X4 DOUBLE TOP PLATES AND SILL PLATES W/ 2X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	SP4	SP4	SP4	SP4	SP4
16	SP4	SP4	SP4	SP2	SP2
19.2	SP2	SP2	SP2	SP2	SP2
24	SP2	SP2	SP2	SP2	SP2

RECOMMENDED CONNECTORS-INTERIOR ZONE 2X6 DOUBLE TOP PLATES AND SILL PLATES W/ 2X,3X, & 4X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	SP6	SP6	SP6	SP6	SP6
16	SP6	SP6	SP6	(2) H2.5A	(2) H2.5A
19.2	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
24	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A

RECOMMENDED CONNECTORS-INTERIOR ZONE 2X8 DOUBLE TOP PLATES AND SILL PLATES W/ 2X,3X, & 4X STUDS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	SP8	SP8	SP8	SP8	SP8
16	SP8	SP8	SP8	(2) H2.5A	(2) H2.5A
19.2	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A
24	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A	(2) H2.5A

NOTES

1. STUD CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.8 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. FOR INSTANCES WHERE TWO CONNECTORS ARE SPECIFIED, CONNECTORS SHALL BE INSTALLED DIAGONALLY FROM EACH OTHER ON OPPOSITE FACES OF THE WALL FRAMING.
4. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: INTERIOR ZONE WALL FRAMING UPLIFT DESIGN TABLES

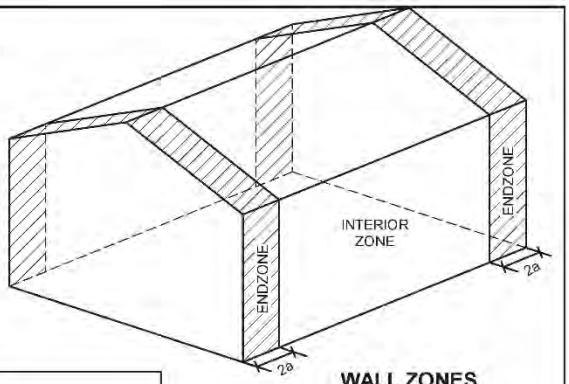
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

S-62

Sheet Number 62 of 63

TABLES FOR SIZING HURRICANE STRAPS TIEING WALL STUDS TO BAND JOISTS



WALL ZONES

ENDZONE WIND UPLIFT FORCES ON PLATE TIES AT WALL FRAMING (lbs.)					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT	UPLIFT	UPLIFT	UPLIFT	UPLIFT
12	398	441	484	528	572
16	532	588	646	704	762
19.2	638	706	775	845	915
24	798	882	969	1056	1143

INTERIOR ZONE WIND UPLIFT FORCES ON PLATE TIES AT WALL FRAMING (lbs.)					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	UPLIFT	UPLIFT	UPLIFT	UPLIFT	UPLIFT
12	263	287	311	336	361
16	350	382	415	448	482
19.2	420	459	498	538	578
24	525	573	622	672	722

RECOMMENDED CONNECTORS-ENDZONE STUDS TO BANDJOISTS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
16	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
19.2	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
24	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36

RECOMMENDED CONNECTORS-INTERIOR ZONE STUDS TO BANDJOISTS					
STUD SPACING (INCHES O.C.)	TOTAL BUILDING WIDTH (INCLUDING OVERHANGS, ft)				
	24, 2a = 6'-0"	28, 2a = 6'-0"	32, 2a = 6'-6"	36, 2a = 7'-3"	40, 2a = 8'-0"
	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS	CONNECTORS
12	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
16	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
19.2	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36
24	MSTA36	MSTA36	MSTA36	MSTA36	MSTA36

NOTES

1. STUD CONNECTION BASIS OF DESIGN:
   - WIND SPEED.....165 MPH (ULTIMATE)
   - EXPOSURE CATEGORY.....B
   - TOPOGRAPHIC FACTOR (Kzt).....2.0
   - ROOF ANGLE.....2/12 (9.5 DEGREES) (CONTROLS)
   - MEAN ROOF HEIGHT (MRH).....30'-0"
   - RISK CATEGORY.....II
   - BUILDING CLASSIFICATION.....PARTIALLY OPEN/ENCLOSED
   - INTERNAL PRESSURE.....+/-0.18
   - WALL PLATE HEIGHT.....11'-6"
2. UPLIFT LOADS SHOWN IN TABLE ABOVE ARE BASED ON MAIN WIND FORCE RESISTING SYSTEM NOMINAL WIND LOADS.
3. THE REFERENCED CONNECTORS ARE MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. FEMA/DPNR DOES NOT SPECIFICALLY ENDORSE THE CONNECTORS OF ANY MANUFACTURER. CONNECTORS THAT EQUAL THE SPECIFICATIONS OF THE NOTED CONNECTORS MAY BE SUBSTITUTED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WOOD WALL-BAND JOIST UPLIFT DESIGN TABLES

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

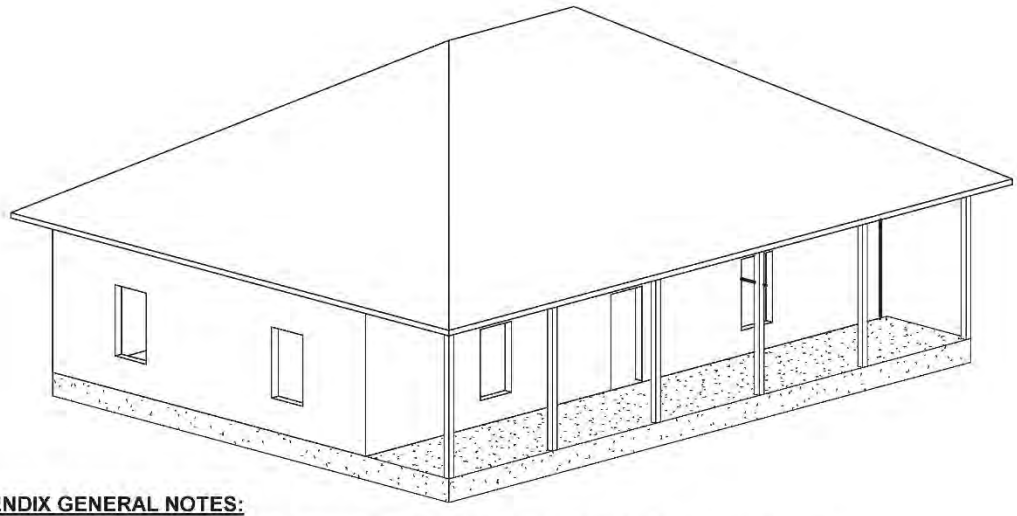
Sheet Number:

S-63

Sheet Number 63 of 63

CONSTRUCTION INFORMATION
for a
STRONGER HOME

APPENDIX
TO THE
4th EDITION APRIL 2018
INCLUDING SPAN TABLES
REPLACES ALL PREVIOUS EDITIONS



APPENDIX GENERAL NOTES:

THIS IS A GUIDANCE DOCUMENT ONLY. REFERENCED BY THE U.S.V.I. BUILDING CODE.

ALL CONSTRUCTION MUST COMPLY WITH THE U.S.V.I. BUILDING CODE.

YOU ARE REQUIRED TO OBTAIN THE NECESSARY BUILDING PERMITS FROM THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES.

SIGNED AND SEALED DRAWINGS FOR PERMIT MUST BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND NATURAL RESOURCES (DPNR) DIVISION OF PERMITS.

STRUCTURES LOCATED IN SPECIAL FLOOD HAZARD AREAS SHALL BE DESIGNED BY A U.S.V.I. REGISTERED DESIGN PROFESSIONAL AND CERTIFIED TO COMPLY WITH ASCE 24-14 FLOOD RESISTANT DESIGN AND CONSTRUCTION.

ALL NOTES AND REQUIREMENTS FOUND IN THE MAIN BODY OF THE CONSTRUCTION INFORMATION FOR A STRONGER HOME, 4TH EDITION STILL APPLY. SEE PREFACE FOR ADDITIONAL LIMITATIONS AND ASSUMPTIONS ASSOCIATED WITH THE APPENDIX.

NOTE: ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: TITLE SHEET

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-01

Sheet Number 1 of 45

1 Background

This Appendix to the USVI Stronger Homes guidelines, presents the limiting spans for studs, roof rafters, floor beams, floor joists, hip and valley beams for structural lumber sizes in the USVI. For each lumber size, the limiting spans determined are the longest spans possible while satisfying the requirements of IRC 2018. The design values for the different species of lumber are based on the design values in 2018 National Design Specification (NDS) for Wood Construction and its Supplement.

2 Member Sizing

The timber member shown in the span tables are designated based on their actual sizes but expressed as nominal sizes. The actual dressed member sizes vary from the nominal sizes. Table below shows the nominal dimension and corresponding dressed actual dimensions.

Thickness (in)		Width (in)	
Nominal	Actual Size	Nominal	Actual Size
2	1.5	4	3.50
3	2.5	6	5.50
4	3.5	8	7.25
		10	9.25
		12	11.25
		14	13.25

The sections with a nominal thickness of 2 inches, 3 inches and 4 inches are designated in this guide as 2x, 3x and 4x sections respectively.

3 Structure Risk Category and Classification

The homes have a structural risk category of II (as defined in Table 1.5-1 of ASCE 7-16). The building enclosure type is taken as Enclosed or Partially Open.

4 Structure and Roof geometry:

The guidance is provided only for regular shaped structures with plan aspect ratios (Width:Length) from 1:1 to 1:2. Structures with unusual geometrical irregularities in its spatial form are not covered by this document and must be professionally designed. The mean roof height is assumed to be less than 30 feet and is assumed to have simple diaphragm

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: PREFACE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-02
Sheet Number 2 of 45

construction. The building foot print for design covered by this guidance shall be between 24 feet to 40 feet wide (in increments of four feet such as 24, 28, 32, 36 and 40 feet) and between 40 feet to 52 feet long (in increments such as 40, 44, 48 and 52 feet). Interior bearing walls are required at the center of the home. The support walls shall be constructed out of CMU (Concrete Masonry Units), Concrete or Wood Frames.

The provisions shown here are applicable only for Hip and Gable roofs. The roof overhang is limited to 2 feet maximum.

5 Design Loads

Unless stated otherwise, all calculations are based on LRFD (Load Resistance Factor Design) methods using the loads from ASCE 7-16.

5.1 Dead Loads:

The uniform area dead loads used for the various structural elements are noted in the respective span tables.

5.2 Live Loads:

The uniform area live loads used for the various structural elements are also noted in the respective span tables.

5.3 Wind Loads:

Wind forces are calculated with wind loads acting perpendicular to wall and roof surfaces. Lateral loads flow into roof and floor diaphragms and are transferred to the foundation via shear walls. Roof uplift forces are transferred to the foundation by direct tension through the wall framing and tension straps or wall sheathing. Shear wall overturning forces are resisted by the structure's dead load and by supplemental hold down connections. It is assumed that the home is a simple structure that is roughly rectangular in shape, has relatively uniform distribution of shear resistance throughout the structure, and has no significant structural discontinuities.

The wind loads are determined in accordance with the envelope procedure which has been presented in ASCE 7-16. The Basic Wind Speed is 165 mph (based on Figure 26.5-1B of ASCE 7-16 for Virgin Islands) and is used to determine the provisions of this guidance. The wind Directionality Factor K_d is taken as 0.85 (as per Table 26.6-1 of ASCE 7-16). The ground

elevation factor K_e is taken as 1.0. The gust effect factor is taken as 0.85 (based on Section 26.11.1 for rigid building).

6 Design Parameters

The design parameters for Floor, Wall and Roof systems are as follows:

6.1 Floor System

6.1.1 Floor Beams

- Dead load of 15 PSF and live load of 40 PSF is used and combined as per ASCE 7-16
- The widths of tributary areas are 8', 10', 12', 14', 16' and 18'.
- Single beams and ganged beams are presented.
- Ganged beams must be stagger bolted at a spacing of 2 feet to ensure composite action.
- Spans satisfy both strength and serviceability requirements.
- Live load deflection is limited to L/360 and the total load deflection is limited to L/240

6.1.2 Floor Joists

- Dead load of 15 PSF and live load of 40 PSF is used and combined as per ASCE 7-16
- The joists are spaced at 12", 16", 19.2" and 24"
- Spans satisfy both strength and serviceability requirements.
- Live load deflection is limited to L/360.

6.2 Wall System

6.2.1 Wall Studs

- Axial loads from the roof and/or upper floors and lateral wind forces are analyzed.
- Three exposure categories B (with K_{zt} = 1.0, 2.0) and D (with K_{zt} = 1.0) are analyzed.
- Envelope method specified in ASCE 7-16 is used to determine wind loads.
- Spans are checked for MWFRS (Main Wind Force Resisting System) wind loads and Components & Cladding (C&C) wind loads.
- 2X, 3X and 4X sections spaced at 12", 16", 19.2" and 24" are analyzed.
- The deflection is limited to L/180.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: PREFACE CONTINUED

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-04
Sheet Number 4 of 45

6.3 Roof System

6.3.1 Rafters

- Dead load of 10 PSF and no live load is used.
- The spans are determined for the interior and edge roof zones.
- C&C (Components and Cladding) wind loads are used for analysis.
- Roof slopes vary from 2:12 to 12:12.
- 2X, 3X and 4X sections spaced at 12", 16", 19.2" and 24" are analyzed.
- Deflection is limited to L/180.

6.3.2 Roof Beams

- Dead load of 10 PSF and no live load is used.
- The widths (horizontal projection) of tributary areas are 10', 12', 14', 16', 18' and 20'.
- Three exposure categories B (with K_{zt} = 1.0, 2.0) and D (with K_{zt} = 1.0) are analyzed.
- Envelope method specified in ASCE 7-16 is used to determine wind loads.
- The edge zone load is used to determine limiting span.
- Deflection is limited to L/240.

6.3.3 Hip and Valley Beams

- Dead load of 10 PSF and no live load is used.
- Three exposure categories B (with K_{zt} = 1.0, 2.0) and D (with K_{zt}= 1.0) are analyzed.
- Envelope method specified in ASCE 7-16 is used to determine wind loads.
- The wind load is assumed to vary linearly from the highest value at the hip to a value of zero at the valley.
- Deflection is limited to L/240.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: PREFACE CONTINUED

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-05

Sheet Number 5 of 45

DRAWING INDEX

SHEET NUMBER	SHEET NAME
A-01	TITLE SHEET
A-02	PREFACE
A-03	PREFACE CONTINUED
A-04	PREFACE CONTINUED
A-05	PREFACE CONTINUED
A-06	DRAWING INDEX
A-07	APPROVED METHODS OF ROOF SUPPORT
A-08	HIP ROOF LAYOUT RECOMMENDATIONS
A-09	FLOOR BEAM DESIGN TABLE A
A-10	FLOOR BEAM DESIGN TABLE B
A-11	FLOOR BEAM DESIGN TABLE C
A-12	FLOOR BEAM DESIGN TABLE D
A-13	FLOOR JOIST DESIGN TABLE
A-14	WALL STUD DESIGN TABLE
A-15	ROOF BEAM DESIGN TABLE A
A-16	ROOF BEAM DESIGN TABLE B
A-17	ROOF BEAM DESIGN TABLE C
A-18	ROOF BEAM DESIGN TABLE D
A-19	ROOF BEAM DESIGN TABLE E
A-20	ROOF BEAM DESIGN TABLE F
A-21	HIP & VALLEY ROOF BEAM DESIGN TABLE
A-22	RAFTER DESIGN TABLE A-EXP. B, Kzt = 1.0
A-23	RAFTER DESIGN TABLE B-EXP. B, Kzt = 1.0
A-24	RAFTER DESIGN TABLE C-EXP. B, Kzt = 1.0
A-25	RAFTER DESIGN TABLE D-EXP. B Kzt = 1.0
A-26	RAFTER DESIGN TABLE E-EXP. B, Kzt = 1.0
A-27	RAFTER DESIGN TABLE F-EXP. B, Kzt = 1.0
A-28	RAFTER DESIGN TABLE G-EXP. B, Kzt =1.0
A-29	RAFTER DESIGN TABLE H-EXP. B, Kzt = 1.0
A-30	RAFTER DESIGN TABLE A-EXP. B, Kzt = 2.0
A-31	RAFTER DESIGN TABLE B-EXP. B, Kzt = 2.0
A-32	RAFTER DESIGN TABLE C-EXP. B, Kzt = 2.0
A-33	RAFTER DESIGN TABLE D-EXP. B, Kzt = 2.0
A-34	RAFTER DESIGN TABLE E-EXP. B, Kzt = 2.0
A-35	RAFTER DESIGN TABLE F-EXP. B, Kzt = 2.0
A-36	RAFTER DESIGN TABLE G-EXP. B, Kzt = 2.0
A-37	RAFTER DESIGN TABLE H-EXP. B, Kzt = 2.0
A-38	RAFTER DESIGN TABLE A-EXP. D, Kzt = 1.0
A-39	RAFTER DESIGN TABLE B-EXP. D, Kzt = 1.0
A-40	RAFTER DESIGN TABLE C-EXP. D, Kzt =1.0
A-41	RAFTER DESIGN TABLE D-EXP. D, Kzt = 1.0
A-42	RAFTER DESIGN TABLE E-EXP. D, Kzt = 1.0
A-43	RAFTER DESIGN TABLE F-EXP. D, Kzt = 1.0
A-44	RAFTER DESIGN TABLE G-EXP. D, Kzt = 1.0
A-45	RAFTER DESIGN TABLE H-EXP. D, Kzt = 1.0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: DRAWING INDEX

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

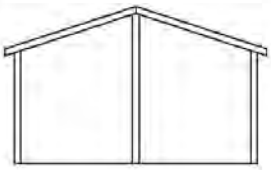
A-06

Sheet Number 6 of 45

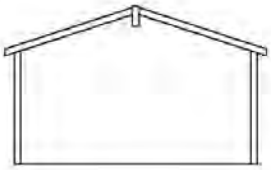
APPROVED METHODS OF ROOF RAFTER AND HIP BEAM SUPPORT



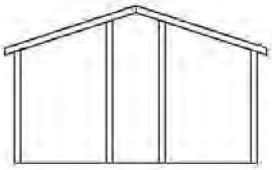
THIS ROOF HAS A CATHEDRAL CEILING WITHOUT INTERIOR BEARING WALLS OR STRUCTURAL RIDGE BEAMS. THIS CONDITION IS NOT ALLOWED. PRE-ENGINEERED TRUSSES MAY BE USED IF DESIGN IS SIGNED AND SEALED BY ENGINEER REGISTERED IN THE U.S. VIRGIN ISLANDS AND MANUFACTURING IS PERFORMED BY A CERTIFIED TRUSS MANUFACTURING FACILITY PER THE TRUSS PLATE INSTITUTE. "NATIONAL DESIGN STANDARD FOR METAL-PLATE CONNECTED WOOD TRUSS CONSTRUCTION" (ANSI/TPI 1-2014).



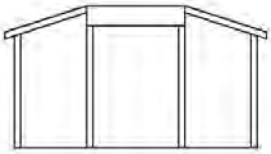
THIS ROOF IS SUPPORTED BY AN INTERIOR BEARING WALL DIRECTLY BELOW THE RIDGE. IF THE FLOOR PLAN ALLOWS A CENTER WALL, THIS IS THE MOST ECONOMICAL METHOD OF SUPPORTING THE ROOF AT THE RIDGE



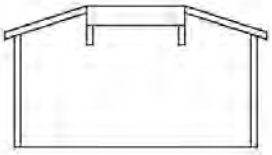
THIS ROOF IS ADEQUATELY SUPPORTED BY A STRUCTURAL ROOF BEAM AT THE RIDGE. THIS BEAM MUST BE VERTICALLY SUPPORTED BY COLUMNS, EXTERIOR WALLS, INTERIOR WALLS, OTHER BEAMS, OR A COMBINATION OF THESE METHODS. THIS BEAM MUST BE PROPERLY SELECTED FOR SIZE, SPACING, AND UNSUPPORTED SPAN.



THIS ROOF SECTION IS SUPPORTED BY INTERIOR WALLS OFFSET NOT MORE THAN 2 FEET FROM THE CENTER OF THE RIDGE BEING SUPPORTED. THIS METHOD OF SUPPORT MAY ONLY BE USED IF THERE ARE SUPPORTING WALLS ON BOTH SIDES OF THE RIDGE AND NOT OFFSET GREATER THAN 2 FEET FROM CENTERLINE OF THE WALL TO THE CENTERLINE OF THE RIDGE. THE MAXIMUM WIDTH OF A HALLWAY IS 4 FEET UNLESS ADDITIONAL BEAMS OR HEADERS ARE UTILIZED. COMBINATIONS OF THE SUPPORT METHODS SET FORTH ABOVE MAY BE USED AND IN MOST CASES WILL BE ADVANTAGEOUS BASED UPON FLOOR PLAN LAYOUTS.



IF THE RIDGE IS ADEQUATELY SUPPORTED BY INTERIOR BEARING WALLS, BEAMS, HEADERS, COLUMNS, OR A COMBINATION, THE HIPS ARE ALSO SUPPORTED. THE CENTER RIDGE MAY NOT BE SUPPORTED BY CANTILEVERED SECTIONS OF HIPS PROJECTING BEYOND AN INTERIOR BEARING WALL UNDER THE HIP.



THE HIPS AND VALLEYS MUST BE SPECIFIED AS BEAMS OF ADEQUATE SIZE AND SPACING TO CARRY THE IMPOSED ROOF LOADS. INTERSECTING INTERIOR BEARING WALLS, HEADERS, BEAMS, AND COLUMNS MAY BE USED TO REDUCE UNSUPPORTED SPANS OF THE HIP OR VALLEY.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: APPROVED METHODS OF ROOF SUPPORT

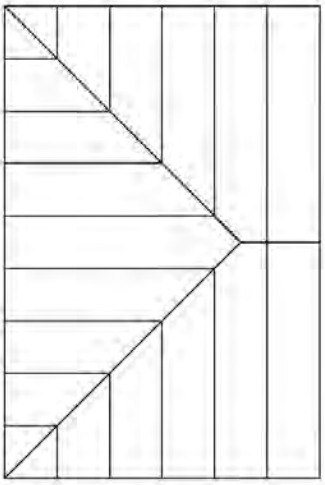
Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

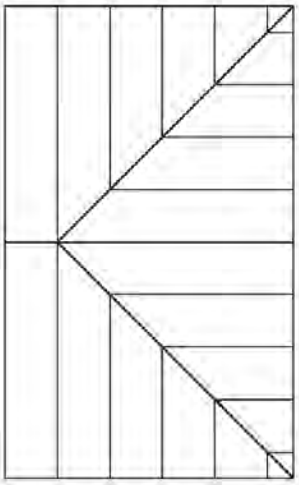
A-07

Sheet Number 7 of 45

HIP ROOF LAYOUT RECOMMENDATIONS



THIS



NOT THIS

THE PREFERED METHOD OF LAYOUT FOR THE INTERSECTION OF THE RIDGE, HIPS, COMMON RAFTERS, AND JACK RAFTERS IS SHOWN IN THE VIEW ON THE LEFT. THE CONNECTION WITH THREE STRUCTURAL MEMBERS IS STRONGER AND EASIER TO TIE CORRECTLY IN THE FIELD THAN THE ONE WITH FIVE MEMBERS BEING JOINED AT ONE POINT AS SHOWN IN THE VIEW ON THE RIGHT. THE CONTRACTOR MUST LAYOUT OUT FRAMING IN A WORKMANLIKE MANNER.

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: HIP ROOF LAYOUT RECOMMENDATIONS

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-08

Sheet Number 8 of 45

FLOOR BEAM BEAM ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 15 PSF
Live Load: 40 PSF
Deflection Limits: Δ_{LL} = L/360, Δ_{TL} = L/240
Limits and Assumption: See Appendix General Notes

Wood Species	Plys - Beam Size (Nominal)	Governing Span (ft-in)					
		8' Tributary Width	10' Tributary Width	12' Tributary Width	14' Tributary Width	16' Tributary Width	18' Tributary Width
DFL1	(1) 2x8	5 - 3	4 - 8	4 - 3	4 - 0	3 - 8	3 - 6
DFL1	(2) 2x8	7 - 4	6 - 7	6 - 1	5 - 7	5 - 3	5 - 0
DFL1	(3) 2x8	9 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 1
DFL1	(4) 2x8	10 - 3	9 - 4	8 - 6	7 - 10	7 - 4	7 - 0
DFL1	(1) 2x10	6 - 4	5 - 8	5 - 2	4 - 10	4 - 6	4 - 3
DFL1	(2) 2x10	9 - 0	8 - 1	7 - 4	6 - 10	6 - 4	6 - 0
DFL1	(3) 2x10	11 - 0	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4
DFL1	(4) 2x10	12 - 8	11 - 4	10 - 4	9 - 8	9 - 0	8 - 6
DFL1	(1) 2x12	7 - 4	6 - 7	6 - 1	5 - 7	5 - 3	5 - 0
DFL1	(2) 2x12	10 - 6	9 - 4	8 - 7	7 - 10	7 - 4	7 - 0
DFL1	(3) 2x12	12 - 9	11 - 6	10 - 6	9 - 8	9 - 1	8 - 7
DFL1	(4) 2x12	14 - 8	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10
DFL1	(1) 3x8	6 - 9	6 - 1	5 - 6	5 - 1	4 - 9	4 - 6
DFL1	(2) 3x8	9 - 6	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4
DFL1	(3) 3x8	11 - 1	10 - 3	9 - 6	8 - 9	8 - 3	7 - 9
DFL1	(4) 3x8	12 - 2	11 - 4	10 - 8	10 - 1	9 - 6	9 - 0
DFL1	(1) 3x10	8 - 3	7 - 4	6 - 9	6 - 3	5 - 10	5 - 6
DFL1	(2) 3x10	11 - 7	10 - 4	9 - 6	8 - 9	8 - 3	7 - 9
DFL1	(3) 3x10	14 - 2	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6
DFL1	(4) 3x10	15 - 7	14 - 6	13 - 4	12 - 4	11 - 7	11 - 0
DFL1	(1) 3x12	9 - 7	8 - 7	7 - 9	7 - 3	6 - 9	6 - 4
DFL1	(2) 3x12	13 - 6	12 - 1	11 - 0	10 - 2	9 - 7	9 - 0
DFL1	(3) 3x12	16 - 4	14 - 8	13 - 6	12 - 6	11 - 8	11 - 0
DFL1	(4) 3x12	18 - 10	16 - 10	15 - 6	14 - 4	13 - 6	12 - 8
DFL1	(1) 4x8	8 - 3	7 - 6	6 - 9	6 - 3	5 - 10	5 - 7
DFL1	(2) 4x8	10 - 10	10 - 1	9 - 6	8 - 10	8 - 3	7 - 10
DFL1	(3) 4x8	12 - 4	11 - 6	10 - 10	10 - 3	9 - 10	9 - 6
DFL1	(4) 4x8	13 - 8	12 - 8	12 - 0	11 - 4	10 - 10	10 - 4
DFL1	(1) 4x10	10 - 2	9 - 1	8 - 3	7 - 8	7 - 2	6 - 9
DFL1	(2) 4x10	13 - 10	12 - 9	11 - 8	10 - 10	10 - 2	9 - 7
DFL1	(3) 4x10	15 - 10	14 - 8	13 - 10	13 - 2	12 - 4	11 - 8
DFL1	(4) 4x10	17 - 6	16 - 2	15 - 2	14 - 6	13 - 10	13 - 3
DFL1	(1) 4x12	11 - 10	10 - 7	9 - 8	9 - 0	8 - 4	7 - 10
DFL1	(2) 4x12	16 - 7	14 - 10	13 - 8	12 - 8	11 - 10	11 - 2
DFL1	(3) 4x12	19 - 3	17 - 10	16 - 7	15 - 4	14 - 6	13 - 8
DFL1	(4) 4x12	21 - 2	19 - 8	18 - 6	17 - 7	16 - 7	15 - 8

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: FLOOR BEAM DESIGN TABLE A

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-09
Sheet Number 9 of 45

FLOOR BEAM BEAM ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 15 PSF
Live Load: 40 PSF
Deflection Limits: Δ_{LL} = L/360, Δ_{TL} = L/240
Limits and Assumption: See Appendix General Notes

Wood Species	Plys - Beam Size (Nominal)	Governing Span (ft-in)					
		8' Tributary Width	10' Tributary Width	12' Tributary Width	14' Tributary Width	16' Tributary Width	18' Tributary Width
DFL2	(1) 2x8	5 - 0	4 - 6	4 - 1	3 - 9	3 - 6	3 - 3
DFL2	(2) 2x8	7 - 0	6 - 3	5 - 8	5 - 3	5 - 0	4 - 8
DFL2	(3) 2x8	8 - 7	7 - 8	7 - 0	6 - 6	6 - 1	5 - 8
DFL2	(4) 2x8	9 - 10	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7
DFL2	(1) 2x10	6 - 1	5 - 4	5 - 0	4 - 7	4 - 3	4 - 1
DFL2	(2) 2x10	8 - 7	7 - 8	7 - 0	6 - 6	6 - 1	5 - 8
DFL2	(3) 2x10	10 - 6	9 - 4	8 - 7	7 - 10	7 - 4	7 - 0
DFL2	(4) 2x10	12 - 1	10 - 9	9 - 10	9 - 2	8 - 7	8 - 1
DFL2	(1) 2x12	7 - 0	6 - 3	5 - 9	5 - 3	5 - 0	4 - 8
DFL2	(2) 2x12	9 - 10	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7
DFL2	(3) 2x12	12 - 1	10 - 10	9 - 10	9 - 2	8 - 7	8 - 1
DFL2	(4) 2x12	14 - 0	12 - 6	11 - 6	10 - 7	9 - 10	9 - 4
DFL2	(1) 3x8	6 - 4	5 - 8	5 - 2	4 - 10	4 - 6	4 - 3
DFL2	(2) 3x8	9 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 1
DFL2	(3) 3x8	10 - 10	9 - 10	9 - 1	8 - 4	7 - 10	7 - 4
DFL2	(4) 3x8	12 - 0	11 - 1	10 - 4	9 - 8	9 - 1	8 - 6
DFL2	(1) 3x10	7 - 9	7 - 0	6 - 4	5 - 10	5 - 7	5 - 2
DFL2	(2) 3x10	11 - 0	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4
DFL2	(3) 3x10	13 - 6	12 - 1	11 - 0	10 - 2	9 - 7	9 - 0
DFL2	(4) 3x10	15 - 3	13 - 10	12 - 8	11 - 9	11 - 0	10 - 4
DFL2	(1) 3x12	9 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 1
DFL2	(2) 3x12	12 - 9	11 - 6	10 - 6	9 - 8	9 - 1	8 - 7
DFL2	(3) 3x12	15 - 7	14 - 0	12 - 9	11 - 9	11 - 1	10 - 6
DFL2	(4) 3x12	17 - 10	16 - 1	14 - 8	13 - 7	12 - 9	12 - 1
DFL2	(1) 4x8	7 - 10	7 - 1	6 - 6	6 - 0	5 - 7	5 - 3
DFL2	(2) 4x8	10 - 7	9 - 10	9 - 1	8 - 4	7 - 10	7 - 6
DFL2	(3) 4x8	12 - 2	11 - 3	10 - 7	10 - 1	9 - 8	9 - 1
DFL2	(4) 4x8	13 - 4	12 - 4	11 - 8	11 - 1	10 - 7	10 - 2
DFL2	(1) 4x10	9 - 8	8 - 8	7 - 10	7 - 3	6 - 10	6 - 6
DFL2	(2) 4x10	13 - 7	12 - 2	11 - 1	10 - 3	9 - 8	9 - 1
DFL2	(3) 4x10	15 - 6	14 - 4	13 - 7	12 - 7	11 - 9	11 - 1
DFL2	(4) 4x10	17 - 1	15 - 10	14 - 10	14 - 2	13 - 7	12 - 9
DFL2	(1) 4x12	11 - 2	10 - 1	9 - 2	8 - 6	8 - 0	7 - 6
DFL2	(2) 4x12	15 - 9	14 - 2	13 - 0	12 - 0	11 - 2	10 - 7
DFL2	(3) 4x12	18 - 10	17 - 3	15 - 9	14 - 8	13 - 8	13 - 0
DFL2	(4) 4x12	20 - 9	19 - 3	18 - 2	16 - 10	15 - 9	14 - 10

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: FLOOR BEAM DESIGN TABLE B

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-10
Sheet Number 10 of 45

FLOOR BEAM BEAM ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 15 PSF
Live Load: 40 PSF
Deflection Limits: Δ_{LL} = L/360, Δ_{TL} = L/240
Limits and Assumption: See Appendix General Notes

Wood Species	Plys - Beam Size (Nominal)	Governing Span (ft-in)					
		8' Tributary Width	10' Tributary Width	12' Tributary Width	14' Tributary Width	16' Tributary Width	18' Tributary Width
SP01	(1) 2x8	5 - 4	4 - 9	4 - 4	4 - 1	3 - 9	3 - 7
SP01	(2) 2x8	7 - 7	6 - 9	6 - 2	5 - 8	5 - 4	5 - 1
SP01	(3) 2x8	9 - 2	8 - 3	7 - 7	7 - 0	6 - 7	6 - 2
SP01	(4) 2x8	10 - 1	9 - 4	8 - 8	8 - 1	7 - 7	7 - 1
SP01	(1) 2x10	6 - 3	5 - 7	5 - 1	4 - 8	4 - 4	4 - 2
SP01	(2) 2x10	8 - 9	7 - 10	7 - 2	6 - 8	6 - 3	5 - 10
SP01	(3) 2x10	10 - 9	9 - 8	8 - 9	8 - 2	7 - 8	7 - 2
SP01	(4) 2x10	12 - 4	11 - 1	10 - 2	9 - 4	8 - 9	8 - 3
SP01	(1) 2x12	7 - 4	6 - 7	6 - 1	5 - 7	5 - 3	5 - 0
SP01	(2) 2x12	10 - 6	9 - 4	8 - 7	7 - 10	7 - 4	7 - 0
SP01	(3) 2x12	12 - 9	11 - 6	10 - 6	9 - 8	9 - 1	8 - 7
SP01	(4) 2x12	14 - 8	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10
SP01	(1) 3x8	6 - 10	6 - 2	5 - 7	5 - 2	4 - 10	4 - 7
SP01	(2) 3x8	9 - 6	8 - 8	8 - 0	7 - 4	6 - 10	6 - 6
SP01	(3) 3x8	10 - 10	10 - 1	9 - 6	9 - 0	8 - 4	8 - 0
SP01	(4) 3x8	12 - 0	11 - 1	10 - 6	9 - 10	9 - 6	9 - 1
SP01	(1) 3x10	8 - 1	7 - 2	6 - 7	6 - 1	5 - 8	5 - 4
SP01	(2) 3x10	11 - 4	10 - 2	9 - 3	8 - 7	8 - 1	7 - 7
SP01	(3) 3x10	13 - 10	12 - 4	11 - 4	10 - 6	9 - 10	9 - 3
SP01	(4) 3x10	15 - 3	14 - 2	13 - 1	12 - 1	11 - 4	10 - 8
SP01	(1) 3x12	9 - 7	8 - 7	7 - 9	7 - 2	6 - 9	6 - 4
SP01	(2) 3x12	13 - 6	12 - 1	11 - 0	10 - 2	9 - 7	9 - 0
SP01	(3) 3x12	16 - 4	14 - 8	13 - 6	12 - 6	11 - 8	11 - 0
SP01	(4) 3x12	18 - 7	16 - 10	15 - 6	14 - 4	13 - 6	12 - 8
SP01	(1) 4x8	8 - 4	7 - 8	7 - 0	6 - 6	6 - 1	5 - 8
SP01	(2) 4x8	10 - 7	9 - 10	9 - 3	8 - 9	8 - 4	8 - 1
SP01	(3) 4x8	12 - 2	11 - 3	10 - 7	10 - 1	9 - 8	9 - 3
SP01	(4) 4x8	13 - 4	12 - 4	11 - 8	11 - 1	10 - 7	10 - 2
SP01	(1) 4x10	10 - 0	9 - 0	8 - 2	7 - 7	7 - 1	6 - 8
SP01	(2) 4x10	13 - 7	12 - 7	11 - 6	10 - 8	10 - 0	9 - 4
SP01	(3) 4x10	15 - 6	14 - 4	13 - 7	12 - 10	12 - 2	11 - 6
SP01	(4) 4x10	17 - 1	15 - 10	14 - 10	14 - 2	13 - 7	13 - 1
SP01	(1) 4x12	11 - 9	10 - 7	9 - 8	9 - 0	8 - 4	7 - 10
SP01	(2) 4x12	16 - 6	14 - 10	13 - 7	12 - 8	11 - 9	11 - 2
SP01	(3) 4x12	18 - 10	17 - 6	16 - 6	15 - 4	14 - 6	13 - 7
SP01	(4) 4x12	20 - 9	19 - 3	18 - 2	17 - 3	16 - 6	15 - 8

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: FLOOR BEAM DESIGN TABLE C

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-11
Sheet Number 11 of 45

FLOOR BEAM BEAM ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 15 PSF
Live Load: 40 PSF
Deflection Limits: Δ_{LL} = L/360, Δ_{TL} = L/240
Limits and Assumption: See Appendix General Notes

Wood Species	Plys - Beam Size (Nominal)	Governing Span (ft-in)					
		8' Tributary Width	10' Tributary Width	12' Tributary Width	14' Tributary Width	16' Tributary Width	18' Tributary Width
SP02	(1) 2x8	4 - 7	4 - 1	3 - 9	3 - 6	3 - 3	3 - 1
SP02	(2) 2x8	6 - 6	5 - 9	5 - 3	4 - 10	4 - 7	4 - 3
SP02	(3) 2x8	7 - 10	7 - 1	6 - 6	6 - 0	5 - 7	5 - 3
SP02	(4) 2x8	9 - 2	8 - 2	7 - 6	6 - 10	6 - 6	6 - 1
SP02	(1) 2x10	5 - 6	4 - 10	4 - 6	4 - 1	3 - 10	3 - 7
SP02	(2) 2x10	7 - 8	6 - 10	6 - 3	5 - 9	5 - 6	5 - 2
SP02	(3) 2x10	9 - 4	8 - 4	7 - 8	7 - 1	6 - 8	6 - 3
SP02	(4) 2x10	10 - 9	9 - 8	8 - 10	8 - 2	7 - 8	7 - 3
SP02	(1) 2x12	6 - 4	5 - 9	5 - 3	4 - 10	4 - 7	4 - 3
SP02	(2) 2x12	9 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 1
SP02	(3) 2x12	11 - 1	9 - 10	9 - 1	8 - 4	7 - 10	7 - 4
SP02	(4) 2x12	12 - 8	11 - 4	10 - 4	9 - 8	9 - 1	8 - 7
SP02	(1) 3x8	5 - 10	5 - 3	4 - 10	4 - 6	4 - 2	4 - 0
SP02	(2) 3x8	8 - 4	7 - 6	6 - 10	6 - 3	5 - 10	5 - 7
SP02	(3) 3x8	10 - 2	9 - 2	8 - 4	7 - 9	7 - 3	6 - 10
SP02	(4) 3x8	11 - 6	10 - 6	9 - 7	8 - 10	8 - 4	7 - 10
SP02	(1) 3x10	7 - 0	6 - 3	5 - 9	5 - 3	5 - 0	4 - 8
SP02	(2) 3x10	9 - 10	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7
SP02	(3) 3x10	12 - 1	10 - 9	9 - 10	9 - 2	8 - 7	8 - 1
SP02	(4) 3x10	13 - 10	12 - 6	11 - 4	10 - 7	9 - 10	9 - 4
SP02	(1) 3x12	8 - 3	7 - 4	6 - 9	6 - 3	5 - 10	5 - 6
SP02	(2) 3x12	11 - 8	10 - 4	9 - 7	8 - 10	8 - 3	7 - 9
SP02	(3) 3x12	14 - 2	12 - 8	11 - 8	10 - 9	10 - 1	9 - 7
SP02	(4) 3x12	16 - 3	14 - 7	13 - 4	12 - 4	11 - 8	11 - 0
SP02	(1) 4x8	7 - 4	6 - 7	6 - 0	5 - 7	5 - 2	4 - 10
SP02	(2) 4x8	10 - 2	9 - 3	8 - 6	7 - 10	7 - 4	6 - 10
SP02	(3) 4x8	11 - 8	10 - 9	10 - 2	9 - 7	9 - 0	8 - 6
SP02	(4) 4x8	12 - 9	11 - 10	11 - 2	10 - 7	10 - 2	9 - 9
SP02	(1) 4x10	8 - 8	7 - 9	7 - 1	6 - 7	6 - 2	5 - 9
SP02	(2) 4x10	12 - 3	11 - 0	10 - 1	9 - 3	8 - 8	8 - 2
SP02	(3) 4x10	14 - 10	13 - 4	12 - 3	11 - 4	10 - 8	10 - 1
SP02	(4) 4x10	16 - 4	15 - 2	14 - 1	13 - 1	12 - 3	11 - 7
SP02	(1) 4x12	10 - 3	9 - 2	8 - 4	7 - 9	7 - 3	6 - 10
SP02	(2) 4x12	14 - 4	12 - 10	11 - 9	11 - 0	10 - 3	9 - 8
SP02	(3) 4x12	17 - 6	15 - 8	14 - 4	13 - 4	12 - 6	11 - 9
SP02	(4) 4x12	19 - 10	18 - 1	16 - 6	15 - 4	14 - 4	13 - 7

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: FLOOR BEAM DESIGN TABLE D

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-12
Sheet Number 12 of 45

FLOOR JOIST ALLOWABLE SPANS
USVI

Date: 3/6/2018	Dead Load: 15 PSF
Governing Code: 2018 IBC/ASCE 7-16	Live Load: 40 PSF
Risk Category: II	Deflection Limits: Δ_{LL} = L/360
Base Wind Speed: 165 MPH	Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Nominal Depth (in)	Wood Species	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
		Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
6	DFL1	10 - 11	9 - 11	9 - 4	8 - 8	12 - 11	11 - 9	11 - 1	10 - 3	14 - 6	13 - 2	12 - 4	11 - 6
8	DFL1	14 - 5	13 - 1	12 - 3	11 - 2	17 - 1	15 - 6	14 - 7	13 - 6	19 - 1	17 - 4	16 - 4	15 - 2
10	DFL1	18 - 4	16 - 7	15 - 2	13 - 7	21 - 9	19 - 9	18 - 7	17 - 3	24 - 4	22 - 2	20 - 10	19 - 4
12	DFL1	22 - 0	19 - 2	17 - 7	15 - 9	26 - 0	24 - 1	22 - 6	20 - 2	26 - 0	26 - 0	25 - 4	23 - 6
6	DFL2	10 - 8	9 - 8	9 - 2	8 - 4	12 - 8	11 - 6	10 - 10	10 - 1	14 - 2	12 - 11	12 - 1	11 - 3
8	DFL2	14 - 1	12 - 10	11 - 10	10 - 7	16 - 9	15 - 2	14 - 3	13 - 3	18 - 8	17 - 0	16 - 0	14 - 10
10	DFL2	18 - 0	15 - 9	14 - 5	12 - 11	21 - 4	19 - 5	18 - 3	16 - 7	23 - 10	21 - 8	20 - 5	18 - 11
12	DFL2	20 - 11	18 - 2	16 - 8	14 - 11	26 - 0	23 - 3	21 - 4	19 - 2	26 - 0	26 - 0	24 - 10	23 - 1
6	SP01	10 - 8	9 - 8	9 - 2	8 - 6	12 - 8	11 - 6	10 - 10	10 - 1	14 - 2	12 - 11	12 - 1	11 - 3
8	SP01	14 - 1	12 - 10	12 - 0	11 - 2	16 - 9	15 - 2	14 - 3	13 - 3	18 - 8	17 - 0	16 - 0	14 - 10
10	SP01	18 - 0	16 - 2	14 - 10	13 - 3	21 - 4	19 - 5	18 - 3	16 - 11	23 - 10	21 - 8	20 - 5	18 - 11
12	SP01	21 - 11	19 - 2	17 - 6	15 - 9	26 - 0	23 - 7	22 - 2	20 - 2	26 - 0	26 - 0	24 - 10	23 - 1
6	SP02	10 - 3	9 - 3	8 - 7	7 - 9	12 - 1	11 - 0	10 - 4	9 - 7	13 - 7	12 - 4	11 - 7	10 - 9
8	SP02	13 - 6	11 - 11	10 - 11	9 - 9	16 - 0	14 - 6	13 - 8	12 - 7	17 - 11	16 - 3	15 - 3	14 - 2
10	SP02	16 - 3	14 - 1	12 - 11	11 - 7	20 - 5	18 - 1	16 - 7	14 - 10	22 - 10	20 - 9	19 - 5	17 - 6
12	SP02	19 - 6	16 - 7	15 - 2	13 - 7	24 - 2	21 - 2	19 - 5	17 - 5	26 - 0	24 - 9	22 - 9	20 - 6

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: FLOOR JOIST DESIGN TABLE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-13

Sheet Number 13 of 45

STUDS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Wood Species	Size	Exposure B, Kzt = 1.0				Exposure B, Kzt = 2.0				Exposure D, Kzt = 1.0			
		Spacing				Spacing				Spacing			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
DFL1	2x4	6 - 10	6 - 3	5 - 9	5 - 1	5 - 5	4 - 11	4 - 8	4 - 4	5 - 9	5 - 3	4 - 11	4 - 6
DFL1	2x6	10 - 10	9 - 11	9 - 6	8 - 6	8 - 7	7 - 10	7 - 4	6 - 10	9 - 2	8 - 4	7 - 11	7 - 4
DFL1	2x8	14 - 3	13 - 4	12 - 8	11 - 8	11 - 4	10 - 3	9 - 5	8 - 6	12 - 2	11 - 1	10 - 5	9 - 5
DFL1	3x4	6 - 10	6 - 10	6 - 8	6 - 0	6 - 5	5 - 10	5 - 6	5 - 2	6 - 10	6 - 3	5 - 11	5 - 6
DFL1	3x6	10 - 10	10 - 10	10 - 10	10 - 7	10 - 2	9 - 4	8 - 10	8 - 3	10 - 10	10 - 0	9 - 5	8 - 10
DFL1	3x8	14 - 3	14 - 3	14 - 3	14 - 3	13 - 7	12 - 6	11 - 10	10 - 10	14 - 3	13 - 4	12 - 8	11 - 11
DFL1	4x4	6 - 10	6 - 10	6 - 10	6 - 10	6 - 10	6 - 7	6 - 2	5 - 9	6 - 10	6 - 10	6 - 7	6 - 2
DFL1	4x6	10 - 10	10 - 10	10 - 10	10 - 10	10 - 10	10 - 6	9 - 11	9 - 4	10 - 10	10 - 10	10 - 7	10 - 0
DFL1	4x8	14 - 3	14 - 3	14 - 3	14 - 3	14 - 3	14 - 1	13 - 5	12 - 8	14 - 3	14 - 3	14 - 3	13 - 6
DFL2	2x4	6 - 9	5 - 11	5 - 5	4 - 10	5 - 4	4 - 10	4 - 7	4 - 3	5 - 8	5 - 2	4 - 10	4 - 5
DFL2	2x6	10 - 7	9 - 9	9 - 3	8 - 4	8 - 5	7 - 8	7 - 2	6 - 6	8 - 11	8 - 2	7 - 8	7 - 2
DFL2	2x8	14 - 2	13 - 1	12 - 5	11 - 5	11 - 2	9 - 8	8 - 11	8 - 0	11 - 11	10 - 9	9 - 10	8 - 11
DFL2	3x4	6 - 10	6 - 10	6 - 7	5 - 11	6 - 4	5 - 9	5 - 5	5 - 0	6 - 9	6 - 1	5 - 9	5 - 4
DFL2	3x6	10 - 10	10 - 10	10 - 10	10 - 4	10 - 0	9 - 2	8 - 7	7 - 10	10 - 8	9 - 9	9 - 3	8 - 7
DFL2	3x8	14 - 3	14 - 3	14 - 3	14 - 0	13 - 4	12 - 3	11 - 3	10 - 3	14 - 2	13 - 1	12 - 4	11 - 4
DFL2	4x4	6 - 10	6 - 10	6 - 10	6 - 10	6 - 10	6 - 5	6 - 1	5 - 8	6 - 10	6 - 10	6 - 5	6 - 1
DFL2	4x6	10 - 10	10 - 10	10 - 10	10 - 10	10 - 10	10 - 3	9 - 9	9 - 1	10 - 10	10 - 10	10 - 5	9 - 9
DFL2	4x8	14 - 3	14 - 3	14 - 3	14 - 3	14 - 3	13 - 9	13 - 1	12 - 4	14 - 3	14 - 3	14 - 0	13 - 3
SP01	2x4	6 - 9	6 - 0	5 - 6	4 - 11	5 - 4	4 - 10	4 - 7	4 - 3	5 - 8	5 - 2	4 - 10	4 - 6
SP01	2x6	10 - 7	9 - 9	9 - 3	8 - 6	8 - 5	7 - 8	7 - 3	6 - 9	8 - 11	8 - 2	7 - 9	7 - 3
SP01	2x8	14 - 2	13 - 1	12 - 6	11 - 8	11 - 2	10 - 2	9 - 7	8 - 8	11 - 11	10 - 11	10 - 4	9 - 8
SP01	3x4	6 - 10	6 - 10	6 - 8	6 - 0	6 - 4	5 - 9	5 - 5	5 - 0	6 - 9	6 - 1	5 - 9	5 - 4
SP01	3x6	10 - 10	10 - 10	10 - 10	10 - 4	10 - 0	9 - 2	8 - 8	8 - 1	10 - 8	9 - 9	9 - 3	8 - 8
SP01	3x8	14 - 3	14 - 3	14 - 3	14 - 0	13 - 4	12 - 3	11 - 7	10 - 10	14 - 2	13 - 1	12 - 5	11 - 8
SP01	4x4	6 - 10	6 - 10	6 - 10	6 - 10	6 - 10	6 - 5	6 - 1	5 - 8	6 - 10	6 - 10	6 - 5	6 - 1
SP01	4x6	10 - 10	10 - 10	10 - 10	10 - 10	10 - 10	10 - 3	9 - 9	9 - 2	10 - 10	10 - 10	10 - 5	9 - 10
SP01	4x8	14 - 3	14 - 3	14 - 3	14 - 3	14 - 3	13 - 9	13 - 2	12 - 4	14 - 3	14 - 3	14 - 0	13 - 3
SP02	2x4	6 - 5	5 - 9	5 - 3	4 - 8	5 - 1	4 - 7	4 - 4	4 - 0	5 - 5	4 - 11	4 - 8	4 - 3
SP02	2x6	10 - 2	9 - 4	8 - 10	8 - 0	8 - 0	7 - 3	6 - 8	6 - 0	8 - 7	7 - 9	7 - 4	6 - 7
SP02	2x8	13 - 7	12 - 5	11 - 9	10 - 10	10 - 3	8 - 11	8 - 2	7 - 5	11 - 3	9 - 10	9 - 1	8 - 2
SP02	3x4	6 - 10	6 - 10	6 - 4	5 - 8	6 - 0	5 - 6	5 - 2	4 - 8	6 - 5	5 - 10	5 - 6	5 - 1
SP02	3x6	10 - 10	10 - 10	10 - 6	9 - 11	9 - 6	8 - 8	8 - 0	7 - 3	10 - 2	9 - 4	8 - 9	8 - 0
SP02	3x8	14 - 3	14 - 3	14 - 2	13 - 5	12 - 8	11 - 3	10 - 4	9 - 4	13 - 7	12 - 5	11 - 6	10 - 5
SP02	4x4	6 - 10	6 - 10	6 - 10	6 - 9	6 - 9	6 - 2	5 - 9	5 - 5	6 - 10	6 - 7	6 - 2	5 - 9
SP02	4x6	10 - 10	10 - 10	10 - 10	10 - 10	10 - 8	9 - 10	9 - 3	8 - 8	10 - 10	10 - 5	9 - 11	9 - 3
SP02	4x8	14 - 3	14 - 3	14 - 3	14 - 3	14 - 3	13 - 1	12 - 5	11 - 4	14 - 3	14 - 0	13 - 4	12 - 6

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: WALL STUD DESIGN TABLE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-14
Sheet Number 14 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	DFL1	2:12 to 4:12	8 - 5	7 - 8	7 - 1	6 - 7	6 - 3	5 - 11	5 - 7	5 - 1	4 - 9	4 - 5	4 - 2	3 - 11	6 - 2	5 - 8	5 - 3	4 - 11	4 - 7	4 - 5
(2) 2x8	DFL1	2:12 to 4:12	11 - 3	10 - 7	10 - 0	9 - 5	8 - 10	8 - 5	7 - 11	7 - 3	6 - 9	6 - 3	5 - 11	5 - 7	8 - 10	8 - 1	7 - 5	7 - 0	6 - 7	6 - 3
(3) 2x8	DFL1	2:12 to 4:12	12 - 10	12 - 1	11 - 6	11 - 0	10 - 7	10 - 2	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11	10 - 6	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(4) 2x8	DFL1	2:12 to 4:12	14 - 2	13 - 4	12 - 8	12 - 1	11 - 8	11 - 3	10 - 10	10 - 2	9 - 6	8 - 11	8 - 5	7 - 11	11 - 7	10 - 11	10 - 4	9 - 10	9 - 4	8 - 10
(1) 2x10	DFL1	2:12 to 4:12	10 - 2	9 - 3	8 - 7	8 - 0	7 - 7	7 - 2	6 - 9	6 - 2	5 - 9	5 - 4	5 - 1	4 - 10	7 - 7	6 - 11	6 - 5	6 - 0	5 - 7	5 - 4
(2) 2x10	DFL1	2:12 to 4:12	14 - 4	13 - 2	12 - 3	11 - 5	10 - 10	10 - 3	9 - 8	8 - 10	8 - 2	7 - 8	7 - 3	6 - 10	10 - 9	9 - 10	9 - 1	8 - 6	8 - 0	7 - 7
(3) 2x10	DFL1	2:12 to 4:12	16 - 5	15 - 6	14 - 8	14 - 0	13 - 3	12 - 7	11 - 10	10 - 10	10 - 1	9 - 5	8 - 10	8 - 5	13 - 2	12 - 0	11 - 2	10 - 5	9 - 10	9 - 4
(4) 2x10	DFL1	2:12 to 4:12	18 - 1	17 - 0	16 - 2	15 - 6	14 - 10	14 - 4	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 8	14 - 10	13 - 10	12 - 10	12 - 0	11 - 4	10 - 9
(1) 2x12	DFL1	2:12 to 4:12	11 - 9	10 - 9	9 - 11	9 - 4	8 - 9	8 - 4	7 - 10	7 - 2	6 - 8	6 - 3	5 - 10	5 - 7	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2
(2) 2x12	DFL1	2:12 to 4:12	16 - 8	15 - 3	14 - 2	13 - 3	12 - 6	11 - 11	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	7 - 11	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 10
(3) 2x12	DFL1	2:12 to 4:12	20 - 0	18 - 7	17 - 3	16 - 2	15 - 4	14 - 6	13 - 9	12 - 7	11 - 8	10 - 11	10 - 3	9 - 9	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10
(4) 2x12	DFL1	2:12 to 4:12	22 - 0	20 - 9	19 - 8	18 - 8	17 - 7	16 - 9	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3	17 - 6	16 - 0	14 - 11	13 - 11	13 - 2	12 - 6
(1) 2x14	DFL1	2:12 to 4:12	13 - 1	12 - 0	11 - 1	10 - 4	9 - 9	9 - 3	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11
(2) 2x14	DFL1	2:12 to 4:12	18 - 7	17 - 0	15 - 10	14 - 10	14 - 0	13 - 3	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 11	13 - 11	12 - 9	11 - 9	11 - 0	10 - 5	9 - 10
(3) 2x14	DFL1	2:12 to 4:12	22 - 7	20 - 9	19 - 3	18 - 1	17 - 1	16 - 2	15 - 4	14 - 0	13 - 0	12 - 2	11 - 6	10 - 11	17 - 0	15 - 6	14 - 5	13 - 6	12 - 9	12 - 1
(4) 2x14	DFL1	2:12 to 4:12	25 - 0	23 - 9	22 - 1	20 - 9	19 - 7	18 - 8	17 - 8	16 - 2	15 - 0	14 - 0	13 - 3	12 - 7	19 - 6	17 - 11	16 - 7	15 - 7	14 - 8	13 - 11
(1) 3x8	DFL1	2:12 to 4:12	10 - 7	9 - 11	9 - 2	8 - 7	8 - 1	7 - 8	7 - 3	6 - 7	6 - 1	5 - 9	5 - 5	5 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 0	5 - 8
(1) 3x10	DFL1	2:12 to 4:12	13 - 2	12 - 1	11 - 2	10 - 5	9 - 10	9 - 4	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4	6 - 11
(1) 3x12	DFL1	2:12 to 4:12	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3	11 - 4	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1
(1) 3x14	DFL1	2:12 to 4:12	17 - 0	15 - 7	14 - 5	13 - 6	12 - 9	12 - 1	11 - 5	10 - 5	9 - 8	9 - 1	8 - 6	8 - 1	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0
(1) 4x8	DFL1	2:12 to 4:12	11 - 10	11 - 2	10 - 7	10 - 1	9 - 9	9 - 5	8 - 11	8 - 2	7 - 7	7 - 1	6 - 8	6 - 4	9 - 8	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0
(1) 4x10	DFL1	2:12 to 4:12	15 - 1	14 - 3	13 - 6	12 - 11	12 - 2	11 - 7	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9	12 - 2	11 - 1	10 - 3	9 - 7	9 - 1	8 - 7
(1) 4x12	DFL1	2:12 to 4:12	18 - 5	17 - 3	16 - 0	15 - 0	14 - 2	13 - 5	12 - 9	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0
(1) 4x14	DFL1	2:12 to 4:12	21 - 2	19 - 4	18 - 0	16 - 10	15 - 11	15 - 1	14 - 3	13 - 0	12 - 1	11 - 4	10 - 8	10 - 1	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3
(1) 2x8	DFL2	2:12 to 4:12	7 - 11	7 - 3	6 - 8	6 - 3	5 - 11	5 - 7	5 - 3	4 - 10	4 - 6	4 - 2	3 - 11	3 - 9	5 - 10	5 - 4	5 - 0	4 - 8	4 - 4	4 - 2
(2) 2x8	DFL2	2:12 to 4:12	11 - 0	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	7 - 6	6 - 11	6 - 4	5 - 11	5 - 7	5 - 4	8 - 4	7 - 8	7 - 1	6 - 7	6 - 3	5 - 11
(3) 2x8	DFL2	2:12 to 4:12	12 - 7	11 - 10	11 - 3	10 - 9	10 - 3	9 - 9	9 - 3	8 - 5	7 - 10	7 - 4	6 - 11	6 - 6	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3
(4) 2x8	DFL2	2:12 to 4:12	13 - 11	13 - 1	12 - 5	11 - 10	11 - 5	11 - 0	10 - 7	9 - 9	9 - 0	8 - 5	7 - 11	7 - 6	11 - 4	10 - 8	10 - 0	9 - 4	8 - 10	8 - 5
(1) 2x10	DFL2	2:12 to 4:12	9 - 8	8 - 10	8 - 2	7 - 8	7 - 2	6 - 10	6 - 5	5 - 11	5 - 5	5 - 1	4 - 10	4 - 7	7 - 2	6 - 6	6 - 1	5 - 8	5 - 4	5 - 1
(2) 2x10	DFL2	2:12 to 4:12	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 9	9 - 2	8 - 5	7 - 9	7 - 3	6 - 10	6 - 6	10 - 2	9 - 4	8 - 8	8 - 1	7 - 7	7 - 3
(3) 2x10	DFL2	2:12 to 4:12	16 - 1	15 - 2	14 - 2	13 - 3	12 - 6	11 - 11	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 10
(4) 2x10	DFL2	2:12 to 4:12	17 - 9	16 - 8	15 - 10	15 - 2	14 - 5	13 - 9	13 - 0	11 - 10	11 - 0	10 - 3	9 - 8	9 - 2	14 - 4	13 - 2	12 - 2	11 - 5	10 - 9	10 - 3
(1) 2x12	DFL2	2:12 to 4:12	11 - 2	10 - 2	9 - 5	8 - 10	8 - 4	7 - 11	7 - 6	6 - 10	6 - 4	5 - 11	5 - 7	5 - 3	8 - 3	7 - 7	7 - 0	6 - 7	6 - 2	5 - 10
(2) 2x12	DFL2	2:12 to 4:12	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3	10 - 8	9 - 9	9 - 0	8 - 5	7 - 11	7 - 7	11 - 10	10 - 10	10 - 0	9 - 4	8 - 10	8 - 5
(3) 2x12	DFL2	2:12 to 4:12	19 - 3	17 - 8	16 - 5	15 - 4	14 - 6	13 - 9	13 - 0	11 - 11	11 - 0	10 - 4	9 - 9	9 - 3	14 - 5	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3
(4) 2x12	DFL2	2:12 to 4:12	21 - 7	20 - 3	18 - 10	17 - 8	16 - 8	15 - 10	15 - 0	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8	16 - 7	15 - 3	14 - 1	13 - 3	12 - 6	11 - 10
(1) 2x14	DFL2	2:12 to 4:12	12 - 5	11 - 4	10 - 6	9 - 10	9 - 3	8 - 10	8 - 4	7 - 7	7 - 0	6 - 7	6 - 2	5 - 11	9 - 3	8 - 5	7 - 10	7 - 4	6 - 11	6 - 7
(2) 2x14	DFL2	2:12 to 4:12	17 - 8	16 - 2	15 - 0	14 - 0	13 - 3	12 - 7	11 - 11	10 - 10	10 - 1	9 - 5	8 - 11	8 - 5	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10	9 - 4
(3) 2x14	DFL2	2:12 to 4:12	21 - 6	19 - 8	18 - 3	17 - 2	16 - 2	15 - 4	14 - 6	13 - 3	12 - 4	11 - 6	10 - 11	10 - 4	16 - 1	14 - 9	13 - 8	12 - 10	12 - 1	11 - 6
(4) 2x14	DFL2	2:12 to 4:12	24 - 7	22 - 7	21 - 0	19 - 8	18 - 7	17 - 8	16 - 9	15 - 4	14 - 2	13 - 4	12 - 7	11 - 11	18 - 6	17 - 0	15 - 9	14 - 9	13 - 11	13 - 3
(1) 3x8	DFL2	2:12 to 4:12	10 - 3	9 - 5	8 - 8	8 - 2	7 - 8	7 - 3	6 - 10	6 - 3	5 - 10	5 - 5	5 - 1	4 - 10	7 - 8	7 - 0	6 - 5	6 - 0	5 - 8	5 - 5
(1) 3x10	DFL2	2:12 to 4:12	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 11	8 - 5	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11	9 - 4	8 - 6	7 - 11	7 - 4	6 - 11	6 - 7
(1) 3x12	DFL2	2:12 to 4:12	14 - 6	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11	10 - 9	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(1) 3x14	DFL2	2:12 to 4:12	22 - 7	20 - 8	19 - 3	18 - 0	17 - 0	16 - 2	15 - 4	14 - 0	13 - 0	12 - 2	11 - 6	10 - 11	16 - 11	15 - 6	14 - 5	13 - 6	12 - 9	12 - 1
(1) 4x8	DFL2	2:12 to 4:12	11 - 7	10 - 11	10 - 4	9 - 11	9 - 5	9 - 0	8 - 6	7 - 9	7 - 2	6 - 8	6 - 4	6 - 0	9 - 5	8 - 7	7 - 11	7 - 5	7 - 0	6 - 8
(1) 4x10	DFL2	2:12 to 4:12	14 - 10	13 - 11	13 - 1	12 - 3	11 - 7	11 - 0	10 - 4	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4	11 - 6	10 - 6	9 - 9	9 - 1	8 - 7	8 - 2
(1) 4x12	DFL2	2:12 to 4:12	17 - 11	16 - 5	15 - 2	14 - 3	13 - 5	12 - 9	12 - 1	11 - 0	10 - 3	9 - 7	9 - 0	8 - 7	13 - 5	12 - 3	11 - 4	10 - 7	10 - 0	9 - 6
(1) 4x14	DFL2	2:12 to 4:12	25 - 0	25 - 0	23 - 10	22 - 4	21 - 1	20 - 1	19 - 0	17 - 5	16 - 2	15 - 1	14 - 3	13 - 7	21 - 0	19 - 3	17 - 11	16 - 9	15 - 10	15 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE A

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-15

Sheet Number 15 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	SP01	2:12 to 4:12	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0	5 - 8	5 - 2	4 - 10	4 - 6	4 - 3	4 - 0	6 - 4	5 - 9	5 - 4	5 - 0	4 - 8	4 - 5
(2) 2x8	SP01	2:12 to 4:12	11 - 0	10 - 4	9 - 10	9 - 5	9 - 0	8 - 7	8 - 1	7 - 5	6 - 10	6 - 5	6 - 0	5 - 9	9 - 0	8 - 3	7 - 7	7 - 1	6 - 9	6 - 4
(3) 2x8	SP01	2:12 to 4:12	12 - 7	11 - 10	11 - 3	10 - 9	10 - 4	10 - 0	9 - 7	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0	10 - 4	9 - 9	9 - 3	8 - 9	8 - 3	7 - 10
(4) 2x8	SP01	2:12 to 4:12	13 - 11	13 - 1	12 - 5	11 - 10	11 - 5	11 - 0	10 - 7	10 - 0	9 - 6	9 - 1	8 - 7	8 - 1	11 - 4	10 - 8	10 - 2	9 - 9	9 - 4	9 - 0
(1) 2x10	SP01	2:12 to 4:12	9 - 11	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0	6 - 8	6 - 1	5 - 7	5 - 3	4 - 11	4 - 8	7 - 4	6 - 9	6 - 3	5 - 10	5 - 6	5 - 2
(2) 2x10	SP01	2:12 to 4:12	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 8	10 - 6	9 - 7	8 - 11	8 - 4	7 - 10	7 - 5
(3) 2x10	SP01	2:12 to 4:12	16 - 1	15 - 2	14 - 5	13 - 8	12 - 11	12 - 3	11 - 7	10 - 7	9 - 10	9 - 2	8 - 8	8 - 3	12 - 10	11 - 9	10 - 11	10 - 2	9 - 7	9 - 1
(4) 2x10	SP01	2:12 to 4:12	17 - 9	16 - 8	15 - 10	15 - 2	14 - 7	14 - 1	13 - 4	12 - 2	11 - 4	10 - 7	10 - 0	9 - 6	14 - 6	13 - 6	12 - 7	11 - 9	11 - 1	10 - 6
(1) 2x12	SP01	2:12 to 4:12	11 - 9	10 - 8	9 - 11	9 - 3	8 - 9	8 - 4	7 - 10	7 - 2	6 - 8	6 - 2	5 - 10	5 - 7	8 - 9	7 - 11	7 - 4	6 - 11	6 - 6	6 - 2
(2) 2x12	SP01	2:12 to 4:12	16 - 8	15 - 3	14 - 2	13 - 3	12 - 6	11 - 10	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	7 - 11	12 - 5	11 - 5	10 - 7	9 - 10	9 - 4	8 - 10
(3) 2x12	SP01	2:12 to 4:12	19 - 7	18 - 5	17 - 3	16 - 2	15 - 3	14 - 6	13 - 9	12 - 7	11 - 8	10 - 11	10 - 3	9 - 9	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10
(4) 2x12	SP01	2:12 to 4:12	21 - 7	20 - 4	19 - 3	18 - 5	17 - 7	16 - 8	15 - 10	14 - 5	13 - 5	12 - 7	11 - 10	11 - 3	17 - 6	16 - 0	14 - 10	13 - 11	13 - 2	12 - 6
(1) 2x14	SP01	2:12 to 4:12	12 - 8	11 - 7	10 - 8	10 - 0	9 - 5	9 - 0	8 - 6	7 - 9	7 - 2	6 - 8	6 - 4	6 - 0	9 - 5	8 - 7	7 - 11	7 - 5	7 - 0	6 - 8
(2) 2x14	SP01	2:12 to 4:12	17 - 11	16 - 5	15 - 3	14 - 3	13 - 6	12 - 10	12 - 1	11 - 1	10 - 3	9 - 7	9 - 0	8 - 7	13 - 5	12 - 3	11 - 4	10 - 8	10 - 0	9 - 6
(3) 2x14	SP01	2:12 to 4:12	21 - 10	20 - 0	18 - 7	17 - 5	16 - 5	15 - 8	14 - 9	13 - 6	12 - 6	11 - 9	11 - 1	10 - 6	16 - 5	15 - 0	13 - 11	13 - 0	12 - 3	11 - 8
(4) 2x14	SP01	2:12 to 4:12	24 - 11	22 - 11	21 - 4	20 - 0	18 - 11	18 - 0	17 - 0	15 - 7	14 - 5	13 - 6	12 - 9	12 - 1	18 - 10	17 - 3	16 - 0	15 - 0	14 - 2	13 - 5
(1) 3x8	SP01	2:12 to 4:12	10 - 4	9 - 9	9 - 3	8 - 9	8 - 3	7 - 10	7 - 5	6 - 9	6 - 3	5 - 10	5 - 6	5 - 3	8 - 2	7 - 6	6 - 11	6 - 6	6 - 1	5 - 10
(1) 3x10	SP01	2:12 to 4:12	12 - 10	11 - 9	10 - 11	10 - 2	9 - 8	9 - 2	8 - 8	7 - 11	7 - 4	6 - 10	6 - 5	6 - 1	9 - 7	8 - 9	8 - 1	7 - 7	7 - 2	6 - 9
(1) 3x12	SP01	2:12 to 4:12	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3	11 - 4	10 - 5	9 - 7	9 - 0	8 - 6	8 - 1
(1) 3x14	SP01	2:12 to 4:12	22 - 11	21 - 0	19 - 6	18 - 4	17 - 4	16 - 5	15 - 7	14 - 3	13 - 2	12 - 4	11 - 8	11 - 1	17 - 3	15 - 9	14 - 8	13 - 9	12 - 11	12 - 4
(1) 4x8	SP01	2:12 to 4:12	11 - 7	10 - 11	10 - 4	9 - 11	9 - 6	9 - 2	8 - 10	8 - 4	7 - 9	7 - 3	6 - 10	6 - 6	9 - 6	8 - 11	8 - 6	8 - 1	7 - 7	7 - 3
(1) 4x10	SP01	2:12 to 4:12	14 - 10	13 - 11	13 - 3	12 - 8	11 - 11	11 - 4	10 - 9	9 - 10	9 - 1	8 - 6	8 - 0	7 - 7	11 - 11	10 - 10	10 - 1	9 - 5	8 - 11	8 - 5
(1) 4x12	SP01	2:12 to 4:12	18 - 0	16 - 11	16 - 0	15 - 0	14 - 2	13 - 5	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0
(1) 4x14	SP01	2:12 to 4:12	25 - 0	25 - 0	23 - 11	22 - 7	21 - 4	20 - 4	19 - 3	17 - 7	16 - 4	15 - 4	14 - 5	13 - 9	21 - 3	19 - 6	18 - 1	17 - 0	16 - 0	15 - 3
(1) 2x8	SP02	2:12 to 4:12	7 - 4	6 - 8	6 - 2	5 - 9	5 - 5	5 - 2	4 - 11	4 - 6	4 - 2	3 - 10	3 - 8	3 - 5	5 - 5	4 - 11	4 - 7	4 - 3	4 - 1	3 - 10
(2) 2x8	SP02	2:12 to 4:12	10 - 5	9 - 6	8 - 10	8 - 3	7 - 9	7 - 4	7 - 0	6 - 4	5 - 11	5 - 6	5 - 2	4 - 11	7 - 9	7 - 1	6 - 6	6 - 1	5 - 9	5 - 6
(3) 2x8	SP02	2:12 to 4:12	12 - 1	11 - 4	10 - 9	10 - 1	9 - 6	9 - 0	8 - 6	7 - 9	7 - 3	6 - 9	6 - 4	6 - 0	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 9
(4) 2x8	SP02	2:12 to 4:12	13 - 3	12 - 6	11 - 10	11 - 4	10 - 11	10 - 5	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4	7 - 0	10 - 10	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(1) 2x10	SP02	2:12 to 4:12	8 - 8	7 - 11	7 - 4	6 - 10	6 - 6	6 - 2	5 - 10	5 - 3	4 - 11	4 - 7	4 - 4	4 - 1	6 - 5	5 - 11	5 - 5	5 - 1	4 - 10	4 - 7
(2) 2x10	SP02	2:12 to 4:12	12 - 3	11 - 3	10 - 5	9 - 9	9 - 2	8 - 9	8 - 3	7 - 6	7 - 0	6 - 6	6 - 2	5 - 10	9 - 2	8 - 5	7 - 9	7 - 3	6 - 10	6 - 6
(3) 2x10	SP02	2:12 to 4:12	15 - 0	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8	10 - 1	9 - 3	8 - 7	8 - 0	7 - 7	7 - 2	11 - 2	10 - 3	9 - 6	8 - 11	8 - 5	7 - 11
(4) 2x10	SP02	2:12 to 4:12	16 - 11	15 - 9	14 - 8	13 - 9	13 - 0	12 - 4	11 - 8	10 - 8	9 - 10	9 - 3	8 - 9	8 - 3	12 - 11	11 - 10	10 - 11	10 - 3	9 - 8	9 - 2
(1) 2x12	SP02	2:12 to 4:12	10 - 2	9 - 4	8 - 7	8 - 1	7 - 7	7 - 3	6 - 10	6 - 3	5 - 9	5 - 5	5 - 1	4 - 10	7 - 7	6 - 11	6 - 5	6 - 0	5 - 8	5 - 4
(2) 2x12	SP02	2:12 to 4:12	14 - 5	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3	9 - 9	8 - 10	8 - 3	7 - 8	7 - 3	6 - 11	10 - 9	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(3) 2x12	SP02	2:12 to 4:12	17 - 7	16 - 1	14 - 11	14 - 0	13 - 3	12 - 7	11 - 11	10 - 10	10 - 1	9 - 5	8 - 11	8 - 5	13 - 2	12 - 1	11 - 2	10 - 5	9 - 10	9 - 4
(4) 2x12	SP02	2:12 to 4:12	20 - 2	18 - 6	17 - 2	16 - 1	15 - 3	14 - 6	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 9	15 - 2	13 - 10	12 - 10	12 - 1	11 - 4	10 - 10
(1) 2x14	SP02	2:12 to 4:12	11 - 1	10 - 2	9 - 5	8 - 10	8 - 4	7 - 10	7 - 5	6 - 9	6 - 3	5 - 11	5 - 7	5 - 3	8 - 3	7 - 7	7 - 0	6 - 6	6 - 2	5 - 10
(2) 2x14	SP02	2:12 to 4:12	15 - 9	14 - 5	13 - 4	12 - 6	11 - 10	11 - 3	10 - 7	9 - 8	9 - 0	8 - 5	7 - 11	7 - 6	11 - 9	10 - 9	10 - 0	9 - 4	8 - 10	8 - 4
(3) 2x14	SP02	2:12 to 4:12	19 - 1	17 - 6	16 - 3	15 - 3	14 - 5	13 - 8	12 - 11	11 - 10	11 - 0	10 - 3	9 - 8	9 - 2	14 - 4	13 - 2	12 - 2	11 - 5	10 - 9	10 - 3
(4) 2x14	SP02	2:12 to 4:12	21 - 10	20 - 1	18 - 8	17 - 6	16 - 7	15 - 9	14 - 11	13 - 8	12 - 8	11 - 10	11 - 2	10 - 7	16 - 6	15 - 1	14 - 0	13 - 2	12 - 5	11 - 9
(1) 3x8	SP02	2:12 to 4:12	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 9	6 - 4	5 - 10	5 - 4	5 - 0	4 - 9	4 - 6	7 - 1	6 - 5	6 - 0	5 - 7	5 - 3	5 - 0
(1) 3x10	SP02	2:12 to 4:12	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	7 - 6	6 - 11	6 - 4	6 - 0	5 - 7	5 - 4	8 - 4	7 - 8	7 - 1	6 - 7	6 - 3	5 - 11
(1) 3x12	SP02	2:12 to 4:12	13 - 2	12 - 1	11 - 2	10 - 6	9 - 11	9 - 5	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0
(1) 3x14	SP02	2:12 to 4:12	20 - 1	18 - 5	17 - 1	16 - 1	15 - 2	14 - 5	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 8	15 - 1	13 - 10	12 - 10	12 - 0	11 - 4	10 - 9
(1) 4x8	SP02	2:12 to 4:12	11 - 1	10 - 5	9 - 11	9 - 4	8 - 10	8 - 4	7 - 11	7 - 2	6 - 8	6 - 3	5 - 11	5 - 7	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2
(1) 4x10	SP02	2:12 to 4:12	13 - 11	12 - 9	11 - 10	11 - 1	10 - 5	9 - 11	9 - 4	8 - 7	7 - 11	7 - 5	7 - 0	6 - 8	10 - 5	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4
(1) 4x12	SP02	2:12 to 4:12	16 - 4	14 - 11	13 - 10	13 - 0	12 - 3	11 - 8	11 - 0	10 - 1	9 - 4	8 - 9	8 - 3	7 - 10	12 - 2	11 - 2	10 - 4	9 - 8	9 - 2	8 - 8
(1) 4x14	SP02	2:12 to 4:12	24 - 7	22 - 8	21 - 1	19 - 9	18 - 8	17 - 9	16 - 10	15 - 5	14 - 4	13 - 5	12 - 8	12 - 0	18 - 8	17 - 1	15 - 10	14 - 10	14 - 0	13 - 4

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE B

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-16

Sheet Number 16 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	DFL1	5:12 to 6:12	8 - 5	7 - 8	7 - 1	6 - 7	6 - 3	5 - 11	5 - 7	5 - 1	4 - 9	4 - 5	4 - 2	3 - 11	6 - 3	5 - 8	5 - 3	4 - 11	4 - 7	4 - 5
(2) 2x8	DFL1	5:12 to 6:12	11 - 3	10 - 7	10 - 0	9 - 5	8 - 10	8 - 5	7 - 11	7 - 3	6 - 9	6 - 3	5 - 11	5 - 7	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3
(3) 2x8	DFL1	5:12 to 6:12	12 - 11	12 - 1	11 - 6	11 - 0	10 - 7	10 - 3	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11	10 - 7	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(4) 2x8	DFL1	5:12 to 6:12	14 - 2	13 - 4	12 - 8	12 - 1	11 - 8	11 - 3	10 - 10	10 - 2	9 - 6	8 - 11	8 - 5	7 - 11	11 - 7	10 - 11	10 - 4	9 - 10	9 - 4	8 - 10
(1) 2x10	DFL1	5:12 to 6:12	10 - 2	9 - 3	8 - 7	8 - 1	7 - 7	7 - 2	6 - 10	6 - 2	5 - 9	5 - 4	5 - 1	4 - 10	7 - 7	6 - 11	6 - 5	6 - 0	5 - 8	5 - 4
(2) 2x10	DFL1	5:12 to 6:12	14 - 4	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3	9 - 8	8 - 10	8 - 2	7 - 8	7 - 3	6 - 10	10 - 9	9 - 10	9 - 1	8 - 6	8 - 0	7 - 8
(3) 2x10	DFL1	5:12 to 6:12	16 - 5	15 - 6	14 - 8	14 - 0	13 - 3	12 - 7	11 - 10	10 - 10	10 - 1	9 - 5	8 - 10	8 - 5	13 - 2	12 - 0	11 - 2	10 - 5	9 - 10	9 - 4
(4) 2x10	DFL1	5:12 to 6:12	18 - 1	17 - 0	16 - 2	15 - 6	14 - 10	14 - 4	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 9	14 - 10	13 - 10	12 - 10	12 - 1	11 - 4	10 - 9
(1) 2x12	DFL1	5:12 to 6:12	11 - 9	10 - 9	9 - 11	9 - 4	8 - 9	8 - 4	7 - 10	7 - 2	6 - 8	6 - 3	5 - 10	5 - 7	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2
(2) 2x12	DFL1	5:12 to 6:12	16 - 8	15 - 3	14 - 2	13 - 3	12 - 6	11 - 11	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 10
(3) 2x12	DFL1	5:12 to 6:12	20 - 0	18 - 8	17 - 4	16 - 3	15 - 4	14 - 6	13 - 9	12 - 7	11 - 8	10 - 11	10 - 3	9 - 9	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10
(4) 2x12	DFL1	5:12 to 6:12	22 - 0	20 - 9	19 - 8	18 - 8	17 - 7	16 - 9	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3	17 - 6	16 - 1	14 - 11	13 - 11	13 - 2	12 - 6
(1) 2x14	DFL1	5:12 to 6:12	13 - 1	12 - 0	11 - 1	10 - 5	9 - 9	9 - 3	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2	9 - 9	8 - 11	8 - 3	7 - 9	7 - 3	6 - 11
(2) 2x14	DFL1	5:12 to 6:12	18 - 7	17 - 0	15 - 10	14 - 10	14 - 0	13 - 3	12 - 6	11 - 6	10 - 7	9 - 11	9 - 4	8 - 11	13 - 11	12 - 9	11 - 9	11 - 0	10 - 5	9 - 11
(3) 2x14	DFL1	5:12 to 6:12	22 - 8	20 - 9	19 - 3	18 - 1	17 - 1	16 - 3	15 - 4	14 - 0	13 - 0	12 - 2	11 - 6	10 - 11	17 - 0	15 - 7	14 - 5	13 - 6	12 - 9	12 - 1
(4) 2x14	DFL1	5:12 to 6:12	25 - 0	23 - 10	22 - 2	20 - 9	19 - 7	18 - 8	17 - 8	16 - 2	15 - 0	14 - 0	13 - 3	12 - 7	19 - 6	17 - 11	16 - 7	15 - 7	14 - 8	13 - 11
(1) 3x8	DFL1	5:12 to 6:12	10 - 7	9 - 11	9 - 2	8 - 7	8 - 1	7 - 8	7 - 3	6 - 7	6 - 1	5 - 9	5 - 5	5 - 1	8 - 1	7 - 4	6 - 10	6 - 4	6 - 0	5 - 8
(1) 3x10	DFL1	5:12 to 6:12	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10	9 - 4	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4	6 - 11
(1) 3x12	DFL1	5:12 to 6:12	15 - 3	14 - 0	12 - 11	12 - 1	11 - 5	10 - 10	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3	11 - 5	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1
(1) 3x14	DFL1	5:12 to 6:12	17 - 0	15 - 7	14 - 5	13 - 6	12 - 9	12 - 1	11 - 5	10 - 5	9 - 8	9 - 1	8 - 7	8 - 1	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0
(1) 4x8	DFL1	5:12 to 6:12	11 - 10	11 - 2	10 - 7	10 - 1	9 - 9	9 - 5	8 - 11	8 - 2	7 - 7	7 - 1	6 - 8	6 - 4	9 - 8	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0
(1) 4x10	DFL1	5:12 to 6:12	15 - 1	14 - 3	13 - 6	12 - 11	12 - 2	11 - 7	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9	12 - 2	11 - 1	10 - 3	9 - 7	9 - 1	8 - 7
(1) 4x12	DFL1	5:12 to 6:12	18 - 5	17 - 3	16 - 0	15 - 0	14 - 2	13 - 6	12 - 9	11 - 8	10 - 9	10 - 1	9 - 6	9 - 0	14 - 1	12 - 11	12 - 0	11 - 2	10 - 7	10 - 0
(1) 4x14	DFL1	5:12 to 6:12	21 - 2	19 - 4	18 - 0	16 - 10	15 - 11	15 - 1	14 - 3	13 - 1	12 - 1	11 - 4	10 - 8	10 - 2	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3
(1) 2x8	DFL2	5:12 to 6:12	7 - 11	7 - 3	6 - 8	6 - 3	5 - 11	5 - 7	5 - 3	4 - 10	4 - 6	4 - 2	3 - 11	3 - 9	5 - 11	5 - 4	5 - 0	4 - 8	4 - 4	4 - 2
(2) 2x8	DFL2	5:12 to 6:12	11 - 0	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	7 - 6	6 - 11	6 - 4	5 - 11	5 - 7	5 - 4	8 - 4	7 - 8	7 - 1	6 - 7	6 - 3	5 - 11
(3) 2x8	DFL2	5:12 to 6:12	12 - 7	11 - 10	11 - 3	10 - 9	10 - 3	9 - 9	9 - 3	8 - 5	7 - 10	7 - 4	6 - 11	6 - 6	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3
(4) 2x8	DFL2	5:12 to 6:12	13 - 11	13 - 1	12 - 5	11 - 10	11 - 5	11 - 0	10 - 7	9 - 9	9 - 0	8 - 5	7 - 11	7 - 7	11 - 5	10 - 8	10 - 0	9 - 4	8 - 10	8 - 5
(1) 2x10	DFL2	5:12 to 6:12	9 - 8	8 - 10	8 - 2	7 - 8	7 - 2	6 - 10	6 - 5	5 - 11	5 - 5	5 - 1	4 - 10	4 - 7	7 - 2	6 - 6	6 - 1	5 - 8	5 - 4	5 - 1
(2) 2x10	DFL2	5:12 to 6:12	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 9	9 - 2	8 - 5	7 - 9	7 - 3	6 - 10	6 - 6	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3
(3) 2x10	DFL2	5:12 to 6:12	16 - 1	15 - 2	14 - 2	13 - 4	12 - 7	11 - 11	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 10
(4) 2x10	DFL2	5:12 to 6:12	17 - 9	16 - 8	15 - 10	15 - 2	14 - 5	13 - 9	13 - 0	11 - 10	11 - 0	10 - 3	9 - 8	9 - 3	14 - 5	13 - 2	12 - 2	11 - 5	10 - 9	10 - 3
(1) 2x12	DFL2	5:12 to 6:12	11 - 2	10 - 2	9 - 5	8 - 10	8 - 4	7 - 11	7 - 6	6 - 10	6 - 4	5 - 11	5 - 7	5 - 3	8 - 4	7 - 7	7 - 0	6 - 7	6 - 2	5 - 10
(2) 2x12	DFL2	5:12 to 6:12	15 - 10	14 - 6	13 - 5	12 - 7	11 - 11	11 - 3	10 - 8	9 - 9	9 - 0	8 - 5	7 - 11	7 - 7	11 - 10	10 - 10	10 - 0	9 - 4	8 - 10	8 - 5
(3) 2x12	DFL2	5:12 to 6:12	19 - 4	17 - 8	16 - 5	15 - 5	14 - 6	13 - 9	13 - 0	11 - 11	11 - 1	10 - 4	9 - 9	9 - 3	14 - 5	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3
(4) 2x12	DFL2	5:12 to 6:12	21 - 7	20 - 4	18 - 10	17 - 8	16 - 8	15 - 11	15 - 0	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8	16 - 8	15 - 3	14 - 1	13 - 3	12 - 6	11 - 10
(1) 2x14	DFL2	5:12 to 6:12	12 - 5	11 - 4	10 - 6	9 - 10	9 - 4	8 - 10	8 - 4	7 - 7	7 - 0	6 - 7	6 - 3	5 - 11	9 - 3	8 - 5	7 - 10	7 - 4	6 - 11	6 - 7
(2) 2x14	DFL2	5:12 to 6:12	17 - 8	16 - 2	15 - 0	14 - 1	13 - 3	12 - 7	11 - 11	10 - 10	10 - 1	9 - 5	8 - 11	8 - 5	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10	9 - 4
(3) 2x14	DFL2	5:12 to 6:12	21 - 6	19 - 8	18 - 3	17 - 2	16 - 2	15 - 5	14 - 6	13 - 4	12 - 4	11 - 6	10 - 11	10 - 4	16 - 1	14 - 9	13 - 8	12 - 10	12 - 1	11 - 6
(4) 2x14	DFL2	5:12 to 6:12	24 - 7	22 - 7	21 - 0	19 - 8	18 - 7	17 - 8	16 - 9	15 - 4	14 - 2	13 - 4	12 - 7	11 - 11	18 - 6	17 - 0	15 - 9	14 - 9	13 - 11	13 - 3
(1) 3x8	DFL2	5:12 to 6:12	10 - 3	9 - 5	8 - 8	8 - 2	7 - 8	7 - 3	6 - 10	6 - 3	5 - 10	5 - 5	5 - 1	4 - 10	7 - 8	7 - 0	6 - 5	6 - 0	5 - 8	5 - 5
(1) 3x10	DFL2	5:12 to 6:12	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 11	8 - 5	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11	9 - 4	8 - 6	7 - 11	7 - 5	6 - 11	6 - 7
(1) 3x12	DFL2	5:12 to 6:12	14 - 6	13 - 3	12 - 3	11 - 6	10 - 10	10 - 4	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11	10 - 10	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(1) 3x14	DFL2	5:12 to 6:12	22 - 7	20 - 9	19 - 3	18 - 0	17 - 1	16 - 2	15 - 4	14 - 0	13 - 0	12 - 2	11 - 6	10 - 11	17 - 0	15 - 6	14 - 5	13 - 6	12 - 9	12 - 1
(1) 4x8	DFL2	5:12 to 6:12	11 - 7	10 - 11	10 - 4	9 - 11	9 - 5	9 - 0	8 - 6	7 - 9	7 - 2	6 - 8	6 - 4	6 - 0	9 - 5	8 - 7	8 - 0	7 - 5	7 - 0	6 - 8
(1) 4x10	DFL2	5:12 to 6:12	14 - 10	13 - 11	13 - 1	12 - 3	11 - 7	11 - 0	10 - 5	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4	11 - 6	10 - 6	9 - 9	9 - 2	8 - 7	8 - 2
(1) 4x12	DFL2	5:12 to 6:12	17 - 11	16 - 5	15 - 3	14 - 3	13 - 5	12 - 9	12 - 1	11 - 0	10 - 3	9 - 7	9 - 0	8 - 7	13 - 5	12 - 3	11 - 4	10 - 7	10 - 0	9 - 6
(1) 4x14	DFL2	5:12 to 6:12	25 - 0	25 - 0	23 - 10	22 - 4	21 - 2	20 - 1	19 - 0	17 - 5	16 - 2	15 - 2	14 - 3	13 - 7	21 - 0	19 - 3	17 - 11	16 - 9	15 - 10	15 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE C

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-17

Sheet Number 17 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	SP01	5:12 to 6:12	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0	5 - 8	5 - 2	4 - 10	4 - 6	4 - 3	4 - 0	6 - 4	5 - 9	5 - 4	5 - 0	4 - 8	4 - 5
(2) 2x8	SP01	5:12 to 6:12	11 - 0	10 - 4	9 - 10	9 - 5	9 - 0	8 - 7	8 - 1	7 - 5	6 - 10	6 - 5	6 - 1	5 - 9	9 - 0	8 - 3	7 - 7	7 - 1	6 - 9	6 - 4
(3) 2x8	SP01	5:12 to 6:12	12 - 7	11 - 10	11 - 3	10 - 9	10 - 4	10 - 0	9 - 8	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0	10 - 4	9 - 9	9 - 3	8 - 9	8 - 3	7 - 10
(4) 2x8	SP01	5:12 to 6:12	13 - 11	13 - 1	12 - 5	11 - 10	11 - 5	11 - 0	10 - 7	10 - 0	9 - 6	9 - 1	8 - 7	8 - 1	11 - 5	10 - 8	10 - 2	9 - 9	9 - 4	9 - 0
(1) 2x10	SP01	5:12 to 6:12	9 - 11	9 - 1	8 - 5	7 - 10	7 - 5	7 - 0	6 - 8	6 - 1	5 - 7	5 - 3	4 - 11	4 - 8	7 - 4	6 - 9	6 - 3	5 - 10	5 - 6	5 - 3
(2) 2x10	SP01	5:12 to 6:12	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 8	10 - 6	9 - 7	8 - 11	8 - 4	7 - 10	7 - 5
(3) 2x10	SP01	5:12 to 6:12	16 - 1	15 - 2	14 - 5	13 - 8	12 - 11	12 - 3	11 - 7	10 - 7	9 - 10	9 - 2	8 - 8	8 - 3	12 - 10	11 - 9	10 - 11	10 - 2	9 - 7	9 - 2
(4) 2x10	SP01	5:12 to 6:12	17 - 9	16 - 8	15 - 10	15 - 2	14 - 7	14 - 1	13 - 4	12 - 2	11 - 4	10 - 7	10 - 0	9 - 6	14 - 6	13 - 6	12 - 7	11 - 9	11 - 1	10 - 6
(1) 2x12	SP01	5:12 to 6:12	11 - 9	10 - 9	9 - 11	9 - 3	8 - 9	8 - 4	7 - 10	7 - 2	6 - 8	6 - 2	5 - 10	5 - 7	8 - 9	8 - 0	7 - 4	6 - 11	6 - 6	6 - 2
(2) 2x12	SP01	5:12 to 6:12	16 - 8	15 - 3	14 - 2	13 - 3	12 - 6	11 - 11	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	7 - 11	12 - 5	11 - 5	10 - 7	9 - 10	9 - 4	8 - 10
(3) 2x12	SP01	5:12 to 6:12	19 - 7	18 - 5	17 - 3	16 - 2	15 - 3	14 - 6	13 - 9	12 - 7	11 - 8	10 - 11	10 - 3	9 - 9	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10
(4) 2x12	SP01	5:12 to 6:12	21 - 7	20 - 4	19 - 3	18 - 5	17 - 7	16 - 9	15 - 10	14 - 6	13 - 5	12 - 7	11 - 10	11 - 3	17 - 6	16 - 0	14 - 10	13 - 11	13 - 2	12 - 6
(1) 2x14	SP01	5:12 to 6:12	12 - 8	11 - 7	10 - 8	10 - 0	9 - 5	9 - 0	8 - 6	7 - 9	7 - 2	6 - 8	6 - 4	6 - 0	9 - 5	8 - 7	8 - 0	7 - 5	7 - 0	6 - 8
(2) 2x14	SP01	5:12 to 6:12	17 - 11	16 - 5	15 - 3	14 - 3	13 - 6	12 - 10	12 - 1	11 - 1	10 - 3	9 - 7	9 - 1	8 - 7	13 - 5	12 - 3	11 - 5	10 - 8	10 - 1	9 - 6
(3) 2x14	SP01	5:12 to 6:12	21 - 10	20 - 0	18 - 7	17 - 5	16 - 6	15 - 8	14 - 9	13 - 6	12 - 6	11 - 9	11 - 1	10 - 6	16 - 5	15 - 0	13 - 11	13 - 0	12 - 4	11 - 8
(4) 2x14	SP01	5:12 to 6:12	25 - 0	22 - 11	21 - 4	20 - 0	18 - 11	18 - 0	17 - 0	15 - 7	14 - 5	13 - 6	12 - 9	12 - 2	18 - 10	17 - 3	16 - 0	15 - 0	14 - 2	13 - 5
(1) 3x8	SP01	5:12 to 6:12	10 - 4	9 - 9	9 - 3	8 - 9	8 - 3	7 - 10	7 - 5	6 - 9	6 - 3	5 - 10	5 - 6	5 - 3	8 - 3	7 - 6	6 - 11	6 - 6	6 - 1	5 - 10
(1) 3x10	SP01	5:12 to 6:12	12 - 10	11 - 9	10 - 11	10 - 3	9 - 8	9 - 2	8 - 8	7 - 11	7 - 4	6 - 10	6 - 5	6 - 1	9 - 7	8 - 9	8 - 1	7 - 7	7 - 2	6 - 10
(1) 3x12	SP01	5:12 to 6:12	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3	11 - 4	10 - 5	9 - 7	9 - 0	8 - 6	8 - 1
(1) 3x14	SP01	5:12 to 6:12	22 - 11	21 - 0	19 - 7	18 - 4	17 - 4	16 - 6	15 - 7	14 - 3	13 - 3	12 - 4	11 - 8	11 - 1	17 - 3	15 - 10	14 - 8	13 - 9	12 - 11	12 - 4
(1) 4x8	SP01	5:12 to 6:12	11 - 7	10 - 11	10 - 4	9 - 11	9 - 6	9 - 2	8 - 10	8 - 4	7 - 9	7 - 3	6 - 10	6 - 6	9 - 6	8 - 11	8 - 6	8 - 1	7 - 7	7 - 3
(1) 4x10	SP01	5:12 to 6:12	14 - 10	13 - 11	13 - 3	12 - 8	11 - 11	11 - 4	10 - 9	9 - 10	9 - 1	8 - 6	8 - 0	7 - 7	11 - 11	10 - 11	10 - 1	9 - 5	8 - 11	8 - 5
(1) 4x12	SP01	5:12 to 6:12	18 - 0	16 - 11	16 - 0	15 - 0	14 - 2	13 - 5	12 - 9	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0
(1) 4x14	SP01	5:12 to 6:12	25 - 0	25 - 0	23 - 11	22 - 7	21 - 4	20 - 4	19 - 3	17 - 7	16 - 4	15 - 4	14 - 5	13 - 9	21 - 3	19 - 6	18 - 1	17 - 0	16 - 0	15 - 3
(1) 2x8	SP02	5:12 to 6:12	7 - 4	6 - 8	6 - 2	5 - 10	5 - 6	5 - 2	4 - 11	4 - 6	4 - 2	3 - 10	3 - 8	3 - 5	5 - 5	5 - 0	4 - 7	4 - 4	4 - 1	3 - 10
(2) 2x8	SP02	5:12 to 6:12	10 - 5	9 - 6	8 - 10	8 - 3	7 - 9	7 - 5	7 - 0	6 - 4	5 - 11	5 - 6	5 - 2	4 - 11	7 - 9	7 - 1	6 - 7	6 - 1	5 - 9	5 - 6
(3) 2x8	SP02	5:12 to 6:12	12 - 1	11 - 4	10 - 9	10 - 1	9 - 6	9 - 0	8 - 6	7 - 10	7 - 3	6 - 9	6 - 4	6 - 1	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 9
(4) 2x8	SP02	5:12 to 6:12	13 - 3	12 - 6	11 - 10	11 - 4	10 - 11	10 - 5	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(1) 2x10	SP02	5:12 to 6:12	8 - 8	7 - 11	7 - 4	6 - 10	6 - 6	6 - 2	5 - 10	5 - 4	4 - 11	4 - 7	4 - 4	4 - 1	6 - 5	5 - 11	5 - 5	5 - 1	4 - 10	4 - 7
(2) 2x10	SP02	5:12 to 6:12	12 - 4	11 - 3	10 - 5	9 - 9	9 - 3	8 - 9	8 - 3	7 - 7	7 - 0	6 - 6	6 - 2	5 - 10	9 - 2	8 - 5	7 - 9	7 - 3	6 - 10	6 - 6
(3) 2x10	SP02	5:12 to 6:12	15 - 0	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8	10 - 1	9 - 3	8 - 7	8 - 0	7 - 7	7 - 2	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0
(4) 2x10	SP02	5:12 to 6:12	17 - 0	15 - 9	14 - 8	13 - 9	13 - 0	12 - 4	11 - 8	10 - 8	9 - 10	9 - 3	8 - 9	8 - 3	12 - 11	11 - 10	10 - 11	10 - 3	9 - 8	9 - 2
(1) 2x12	SP02	5:12 to 6:12	10 - 2	9 - 4	8 - 7	8 - 1	7 - 7	7 - 3	6 - 10	6 - 3	5 - 9	5 - 5	5 - 1	4 - 10	7 - 7	6 - 11	6 - 5	6 - 0	5 - 8	5 - 4
(2) 2x12	SP02	5:12 to 6:12	14 - 5	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11	10 - 9	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8
(3) 2x12	SP02	5:12 to 6:12	17 - 7	16 - 1	14 - 11	14 - 0	13 - 3	12 - 7	11 - 11	10 - 10	10 - 1	9 - 5	8 - 11	8 - 5	13 - 2	12 - 1	11 - 2	10 - 6	9 - 10	9 - 4
(4) 2x12	SP02	5:12 to 6:12	20 - 2	18 - 6	17 - 2	16 - 1	15 - 3	14 - 6	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 9	15 - 2	13 - 11	12 - 10	12 - 1	11 - 5	10 - 10
(1) 2x14	SP02	5:12 to 6:12	11 - 1	10 - 2	9 - 5	8 - 10	8 - 4	7 - 11	7 - 5	6 - 10	6 - 3	5 - 11	5 - 7	5 - 3	8 - 3	7 - 7	7 - 0	6 - 6	6 - 2	5 - 10
(2) 2x14	SP02	5:12 to 6:12	15 - 9	14 - 5	13 - 4	12 - 6	11 - 10	11 - 3	10 - 7	9 - 8	9 - 0	8 - 5	7 - 11	7 - 6	11 - 9	10 - 9	10 - 0	9 - 4	8 - 10	8 - 4
(3) 2x14	SP02	5:12 to 6:12	19 - 1	17 - 6	16 - 3	15 - 3	14 - 5	13 - 8	12 - 11	11 - 10	11 - 0	10 - 3	9 - 8	9 - 3	14 - 4	13 - 2	12 - 2	11 - 5	10 - 9	10 - 3
(4) 2x14	SP02	5:12 to 6:12	21 - 11	20 - 1	18 - 8	17 - 6	16 - 7	15 - 9	14 - 11	13 - 8	12 - 8	11 - 10	11 - 2	10 - 7	16 - 6	15 - 1	14 - 0	13 - 2	12 - 5	11 - 9
(1) 3x8	SP02	5:12 to 6:12	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 9	6 - 4	5 - 10	5 - 4	5 - 0	4 - 9	4 - 6	7 - 1	6 - 5	6 - 0	5 - 7	5 - 3	5 - 0
(1) 3x10	SP02	5:12 to 6:12	11 - 3	10 - 3	9 - 6	8 - 11	8 - 5	8 - 0	7 - 6	6 - 11	6 - 4	6 - 0	5 - 7	5 - 4	8 - 4	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11
(1) 3x12	SP02	5:12 to 6:12	13 - 2	12 - 1	11 - 2	10 - 6	9 - 11	9 - 5	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0
(1) 3x14	SP02	5:12 to 6:12	20 - 1	18 - 5	17 - 2	16 - 1	15 - 2	14 - 5	13 - 8	12 - 6	11 - 7	10 - 10	10 - 3	9 - 8	15 - 1	13 - 10	12 - 10	12 - 0	11 - 4	10 - 9
(1) 4x8	SP02	5:12 to 6:12	11 - 1	10 - 5	9 - 11	9 - 4	8 - 10	8 - 4	7 - 11	7 - 3	6 - 8	6 - 3	5 - 11	5 - 7	8 - 9	8 - 0	7 - 5	6 - 11	6 - 7	6 - 3
(1) 4x10	SP02	5:12 to 6:12	13 - 11	12 - 9	11 - 10	11 - 1	10 - 5	9 - 11	9 - 4	8 - 7	7 - 11	7 - 5	7 - 0	6 - 8	10 - 5	9 - 6	8 - 10	8 - 3	7 - 9	7 - 4
(1) 4x12	SP02	5:12 to 6:12	16 - 4	14 - 11	13 - 10	13 - 0	12 - 3	11 - 8	11 - 0	10 - 1	9 - 4	8 - 9	8 - 3	7 - 10	12 - 3	11 - 2	10 - 4	9 - 8	9 - 2	8 - 8
(1) 4x14	SP02	5:12 to 6:12	24 - 8	22 - 8	21 - 1	19 - 10	18 - 9	17 - 10	16 - 10	15 - 5	14 - 4	13 - 5	12 - 8	12 - 0	18 - 8	17 - 1	15 - 10	14 - 10	14 - 0	13 - 4

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE D

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-18

Sheet Number 18 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	DFL1	7:12 to 12:12	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0	5 - 8	5 - 2	4 - 9	4 - 6	4 - 3	4 - 0	6 - 4	5 - 9	5 - 4	5 - 0	4 - 8	4 - 5
(2) 2x8	DFL1	7:12 to 12:12	11 - 4	10 - 8	10 - 2	9 - 6	9 - 0	8 - 6	8 - 1	7 - 4	6 - 10	6 - 4	6 - 0	5 - 8	8 - 11	8 - 2	7 - 7	7 - 1	6 - 8	6 - 4
(3) 2x8	DFL1	7:12 to 12:12	13 - 0	12 - 3	11 - 7	11 - 1	10 - 8	10 - 4	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0	10 - 8	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(4) 2x8	DFL1	7:12 to 12:12	14 - 4	13 - 6	12 - 10	12 - 3	11 - 9	11 - 4	10 - 11	10 - 3	9 - 8	9 - 0	8 - 6	8 - 1	11 - 9	11 - 0	10 - 6	10 - 0	9 - 5	9 - 0
(1) 2x10	DFL1	7:12 to 12:12	10 - 4	9 - 5	8 - 9	8 - 2	7 - 8	7 - 4	6 - 11	6 - 3	5 - 10	5 - 5	5 - 2	4 - 10	7 - 8	7 - 0	6 - 6	6 - 1	5 - 8	5 - 5
(2) 2x10	DFL1	7:12 to 12:12	14 - 6	13 - 5	12 - 5	11 - 8	11 - 0	10 - 5	9 - 10	9 - 0	8 - 4	7 - 9	7 - 4	7 - 0	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(3) 2x10	DFL1	7:12 to 12:12	16 - 7	15 - 8	14 - 10	14 - 2	13 - 5	12 - 9	12 - 0	11 - 0	10 - 2	9 - 6	9 - 0	8 - 6	13 - 4	12 - 2	11 - 4	10 - 7	10 - 0	9 - 6
(4) 2x10	DFL1	7:12 to 12:12	18 - 3	17 - 2	16 - 4	15 - 8	15 - 0	14 - 6	13 - 10	12 - 8	11 - 9	11 - 0	10 - 4	9 - 10	15 - 0	14 - 1	13 - 0	12 - 3	11 - 6	10 - 11
(1) 2x12	DFL1	7:12 to 12:12	11 - 11	10 - 11	10 - 1	9 - 5	8 - 11	8 - 5	8 - 0	7 - 3	6 - 9	6 - 4	5 - 11	5 - 8	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3
(2) 2x12	DFL1	7:12 to 12:12	16 - 11	15 - 6	14 - 5	13 - 6	12 - 9	12 - 1	11 - 5	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1	12 - 8	11 - 7	10 - 8	10 - 0	9 - 5	9 - 0
(3) 2x12	DFL1	7:12 to 12:12	20 - 2	18 - 11	17 - 7	16 - 5	15 - 6	14 - 9	13 - 11	12 - 9	11 - 10	11 - 1	10 - 5	9 - 11	15 - 5	14 - 2	13 - 1	12 - 3	11 - 7	11 - 0
(4) 2x12	DFL1	7:12 to 12:12	22 - 3	20 - 11	19 - 11	18 - 11	17 - 11	17 - 0	16 - 0	14 - 8	13 - 7	12 - 9	12 - 0	11 - 5	17 - 9	16 - 3	15 - 1	14 - 2	13 - 4	12 - 8
(1) 2x14	DFL1	7:12 to 12:12	13 - 4	12 - 2	11 - 3	10 - 6	9 - 11	9 - 5	8 - 11	8 - 1	7 - 6	7 - 0	6 - 8	6 - 3	9 - 11	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0
(2) 2x14	DFL1	7:12 to 12:12	18 - 11	17 - 4	16 - 1	15 - 0	14 - 2	13 - 6	12 - 9	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0	14 - 1	12 - 11	11 - 11	11 - 2	10 - 7	10 - 0
(3) 2x14	DFL1	7:12 to 12:12	23 - 0	21 - 1	19 - 7	18 - 4	17 - 4	16 - 5	15 - 6	14 - 2	13 - 2	12 - 4	11 - 8	11 - 1	17 - 3	15 - 9	14 - 7	13 - 8	12 - 11	12 - 3
(4) 2x14	DFL1	7:12 to 12:12	25 - 0	24 - 2	22 - 5	21 - 1	19 - 11	18 - 11	17 - 11	16 - 4	15 - 2	14 - 3	13 - 5	12 - 9	19 - 10	18 - 2	16 - 10	15 - 9	14 - 11	14 - 2
(1) 3x8	DFL1	7:12 to 12:12	10 - 8	10 - 1	9 - 4	8 - 8	8 - 3	7 - 10	7 - 4	6 - 8	6 - 3	5 - 10	5 - 6	5 - 2	8 - 2	7 - 5	6 - 11	6 - 5	6 - 1	5 - 9
(1) 3x10	DFL1	7:12 to 12:12	13 - 5	12 - 3	11 - 4	10 - 7	10 - 0	9 - 6	9 - 0	8 - 2	7 - 7	7 - 1	6 - 8	6 - 4	10 - 0	9 - 1	8 - 5	7 - 11	7 - 5	7 - 1
(1) 3x12	DFL1	7:12 to 12:12	15 - 6	14 - 2	13 - 2	12 - 4	11 - 7	11 - 0	10 - 5	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4	11 - 6	10 - 7	9 - 9	9 - 2	8 - 7	8 - 2
(1) 3x14	DFL1	7:12 to 12:12	17 - 3	15 - 10	14 - 8	13 - 9	12 - 11	12 - 4	11 - 7	10 - 7	9 - 10	9 - 2	8 - 8	8 - 3	12 - 11	11 - 9	10 - 11	10 - 2	9 - 7	9 - 2
(1) 4x8	DFL1	7:12 to 12:12	12 - 0	11 - 3	10 - 8	10 - 3	9 - 10	9 - 6	9 - 1	8 - 3	7 - 8	7 - 2	6 - 9	6 - 5	9 - 9	9 - 2	8 - 6	8 - 0	7 - 6	7 - 1
(1) 4x10	DFL1	7:12 to 12:12	15 - 3	14 - 4	13 - 8	13 - 1	12 - 5	11 - 9	11 - 1	10 - 2	9 - 5	8 - 9	8 - 3	7 - 10	12 - 4	11 - 3	10 - 5	9 - 9	9 - 2	8 - 9
(1) 4x12	DFL1	7:12 to 12:12	18 - 7	17 - 6	16 - 3	15 - 3	14 - 5	13 - 8	12 - 11	11 - 9	10 - 11	10 - 3	9 - 8	9 - 2	14 - 4	13 - 1	12 - 2	11 - 4	10 - 8	10 - 2
(1) 4x14	DFL1	7:12 to 12:12	21 - 5	19 - 8	18 - 3	17 - 1	16 - 2	15 - 4	14 - 6	13 - 3	12 - 3	11 - 6	10 - 10	10 - 3	16 - 1	14 - 8	13 - 7	12 - 9	12 - 0	11 - 5
(1) 2x8	DFL2	7:12 to 12:12	8 - 0	7 - 4	6 - 10	6 - 4	6 - 0	5 - 8	5 - 4	4 - 11	4 - 6	4 - 3	4 - 0	3 - 9	6 - 0	5 - 5	5 - 0	4 - 8	4 - 5	4 - 2
(2) 2x8	DFL2	7:12 to 12:12	11 - 2	10 - 5	9 - 8	9 - 1	8 - 6	8 - 1	7 - 8	7 - 0	6 - 5	6 - 0	5 - 8	5 - 5	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0
(3) 2x8	DFL2	7:12 to 12:12	12 - 9	12 - 0	11 - 5	10 - 11	10 - 5	9 - 11	9 - 4	8 - 7	7 - 11	7 - 5	7 - 0	6 - 7	10 - 5	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4
(4) 2x8	DFL2	7:12 to 12:12	14 - 0	13 - 2	12 - 6	12 - 0	11 - 6	11 - 2	10 - 8	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8	11 - 6	10 - 10	10 - 2	9 - 6	8 - 11	8 - 6
(1) 2x10	DFL2	7:12 to 12:12	9 - 9	8 - 11	8 - 3	7 - 9	7 - 4	6 - 11	6 - 6	6 - 0	5 - 6	5 - 2	4 - 10	4 - 7	7 - 3	6 - 8	6 - 2	5 - 9	5 - 5	5 - 2
(2) 2x10	DFL2	7:12 to 12:12	13 - 11	12 - 9	11 - 9	11 - 0	10 - 5	9 - 11	9 - 4	8 - 6	7 - 11	7 - 5	6 - 11	6 - 7	10 - 4	9 - 6	8 - 9	8 - 2	7 - 9	7 - 4
(3) 2x10	DFL2	7:12 to 12:12	16 - 3	15 - 4	14 - 5	13 - 6	12 - 9	12 - 1	11 - 5	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0
(4) 2x10	DFL2	7:12 to 12:12	17 - 11	16 - 10	16 - 0	15 - 4	14 - 8	13 - 11	13 - 2	12 - 0	11 - 2	10 - 5	9 - 10	9 - 4	14 - 7	13 - 4	12 - 4	11 - 7	10 - 11	10 - 4
(1) 2x12	DFL2	7:12 to 12:12	11 - 4	10 - 4	9 - 7	9 - 0	8 - 6	8 - 0	7 - 7	6 - 11	6 - 5	6 - 0	5 - 8	5 - 4	8 - 5	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11
(2) 2x12	DFL2	7:12 to 12:12	16 - 1	14 - 9	13 - 8	12 - 9	12 - 1	11 - 5	10 - 10	9 - 10	9 - 2	8 - 7	8 - 1	7 - 8	12 - 0	11 - 0	10 - 2	9 - 6	9 - 0	8 - 6
(3) 2x12	DFL2	7:12 to 12:12	19 - 7	17 - 11	16 - 8	15 - 7	14 - 9	14 - 0	13 - 3	12 - 1	11 - 2	10 - 6	9 - 11	9 - 5	14 - 8	13 - 5	12 - 5	11 - 8	11 - 0	10 - 5
(4) 2x12	DFL2	7:12 to 12:12	21 - 10	20 - 6	19 - 2	17 - 11	16 - 11	16 - 1	15 - 3	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10	16 - 10	15 - 5	14 - 4	13 - 5	12 - 8	12 - 0
(1) 2x14	DFL2	7:12 to 12:12	12 - 7	11 - 6	10 - 8	10 - 0	9 - 5	8 - 11	8 - 5	7 - 9	7 - 2	6 - 8	6 - 4	6 - 0	9 - 5	8 - 7	7 - 11	7 - 5	7 - 0	6 - 8
(2) 2x14	DFL2	7:12 to 12:12	17 - 11	16 - 5	15 - 3	14 - 3	13 - 6	12 - 9	12 - 1	11 - 0	10 - 2	9 - 7	9 - 0	8 - 7	13 - 5	12 - 3	11 - 4	10 - 7	10 - 0	9 - 6
(3) 2x14	DFL2	7:12 to 12:12	21 - 9	20 - 0	18 - 7	17 - 5	16 - 5	15 - 7	14 - 9	13 - 6	12 - 6	11 - 8	11 - 0	10 - 6	16 - 4	14 - 11	13 - 10	13 - 0	12 - 3	11 - 8
(4) 2x14	DFL2	7:12 to 12:12	24 - 11	22 - 11	21 - 4	20 - 0	18 - 11	17 - 11	16 - 11	15 - 6	14 - 5	13 - 6	12 - 9	12 - 1	18 - 9	17 - 2	16 - 0	14 - 11	14 - 1	13 - 5
(1) 3x8	DFL2	7:12 to 12:12	10 - 5	9 - 6	8 - 10	8 - 3	7 - 9	7 - 5	7 - 0	6 - 4	5 - 11	5 - 6	5 - 2	4 - 11	7 - 9	7 - 1	6 - 7	6 - 1	5 - 9	5 - 6
(1) 3x10	DFL2	7:12 to 12:12	12 - 8	11 - 7	10 - 9	10 - 1	9 - 6	9 - 0	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0	9 - 5	8 - 8	8 - 0	7 - 6	7 - 1	6 - 8
(1) 3x12	DFL2	7:12 to 12:12	14 - 8	13 - 5	12 - 6	11 - 8	11 - 0	10 - 5	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(1) 3x14	DFL2	7:12 to 12:12	22 - 11	21 - 0	19 - 6	18 - 4	17 - 4	16 - 5	15 - 6	14 - 2	13 - 2	12 - 4	11 - 8	11 - 0	17 - 2	15 - 9	14 - 7	13 - 8	12 - 11	12 - 3
(1) 4x8	DFL2	7:12 to 12:12	11 - 9	11 - 0	10 - 6	10 - 0	9 - 7	9 - 1	8 - 7	7 - 10	7 - 3	6 - 10	6 - 5	6 - 1	9 - 6	8 - 9	8 - 1	7 - 7	7 - 1	6 - 9
(1) 4x10	DFL2	7:12 to 12:12	15 - 0	14 - 1	13 - 4	12 - 5	11 - 9	11 - 2	10 - 6	9 - 7	8 - 11	8 - 4	7 - 10	7 - 5	11 - 8	10 - 8	9 - 11	9 - 3	8 - 9	8 - 3
(1) 4x12	DFL2	7:12 to 12:12	18 - 2	16 - 8	15 - 5	14 - 6	13 - 8	13 - 0	12 - 3	11 - 2	10 - 4	9 - 8	9 - 2	8 - 8	13 - 7	12 - 5	11 - 6	10 - 9	10 - 2	9 - 8
(1) 4x14	DFL2	7:12 to 12:12	25 - 0	25 - 0	24 - 2	22 - 8	21 - 5	20 - 5	19 - 3	17 - 8	16 - 4	15 - 4	14 - 6	13 - 9	21 - 4	19 - 6	18 - 2	17 - 0	16 - 1	15 - 3

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE E

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-19

Sheet Number 19 of 45

ROOF BEAMS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Governing Span (ft-in)

Member Size and Plys	Wood Species	Slope	Exposure B, K_{zt} = 1.0						Exposure B, K_{zt} = 2.0						Exposure D, K_{zt} = 1.0					
			Tributary Width						Tributary Width						Tributary Width					
			10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft	10 ft	12 ft	14 ft	16 ft	18 ft	20 ft
(1) 2x8	SP01	7:12 to 12:12	8 - 8	7 - 11	7 - 4	6 - 10	6 - 5	6 - 1	5 - 9	5 - 3	4 - 10	4 - 7	4 - 3	4 - 1	6 - 5	5 - 10	5 - 5	5 - 1	4 - 9	4 - 6
(2) 2x8	SP01	7:12 to 12:12	11 - 2	10 - 6	9 - 11	9 - 6	9 - 2	8 - 9	8 - 3	7 - 6	6 - 11	6 - 6	6 - 2	5 - 10	9 - 1	8 - 4	7 - 9	7 - 3	6 - 10	6 - 6
(3) 2x8	SP01	7:12 to 12:12	12 - 9	12 - 0	11 - 5	10 - 11	10 - 6	10 - 1	9 - 9	9 - 2	8 - 6	8 - 0	7 - 6	7 - 2	10 - 5	9 - 10	9 - 4	8 - 10	8 - 4	7 - 11
(4) 2x8	SP01	7:12 to 12:12	14 - 0	13 - 2	12 - 6	12 - 0	11 - 6	11 - 2	10 - 8	10 - 1	9 - 7	9 - 2	8 - 8	8 - 3	11 - 6	10 - 10	10 - 3	9 - 10	9 - 5	9 - 1
(1) 2x10	SP01	7:12 to 12:12	10 - 1	9 - 2	8 - 6	8 - 0	7 - 6	7 - 2	6 - 9	6 - 2	5 - 8	5 - 4	5 - 0	4 - 9	7 - 6	6 - 10	6 - 4	5 - 11	5 - 7	5 - 3
(2) 2x10	SP01	7:12 to 12:12	14 - 3	13 - 1	12 - 2	11 - 4	10 - 9	10 - 2	9 - 7	8 - 9	8 - 1	7 - 7	7 - 2	6 - 10	10 - 8	9 - 9	9 - 0	8 - 5	8 - 0	7 - 7
(3) 2x10	SP01	7:12 to 12:12	16 - 3	15 - 4	14 - 7	13 - 11	13 - 1	12 - 5	11 - 9	10 - 9	9 - 11	9 - 4	8 - 9	8 - 4	13 - 0	11 - 11	11 - 0	10 - 4	9 - 9	9 - 3
(4) 2x10	SP01	7:12 to 12:12	17 - 11	16 - 10	16 - 0	15 - 4	14 - 9	14 - 3	13 - 6	12 - 4	11 - 6	10 - 9	10 - 2	9 - 7	14 - 8	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8
(1) 2x12	SP01	7:12 to 12:12	11 - 11	10 - 11	10 - 1	9 - 5	8 - 11	8 - 5	7 - 11	7 - 3	6 - 9	6 - 3	5 - 11	5 - 8	8 - 10	8 - 1	7 - 6	7 - 0	6 - 7	6 - 3
(2) 2x12	SP01	7:12 to 12:12	16 - 11	15 - 6	14 - 4	13 - 6	12 - 8	12 - 1	11 - 5	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1	12 - 8	11 - 7	10 - 8	10 - 0	9 - 5	9 - 0
(3) 2x12	SP01	7:12 to 12:12	19 - 10	18 - 8	17 - 6	16 - 5	15 - 6	14 - 9	13 - 11	12 - 9	11 - 9	11 - 0	10 - 5	9 - 11	15 - 5	14 - 1	13 - 1	12 - 3	11 - 7	11 - 0
(4) 2x12	SP01	7:12 to 12:12	21 - 10	20 - 6	19 - 6	18 - 8	17 - 10	17 - 0	16 - 0	14 - 8	13 - 7	12 - 9	12 - 0	11 - 5	17 - 9	16 - 3	15 - 1	14 - 1	13 - 4	12 - 8
(1) 2x14	SP01	7:12 to 12:12	12 - 10	11 - 9	10 - 10	10 - 2	9 - 7	9 - 1	8 - 7	7 - 10	7 - 3	6 - 10	6 - 5	6 - 1	9 - 7	8 - 9	8 - 1	7 - 7	7 - 1	6 - 9
(2) 2x14	SP01	7:12 to 12:12	18 - 3	16 - 8	15 - 6	14 - 6	13 - 8	13 - 0	12 - 3	11 - 3	10 - 5	9 - 9	9 - 2	8 - 8	13 - 7	12 - 5	11 - 6	10 - 10	10 - 2	9 - 8
(3) 2x14	SP01	7:12 to 12:12	22 - 2	20 - 4	18 - 10	17 - 8	16 - 9	15 - 11	15 - 0	13 - 9	12 - 9	11 - 11	11 - 3	10 - 8	16 - 7	15 - 2	14 - 1	13 - 3	12 - 6	11 - 10
(4) 2x14	SP01	7:12 to 12:12	25 - 0	23 - 3	21 - 8	20 - 4	19 - 2	18 - 3	17 - 3	15 - 9	14 - 8	13 - 9	12 - 11	12 - 4	19 - 1	17 - 6	16 - 3	15 - 3	14 - 4	13 - 8
(1) 3x8	SP01	7:12 to 12:12	10 - 6	9 - 10	9 - 4	8 - 11	8 - 5	7 - 11	7 - 6	6 - 10	6 - 4	5 - 11	5 - 7	5 - 4	8 - 4	7 - 7	7 - 0	6 - 7	6 - 3	5 - 11
(1) 3x10	SP01	7:12 to 12:12	13 - 1	11 - 11	11 - 1	10 - 4	9 - 9	9 - 3	8 - 9	8 - 0	7 - 5	6 - 11	6 - 6	6 - 2	9 - 9	8 - 11	8 - 3	7 - 8	7 - 3	6 - 11
(1) 3x12	SP01	7:12 to 12:12	15 - 6	14 - 2	13 - 1	12 - 3	11 - 7	11 - 0	10 - 5	9 - 6	8 - 9	8 - 3	7 - 9	7 - 4	11 - 6	10 - 6	9 - 9	9 - 2	8 - 7	8 - 2
(1) 3x14	SP01	7:12 to 12:12	23 - 3	21 - 4	19 - 10	18 - 7	17 - 7	16 - 9	15 - 9	14 - 5	13 - 5	12 - 6	11 - 10	11 - 3	17 - 6	16 - 0	14 - 10	13 - 11	13 - 2	12 - 6
(1) 4x8	SP01	7:12 to 12:12	11 - 9	11 - 0	10 - 6	10 - 0	9 - 8	9 - 4	8 - 11	8 - 5	7 - 10	7 - 4	6 - 11	6 - 7	9 - 7	9 - 0	8 - 7	8 - 2	7 - 9	7 - 4
(1) 4x10	SP01	7:12 to 12:12	15 - 0	14 - 1	13 - 4	12 - 9	12 - 2	11 - 6	10 - 10	9 - 11	9 - 2	8 - 7	8 - 1	7 - 8	12 - 1	11 - 0	10 - 3	9 - 7	9 - 0	8 - 7
(1) 4x12	SP01	7:12 to 12:12	18 - 2	17 - 2	16 - 3	15 - 3	14 - 5	13 - 8	12 - 11	11 - 9	10 - 11	10 - 3	9 - 8	9 - 2	14 - 4	13 - 1	12 - 1	11 - 4	10 - 8	10 - 2
(1) 4x14	SP01	7:12 to 12:12	25 - 0	25 - 0	24 - 2	22 - 11	21 - 8	20 - 7	19 - 6	17 - 10	16 - 7	15 - 6	14 - 8	13 - 11	21 - 7	19 - 9	18 - 4	17 - 2	16 - 3	15 - 5
(1) 2x8	SP02	7:12 to 12:12	7 - 5	6 - 9	6 - 3	5 - 11	5 - 7	5 - 3	4 - 11	4 - 6	4 - 2	3 - 11	3 - 8	3 - 6	5 - 6	5 - 0	4 - 8	4 - 4	4 - 1	3 - 11
(2) 2x8	SP02	7:12 to 12:12	10 - 7	9 - 8	8 - 11	8 - 4	7 - 11	7 - 6	7 - 1	6 - 5	6 - 0	5 - 7	5 - 3	5 - 0	7 - 10	7 - 2	6 - 8	6 - 3	5 - 10	5 - 7
(3) 2x8	SP02	7:12 to 12:12	12 - 2	11 - 6	10 - 11	10 - 3	9 - 8	9 - 2	8 - 8	7 - 11	7 - 4	6 - 10	6 - 5	6 - 1	9 - 7	8 - 9	8 - 2	7 - 7	7 - 2	6 - 10
(4) 2x8	SP02	7:12 to 12:12	13 - 5	12 - 8	12 - 0	11 - 6	11 - 0	10 - 7	10 - 0	9 - 1	8 - 5	7 - 11	7 - 5	7 - 1	11 - 0	10 - 1	9 - 4	8 - 9	8 - 3	7 - 10
(1) 2x10	SP02	7:12 to 12:12	8 - 10	8 - 1	7 - 5	7 - 0	6 - 7	6 - 3	5 - 11	5 - 4	5 - 0	4 - 8	4 - 5	4 - 2	6 - 6	6 - 0	5 - 6	5 - 2	4 - 10	4 - 7
(2) 2x10	SP02	7:12 to 12:12	12 - 6	11 - 5	10 - 7	9 - 11	9 - 4	8 - 11	8 - 4	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11	9 - 4	8 - 6	7 - 10	7 - 4	6 - 11	6 - 7
(3) 2x10	SP02	7:12 to 12:12	15 - 2	13 - 11	12 - 11	12 - 1	11 - 5	10 - 10	10 - 3	9 - 4	8 - 8	8 - 1	7 - 8	7 - 3	11 - 4	10 - 5	9 - 8	9 - 0	8 - 6	8 - 1
(4) 2x10	SP02	7:12 to 12:12	17 - 2	16 - 0	14 - 10	13 - 11	13 - 2	12 - 6	11 - 10	10 - 10	10 - 0	9 - 4	8 - 10	8 - 5	13 - 1	12 - 0	11 - 1	10 - 5	9 - 10	9 - 4
(1) 2x12	SP02	7:12 to 12:12	10 - 4	9 - 5	8 - 9	8 - 2	7 - 9	7 - 4	6 - 11	6 - 4	5 - 10	5 - 6	5 - 2	4 - 11	7 - 8	7 - 0	6 - 6	6 - 1	5 - 9	5 - 5
(2) 2x12	SP02	7:12 to 12:12	14 - 8	13 - 5	12 - 5	11 - 8	11 - 0	10 - 5	9 - 10	9 - 0	8 - 4	7 - 10	7 - 4	7 - 0	10 - 11	10 - 0	9 - 3	8 - 8	8 - 2	7 - 9
(3) 2x12	SP02	7:12 to 12:12	17 - 10	16 - 4	15 - 2	14 - 3	13 - 5	12 - 9	12 - 1	11 - 0	10 - 2	9 - 7	9 - 0	8 - 7	13 - 4	12 - 3	11 - 4	10 - 7	10 - 0	9 - 6
(4) 2x12	SP02	7:12 to 12:12	20 - 5	18 - 9	17 - 5	16 - 4	15 - 5	14 - 8	13 - 10	12 - 8	11 - 9	11 - 0	10 - 5	9 - 10	15 - 4	14 - 1	13 - 1	12 - 3	11 - 6	10 - 11
(1) 2x14	SP02	7:12 to 12:12	11 - 3	10 - 4	9 - 7	8 - 11	8 - 5	8 - 0	7 - 7	6 - 11	6 - 5	6 - 0	5 - 7	5 - 4	8 - 5	7 - 8	7 - 1	6 - 8	6 - 3	5 - 11
(2) 2x14	SP02	7:12 to 12:12	16 - 0	14 - 7	13 - 7	12 - 9	12 - 0	11 - 5	10 - 9	9 - 10	9 - 1	8 - 6	8 - 0	7 - 7	11 - 11	10 - 11	10 - 1	9 - 6	8 - 11	8 - 6
(3) 2x14	SP02	7:12 to 12:12	19 - 5	17 - 9	16 - 6	15 - 6	14 - 8	13 - 11	13 - 2	12 - 0	11 - 2	10 - 5	9 - 10	9 - 4	14 - 7	13 - 4	12 - 4	11 - 7	10 - 11	10 - 4
(4) 2x14	SP02	7:12 to 12:12	22 - 2	20 - 5	19 - 0	17 - 10	16 - 10	16 - 0	15 - 1	13 - 10	12 - 10	12 - 0	11 - 4	10 - 9	16 - 9	15 - 4	14 - 3	13 - 4	12 - 7	11 - 11
(1) 3x8	SP02	7:12 to 12:12	9 - 8	8 - 10	8 - 2	7 - 8	7 - 2	6 - 10	6 - 5	5 - 11	5 - 5	5 - 1	4 - 10	4 - 7	7 - 2	6 - 6	6 - 1	5 - 8	5 - 4	5 - 1
(1) 3x10	SP02	7:12 to 12:12	11 - 5	10 - 5	9 - 8	9 - 1	8 - 6	8 - 1	7 - 8	7 - 0	6 - 6	6 - 1	5 - 8	5 - 5	8 - 6	7 - 9	7 - 2	6 - 9	6 - 4	6 - 0
(1) 3x12	SP02	7:12 to 12:12	13 - 5	12 - 3	11 - 4	10 - 8	10 - 1	9 - 6	9 - 0	8 - 3	7 - 7	7 - 1	6 - 9	6 - 4	10 - 0	9 - 1	8 - 5	7 - 11	7 - 5	7 - 1
(1) 3x14	SP02	7:12 to 12:12	20 - 5	18 - 8	17 - 5	16 - 4	15 - 5	14 - 8	13 - 10	12 - 8	11 - 9	11 - 0	10 - 4	9 - 10	15 - 4	14 - 0	13 - 0	12 - 2	11 - 6	10 - 11
(1) 4x8	SP02	7:12 to 12:12	11 - 2	10 - 7	10 - 0	9 - 6	8 - 11	8 - 6	8 - 0	7 - 4	6 - 9	6 - 4	6 - 0	5 - 8	8 - 11	8 - 1	7 - 6	7 - 0	6 - 8	6 - 4
(1) 4x10	SP02	7:12 to 12:12	14 - 1	12 - 11	12 - 0	11 - 3	10 - 7	10 - 1	9 - 6	8 - 8	8 - 0	7 - 6	7 - 1	6 - 9	10 - 6	9 - 7	8 - 11	8 - 4	7 - 10	7 - 6
(1) 4x12	SP02	7:12 to 12:12	16 - 7	15 - 2	14 - 1	13 - 2	12 - 5	11 - 10	11 - 2	10 - 2	9 - 5	8 - 10	8 - 4	7 - 11	12 - 5	11 - 4	10 - 6	9 - 10	9 - 3	8 - 10
(1) 4x14	SP02	7:12 to 12:12	25 - 0	23 - 0	21 - 5	20 - 1	19 - 0	18 - 1	17 - 1	15 - 8	14 - 6	13 - 7	12 - 10	12 - 2	18 - 11	17 - 4	16 - 1	15 - 1	14 - 3	13 - 6

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: ROOF BEAM DESIGN TABLE F

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-20

Sheet Number 20 of 45

HIP & VALLEY ROOF BEAM ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/240
Limits and Assumption: See Appendix General Notes

Horizontal Projection (ft-in)

BEAM SIZE & PLYS	Exposure B, K_{zt} = 1.0				Exposure B, K_{zt} = 2.0				Exposure D, K_{zt} = 1.0			
	Wood Species				Wood Species				Wood Species			
	DFL1	DFL2	SP01	SP02	DFL1	DFL2	SP01	SP02	DFL1	DFL2	SP01	SP02
(1) 2x8	9 - 10	9 - 6	9 - 9	9 - 0	7 - 9	7 - 6	7 - 11	7 - 2	8 - 3	8 - 0	8 - 5	7 - 7
(2) 2x8	11 - 10	11 - 8	11 - 8	11 - 3	9 - 10	9 - 6	9 - 9	9 - 1	10 - 5	10 - 2	10 - 3	9 - 8
(3) 2x8	13 - 1	12 - 11	12 - 11	12 - 6	11 - 0	10 - 10	10 - 10	10 - 4	11 - 6	11 - 4	11 - 4	11 - 0
(4) 2x8	14 - 1	13 - 10	13 - 10	13 - 5	11 - 10	11 - 8	11 - 8	11 - 3	12 - 5	12 - 3	12 - 3	11 - 10
(1) 2x10	11 - 2	10 - 10	11 - 0	10 - 1	8 - 11	8 - 7	8 - 9	8 - 0	9 - 5	9 - 2	9 - 4	8 - 6
(2) 2x10	14 - 3	13 - 9	14 - 0	12 - 9	11 - 3	10 - 11	11 - 1	10 - 2	12 - 0	11 - 7	11 - 10	10 - 10
(3) 2x10	15 - 9	15 - 6	15 - 6	14 - 8	12 - 11	12 - 6	12 - 9	11 - 7	13 - 9	13 - 3	13 - 7	12 - 5
(4) 2x10	16 - 11	16 - 8	16 - 8	16 - 1	14 - 2	13 - 9	14 - 0	12 - 10	14 - 11	14 - 8	14 - 8	13 - 8
(1) 2x12	12 - 4	11 - 11	12 - 4	11 - 3	9 - 10	9 - 6	9 - 9	8 - 11	10 - 5	10 - 1	10 - 5	9 - 6
(2) 2x12	15 - 8	15 - 2	15 - 8	14 - 3	12 - 5	12 - 0	12 - 5	11 - 4	13 - 3	12 - 10	13 - 3	12 - 1
(3) 2x12	18 - 0	17 - 5	17 - 11	16 - 4	14 - 3	13 - 9	14 - 3	13 - 0	15 - 2	14 - 8	15 - 2	13 - 10
(4) 2x12	19 - 7	19 - 2	19 - 3	18 - 0	15 - 9	15 - 2	15 - 9	14 - 3	16 - 9	16 - 2	16 - 9	15 - 2
(1) 2x14	13 - 4	12 - 10	13 - 0	11 - 11	10 - 6	10 - 2	10 - 4	9 - 5	11 - 3	10 - 10	11 - 0	10 - 1
(2) 2x14	16 - 11	16 - 4	16 - 6	15 - 2	13 - 5	12 - 11	13 - 1	12 - 0	14 - 3	13 - 9	13 - 11	12 - 9
(3) 2x14	19 - 5	18 - 9	18 - 11	17 - 4	15 - 4	14 - 10	15 - 0	13 - 9	16 - 4	15 - 10	16 - 0	14 - 8
(4) 2x14	21 - 4	20 - 7	20 - 10	19 - 1	16 - 11	16 - 4	16 - 6	15 - 2	18 - 0	17 - 5	17 - 7	16 - 2
(1) 3x8	11 - 4	11 - 2	11 - 2	10 - 9	9 - 3	8 - 11	9 - 4	8 - 6	9 - 11	9 - 6	9 - 10	9 - 1
(1) 3x10	13 - 4	12 - 11	13 - 2	12 - 0	10 - 7	10 - 3	10 - 5	9 - 6	11 - 3	10 - 11	11 - 1	10 - 2
(1) 3x12	14 - 9	14 - 3	14 - 9	13 - 5	11 - 8	11 - 4	11 - 8	10 - 8	12 - 6	12 - 0	12 - 6	11 - 4
(1) 3x14	15 - 11	19 - 5	19 - 7	18 - 0	12 - 7	15 - 4	15 - 7	14 - 3	13 - 5	16 - 4	16 - 7	15 - 2
(1) 4x8	12 - 4	12 - 1	12 - 1	11 - 9	10 - 4	10 - 2	10 - 2	9 - 10	10 - 10	10 - 8	10 - 8	10 - 4
(1) 4x10	14 - 9	14 - 7	14 - 7	13 - 11	12 - 3	11 - 10	12 - 1	11 - 0	13 - 0	12 - 7	12 - 10	11 - 9
(1) 4x12	17 - 1	16 - 6	16 - 10	15 - 6	13 - 6	13 - 1	13 - 6	12 - 4	14 - 5	13 - 11	14 - 5	13 - 1
(1) 4x14	18 - 5	22 - 6	22 - 8	20 - 9	14 - 8	17 - 10	18 - 0	16 - 6	15 - 7	19 - 0	19 - 2	17 - 6

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
BY COMMISSIONER: DAWN L. HENRY
DRAWING TITLE: HIP & VALLEY ROOF BEAM DESIGN TABLE

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:
A-21
Sheet Number 21 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	3:12	1	4	6 - 2	5 - 6	5 - 2	4 - 9	7 - 6	6 - 8	6 - 3	5 - 9	8 - 6	7 - 7	7 - 1	6 - 6
DFL1	3:12	1	6	10 - 6	9 - 4	8 - 8	7 - 11	13 - 4	11 - 8	10 - 9	9 - 9	15 - 7	13 - 8	12 - 7	11 - 4
DFL1	3:12	1	8	15 - 6	13 - 6	12 - 6	11 - 3	19 - 0	17 - 2	15 - 9	14 - 3	21 - 3	19 - 4	18 - 2	16 - 7
DFL1	3:12	1	10	20 - 5	18 - 7	17 - 5	15 - 9	24 - 4	22 - 1	20 - 9	19 - 3	26 - 0	24 - 9	23 - 3	21 - 7
DFL1	3:12	1	12	25 - 0	22 - 8	21 - 3	19 - 9	26 - 0	26 - 0	25 - 4	23 - 6	26 - 11	26 - 0	26 - 0	26 - 11
DFL1	3:12	1	14	26 - 0	26 - 0	25 - 2	23 - 4	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	3:12	2n	4	5 - 3	4 - 8	4 - 5	4 - 1	6 - 6	5 - 9	5 - 4	4 - 11	7 - 6	6 - 8	6 - 2	5 - 8
DFL1	3:12	2n	6	9 - 3	8 - 2	7 - 7	6 - 11	11 - 5	10 - 1	9 - 5	8 - 7	13 - 2	11 - 8	10 - 9	9 - 10
DFL1	3:12	2n	8	13 - 0	11 - 7	10 - 8	9 - 9	16 - 0	14 - 3	13 - 3	12 - 1	18 - 3	16 - 3	15 - 2	13 - 10
DFL1	3:12	2n	10	17 - 5	15 - 7	14 - 6	13 - 3	21 - 2	18 - 11	17 - 8	16 - 3	24 - 3	21 - 7	20 - 1	18 - 6
DFL1	3:12	2n	12	21 - 10	19 - 6	18 - 3	16 - 6	26 - 0	23 - 11	22 - 2	20 - 4	26 - 0	26 - 0	25 - 5	23 - 3
DFL1	3:12	2n	14	26 - 0	23 - 9	21 - 9	18 - 11	26 - 0	26 - 0	26 - 11	24 - 9	26 - 0	26 - 0	26 - 11	26 - 11
DFL1	4:12	1	4	6 - 2	5 - 6	5 - 2	4 - 9	7 - 6	6 - 8	6 - 3	5 - 9	8 - 6	7 - 7	7 - 1	6 - 6
DFL1	4:12	1	6	10 - 6	9 - 4	8 - 8	7 - 11	13 - 4	11 - 8	10 - 9	9 - 9	15 - 7	13 - 8	12 - 7	11 - 4
DFL1	4:12	1	8	15 - 6	13 - 6	12 - 6	11 - 3	19 - 0	17 - 2	15 - 9	14 - 3	21 - 3	19 - 4	18 - 2	16 - 7
DFL1	4:12	1	10	20 - 5	18 - 7	17 - 5	15 - 9	24 - 4	22 - 1	20 - 9	19 - 3	26 - 0	24 - 9	23 - 3	21 - 7
DFL1	4:12	1	12	25 - 0	22 - 8	21 - 3	19 - 9	26 - 0	26 - 0	25 - 4	23 - 6	26 - 11	26 - 0	26 - 0	26 - 0
DFL1	4:12	1	14	26 - 0	26 - 0	25 - 2	23 - 4	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	4:12	2n	4	5 - 3	4 - 8	4 - 5	4 - 1	6 - 6	5 - 9	5 - 4	4 - 11	7 - 6	6 - 8	6 - 2	5 - 8
DFL1	4:12	2n	6	9 - 3	8 - 2	7 - 7	6 - 11	11 - 5	10 - 1	9 - 5	8 - 7	13 - 2	11 - 8	10 - 9	9 - 10
DFL1	4:12	2n	8	13 - 0	11 - 7	10 - 8	9 - 9	16 - 0	14 - 3	13 - 3	12 - 1	18 - 3	16 - 3	15 - 2	13 - 10
DFL1	4:12	2n	10	17 - 5	15 - 7	14 - 6	13 - 3	21 - 2	18 - 11	17 - 8	16 - 3	24 - 3	21 - 7	20 - 1	18 - 6
DFL1	4:12	2n	12	21 - 10	19 - 6	18 - 3	16 - 6	26 - 11	23 - 11	22 - 2	20 - 4	26 - 0	26 - 0	25 - 5	23 - 3
DFL1	4:12	2n	14	26 - 0	23 - 9	21 - 9	18 - 11	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 11	26 - 0	26 - 11
DFL1	5:12	1	4	6 - 5	5 - 9	5 - 4	4 - 11	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 10
DFL1	5:12	1	6	10 - 7	9 - 7	8 - 11	8 - 3	12 - 9	11 - 6	10 - 9	9 - 11	14 - 4	13 - 0	12 - 2	11 - 3
DFL1	5:12	1	8	14 - 3	12 - 11	12 - 1	11 - 2	17 - 1	15 - 5	14 - 6	13 - 5	19 - 2	17 - 4	16 - 3	15 - 1
DFL1	5:12	1	10	18 - 5	16 - 8	15 - 8	14 - 6	21 - 11	19 - 11	18 - 8	17 - 3	24 - 7	22 - 4	21 - 0	19 - 5
DFL1	5:12	1	12	22 - 6	20 - 5	19 - 2	17 - 9	26 - 0	24 - 4	22 - 10	21 - 2	26 - 0	26 - 0	25 - 8	23 - 9
DFL1	5:12	1	14	26 - 11	24 - 2	22 - 8	20 - 5	26 - 11	26 - 0	26 - 11	25 - 0	26 - 0	26 - 0	26 - 0	26 - 11
DFL1	5:12	2n	4	5 - 6	4 - 11	4 - 6	4 - 2	6 - 11	6 - 1	5 - 7	5 - 2	7 - 11	7 - 0	6 - 6	5 - 11
DFL1	5:12	2n	6	9 - 8	8 - 8	8 - 1	7 - 4	11 - 10	10 - 6	9 - 10	9 - 0	13 - 4	12 - 1	11 - 2	10 - 3
DFL1	5:12	2n	8	13 - 3	11 - 11	11 - 1	10 - 2	16 - 0	14 - 4	13 - 6	12 - 5	18 - 1	16 - 3	15 - 2	14 - 0
DFL1	5:12	2n	10	17 - 4	15 - 7	14 - 7	13 - 5	20 - 11	18 - 10	17 - 7	16 - 2	23 - 5	21 - 4	19 - 11	18 - 4
DFL1	5:12	2n	12	21 - 6	19 - 4	18 - 1	16 - 5	25 - 6	23 - 2	21 - 9	20 - 1	26 - 0	25 - 11	24 - 5	22 - 8
DFL1	5:12	2n	14	25 - 4	23 - 0	21 - 3	18 - 8	26 - 11	26 - 11	25 - 8	23 - 10	26 - 11	26 - 0	26 - 0	26 - 0
DFL1	6:12	1	4	6 - 5	5 - 9	5 - 4	4 - 11	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 10
DFL1	6:12	1	6	10 - 7	9 - 7	8 - 11	8 - 3	12 - 9	11 - 6	10 - 9	9 - 11	14 - 4	13 - 0	12 - 2	11 - 3
DFL1	6:12	1	8	14 - 3	12 - 11	12 - 1	11 - 2	17 - 1	15 - 5	14 - 6	13 - 5	19 - 2	17 - 4	16 - 3	15 - 1
DFL1	6:12	1	10	18 - 5	16 - 8	15 - 8	14 - 6	21 - 11	19 - 11	18 - 8	17 - 3	24 - 7	22 - 4	21 - 0	19 - 5
DFL1	6:12	1	12	22 - 6	20 - 5	19 - 2	17 - 9	26 - 0	24 - 4	22 - 10	21 - 2	26 - 0	26 - 0	25 - 8	23 - 9
DFL1	6:12	1	14	26 - 0	24 - 2	22 - 8	20 - 5	26 - 11	26 - 11	26 - 11	25 - 0	26 - 0	26 - 11	26 - 0	26 - 11
DFL1	6:12	2n	4	5 - 6	4 - 11	4 - 6	4 - 2	6 - 11	6 - 1	5 - 7	5 - 2	7 - 11	7 - 0	6 - 6	5 - 11
DFL1	6:12	2n	6	9 - 8	8 - 8	8 - 1	7 - 4	11 - 10	10 - 6	9 - 10	9 - 0	13 - 4	12 - 1	11 - 2	10 - 3
DFL1	6:12	2n	8	13 - 3	11 - 11	11 - 1	10 - 2	16 - 0	14 - 4	13 - 6	12 - 5	18 - 1	16 - 3	15 - 2	14 - 0
DFL1	6:12	2n	10	17 - 4	15 - 7	14 - 7	13 - 5	20 - 11	18 - 10	17 - 7	16 - 2	23 - 5	21 - 4	19 - 11	18 - 4
DFL1	6:12	2n	12	21 - 6	19 - 4	18 - 1	16 - 5	25 - 6	23 - 2	21 - 9	20 - 1	26 - 0	25 - 11	24 - 5	22 - 8
DFL1	6:12	2n	14	25 - 4	23 - 0	21 - 3	18 - 8	26 - 0	26 - 0	25 - 8	23 - 10	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	7:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	7:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	7:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	7:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 0	24 - 6	23 - 1	21 - 5
DFL1	7:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 11	25 - 1	23 - 3	26 - 0	26 - 0	26 - 0	26 - 0
DFL1	7:12	1	14	26 - 0	26 - 11	24 - 11	23 - 1	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	7:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	7:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	7:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	7:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	7:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 0	26 - 0	25 - 10	23 - 11
DFL1	7:12	2n	14	26 - 0	24 - 4	22 - 8	19 - 11	26 - 0	26 - 0	26 - 0	25 - 3	26 - 0	26 - 0	26 - 0	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE A-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-22

Sheet Number 22 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	8:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	8:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	8:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	8:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 0	24 - 6	23 - 1	21 - 5
DFL1	8:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 0	25 - 1	23 - 3	26 - 11	26 - 0	26 - 0	26 - 0
DFL1	8:12	1	14	26 - 11	26 - 0	24 - 11	23 - 1	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
DFL1	8:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	8:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	8:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	8:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	8:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 11	26 - 0	25 - 10	23 - 11
DFL1	8:12	2n	14	26 - 11	24 - 4	22 - 8	19 - 11	26 - 0	26 - 0	26 - 11	25 - 3	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	9:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	9:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	9:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	9:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 11	24 - 6	23 - 1	21 - 5
DFL1	9:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 0	25 - 1	23 - 3	26 - 11	26 - 0	26 - 0	26 - 0
DFL1	9:12	1	14	26 - 0	26 - 11	24 - 11	23 - 1	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 11
DFL1	9:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	9:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	9:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	9:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	9:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 0	26 - 11	25 - 10	23 - 11
DFL1	9:12	2n	14	26 - 0	24 - 4	22 - 8	19 - 11	26 - 11	26 - 0	26 - 0	25 - 3	26 - 0	26 - 0	26 - 0	26 - 0
DFL1	10:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	10:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	10:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	10:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 11	24 - 6	23 - 1	21 - 5
DFL1	10:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 0	25 - 1	23 - 3	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	10:12	1	14	26 - 0	26 - 0	24 - 11	23 - 1	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	10:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	10:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	10:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	10:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	10:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 11	26 - 0	25 - 10	23 - 11
DFL1	10:12	2n	14	26 - 0	24 - 4	22 - 8	19 - 11	26 - 0	26 - 0	26 - 11	25 - 3	26 - 11	26 - 0	26 - 11	26 - 0
DFL1	11:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	11:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	11:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	11:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 0	24 - 6	23 - 1	21 - 5
DFL1	11:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 0	25 - 1	23 - 3	26 - 11	26 - 0	26 - 11	26 - 0
DFL1	11:12	1	14	26 - 11	26 - 0	24 - 11	23 - 1	26 - 0	26 - 0	26 - 11	26 - 11	26 - 0	26 - 11	26 - 0	26 - 0
DFL1	11:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	11:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	11:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	11:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	11:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 0	26 - 0	25 - 10	23 - 11
DFL1	11:12	2n	14	26 - 11	24 - 4	22 - 8	19 - 11	26 - 0	26 - 0	26 - 11	25 - 3	26 - 0	26 - 11	26 - 0	26 - 0
DFL1	12:12	1	4	6 - 6	5 - 10	5 - 6	5 - 1	8 - 0	7 - 2	6 - 8	6 - 1	9 - 1	8 - 2	7 - 7	6 - 11
DFL1	12:12	1	6	11 - 1	9 - 10	9 - 2	8 - 5	13 - 8	12 - 2	11 - 3	10 - 3	15 - 8	13 - 11	12 - 11	11 - 10
DFL1	12:12	1	8	15 - 6	13 - 10	12 - 10	11 - 9	18 - 11	17 - 1	15 - 9	14 - 5	21 - 2	19 - 2	18 - 1	16 - 7
DFL1	12:12	1	10	20 - 4	18 - 6	17 - 5	15 - 9	24 - 1	21 - 11	20 - 7	19 - 2	26 - 0	24 - 6	23 - 1	21 - 5
DFL1	12:12	1	12	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	26 - 0	25 - 1	23 - 3	26 - 11	26 - 0	26 - 11	26 - 11
DFL1	12:12	1	14	26 - 11	26 - 0	24 - 11	23 - 1	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 0
DFL1	12:12	2n	4	6 - 0	5 - 4	5 - 0	4 - 8	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
DFL1	12:12	2n	6	10 - 0	9 - 0	8 - 4	7 - 9	12 - 2	10 - 10	10 - 2	9 - 4	13 - 9	12 - 5	11 - 6	10 - 7
DFL1	12:12	2n	8	13 - 8	12 - 4	11 - 5	10 - 6	16 - 7	14 - 10	13 - 11	12 - 9	18 - 10	16 - 11	15 - 9	14 - 6
DFL1	12:12	2n	10	18 - 0	16 - 2	15 - 1	13 - 10	21 - 10	19 - 7	18 - 4	16 - 10	24 - 10	22 - 3	20 - 9	19 - 1
DFL1	12:12	2n	12	22 - 6	20 - 2	18 - 10	17 - 4	26 - 0	24 - 7	22 - 10	21 - 0	26 - 0	26 - 0	25 - 10	23 - 11
DFL1	12:12	2n	14	26 - 0	24 - 4	22 - 8	19 - 11	26 - 11	26 - 0	26 - 0	25 - 3	26 - 0	26 - 0	26 - 0	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE B-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-23

Sheet Number 23 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	3:12	1	4	6 - 0	5 - 5	5 - 0	4 - 7	7 - 4	6 - 7	6 - 1	5 - 7	8 - 4	7 - 5	6 - 11	6 - 5
DFL2	3:12	1	6	10 - 3	9 - 1	8 - 5	7 - 9	13 - 0	11 - 4	10 - 5	9 - 6	15 - 2	13 - 3	12 - 3	11 - 0
DFL2	3:12	1	8	15 - 1	13 - 2	12 - 2	10 - 11	18 - 7	16 - 8	15 - 4	13 - 10	20 - 10	18 - 11	17 - 9	16 - 2
DFL2	3:12	1	10	20 - 0	18 - 2	17 - 0	15 - 4	23 - 10	21 - 7	20 - 4	18 - 10	26 - 0	24 - 3	22 - 9	21 - 1
DFL2	3:12	1	12	24 - 6	22 - 2	20 - 10	19 - 4	26 - 0	26 - 0	24 - 10	23 - 0	26 - 0	26 - 0	26 - 0	25 - 10
DFL2	3:12	1	14	26 - 0	26 - 11	24 - 8	22 - 8	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	3:12	2n	4	5 - 2	4 - 7	4 - 3	3 - 11	6 - 4	5 - 8	5 - 3	4 - 10	7 - 4	6 - 6	6 - 0	5 - 6
DFL2	3:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	11 - 2	9 - 10	9 - 2	8 - 4	12 - 10	11 - 4	10 - 6	9 - 7
DFL2	3:12	2n	8	12 - 9	11 - 3	10 - 5	9 - 6	15 - 7	13 - 11	12 - 11	11 - 10	17 - 10	15 - 11	14 - 10	13 - 6
DFL2	3:12	2n	10	17 - 0	15 - 2	14 - 1	12 - 8	20 - 8	18 - 6	17 - 4	15 - 10	23 - 8	21 - 1	19 - 8	18 - 1
DFL2	3:12	2n	12	21 - 4	19 - 1	17 - 9	15 - 5	26 - 0	23 - 4	21 - 8	19 - 10	26 - 0	26 - 11	24 - 10	22 - 8
DFL2	3:12	2n	14	26 - 0	22 - 11	20 - 4	17 - 9	26 - 0	26 - 11	26 - 0	24 - 2	26 - 0	26 - 11	26 - 0	26 - 0
DFL2	4:12	1	4	6 - 0	5 - 5	5 - 0	4 - 7	7 - 4	6 - 7	6 - 1	5 - 7	8 - 4	7 - 5	6 - 11	6 - 5
DFL2	4:12	1	6	10 - 3	9 - 1	8 - 5	7 - 9	13 - 0	11 - 4	10 - 5	9 - 6	15 - 2	13 - 3	12 - 3	11 - 0
DFL2	4:12	1	8	15 - 1	13 - 2	12 - 2	10 - 11	18 - 7	16 - 8	15 - 4	13 - 10	20 - 10	18 - 11	17 - 9	16 - 2
DFL2	4:12	1	10	20 - 0	18 - 2	17 - 0	15 - 4	23 - 10	21 - 7	20 - 4	18 - 10	26 - 0	24 - 3	22 - 9	21 - 1
DFL2	4:12	1	12	24 - 6	22 - 2	20 - 10	19 - 4	26 - 0	26 - 0	24 - 10	23 - 0	26 - 0	26 - 0	26 - 0	25 - 10
DFL2	4:12	1	14	26 - 0	26 - 0	24 - 8	22 - 8	26 - 0	26 - 0	26 - 11	26 - 11	26 - 0	26 - 11	26 - 0	26 - 0
DFL2	4:12	2n	4	5 - 2	4 - 7	4 - 3	3 - 11	6 - 4	5 - 8	5 - 3	4 - 10	7 - 4	6 - 6	6 - 0	5 - 6
DFL2	4:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	11 - 2	9 - 10	9 - 2	8 - 4	12 - 10	11 - 4	10 - 6	9 - 7
DFL2	4:12	2n	8	12 - 9	11 - 3	10 - 5	9 - 6	15 - 7	13 - 11	12 - 11	11 - 10	17 - 10	15 - 11	14 - 10	13 - 6
DFL2	4:12	2n	10	17 - 0	15 - 2	14 - 1	12 - 8	20 - 8	18 - 6	17 - 4	15 - 10	23 - 8	21 - 1	19 - 8	18 - 1
DFL2	4:12	2n	12	21 - 4	19 - 1	17 - 9	15 - 5	26 - 0	23 - 4	21 - 8	19 - 10	26 - 0	26 - 0	24 - 10	22 - 8
DFL2	4:12	2n	14	26 - 0	22 - 11	20 - 4	17 - 9	26 - 0	26 - 0	26 - 0	24 - 2	26 - 0	26 - 0	26 - 11	26 - 0
DFL2	5:12	1	4	6 - 3	5 - 7	5 - 3	4 - 10	7 - 7	6 - 10	6 - 4	5 - 10	8 - 8	7 - 9	7 - 3	6 - 8
DFL2	5:12	1	6	10 - 5	9 - 4	8 - 9	8 - 1	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
DFL2	5:12	1	8	14 - 0	12 - 8	11 - 10	10 - 11	16 - 8	15 - 1	14 - 2	13 - 1	18 - 9	17 - 0	15 - 11	14 - 9
DFL2	5:12	1	10	18 - 0	16 - 4	15 - 4	14 - 2	21 - 6	19 - 6	18 - 3	16 - 11	24 - 1	21 - 10	20 - 6	19 - 0
DFL2	5:12	1	12	22 - 1	20 - 0	18 - 9	17 - 2	26 - 0	23 - 10	22 - 5	20 - 9	26 - 0	26 - 0	25 - 1	23 - 3
DFL2	5:12	1	14	26 - 0	23 - 8	21 - 8	19 - 3	26 - 0	26 - 0	26 - 11	24 - 6	26 - 0	26 - 11	26 - 0	26 - 0
DFL2	5:12	2n	4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 8	5 - 11	5 - 6	5 - 0	7 - 9	6 - 10	6 - 4	5 - 9
DFL2	5:12	2n	6	9 - 5	8 - 5	7 - 10	7 - 2	11 - 6	10 - 4	9 - 7	8 - 10	13 - 1	11 - 9	10 - 11	10 - 0
DFL2	5:12	2n	8	13 - 0	11 - 8	10 - 10	9 - 11	15 - 7	14 - 1	13 - 2	12 - 2	17 - 8	15 - 11	14 - 10	13 - 9
DFL2	5:12	2n	10	16 - 11	15 - 3	14 - 3	13 - 1	20 - 5	18 - 5	17 - 3	15 - 10	23 - 0	20 - 10	19 - 6	17 - 11
DFL2	5:12	2n	12	21 - 1	18 - 11	17 - 7	15 - 5	25 - 0	22 - 8	21 - 4	19 - 8	26 - 0	25 - 5	23 - 11	22 - 2
DFL2	5:12	2n	14	24 - 10	22 - 1	20 - 0	17 - 7	26 - 11	26 - 11	25 - 2	23 - 4	26 - 0	26 - 11	26 - 0	26 - 11
DFL2	6:12	1	4	6 - 3	5 - 7	5 - 3	4 - 10	7 - 7	6 - 10	6 - 4	5 - 10	8 - 8	7 - 9	7 - 3	6 - 8
DFL2	6:12	1	6	10 - 5	9 - 4	8 - 9	8 - 1	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
DFL2	6:12	1	8	14 - 0	12 - 8	11 - 10	10 - 11	16 - 8	15 - 1	14 - 2	13 - 1	18 - 9	17 - 0	15 - 11	14 - 9
DFL2	6:12	1	10	18 - 0	16 - 4	15 - 4	14 - 2	21 - 6	19 - 6	18 - 3	16 - 11	24 - 1	21 - 10	20 - 6	19 - 0
DFL2	6:12	1	12	22 - 1	20 - 0	18 - 9	17 - 2	26 - 11	23 - 10	22 - 5	20 - 9	26 - 0	26 - 11	25 - 1	23 - 3
DFL2	6:12	1	14	26 - 0	23 - 8	21 - 8	19 - 3	26 - 0	26 - 0	26 - 0	24 - 6	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	6:12	2n	4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 8	5 - 11	5 - 6	5 - 0	7 - 9	6 - 10	6 - 4	5 - 9
DFL2	6:12	2n	6	9 - 5	8 - 5	7 - 10	7 - 2	11 - 6	10 - 4	9 - 7	8 - 10	13 - 1	11 - 9	10 - 11	10 - 0
DFL2	6:12	2n	8	13 - 0	11 - 8	10 - 10	9 - 11	15 - 7	14 - 1	13 - 2	12 - 2	17 - 8	15 - 11	14 - 10	13 - 9
DFL2	6:12	2n	10	16 - 11	15 - 3	14 - 3	13 - 1	20 - 5	18 - 5	17 - 3	15 - 10	23 - 0	20 - 10	19 - 6	17 - 11
DFL2	6:12	2n	12	21 - 1	18 - 11	17 - 7	15 - 5	25 - 0	22 - 8	21 - 4	19 - 8	26 - 0	25 - 5	23 - 11	22 - 2
DFL2	6:12	2n	14	24 - 10	22 - 1	20 - 0	17 - 7	26 - 0	26 - 0	25 - 2	23 - 4	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	7:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	7:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	7:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	7:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 11	24 - 0	22 - 7	21 - 0
DFL2	7:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 11	24 - 7	22 - 10	26 - 0	26 - 0	26 - 0	25 - 6
DFL2	7:12	1	14	26 - 11	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
DFL2	7:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	7:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	7:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	7:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	7:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	7:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE C-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-24

Sheet Number 24 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	8:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	8:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	8:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	8:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
DFL2	8:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 0	24 - 7	22 - 10	26 - 0	26 - 11	26 - 11	25 - 6
DFL2	8:12	1	14	26 - 11	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 11	26 - 11	26 - 0	26 - 11	26 - 11
DFL2	8:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	8:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	8:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	8:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	8:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	8:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 0	24 - 9	26 - 11	26 - 0	26 - 11	26 - 0
DFL2	9:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	9:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	9:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	9:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
DFL2	9:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 0	24 - 7	22 - 10	26 - 0	26 - 0	26 - 0	25 - 6
DFL2	9:12	1	14	26 - 11	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	9:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	9:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	9:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	9:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	9:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	9:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 11	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	10:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	10:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	10:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	10:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
DFL2	10:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 0	24 - 7	22 - 10	26 - 11	26 - 11	26 - 0	25 - 6
DFL2	10:12	1	14	26 - 0	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	10:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	10:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	10:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	10:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	10:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	10:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	11:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	11:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	11:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	11:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
DFL2	11:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 0	24 - 7	22 - 10	26 - 0	26 - 0	26 - 0	25 - 6
DFL2	11:12	1	14	26 - 11	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
DFL2	11:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	11:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	11:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	11:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	11:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 11	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	11:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 11
DFL2	12:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
DFL2	12:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
DFL2	12:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
DFL2	12:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 11	24 - 0	22 - 7	21 - 0
DFL2	12:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 11	24 - 7	22 - 10	26 - 0	26 - 11	26 - 0	25 - 6
DFL2	12:12	1	14	26 - 0	25 - 11	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 11
DFL2	12:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
DFL2	12:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
DFL2	12:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
DFL2	12:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
DFL2	12:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 5	26 - 11	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
DFL2	12:12	2n	14	26 - 0	23 - 9	21 - 5	18 - 9	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 11	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE D-EXP. B Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-25

Sheet Number 25 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	3:12	1	4	6 - 0	5 - 5	5 - 0	4 - 7	7 - 4	6 - 7	6 - 1	5 - 7	8 - 4	7 - 5	6 - 11	6 - 5
SP01	3:12	1	6	10 - 3	9 - 1	8 - 5	7 - 9	13 - 0	11 - 4	10 - 5	9 - 6	15 - 2	13 - 3	12 - 3	11 - 0
SP01	3:12	1	8	15 - 1	13 - 2	12 - 2	10 - 11	18 - 7	16 - 8	15 - 4	13 - 10	20 - 10	18 - 11	17 - 9	16 - 2
SP01	3:12	1	10	20 - 0	18 - 2	17 - 0	15 - 4	23 - 10	21 - 7	20 - 4	18 - 10	26 - 0	24 - 3	22 - 9	21 - 1
SP01	3:12	1	12	24 - 6	22 - 2	20 - 10	19 - 4	26 - 0	26 - 0	24 - 10	23 - 0	26 - 0	26 - 11	26 - 0	25 - 10
SP01	3:12	1	14	26 - 0	26 - 11	24 - 8	22 - 10	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
SP01	3:12	2n	4	5 - 2	4 - 7	4 - 3	3 - 11	6 - 4	5 - 8	5 - 3	4 - 10	7 - 4	6 - 6	6 - 0	5 - 6
SP01	3:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	11 - 2	9 - 10	9 - 2	8 - 4	12 - 10	11 - 4	10 - 6	9 - 7
SP01	3:12	2n	8	12 - 9	11 - 3	10 - 5	9 - 6	15 - 7	13 - 11	12 - 11	11 - 10	17 - 10	15 - 11	14 - 10	13 - 6
SP01	3:12	2n	10	17 - 0	15 - 2	14 - 1	12 - 11	20 - 8	18 - 6	17 - 4	15 - 10	23 - 8	21 - 1	19 - 8	18 - 1
SP01	3:12	2n	12	21 - 4	19 - 1	17 - 10	16 - 4	26 - 0	23 - 4	21 - 8	19 - 10	26 - 0	26 - 11	24 - 10	22 - 8
SP01	3:12	2n	14	26 - 0	23 - 1	20 - 10	18 - 2	26 - 0	26 - 11	26 - 0	24 - 2	26 - 0	26 - 11	26 - 0	26 - 0
SP01	4:12	1	4	6 - 0	5 - 5	5 - 0	4 - 7	7 - 4	6 - 7	6 - 1	5 - 7	8 - 4	7 - 5	6 - 11	6 - 5
SP01	4:12	1	6	10 - 3	9 - 1	8 - 5	7 - 9	13 - 0	11 - 4	10 - 5	9 - 6	15 - 2	13 - 3	12 - 3	11 - 0
SP01	4:12	1	8	15 - 1	13 - 2	12 - 2	10 - 11	18 - 7	16 - 8	15 - 4	13 - 10	20 - 10	18 - 11	17 - 9	16 - 2
SP01	4:12	1	10	20 - 0	18 - 2	17 - 0	15 - 4	23 - 10	21 - 7	20 - 4	18 - 10	26 - 0	24 - 3	22 - 9	21 - 1
SP01	4:12	1	12	24 - 6	22 - 2	20 - 10	19 - 4	26 - 0	26 - 0	24 - 10	23 - 0	26 - 0	26 - 0	26 - 0	25 - 10
SP01	4:12	1	14	26 - 11	26 - 0	24 - 8	22 - 10	26 - 0	26 - 0	26 - 0	26 - 11	26 - 11	26 - 0	26 - 0	26 - 0
SP01	4:12	2n	4	5 - 2	4 - 7	4 - 3	3 - 11	6 - 4	5 - 8	5 - 3	4 - 10	7 - 4	6 - 6	6 - 0	5 - 6
SP01	4:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	11 - 2	9 - 10	9 - 2	8 - 4	12 - 10	11 - 4	10 - 6	9 - 7
SP01	4:12	2n	8	12 - 9	11 - 3	10 - 5	9 - 6	15 - 7	13 - 11	12 - 11	11 - 10	17 - 10	15 - 11	14 - 10	13 - 6
SP01	4:12	2n	10	17 - 0	15 - 2	14 - 1	12 - 11	20 - 8	18 - 6	17 - 4	15 - 10	23 - 8	21 - 1	19 - 8	18 - 1
SP01	4:12	2n	12	21 - 4	19 - 1	17 - 10	16 - 4	26 - 11	23 - 4	21 - 8	19 - 10	26 - 0	26 - 0	24 - 10	22 - 8
SP01	4:12	2n	14	26 - 0	23 - 1	20 - 10	18 - 2	26 - 0	26 - 0	26 - 0	24 - 2	26 - 0	26 - 0	26 - 0	26 - 0
SP01	5:12	1	4	6 - 3	5 - 7	5 - 3	4 - 10	7 - 7	6 - 10	6 - 4	5 - 10	8 - 8	7 - 9	7 - 3	6 - 8
SP01	5:12	1	6	10 - 5	9 - 4	8 - 9	8 - 1	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
SP01	5:12	1	8	14 - 0	12 - 8	11 - 10	10 - 11	16 - 8	15 - 1	14 - 2	13 - 1	18 - 9	17 - 0	15 - 11	14 - 9
SP01	5:12	1	10	18 - 0	16 - 4	15 - 4	14 - 2	21 - 6	19 - 6	18 - 3	16 - 11	24 - 1	21 - 10	20 - 6	19 - 0
SP01	5:12	1	12	22 - 1	20 - 0	18 - 9	17 - 5	26 - 0	23 - 10	22 - 5	20 - 9	26 - 0	26 - 0	25 - 1	23 - 3
SP01	5:12	1	14	26 - 0	23 - 8	22 - 1	19 - 8	26 - 0	26 - 0	26 - 11	24 - 6	26 - 0	26 - 11	26 - 0	26 - 0
SP01	5:12	2n	4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 8	5 - 11	5 - 6	5 - 0	7 - 9	6 - 10	6 - 4	5 - 9
SP01	5:12	2n	6	9 - 5	8 - 5	7 - 10	7 - 2	11 - 6	10 - 4	9 - 7	8 - 10	13 - 1	11 - 9	10 - 11	10 - 0
SP01	5:12	2n	8	13 - 0	11 - 8	10 - 10	9 - 11	15 - 7	14 - 1	13 - 2	12 - 2	17 - 8	15 - 11	14 - 10	13 - 9
SP01	5:12	2n	10	16 - 11	15 - 3	14 - 3	13 - 2	20 - 5	18 - 5	17 - 3	15 - 10	23 - 0	20 - 10	19 - 6	17 - 11
SP01	5:12	2n	12	21 - 1	18 - 11	17 - 8	16 - 3	25 - 0	22 - 8	21 - 4	19 - 8	26 - 0	25 - 5	23 - 11	22 - 2
SP01	5:12	2n	14	24 - 10	22 - 6	20 - 5	18 - 0	26 - 0	26 - 11	25 - 2	23 - 4	26 - 0	26 - 11	26 - 0	26 - 11
SP01	6:12	1	4	6 - 3	5 - 7	5 - 3	4 - 10	7 - 7	6 - 10	6 - 4	5 - 10	8 - 8	7 - 9	7 - 3	6 - 8
SP01	6:12	1	6	10 - 5	9 - 4	8 - 9	8 - 1	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
SP01	6:12	1	8	14 - 0	12 - 8	11 - 10	10 - 11	16 - 8	15 - 1	14 - 2	13 - 1	18 - 9	17 - 0	15 - 11	14 - 9
SP01	6:12	1	10	18 - 0	16 - 4	15 - 4	14 - 2	21 - 6	19 - 6	18 - 3	16 - 11	24 - 1	21 - 10	20 - 6	19 - 0
SP01	6:12	1	12	22 - 1	20 - 0	18 - 9	17 - 5	26 - 0	23 - 10	22 - 5	20 - 9	26 - 0	26 - 11	25 - 1	23 - 3
SP01	6:12	1	14	26 - 0	23 - 8	22 - 1	19 - 8	26 - 0	26 - 0	26 - 0	24 - 6	26 - 0	26 - 0	26 - 0	26 - 0
SP01	6:12	2n	4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 8	5 - 11	5 - 6	5 - 0	7 - 9	6 - 10	6 - 4	5 - 9
SP01	6:12	2n	6	9 - 5	8 - 5	7 - 10	7 - 2	11 - 6	10 - 4	9 - 7	8 - 10	13 - 1	11 - 9	10 - 11	10 - 0
SP01	6:12	2n	8	13 - 0	11 - 8	10 - 10	9 - 11	15 - 7	14 - 1	13 - 2	12 - 2	17 - 8	15 - 11	14 - 10	13 - 9
SP01	6:12	2n	10	16 - 11	15 - 3	14 - 3	13 - 2	20 - 5	18 - 5	17 - 3	15 - 10	23 - 0	20 - 10	19 - 6	17 - 11
SP01	6:12	2n	12	21 - 1	18 - 11	17 - 8	16 - 3	25 - 0	22 - 8	21 - 4	19 - 8	26 - 0	25 - 5	23 - 11	22 - 2
SP01	6:12	2n	14	24 - 10	22 - 6	20 - 5	18 - 0	26 - 0	26 - 0	25 - 2	23 - 4	26 - 0	26 - 0	26 - 0	26 - 0
SP01	7:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	7:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	7:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	7:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 11	24 - 0	22 - 7	21 - 0
SP01	7:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 11	24 - 7	22 - 10	26 - 0	26 - 0	26 - 0	25 - 6
SP01	7:12	1	14	26 - 0	25 - 11	24 - 5	22 - 8	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 11	26 - 0
SP01	7:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	7:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	7:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	7:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	7:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
SP01	7:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE E-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-26

Sheet Number 26 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	8:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	8:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	8:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	8:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
SP01	8:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 0	24 - 7	22 - 10	26 - 0	26 - 0	26 - 0	25 - 6
SP01	8:12	1	14	26 - 11	25 - 11	24 - 5	22 - 8	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 11
SP01	8:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	8:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	8:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	8:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	8:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
SP01	8:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0
SP01	9:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	9:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	9:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	9:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
SP01	9:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 0	24 - 7	22 - 10	26 - 0	26 - 11	26 - 0	25 - 6
SP01	9:12	1	14	26 - 11	25 - 11	24 - 5	22 - 8	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0
SP01	9:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	9:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	9:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	9:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	9:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 11	25 - 4	23 - 4
SP01	9:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 11	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0
SP01	10:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	10:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	10:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	10:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 11	24 - 0	22 - 7	21 - 0
SP01	10:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 0	24 - 7	22 - 10	26 - 11	26 - 0	26 - 0	25 - 6
SP01	10:12	1	14	26 - 11	25 - 11	24 - 5	22 - 8	26 - 11	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0	26 - 0	26 - 0
SP01	10:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	10:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	10:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	10:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	10:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
SP01	10:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 11
SP01	11:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	11:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	11:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	11:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 0	24 - 0	22 - 7	21 - 0
SP01	11:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 11	26 - 0	24 - 7	22 - 10	26 - 0	26 - 0	26 - 11	25 - 6
SP01	11:12	1	14	26 - 0	25 - 11	24 - 5	22 - 8	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0
SP01	11:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	11:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	11:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	11:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	11:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 0	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
SP01	11:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 0	24 - 9	26 - 0	26 - 0	26 - 0	26 - 0
SP01	12:12	1	4	6 - 5	5 - 9	5 - 4	5 - 0	7 - 10	7 - 0	6 - 6	6 - 0	8 - 10	7 - 11	7 - 5	6 - 9
SP01	12:12	1	6	10 - 10	9 - 8	9 - 0	8 - 3	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP01	12:12	1	8	15 - 1	13 - 6	12 - 7	11 - 5	18 - 6	16 - 8	15 - 5	14 - 0	20 - 9	18 - 10	17 - 8	16 - 2
SP01	12:12	1	10	19 - 11	18 - 1	16 - 11	15 - 4	23 - 8	21 - 6	20 - 2	18 - 9	26 - 11	24 - 0	22 - 7	21 - 0
SP01	12:12	1	12	24 - 3	22 - 0	20 - 9	19 - 3	26 - 0	26 - 11	24 - 7	22 - 10	26 - 0	26 - 11	26 - 0	25 - 6
SP01	12:12	1	14	26 - 0	25 - 11	24 - 5	22 - 8	26 - 0	26 - 0	26 - 11	26 - 11	26 - 11	26 - 11	26 - 11	26 - 11
SP01	12:12	2n	4	5 - 10	5 - 3	4 - 10	4 - 6	7 - 1	6 - 4	5 - 11	5 - 6	8 - 1	7 - 3	6 - 9	6 - 2
SP01	12:12	2n	6	9 - 9	8 - 9	8 - 2	7 - 6	11 - 11	10 - 7	9 - 11	9 - 1	13 - 6	12 - 1	11 - 3	10 - 4
SP01	12:12	2n	8	13 - 5	12 - 0	11 - 2	10 - 3	16 - 3	14 - 6	13 - 7	12 - 6	18 - 5	16 - 6	15 - 5	14 - 2
SP01	12:12	2n	10	17 - 8	15 - 10	14 - 9	13 - 7	21 - 4	19 - 2	17 - 11	16 - 5	24 - 4	21 - 9	20 - 3	18 - 8
SP01	12:12	2n	12	22 - 0	19 - 8	18 - 5	16 - 11	26 - 11	24 - 0	22 - 4	20 - 6	26 - 0	26 - 0	25 - 4	23 - 4
SP01	12:12	2n	14	26 - 0	23 - 9	21 - 11	19 - 2	26 - 0	26 - 0	26 - 11	24 - 9	26 - 0	26 - 0	26 - 11	26 - 11

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE F-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-27

Sheet Number 27 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	3:12	1	4	5 - 9	5 - 1	4 - 9	4 - 5	6 - 11	6 - 3	5 - 10	5 - 4	7 - 11	7 - 1	6 - 7	6 - 1
SP02	3:12	1	6	9 - 8	8 - 7	8 - 0	7 - 4	12 - 3	10 - 8	9 - 10	9 - 0	14 - 3	12 - 6	11 - 6	10 - 4
SP02	3:12	1	8	14 - 2	12 - 5	11 - 4	10 - 3	17 - 9	15 - 8	14 - 5	13 - 0	19 - 11	18 - 1	16 - 10	15 - 3
SP02	3:12	1	10	19 - 2	17 - 4	15 - 11	14 - 5	22 - 9	20 - 8	19 - 5	18 - 0	25 - 7	23 - 2	21 - 9	20 - 2
SP02	3:12	1	12	23 - 5	21 - 2	19 - 11	18 - 5	26 - 0	25 - 3	23 - 9	22 - 0	26 - 0	26 - 11	26 - 0	24 - 8
SP02	3:12	1	14	26 - 0	24 - 10	22 - 7	20 - 1	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 11
SP02	3:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 8	6 - 0	5 - 4	5 - 0	4 - 7	6 - 11	6 - 2	5 - 8	5 - 3
SP02	3:12	2n	6	8 - 6	7 - 7	7 - 0	6 - 1	10 - 6	9 - 4	8 - 8	7 - 11	12 - 2	10 - 9	9 - 11	9 - 1
SP02	3:12	2n	8	12 - 1	10 - 8	9 - 10	8 - 7	14 - 10	13 - 2	12 - 3	11 - 2	16 - 11	15 - 1	14 - 0	12 - 10
SP02	3:12	2n	10	16 - 2	14 - 5	12 - 9	10 - 11	19 - 8	17 - 8	16 - 5	15 - 0	22 - 5	20 - 0	18 - 8	17 - 2
SP02	3:12	2n	12	20 - 3	17 - 9	15 - 10	13 - 8	24 - 10	22 - 1	20 - 7	18 - 10	26 - 0	25 - 4	23 - 6	21 - 6
SP02	3:12	2n	14	23 - 11	19 - 9	17 - 9	15 - 4	26 - 0	26 - 0	24 - 8	21 - 2	26 - 11	26 - 0	26 - 0	26 - 0
SP02	4:12	1	4	5 - 9	5 - 1	4 - 9	4 - 5	6 - 11	6 - 3	5 - 10	5 - 4	7 - 11	7 - 1	6 - 7	6 - 1
SP02	4:12	1	6	9 - 8	8 - 7	8 - 0	7 - 4	12 - 3	10 - 8	9 - 10	9 - 0	14 - 3	12 - 6	11 - 6	10 - 4
SP02	4:12	1	8	14 - 2	12 - 5	11 - 4	10 - 3	17 - 9	15 - 8	14 - 5	13 - 0	19 - 11	18 - 1	16 - 10	15 - 3
SP02	4:12	1	10	19 - 2	17 - 4	15 - 11	14 - 5	22 - 9	20 - 8	19 - 5	18 - 0	25 - 7	23 - 2	21 - 9	20 - 2
SP02	4:12	1	12	23 - 5	21 - 2	19 - 11	18 - 5	26 - 0	25 - 3	23 - 9	22 - 0	26 - 0	26 - 0	26 - 0	24 - 8
SP02	4:12	1	14	26 - 0	24 - 10	22 - 7	20 - 1	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 0	26 - 11	26 - 0
SP02	4:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 8	6 - 0	5 - 4	5 - 0	4 - 7	6 - 11	6 - 2	5 - 8	5 - 3
SP02	4:12	2n	6	8 - 6	7 - 7	7 - 0	6 - 1	10 - 6	9 - 4	8 - 8	7 - 11	12 - 2	10 - 9	9 - 11	9 - 1
SP02	4:12	2n	8	12 - 1	10 - 8	9 - 10	8 - 7	14 - 10	13 - 2	12 - 3	11 - 2	16 - 11	15 - 1	14 - 0	12 - 10
SP02	4:12	2n	10	16 - 2	14 - 5	12 - 9	10 - 11	19 - 8	17 - 8	16 - 5	15 - 0	22 - 5	20 - 0	18 - 8	17 - 2
SP02	4:12	2n	12	20 - 3	17 - 9	15 - 10	13 - 8	24 - 10	22 - 1	20 - 7	18 - 10	26 - 11	25 - 4	23 - 6	21 - 6
SP02	4:12	2n	14	23 - 11	19 - 9	17 - 9	15 - 4	26 - 0	26 - 0	24 - 8	21 - 2	26 - 0	26 - 11	26 - 0	26 - 11
SP02	5:12	1	4	6 - 0	5 - 4	5 - 0	4 - 7	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
SP02	5:12	1	6	9 - 11	8 - 11	8 - 4	7 - 8	11 - 11	10 - 9	10 - 1	9 - 3	13 - 5	12 - 2	11 - 4	10 - 6
SP02	5:12	1	8	13 - 4	12 - 1	11 - 3	10 - 5	15 - 11	14 - 5	13 - 6	12 - 6	17 - 11	16 - 3	15 - 3	14 - 1
SP02	5:12	1	10	17 - 3	15 - 7	14 - 7	13 - 1	20 - 6	18 - 7	17 - 6	16 - 2	23 - 1	20 - 11	19 - 7	18 - 2
SP02	5:12	1	12	21 - 1	19 - 1	17 - 6	15 - 7	25 - 1	22 - 9	21 - 5	19 - 10	26 - 0	25 - 6	24 - 0	22 - 3
SP02	5:12	1	14	24 - 7	21 - 2	19 - 2	17 - 1	26 - 11	26 - 0	25 - 1	22 - 4	26 - 0	26 - 0	26 - 0	26 - 0
SP02	5:12	2n	4	5 - 1	4 - 6	4 - 2	3 - 10	6 - 4	5 - 7	5 - 2	4 - 9	7 - 4	6 - 6	6 - 0	5 - 6
SP02	5:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	10 - 11	9 - 9	9 - 1	8 - 4	12 - 6	11 - 2	10 - 5	9 - 6
SP02	5:12	2n	8	12 - 5	11 - 1	10 - 4	9 - 3	14 - 10	13 - 5	12 - 7	11 - 6	16 - 10	15 - 2	14 - 2	13 - 1
SP02	5:12	2n	10	16 - 1	14 - 6	13 - 1	11 - 6	19 - 6	17 - 6	16 - 4	15 - 1	22 - 0	19 - 10	18 - 6	17 - 1
SP02	5:12	2n	12	20 - 0	17 - 7	15 - 10	13 - 11	23 - 11	21 - 8	20 - 4	18 - 8	26 - 0	24 - 3	22 - 10	21 - 3
SP02	5:12	2n	14	22 - 10	19 - 6	17 - 7	15 - 5	26 - 0	25 - 6	23 - 3	20 - 9	26 - 0	26 - 0	26 - 11	25 - 0
SP02	6:12	1	4	6 - 0	5 - 4	5 - 0	4 - 7	7 - 3	6 - 6	6 - 1	5 - 7	8 - 3	7 - 5	6 - 11	6 - 4
SP02	6:12	1	6	9 - 11	8 - 11	8 - 4	7 - 8	11 - 11	10 - 9	10 - 1	9 - 3	13 - 5	12 - 2	11 - 4	10 - 6
SP02	6:12	1	8	13 - 4	12 - 1	11 - 3	10 - 5	15 - 11	14 - 5	13 - 6	12 - 6	17 - 11	16 - 3	15 - 3	14 - 1
SP02	6:12	1	10	17 - 3	15 - 7	14 - 7	13 - 1	20 - 6	18 - 7	17 - 6	16 - 2	23 - 1	20 - 11	19 - 7	18 - 2
SP02	6:12	1	12	21 - 1	19 - 1	17 - 6	15 - 7	25 - 1	22 - 9	21 - 5	19 - 10	26 - 0	25 - 6	24 - 0	22 - 3
SP02	6:12	1	14	24 - 7	21 - 2	19 - 2	17 - 1	26 - 11	26 - 0	25 - 1	22 - 4	26 - 0	26 - 0	26 - 11	26 - 0
SP02	6:12	2n	4	5 - 1	4 - 6	4 - 2	3 - 10	6 - 4	5 - 7	5 - 2	4 - 9	7 - 4	6 - 6	6 - 0	5 - 6
SP02	6:12	2n	6	9 - 0	8 - 0	7 - 5	6 - 9	10 - 11	9 - 9	9 - 1	8 - 4	12 - 6	11 - 2	10 - 5	9 - 6
SP02	6:12	2n	8	12 - 5	11 - 1	10 - 4	9 - 3	14 - 10	13 - 5	12 - 7	11 - 6	16 - 10	15 - 2	14 - 2	13 - 1
SP02	6:12	2n	10	16 - 1	14 - 6	13 - 1	11 - 6	19 - 6	17 - 6	16 - 4	15 - 1	22 - 0	19 - 10	18 - 6	17 - 1
SP02	6:12	2n	12	20 - 0	17 - 7	15 - 10	13 - 11	23 - 11	21 - 8	20 - 4	18 - 8	26 - 11	24 - 3	22 - 10	21 - 3
SP02	6:12	2n	14	22 - 10	19 - 6	17 - 7	15 - 5	26 - 0	25 - 6	23 - 3	20 - 9	26 - 0	26 - 0	26 - 0	25 - 0
SP02	7:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	7:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	7:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	7:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	7:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 0	25 - 0	23 - 6	21 - 10	26 - 0	26 - 0	26 - 0	24 - 5
SP02	7:12	1	14	26 - 11	24 - 5	22 - 3	19 - 11	26 - 0	26 - 11	26 - 11	25 - 8	26 - 0	26 - 0	26 - 0	26 - 11
SP02	7:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	7:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	7:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	7:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	7:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 0	25 - 9	24 - 2	22 - 2
SP02	7:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 0	25 - 5	22 - 3	26 - 0	26 - 0	26 - 0	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE G-EXP. B, Kzt =1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-28

Sheet Number 28 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	8:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	8:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	8:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	8:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	8:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 11	25 - 0	23 - 6	21 - 10	26 - 0	26 - 0	26 - 0	24 - 5
SP02	8:12	1	14	26 - 0	24 - 5	22 - 3	19 - 11	26 - 0	26 - 0	26 - 0	25 - 8	26 - 0	26 - 0	26 - 0	26 - 0
SP02	8:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	8:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	8:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	8:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	8:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 11	25 - 9	24 - 2	22 - 2
SP02	8:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 0	25 - 5	22 - 3	26 - 0	26 - 0	26 - 0	26 - 0
SP02	9:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	9:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	9:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	9:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	9:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 11	25 - 0	23 - 6	21 - 10	26 - 11	26 - 0	26 - 11	24 - 5
SP02	9:12	1	14	26 - 11	24 - 5	22 - 3	19 - 11	26 - 11	26 - 0	26 - 0	25 - 8	26 - 0	26 - 11	26 - 0	26 - 0
SP02	9:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	9:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	9:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	9:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	9:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 0	25 - 9	24 - 2	22 - 2
SP02	9:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 0	25 - 5	22 - 3	26 - 0	26 - 0	26 - 0	26 - 0
SP02	10:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	10:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	10:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	10:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	10:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 11	25 - 0	23 - 6	21 - 10	26 - 0	26 - 0	26 - 0	24 - 5
SP02	10:12	1	14	26 - 0	24 - 5	22 - 3	19 - 11	26 - 0	26 - 0	26 - 0	25 - 8	26 - 0	26 - 0	26 - 0	26 - 11
SP02	10:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	10:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	10:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	10:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	10:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 0	25 - 9	24 - 2	22 - 2
SP02	10:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 0	25 - 5	22 - 3	26 - 0	26 - 0	26 - 11	26 - 0
SP02	11:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	11:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	11:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	11:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	11:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 0	25 - 0	23 - 6	21 - 10	26 - 0	26 - 0	26 - 11	24 - 5
SP02	11:12	1	14	26 - 0	24 - 5	22 - 3	19 - 11	26 - 0	26 - 0	26 - 0	25 - 8	26 - 0	26 - 0	26 - 0	26 - 11
SP02	11:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	11:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	11:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	11:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	11:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 0	25 - 9	24 - 2	22 - 2
SP02	11:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 11	25 - 5	22 - 3	26 - 0	26 - 0	26 - 0	26 - 0
SP02	12:12	1	4	6 - 1	5 - 5	5 - 2	4 - 9	7 - 5	6 - 7	6 - 2	5 - 8	8 - 5	7 - 7	7 - 0	6 - 5
SP02	12:12	1	6	10 - 3	9 - 2	8 - 6	7 - 10	12 - 8	11 - 3	10 - 5	9 - 6	14 - 5	12 - 11	12 - 0	10 - 11
SP02	12:12	1	8	14 - 4	12 - 9	11 - 11	10 - 10	17 - 8	15 - 8	14 - 7	13 - 4	19 - 10	18 - 0	16 - 10	15 - 3
SP02	12:12	1	10	19 - 1	17 - 4	16 - 0	14 - 6	22 - 7	20 - 6	19 - 4	17 - 11	25 - 3	23 - 0	21 - 7	20 - 1
SP02	12:12	1	12	23 - 2	21 - 1	19 - 10	18 - 3	26 - 0	25 - 0	23 - 6	21 - 10	26 - 0	26 - 11	26 - 0	24 - 5
SP02	12:12	1	14	26 - 0	24 - 5	22 - 3	19 - 11	26 - 0	26 - 0	26 - 11	25 - 8	26 - 0	26 - 0	26 - 0	26 - 11
SP02	12:12	2n	4	5 - 7	4 - 11	4 - 7	4 - 4	6 - 9	6 - 0	5 - 8	5 - 2	7 - 8	6 - 10	6 - 5	5 - 11
SP02	12:12	2n	6	9 - 3	8 - 4	7 - 10	7 - 2	11 - 3	10 - 1	9 - 5	8 - 8	12 - 10	11 - 6	10 - 8	9 - 10
SP02	12:12	2n	8	12 - 9	11 - 5	10 - 8	9 - 9	15 - 5	13 - 10	12 - 11	11 - 11	17 - 6	15 - 8	14 - 8	13 - 6
SP02	12:12	2n	10	16 - 9	15 - 0	13 - 10	12 - 1	20 - 3	18 - 3	17 - 0	15 - 8	23 - 1	20 - 8	19 - 3	17 - 9
SP02	12:12	2n	12	20 - 10	18 - 9	16 - 10	14 - 8	25 - 4	22 - 9	21 - 2	19 - 6	26 - 0	25 - 9	24 - 2	22 - 2
SP02	12:12	2n	14	24 - 11	20 - 10	18 - 8	16 - 4	26 - 0	26 - 0	25 - 5	22 - 3	26 - 0	26 - 0	26 - 11	26 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE H-EXP. B, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-29

Sheet Number 29 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	3:12	1	4	4 - 8	4 - 2	3 - 11	3 - 8	5 - 9	5 - 2	4 - 9	4 - 5	6 - 6	5 - 10	5 - 5	5 - 0
DFL1	3:12	1	6	7 - 11	7 - 1	6 - 7	5 - 11	9 - 9	8 - 8	8 - 0	7 - 5	11 - 4	9 - 11	9 - 2	8 - 5
DFL1	3:12	1	8	11 - 3	9 - 10	9 - 2	7 - 11	14 - 3	12 - 6	11 - 5	10 - 4	16 - 7	14 - 7	13 - 4	12 - 1
DFL1	3:12	1	10	15 - 9	13 - 9	12 - 8	10 - 5	19 - 3	17 - 5	16 - 0	14 - 6	21 - 7	19 - 6	18 - 4	16 - 11
DFL1	3:12	1	12	19 - 9	17 - 11	16 - 4	13 - 6	23 - 6	21 - 3	20 - 0	18 - 6	26 - 11	23 - 10	22 - 5	20 - 9
DFL1	3:12	1	14	23 - 4	20 - 7	18 - 8	16 - 1	26 - 0	25 - 2	23 - 8	21 - 9	26 - 0	26 - 0	26 - 11	24 - 7
DFL1	3:12	2n	4	4 - 0	3 - 7	3 - 4	2 - 11	4 - 11	4 - 5	4 - 1	3 - 9	5 - 7	5 - 0	4 - 8	4 - 4
DFL1	3:12	2n	6	6 - 11	6 - 0	5 - 3	4 - 7	8 - 7	7 - 7	7 - 1	6 - 5	9 - 10	8 - 9	8 - 1	7 - 5
DFL1	3:12	2n	8	9 - 9	8 - 5	7 - 5	6 - 4	12 - 1	10 - 8	9 - 11	9 - 0	13 - 10	12 - 4	11 - 5	10 - 5
DFL1	3:12	2n	10	13 - 3	11 - 1	9 - 9	8 - 4	16 - 2	14 - 6	13 - 5	12 - 0	18 - 6	16 - 6	15 - 5	14 - 1
DFL1	3:12	2n	12	16 - 6	13 - 8	12 - 1	10 - 3	20 - 4	18 - 2	16 - 11	14 - 8	23 - 3	20 - 8	19 - 4	17 - 9
DFL1	3:12	2n	14	18 - 11	15 - 9	14 - 0	12 - 1	24 - 9	21 - 9	19 - 5	16 - 11	26 - 0	25 - 3	23 - 5	21 - 5
DFL1	4:12	1	4	4 - 8	4 - 2	3 - 11	3 - 8	5 - 9	5 - 2	4 - 9	4 - 5	6 - 6	5 - 10	5 - 5	5 - 0
DFL1	4:12	1	6	7 - 11	7 - 1	6 - 7	5 - 11	9 - 9	8 - 8	8 - 0	7 - 5	11 - 4	9 - 11	9 - 2	8 - 5
DFL1	4:12	1	8	11 - 3	9 - 10	9 - 2	7 - 11	14 - 3	12 - 6	11 - 5	10 - 4	16 - 7	14 - 7	13 - 4	12 - 1
DFL1	4:12	1	10	15 - 9	13 - 9	12 - 8	10 - 5	19 - 3	17 - 5	16 - 0	14 - 6	21 - 7	19 - 6	18 - 4	16 - 11
DFL1	4:12	1	12	19 - 9	17 - 11	16 - 4	13 - 6	23 - 6	21 - 3	20 - 0	18 - 6	26 - 11	23 - 10	22 - 5	20 - 9
DFL1	4:12	1	14	23 - 4	20 - 7	18 - 8	16 - 1	26 - 0	25 - 2	23 - 8	21 - 9	26 - 0	26 - 0	26 - 11	24 - 7
DFL1	4:12	2n	4	4 - 0	3 - 7	3 - 4	2 - 11	4 - 11	4 - 5	4 - 1	3 - 9	5 - 7	5 - 0	4 - 8	4 - 4
DFL1	4:12	2n	6	6 - 11	6 - 0	5 - 3	4 - 7	8 - 7	7 - 7	7 - 1	6 - 5	9 - 10	8 - 9	8 - 1	7 - 5
DFL1	4:12	2n	8	9 - 9	8 - 5	7 - 5	6 - 4	12 - 1	10 - 8	9 - 11	9 - 0	13 - 10	12 - 4	11 - 5	10 - 5
DFL1	4:12	2n	10	13 - 3	11 - 1	9 - 9	8 - 4	16 - 2	14 - 6	13 - 5	12 - 0	18 - 6	16 - 6	15 - 5	14 - 1
DFL1	4:12	2n	12	16 - 6	13 - 8	12 - 1	10 - 3	20 - 4	18 - 2	16 - 11	14 - 8	23 - 3	20 - 8	19 - 4	17 - 9
DFL1	4:12	2n	14	18 - 11	15 - 9	14 - 0	12 - 1	24 - 9	21 - 9	19 - 5	16 - 11	26 - 0	25 - 3	23 - 5	21 - 5
DFL1	5:12	1	4	4 - 11	4 - 5	4 - 1	3 - 9	6 - 0	5 - 4	5 - 0	4 - 7	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	5:12	1	6	8 - 3	7 - 5	6 - 11	6 - 4	9 - 11	8 - 11	8 - 4	7 - 8	11 - 3	10 - 1	9 - 6	8 - 9
DFL1	5:12	1	8	11 - 2	10 - 1	9 - 5	8 - 5	13 - 5	12 - 1	11 - 4	10 - 5	15 - 1	13 - 7	12 - 9	11 - 10
DFL1	5:12	1	10	14 - 6	13 - 1	12 - 0	10 - 7	17 - 3	15 - 8	14 - 8	13 - 7	19 - 5	17 - 7	16 - 6	15 - 3
DFL1	5:12	1	12	17 - 9	15 - 7	14 - 1	12 - 6	21 - 2	19 - 2	18 - 0	16 - 5	23 - 9	21 - 6	20 - 2	18 - 8
DFL1	5:12	1	14	20 - 4	17 - 6	15 - 10	14 - 1	25 - 0	22 - 8	20 - 10	18 - 6	26 - 0	25 - 5	23 - 11	22 - 2
DFL1	5:12	2n	4	4 - 1	3 - 8	3 - 5	3 - 0	5 - 1	4 - 6	4 - 2	3 - 11	5 - 11	5 - 2	4 - 10	4 - 5
DFL1	5:12	2n	6	7 - 4	6 - 6	5 - 8	4 - 11	9 - 0	8 - 1	7 - 6	6 - 9	10 - 3	9 - 2	8 - 7	7 - 10
DFL1	5:12	2n	8	10 - 2	9 - 1	8 - 1	6 - 11	12 - 5	11 - 1	10 - 4	9 - 6	14 - 0	12 - 8	11 - 10	10 - 10
DFL1	5:12	2n	10	13 - 5	11 - 9	10 - 5	9 - 1	16 - 2	14 - 7	13 - 8	12 - 6	18 - 4	16 - 6	15 - 5	14 - 2
DFL1	5:12	2n	12	16 - 5	13 - 11	12 - 7	10 - 11	20 - 1	18 - 1	16 - 10	14 - 9	22 - 7	20 - 6	19 - 2	17 - 8
DFL1	5:12	2n	14	18 - 8	15 - 9	14 - 3	12 - 7	23 - 10	21 - 3	19 - 1	16 - 10	26 - 11	24 - 2	22 - 9	21 - 2
DFL1	6:12	1	4	4 - 11	4 - 5	4 - 1	3 - 9	6 - 0	5 - 4	5 - 0	4 - 7	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	6:12	1	6	8 - 3	7 - 5	6 - 11	6 - 4	9 - 11	8 - 11	8 - 4	7 - 8	11 - 3	10 - 1	9 - 6	8 - 9
DFL1	6:12	1	8	11 - 2	10 - 1	9 - 5	8 - 5	13 - 5	12 - 1	11 - 4	10 - 5	15 - 1	13 - 7	12 - 9	11 - 10
DFL1	6:12	1	10	14 - 6	13 - 1	12 - 0	10 - 7	17 - 3	15 - 8	14 - 8	13 - 7	19 - 5	17 - 7	16 - 6	15 - 3
DFL1	6:12	1	12	17 - 9	15 - 7	14 - 1	12 - 6	21 - 2	19 - 2	18 - 0	16 - 5	23 - 9	21 - 6	20 - 2	18 - 8
DFL1	6:12	1	14	20 - 4	17 - 6	15 - 10	14 - 1	25 - 0	22 - 8	20 - 10	18 - 6	26 - 0	25 - 5	23 - 11	22 - 2
DFL1	6:12	2n	4	4 - 1	3 - 8	3 - 5	3 - 0	5 - 1	4 - 6	4 - 2	3 - 11	5 - 11	5 - 2	4 - 10	4 - 5
DFL1	6:12	2n	6	7 - 4	6 - 6	5 - 8	4 - 11	9 - 0	8 - 1	7 - 6	6 - 9	10 - 3	9 - 2	8 - 7	7 - 10
DFL1	6:12	2n	8	10 - 2	9 - 1	8 - 1	6 - 11	12 - 5	11 - 1	10 - 4	9 - 6	14 - 0	12 - 8	11 - 10	10 - 10
DFL1	6:12	2n	10	13 - 5	11 - 9	10 - 5	9 - 1	16 - 2	14 - 7	13 - 8	12 - 6	18 - 4	16 - 6	15 - 5	14 - 2
DFL1	6:12	2n	12	16 - 5	13 - 11	12 - 7	10 - 11	20 - 1	18 - 1	16 - 10	14 - 9	22 - 7	20 - 6	19 - 2	17 - 8
DFL1	6:12	2n	14	18 - 8	15 - 9	14 - 3	12 - 7	23 - 10	21 - 3	19 - 1	16 - 10	26 - 0	24 - 2	22 - 9	21 - 2
DFL1	7:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	7:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	7:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	7:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	7:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 0	23 - 8	22 - 3	20 - 8
DFL1	7:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 0	26 - 11	24 - 4
DFL1	7:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	7:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	7:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	7:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	7:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	7:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 0	25 - 8	24 - 1	22 - 1

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE A-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-30

Sheet Number 30 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	8:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	8:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	8:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	8:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	8:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 11	23 - 8	22 - 3	20 - 8
DFL1	8:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 0	26 - 0	24 - 4
DFL1	8:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	8:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	8:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	8:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	8:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	8:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 0	25 - 8	24 - 1	22 - 1
DFL1	9:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	9:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	9:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	9:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	9:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 11	23 - 8	22 - 3	20 - 8
DFL1	9:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 0	26 - 11	24 - 4
DFL1	9:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	9:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	9:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	9:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	9:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	9:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 0	25 - 8	24 - 1	22 - 1
DFL1	10:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	10:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	10:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	10:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	10:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 0	23 - 8	22 - 3	20 - 8
DFL1	10:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 0	26 - 11	24 - 4
DFL1	10:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	10:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	10:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	10:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	10:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	10:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 11	25 - 8	24 - 1	22 - 1
DFL1	11:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	11:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	11:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	11:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	11:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 11	23 - 8	22 - 3	20 - 8
DFL1	11:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 11	26 - 0	24 - 4
DFL1	11:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	11:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	11:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	11:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	11:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	11:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 0	25 - 8	24 - 1	22 - 1
DFL1	12:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 10	5 - 4
DFL1	12:12	1	6	8 - 5	7 - 7	7 - 0	6 - 5	10 - 3	9 - 2	8 - 7	7 - 11	11 - 10	10 - 6	9 - 9	8 - 11
DFL1	12:12	1	8	11 - 9	10 - 5	9 - 8	8 - 9	14 - 5	12 - 10	11 - 11	10 - 10	16 - 7	14 - 8	13 - 8	12 - 6
DFL1	12:12	1	10	15 - 9	14 - 0	13 - 0	11 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 5	19 - 5	18 - 3	16 - 10
DFL1	12:12	1	12	19 - 7	17 - 10	16 - 2	13 - 10	23 - 3	21 - 2	19 - 11	18 - 5	26 - 11	23 - 8	22 - 3	20 - 8
DFL1	12:12	1	14	23 - 1	20 - 4	18 - 7	16 - 2	26 - 0	24 - 11	23 - 5	21 - 5	26 - 0	26 - 0	26 - 0	24 - 4
DFL1	12:12	2n	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
DFL1	12:12	2n	6	7 - 9	6 - 11	6 - 5	5 - 8	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
DFL1	12:12	2n	8	10 - 6	9 - 5	8 - 7	7 - 7	12 - 9	11 - 5	10 - 8	9 - 10	14 - 6	13 - 0	12 - 2	11 - 2
DFL1	12:12	2n	10	13 - 10	12 - 4	11 - 0	9 - 7	16 - 10	15 - 1	14 - 1	13 - 0	19 - 1	17 - 2	16 - 0	14 - 8
DFL1	12:12	2n	12	17 - 4	14 - 8	13 - 2	11 - 6	20 - 11	18 - 10	17 - 7	15 - 7	23 - 10	21 - 4	19 - 11	18 - 4
DFL1	12:12	2n	14	19 - 11	16 - 9	15 - 0	13 - 2	25 - 3	22 - 8	20 - 5	17 - 11	26 - 0	25 - 8	24 - 1	22 - 1

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE B-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-31

Sheet Number 31 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	3:12	1	4	4 - 7	4 - 1	3 - 10	3 - 6	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 4	4 - 11
DFL2	3:12	1	6	7 - 9	6 - 11	6 - 4	5 - 6	9 - 6	8 - 5	7 - 10	7 - 3	11 - 0	9 - 8	9 - 0	8 - 2
DFL2	3:12	1	8	10 - 11	9 - 7	8 - 6	7 - 5	13 - 10	12 - 2	11 - 1	10 - 1	16 - 2	14 - 2	13 - 0	11 - 9
DFL2	3:12	1	10	15 - 4	13 - 5	11 - 7	9 - 8	18 - 10	17 - 0	15 - 7	14 - 1	21 - 1	19 - 2	18 - 0	16 - 5
DFL2	3:12	1	12	19 - 4	17 - 5	14 - 11	12 - 5	23 - 0	20 - 10	19 - 7	18 - 2	25 - 10	23 - 5	22 - 0	20 - 4
DFL2	3:12	1	14	22 - 8	19 - 5	17 - 8	14 - 8	26 - 0	24 - 8	23 - 1	20 - 7	26 - 0	26 - 0	26 - 0	24 - 1
DFL2	3:12	2n	4	3 - 11	3 - 5	3 - 1	2 - 9	4 - 9	4 - 3	4 - 0	3 - 8	5 - 6	4 - 11	4 - 7	4 - 2
DFL2	3:12	2n	6	6 - 9	5 - 7	4 - 11	4 - 3	8 - 4	7 - 5	6 - 10	6 - 0	9 - 7	8 - 6	7 - 11	7 - 2
DFL2	3:12	2n	8	9 - 6	7 - 10	6 - 10	5 - 10	11 - 9	10 - 5	9 - 8	8 - 5	13 - 6	12 - 1	11 - 2	10 - 2
DFL2	3:12	2n	10	12 - 8	10 - 4	9 - 1	7 - 10	15 - 10	14 - 1	13 - 0	11 - 1	18 - 1	16 - 2	15 - 0	13 - 9
DFL2	3:12	2n	12	15 - 5	12 - 9	11 - 2	9 - 6	19 - 10	17 - 9	15 - 10	13 - 8	22 - 8	20 - 3	18 - 10	17 - 4
DFL2	3:12	2n	14	17 - 9	14 - 8	13 - 0	11 - 2	24 - 2	20 - 4	18 - 2	15 - 9	26 - 0	24 - 8	22 - 10	20 - 10
DFL2	4:12	1	4	4 - 7	4 - 1	3 - 10	3 - 6	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 4	4 - 11
DFL2	4:12	1	6	7 - 9	6 - 11	6 - 4	5 - 6	9 - 6	8 - 5	7 - 10	7 - 3	11 - 0	9 - 8	9 - 0	8 - 2
DFL2	4:12	1	8	10 - 11	9 - 7	8 - 6	7 - 5	13 - 10	12 - 2	11 - 1	10 - 1	16 - 2	14 - 2	13 - 0	11 - 9
DFL2	4:12	1	10	15 - 4	13 - 5	11 - 7	9 - 8	18 - 10	17 - 0	15 - 7	14 - 1	21 - 1	19 - 2	18 - 0	16 - 5
DFL2	4:12	1	12	19 - 4	17 - 5	14 - 11	12 - 5	23 - 0	20 - 10	19 - 7	18 - 2	25 - 10	23 - 5	22 - 0	20 - 4
DFL2	4:12	1	14	22 - 8	19 - 5	17 - 8	14 - 8	26 - 0	24 - 8	23 - 1	20 - 7	26 - 0	26 - 11	26 - 0	24 - 1
DFL2	4:12	2n	4	3 - 11	3 - 5	3 - 1	2 - 9	4 - 9	4 - 3	4 - 0	3 - 8	5 - 6	4 - 11	4 - 7	4 - 2
DFL2	4:12	2n	6	6 - 9	5 - 7	4 - 11	4 - 3	8 - 4	7 - 5	6 - 10	6 - 0	9 - 7	8 - 6	7 - 11	7 - 2
DFL2	4:12	2n	8	9 - 6	7 - 10	6 - 10	5 - 10	11 - 9	10 - 5	9 - 8	8 - 5	13 - 6	12 - 1	11 - 2	10 - 2
DFL2	4:12	2n	10	12 - 8	10 - 4	9 - 1	7 - 10	15 - 10	14 - 1	13 - 0	11 - 1	18 - 1	16 - 2	15 - 0	13 - 9
DFL2	4:12	2n	12	15 - 5	12 - 9	11 - 2	9 - 6	19 - 10	17 - 9	15 - 10	13 - 8	22 - 8	20 - 3	18 - 10	17 - 4
DFL2	4:12	2n	14	17 - 9	14 - 8	13 - 0	11 - 2	24 - 2	20 - 4	18 - 2	15 - 9	26 - 0	24 - 8	22 - 10	20 - 10
DFL2	5:12	1	4	4 - 10	4 - 4	4 - 0	3 - 8	5 - 10	5 - 3	4 - 11	4 - 6	6 - 8	5 - 11	5 - 7	5 - 1
DFL2	5:12	1	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 6	11 - 0	9 - 11	9 - 3	8 - 6
DFL2	5:12	1	8	10 - 11	9 - 10	9 - 0	7 - 11	13 - 1	11 - 10	11 - 1	10 - 3	14 - 9	13 - 4	12 - 6	11 - 6
DFL2	5:12	1	10	14 - 2	12 - 7	11 - 4	10 - 0	16 - 11	15 - 4	14 - 4	13 - 3	19 - 0	17 - 3	16 - 2	14 - 11
DFL2	5:12	1	12	17 - 2	14 - 8	13 - 4	11 - 10	20 - 9	18 - 9	17 - 6	15 - 7	23 - 3	21 - 1	19 - 9	18 - 4
DFL2	5:12	1	14	19 - 3	16 - 6	15 - 0	13 - 4	24 - 6	21 - 8	19 - 8	17 - 6	26 - 0	24 - 11	23 - 5	21 - 8
DFL2	5:12	2n	4	4 - 0	3 - 6	3 - 2	2 - 10	5 - 0	4 - 5	4 - 1	3 - 10	5 - 9	5 - 1	4 - 8	4 - 4
DFL2	5:12	2n	6	7 - 2	6 - 1	5 - 3	4 - 7	8 - 9	7 - 10	7 - 3	6 - 7	10 - 0	8 - 11	8 - 4	7 - 8
DFL2	5:12	2n	8	9 - 11	8 - 6	7 - 7	6 - 5	12 - 2	10 - 10	10 - 1	9 - 1	13 - 8	12 - 5	11 - 6	10 - 7
DFL2	5:12	2n	10	13 - 0	10 - 11	9 - 9	8 - 6	15 - 10	14 - 3	13 - 4	11 - 9	17 - 11	16 - 1	15 - 1	13 - 11
DFL2	5:12	2n	12	15 - 5	13 - 1	11 - 9	10 - 3	19 - 8	17 - 7	15 - 9	13 - 11	22 - 2	20 - 0	18 - 9	17 - 3
DFL2	5:12	2n	14	17 - 7	14 - 10	13 - 5	11 - 9	23 - 3	20 - 0	18 - 0	15 - 10	26 - 0	23 - 9	22 - 4	20 - 5
DFL2	6:12	1	4	4 - 10	4 - 4	4 - 0	3 - 8	5 - 10	5 - 3	4 - 11	4 - 6	6 - 8	5 - 11	5 - 7	5 - 1
DFL2	6:12	1	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 6	11 - 0	9 - 11	9 - 3	8 - 6
DFL2	6:12	1	8	10 - 11	9 - 10	9 - 0	7 - 11	13 - 1	11 - 10	11 - 1	10 - 3	14 - 9	13 - 4	12 - 6	11 - 6
DFL2	6:12	1	10	14 - 2	12 - 7	11 - 4	10 - 0	16 - 11	15 - 4	14 - 4	13 - 3	19 - 0	17 - 3	16 - 2	14 - 11
DFL2	6:12	1	12	17 - 2	14 - 8	13 - 4	11 - 10	20 - 9	18 - 9	17 - 6	15 - 7	23 - 3	21 - 1	19 - 9	18 - 4
DFL2	6:12	1	14	19 - 3	16 - 6	15 - 0	13 - 4	24 - 6	21 - 8	19 - 8	17 - 6	26 - 0	24 - 11	23 - 5	21 - 8
DFL2	6:12	2n	4	4 - 0	3 - 6	3 - 2	2 - 10	5 - 0	4 - 5	4 - 1	3 - 10	5 - 9	5 - 1	4 - 8	4 - 4
DFL2	6:12	2n	6	7 - 2	6 - 1	5 - 3	4 - 7	8 - 9	7 - 10	7 - 3	6 - 7	10 - 0	8 - 11	8 - 4	7 - 8
DFL2	6:12	2n	8	9 - 11	8 - 6	7 - 7	6 - 5	12 - 2	10 - 10	10 - 1	9 - 1	13 - 8	12 - 5	11 - 6	10 - 7
DFL2	6:12	2n	10	13 - 0	10 - 11	9 - 9	8 - 6	15 - 10	14 - 3	13 - 4	11 - 9	17 - 11	16 - 1	15 - 1	13 - 11
DFL2	6:12	2n	12	15 - 5	13 - 1	11 - 9	10 - 3	19 - 8	17 - 7	15 - 9	13 - 11	22 - 2	20 - 0	18 - 9	17 - 3
DFL2	6:12	2n	14	17 - 7	14 - 10	13 - 5	11 - 9	23 - 3	20 - 0	18 - 0	15 - 10	26 - 0	23 - 9	22 - 4	20 - 5
DFL2	7:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	7:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	7:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	7:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	7:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	7:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 0	26 - 0	25 - 8	23 - 10
DFL2	7:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	7:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	7:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	7:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	7:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	7:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 0	25 - 2	23 - 6	21 - 7

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE C-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-32

Sheet Number 32 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	8:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	8:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	8:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	8:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	8:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	8:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 11	26 - 0	25 - 8	23 - 10
DFL2	8:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	8:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	8:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	8:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	8:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	8:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 11	25 - 2	23 - 6	21 - 7
DFL2	9:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	9:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	9:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	9:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	9:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	9:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 0	26 - 0	25 - 8	23 - 10
DFL2	9:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	9:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	9:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	9:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	9:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	9:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 0	25 - 2	23 - 6	21 - 7
DFL2	10:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	10:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	10:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	10:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	10:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	10:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 0	26 - 0	25 - 8	23 - 10
DFL2	10:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	10:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	10:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	10:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	10:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	10:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 0	25 - 2	23 - 6	21 - 7
DFL2	11:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	11:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	11:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	11:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	11:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	11:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 0	26 - 0	25 - 8	23 - 10
DFL2	11:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	11:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	11:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	11:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	11:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	11:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 0	25 - 2	23 - 6	21 - 7
DFL2	12:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
DFL2	12:12	1	6	8 - 3	7 - 5	6 - 10	6 - 1	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
DFL2	12:12	1	8	11 - 5	10 - 2	9 - 4	8 - 2	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
DFL2	12:12	1	10	15 - 4	13 - 8	12 - 4	10 - 6	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
DFL2	12:12	1	12	19 - 3	17 - 3	15 - 0	12 - 11	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
DFL2	12:12	1	14	22 - 3	19 - 3	17 - 7	15 - 0	26 - 0	24 - 5	22 - 9	20 - 4	26 - 0	26 - 0	25 - 8	23 - 10
DFL2	12:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 4	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
DFL2	12:12	2n	6	7 - 6	6 - 9	6 - 0	5 - 4	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
DFL2	12:12	2n	8	10 - 3	9 - 0	8 - 1	7 - 1	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
DFL2	12:12	2n	10	13 - 7	11 - 6	10 - 3	9 - 0	16 - 5	14 - 9	13 - 9	12 - 4	18 - 8	16 - 9	15 - 7	14 - 4
DFL2	12:12	2n	12	16 - 5	13 - 9	12 - 5	10 - 9	20 - 6	18 - 5	16 - 10	14 - 8	23 - 4	20 - 10	19 - 6	17 - 11
DFL2	12:12	2n	14	18 - 8	15 - 8	14 - 1	12 - 4	24 - 9	21 - 5	19 - 2	16 - 9	26 - 0	25 - 2	23 - 6	21 - 7

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE D-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-33

Sheet Number 33 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	3:12	1	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 4	4 - 11
SP01	3:12	1	6	7 - 9	6 - 11	6 - 6	5 - 11	9 - 6	8 - 5	7 - 10	7 - 3	11 - 0	9 - 8	9 - 0	8 - 2
SP01	3:12	1	8	10 - 11	9 - 7	8 - 11	8 - 1	13 - 10	12 - 2	11 - 1	10 - 1	16 - 2	14 - 2	13 - 0	11 - 9
SP01	3:12	1	10	15 - 4	13 - 5	12 - 3	10 - 1	18 - 10	17 - 0	15 - 7	14 - 1	21 - 1	19 - 2	18 - 0	16 - 5
SP01	3:12	1	12	19 - 4	17 - 6	16 - 2	13 - 6	23 - 0	20 - 10	19 - 7	18 - 2	25 - 10	23 - 5	22 - 0	20 - 4
SP01	3:12	1	14	22 - 10	19 - 10	18 - 0	15 - 2	26 - 0	24 - 8	23 - 2	21 - 0	26 - 0	26 - 0	26 - 0	24 - 1
SP01	3:12	2n	4	3 - 11	3 - 6	3 - 4	2 - 11	4 - 9	4 - 3	4 - 0	3 - 8	5 - 6	4 - 11	4 - 7	4 - 2
SP01	3:12	2n	6	6 - 9	6 - 0	5 - 5	4 - 8	8 - 4	7 - 5	6 - 10	6 - 3	9 - 7	8 - 6	7 - 11	7 - 2
SP01	3:12	2n	8	9 - 6	8 - 5	7 - 7	6 - 6	11 - 9	10 - 5	9 - 8	8 - 10	13 - 6	12 - 1	11 - 2	10 - 2
SP01	3:12	2n	10	12 - 11	10 - 9	9 - 5	8 - 1	15 - 10	14 - 1	13 - 1	11 - 7	18 - 1	16 - 2	15 - 0	13 - 9
SP01	3:12	2n	12	16 - 4	13 - 8	12 - 1	10 - 3	19 - 10	17 - 10	16 - 7	14 - 8	22 - 8	20 - 3	18 - 10	17 - 4
SP01	3:12	2n	14	18 - 2	15 - 1	13 - 4	11 - 6	24 - 2	20 - 10	18 - 7	16 - 2	26 - 0	24 - 8	22 - 10	20 - 11
SP01	4:12	1	4	4 - 7	4 - 1	3 - 10	3 - 7	5 - 7	5 - 0	4 - 8	4 - 4	6 - 4	5 - 8	5 - 4	4 - 11
SP01	4:12	1	6	7 - 9	6 - 11	6 - 6	5 - 11	9 - 6	8 - 5	7 - 10	7 - 3	11 - 0	9 - 8	9 - 0	8 - 2
SP01	4:12	1	8	10 - 11	9 - 7	8 - 11	8 - 1	13 - 10	12 - 2	11 - 1	10 - 1	16 - 2	14 - 2	13 - 0	11 - 9
SP01	4:12	1	10	15 - 4	13 - 5	12 - 3	10 - 1	18 - 10	17 - 0	15 - 7	14 - 1	21 - 1	19 - 2	18 - 0	16 - 5
SP01	4:12	1	12	19 - 4	17 - 6	16 - 2	13 - 6	23 - 0	20 - 10	19 - 7	18 - 2	25 - 10	23 - 5	22 - 0	20 - 4
SP01	4:12	1	14	22 - 10	19 - 10	18 - 0	15 - 2	26 - 0	24 - 8	23 - 2	21 - 0	26 - 11	26 - 0	26 - 0	24 - 1
SP01	4:12	2n	4	3 - 11	3 - 6	3 - 4	2 - 11	4 - 9	4 - 3	4 - 0	3 - 8	5 - 6	4 - 11	4 - 7	4 - 2
SP01	4:12	2n	6	6 - 9	6 - 0	5 - 5	4 - 8	8 - 4	7 - 5	6 - 10	6 - 3	9 - 7	8 - 6	7 - 11	7 - 2
SP01	4:12	2n	8	9 - 6	8 - 5	7 - 7	6 - 6	11 - 9	10 - 5	9 - 8	8 - 10	13 - 6	12 - 1	11 - 2	10 - 2
SP01	4:12	2n	10	12 - 11	10 - 9	9 - 5	8 - 1	15 - 10	14 - 1	13 - 1	11 - 7	18 - 1	16 - 2	15 - 0	13 - 9
SP01	4:12	2n	12	16 - 4	13 - 8	12 - 1	10 - 3	19 - 10	17 - 10	16 - 7	14 - 8	22 - 8	20 - 3	18 - 10	17 - 4
SP01	4:12	2n	14	18 - 2	15 - 1	13 - 4	11 - 6	24 - 2	20 - 10	18 - 7	16 - 2	26 - 0	24 - 8	22 - 10	20 - 11
SP01	5:12	1	4	4 - 10	4 - 4	4 - 0	3 - 8	5 - 10	5 - 3	4 - 11	4 - 6	6 - 8	5 - 11	5 - 7	5 - 1
SP01	5:12	1	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 6	11 - 0	9 - 11	9 - 3	8 - 6
SP01	5:12	1	8	10 - 11	9 - 10	9 - 2	8 - 6	13 - 1	11 - 10	11 - 1	10 - 3	14 - 9	13 - 4	12 - 6	11 - 6
SP01	5:12	1	10	14 - 2	12 - 10	11 - 9	10 - 4	16 - 11	15 - 4	14 - 4	13 - 3	19 - 0	17 - 3	16 - 2	14 - 11
SP01	5:12	1	12	17 - 4	15 - 7	14 - 1	12 - 6	20 - 9	18 - 9	17 - 7	16 - 4	23 - 3	21 - 1	19 - 9	18 - 4
SP01	5:12	1	14	19 - 7	16 - 10	15 - 3	13 - 7	24 - 6	22 - 1	20 - 1	17 - 10	26 - 0	24 - 11	23 - 5	21 - 8
SP01	5:12	2n	4	4 - 0	3 - 7	3 - 4	3 - 0	5 - 0	4 - 5	4 - 1	3 - 10	5 - 9	5 - 1	4 - 8	4 - 4
SP01	5:12	2n	6	7 - 2	6 - 4	5 - 10	5 - 0	8 - 9	7 - 10	7 - 3	6 - 7	10 - 0	8 - 11	8 - 4	7 - 8
SP01	5:12	2n	8	9 - 11	8 - 11	8 - 3	7 - 2	12 - 2	10 - 10	10 - 1	9 - 3	13 - 8	12 - 5	11 - 6	10 - 7
SP01	5:12	2n	10	13 - 2	11 - 4	10 - 1	8 - 10	15 - 10	14 - 3	13 - 4	12 - 2	17 - 11	16 - 1	15 - 1	13 - 11
SP01	5:12	2n	12	16 - 3	13 - 11	12 - 7	10 - 11	19 - 8	17 - 8	16 - 6	14 - 9	22 - 2	20 - 0	18 - 9	17 - 3
SP01	5:12	2n	14	17 - 11	15 - 2	13 - 8	12 - 1	23 - 4	20 - 5	18 - 4	16 - 2	26 - 0	23 - 9	22 - 4	20 - 8
SP01	6:12	1	4	4 - 10	4 - 4	4 - 0	3 - 8	5 - 10	5 - 3	4 - 11	4 - 6	6 - 8	5 - 11	5 - 7	5 - 1
SP01	6:12	1	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 6	11 - 0	9 - 11	9 - 3	8 - 6
SP01	6:12	1	8	10 - 11	9 - 10	9 - 2	8 - 6	13 - 1	11 - 10	11 - 1	10 - 3	14 - 9	13 - 4	12 - 6	11 - 6
SP01	6:12	1	10	14 - 2	12 - 10	11 - 9	10 - 4	16 - 11	15 - 4	14 - 4	13 - 3	19 - 0	17 - 3	16 - 2	14 - 11
SP01	6:12	1	12	17 - 4	15 - 7	14 - 1	12 - 6	20 - 9	18 - 9	17 - 7	16 - 4	23 - 3	21 - 1	19 - 9	18 - 4
SP01	6:12	1	14	19 - 7	16 - 10	15 - 3	13 - 7	24 - 6	22 - 1	20 - 1	17 - 10	26 - 0	24 - 11	23 - 5	21 - 8
SP01	6:12	2n	4	4 - 0	3 - 7	3 - 4	3 - 0	5 - 0	4 - 5	4 - 1	3 - 10	5 - 9	5 - 1	4 - 8	4 - 4
SP01	6:12	2n	6	7 - 2	6 - 4	5 - 10	5 - 0	8 - 9	7 - 10	7 - 3	6 - 7	10 - 0	8 - 11	8 - 4	7 - 8
SP01	6:12	2n	8	9 - 11	8 - 11	8 - 3	7 - 2	12 - 2	10 - 10	10 - 1	9 - 3	13 - 8	12 - 5	11 - 6	10 - 7
SP01	6:12	2n	10	13 - 2	11 - 4	10 - 1	8 - 10	15 - 10	14 - 3	13 - 4	12 - 2	17 - 11	16 - 1	15 - 1	13 - 11
SP01	6:12	2n	12	16 - 3	13 - 11	12 - 7	10 - 11	19 - 8	17 - 8	16 - 6	14 - 9	22 - 2	20 - 0	18 - 9	17 - 3
SP01	6:12	2n	14	17 - 11	15 - 2	13 - 8	12 - 1	23 - 4	20 - 5	18 - 4	16 - 2	26 - 0	23 - 9	22 - 4	20 - 8
SP01	7:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	7:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	7:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	7:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	7:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	7:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 0	24 - 5	22 - 11	20 - 9	26 - 0	26 - 0	25 - 8	23 - 10
SP01	7:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	7:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	7:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	7:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	7:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	7:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE E-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-34

Sheet Number 34 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	8:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	8:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	8:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	8:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	8:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	8:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 0	24 - 5	22 - 11	20 - 9	26 - 0	26 - 0	25 - 8	23 - 10
SP01	8:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	8:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	8:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	8:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	8:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	8:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7
SP01	9:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	9:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	9:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	9:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	9:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	9:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 0	24 - 5	22 - 11	20 - 9	26 - 0	26 - 11	25 - 8	23 - 10
SP01	9:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	9:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	9:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	9:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	9:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	9:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7
SP01	10:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	10:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	10:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	10:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	10:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	10:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 11	24 - 5	22 - 11	20 - 9	26 - 11	26 - 0	25 - 8	23 - 10
SP01	10:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	10:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	10:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	10:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	10:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	10:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7
SP01	11:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	11:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	11:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	11:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	11:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	11:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 0	24 - 5	22 - 11	20 - 9	26 - 0	26 - 0	25 - 8	23 - 10
SP01	11:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	11:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	11:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	11:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	11:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	11:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7
SP01	12:12	1	4	5 - 0	4 - 6	4 - 3	3 - 11	5 - 11	5 - 4	5 - 1	4 - 8	6 - 9	6 - 1	5 - 8	5 - 3
SP01	12:12	1	6	8 - 3	7 - 5	6 - 10	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 6	10 - 3	9 - 6	8 - 9
SP01	12:12	1	8	11 - 5	10 - 2	9 - 5	8 - 8	14 - 0	12 - 6	11 - 7	10 - 7	16 - 2	14 - 4	13 - 4	12 - 3
SP01	12:12	1	10	15 - 4	13 - 8	12 - 9	10 - 11	18 - 9	16 - 11	15 - 7	14 - 3	21 - 0	19 - 1	17 - 11	16 - 5
SP01	12:12	1	12	19 - 3	17 - 5	16 - 2	13 - 10	22 - 10	20 - 8	19 - 6	18 - 1	25 - 6	23 - 2	21 - 10	20 - 3
SP01	12:12	1	14	22 - 8	19 - 8	17 - 11	15 - 4	26 - 0	24 - 5	22 - 11	20 - 9	26 - 11	26 - 11	25 - 8	23 - 10
SP01	12:12	2n	4	4 - 5	4 - 0	3 - 9	3 - 6	5 - 5	4 - 10	4 - 6	4 - 3	6 - 2	5 - 7	5 - 2	4 - 9
SP01	12:12	2n	6	7 - 6	6 - 9	6 - 3	5 - 9	9 - 1	8 - 2	7 - 8	7 - 0	10 - 4	9 - 3	8 - 8	8 - 0
SP01	12:12	2n	8	10 - 3	9 - 2	8 - 7	7 - 9	12 - 6	11 - 2	10 - 5	9 - 7	14 - 2	12 - 9	11 - 11	10 - 11
SP01	12:12	2n	10	13 - 7	12 - 0	10 - 8	9 - 4	16 - 5	14 - 9	13 - 9	12 - 8	18 - 8	16 - 9	15 - 7	14 - 4
SP01	12:12	2n	12	16 - 11	14 - 8	13 - 2	11 - 6	20 - 6	18 - 5	17 - 3	15 - 8	23 - 4	20 - 10	19 - 6	17 - 11
SP01	12:12	2n	14	19 - 1	16 - 1	14 - 4	12 - 8	24 - 9	21 - 11	19 - 7	17 - 2	26 - 0	25 - 2	23 - 6	21 - 7

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE F-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-35

Sheet Number 35 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	3:12	1	4	4 - 4	3 - 10	3 - 6	3 - 1	5 - 4	4 - 9	4 - 5	4 - 1	6 - 1	5 - 5	5 - 1	4 - 8
SP02	3:12	1	6	7 - 4	6 - 5	5 - 9	5 - 0	9 - 0	8 - 0	7 - 5	6 - 10	10 - 4	9 - 2	8 - 6	7 - 9
SP02	3:12	1	8	10 - 3	8 - 8	7 - 8	6 - 9	13 - 0	11 - 4	10 - 5	9 - 4	15 - 2	13 - 3	12 - 3	11 - 0
SP02	3:12	1	10	14 - 5	11 - 3	9 - 9	8 - 4	18 - 0	15 - 11	14 - 8	12 - 5	20 - 2	18 - 3	17 - 2	15 - 6
SP02	3:12	1	12	18 - 5	14 - 10	12 - 9	10 - 6	22 - 0	19 - 11	18 - 9	16 - 3	24 - 8	22 - 4	21 - 0	19 - 5
SP02	3:12	1	14	20 - 0	17 - 2	14 - 7	12 - 2	26 - 0	22 - 6	20 - 6	18 - 2	26 - 0	26 - 0	24 - 10	22 - 11
SP02	3:12	2n	4	3 - 7	3 - 1	2 - 10	2 - 6	4 - 6	4 - 1	3 - 8	3 - 3	5 - 2	4 - 8	4 - 4	4 - 0
SP02	3:12	2n	6	6 - 1	5 - 0	4 - 5	3 - 11	7 - 11	7 - 0	6 - 3	5 - 5	9 - 1	8 - 1	7 - 6	6 - 10
SP02	3:12	2n	8	8 - 7	7 - 0	6 - 1	5 - 3	11 - 2	9 - 10	8 - 10	7 - 7	12 - 10	11 - 4	10 - 6	9 - 7
SP02	3:12	2n	10	10 - 10	8 - 11	7 - 10	6 - 8	15 - 0	12 - 9	11 - 2	9 - 7	17 - 2	15 - 4	14 - 3	13 - 0
SP02	3:12	2n	12	13 - 8	11 - 2	9 - 10	8 - 5	18 - 10	15 - 9	14 - 0	12 - 1	21 - 6	19 - 3	17 - 11	16 - 1
SP02	3:12	2n	14	15 - 4	12 - 8	11 - 1	9 - 6	21 - 1	17 - 8	15 - 8	13 - 6	26 - 11	23 - 3	20 - 7	18 - 0
SP02	4:12	1	4	4 - 4	3 - 10	3 - 6	3 - 1	5 - 4	4 - 9	4 - 5	4 - 1	6 - 1	5 - 5	5 - 1	4 - 8
SP02	4:12	1	6	7 - 4	6 - 5	5 - 9	5 - 0	9 - 0	8 - 0	7 - 5	6 - 10	10 - 4	9 - 2	8 - 6	7 - 9
SP02	4:12	1	8	10 - 3	8 - 8	7 - 8	6 - 9	13 - 0	11 - 4	10 - 5	9 - 4	15 - 2	13 - 3	12 - 3	11 - 0
SP02	4:12	1	10	14 - 5	11 - 3	9 - 9	8 - 4	18 - 0	15 - 11	14 - 8	12 - 5	20 - 2	18 - 3	17 - 2	15 - 6
SP02	4:12	1	12	18 - 5	14 - 10	12 - 9	10 - 6	22 - 0	19 - 11	18 - 9	16 - 3	24 - 8	22 - 4	21 - 0	19 - 5
SP02	4:12	1	14	20 - 0	17 - 2	14 - 7	12 - 2	26 - 0	22 - 6	20 - 6	18 - 2	26 - 0	26 - 0	24 - 10	22 - 11
SP02	4:12	2n	4	3 - 7	3 - 1	2 - 10	2 - 6	4 - 6	4 - 1	3 - 8	3 - 3	5 - 2	4 - 8	4 - 4	4 - 0
SP02	4:12	2n	6	6 - 1	5 - 0	4 - 5	3 - 11	7 - 11	7 - 0	6 - 3	5 - 5	9 - 1	8 - 1	7 - 6	6 - 10
SP02	4:12	2n	8	8 - 7	7 - 0	6 - 1	5 - 3	11 - 2	9 - 10	8 - 10	7 - 7	12 - 10	11 - 4	10 - 6	9 - 7
SP02	4:12	2n	10	10 - 10	8 - 11	7 - 10	6 - 8	15 - 0	12 - 9	11 - 2	9 - 7	17 - 2	15 - 4	14 - 3	13 - 0
SP02	4:12	2n	12	13 - 8	11 - 2	9 - 10	8 - 5	18 - 10	15 - 9	14 - 0	12 - 1	21 - 6	19 - 3	17 - 11	16 - 1
SP02	4:12	2n	14	15 - 4	12 - 8	11 - 1	9 - 6	21 - 1	17 - 8	15 - 8	13 - 6	26 - 0	23 - 3	20 - 7	18 - 0
SP02	5:12	1	4	4 - 7	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 8	4 - 3	6 - 4	5 - 8	5 - 3	4 - 10
SP02	5:12	1	6	7 - 8	6 - 11	6 - 2	5 - 4	9 - 3	8 - 4	7 - 9	7 - 2	10 - 6	9 - 5	8 - 10	8 - 1
SP02	5:12	1	8	10 - 5	9 - 2	8 - 3	7 - 3	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
SP02	5:12	1	10	13 - 1	11 - 2	10 - 1	8 - 10	16 - 2	14 - 7	13 - 4	11 - 10	18 - 2	16 - 5	15 - 5	14 - 3
SP02	5:12	1	12	15 - 6	13 - 4	12 - 1	10 - 8	19 - 9	17 - 6	15 - 11	14 - 1	22 - 3	20 - 1	18 - 11	17 - 6
SP02	5:12	1	14	17 - 0	14 - 7	13 - 3	11 - 9	22 - 4	19 - 2	17 - 5	15 - 5	26 - 0	23 - 10	21 - 11	19 - 6
SP02	5:12	2n	4	3 - 8	3 - 1	2 - 10	2 - 7	4 - 8	4 - 2	3 - 10	3 - 5	5 - 5	4 - 9	4 - 5	4 - 1
SP02	5:12	2n	6	6 - 8	5 - 4	4 - 8	4 - 1	8 - 4	7 - 5	6 - 10	5 - 10	9 - 6	8 - 6	7 - 11	7 - 3
SP02	5:12	2n	8	9 - 3	7 - 9	6 - 9	5 - 8	11 - 6	10 - 4	9 - 6	8 - 3	13 - 1	11 - 9	10 - 11	10 - 0
SP02	5:12	2n	10	11 - 6	9 - 7	8 - 7	7 - 4	15 - 1	13 - 1	11 - 10	10 - 3	17 - 1	15 - 4	14 - 4	13 - 3
SP02	5:12	2n	12	13 - 11	11 - 9	10 - 6	9 - 1	18 - 8	15 - 9	14 - 3	12 - 7	21 - 2	19 - 1	17 - 10	16 - 0
SP02	5:12	2n	14	15 - 5	13 - 1	11 - 9	10 - 2	20 - 9	17 - 7	15 - 9	13 - 10	25 - 0	22 - 4	20 - 3	17 - 10
SP02	6:12	1	4	4 - 7	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 8	4 - 3	6 - 4	5 - 8	5 - 3	4 - 10
SP02	6:12	1	6	7 - 8	6 - 11	6 - 2	5 - 4	9 - 3	8 - 4	7 - 9	7 - 2	10 - 6	9 - 5	8 - 10	8 - 1
SP02	6:12	1	8	10 - 5	9 - 2	8 - 3	7 - 3	12 - 6	11 - 3	10 - 7	9 - 9	14 - 1	12 - 9	11 - 11	11 - 0
SP02	6:12	1	10	13 - 1	11 - 2	10 - 1	8 - 10	16 - 2	14 - 7	13 - 4	11 - 10	18 - 2	16 - 5	15 - 5	14 - 3
SP02	6:12	1	12	15 - 6	13 - 4	12 - 1	10 - 8	19 - 9	17 - 6	15 - 11	14 - 1	22 - 3	20 - 1	18 - 11	17 - 6
SP02	6:12	1	14	17 - 0	14 - 7	13 - 3	11 - 9	22 - 4	19 - 2	17 - 5	15 - 5	26 - 0	23 - 10	21 - 11	19 - 6
SP02	6:12	2n	4	3 - 8	3 - 1	2 - 10	2 - 7	4 - 8	4 - 2	3 - 10	3 - 5	5 - 5	4 - 9	4 - 5	4 - 1
SP02	6:12	2n	6	6 - 8	5 - 4	4 - 8	4 - 1	8 - 4	7 - 5	6 - 10	5 - 10	9 - 6	8 - 6	7 - 11	7 - 3
SP02	6:12	2n	8	9 - 3	7 - 9	6 - 9	5 - 8	11 - 6	10 - 4	9 - 6	8 - 3	13 - 1	11 - 9	10 - 11	10 - 0
SP02	6:12	2n	10	11 - 6	9 - 7	8 - 7	7 - 4	15 - 1	13 - 1	11 - 10	10 - 3	17 - 1	15 - 4	14 - 4	13 - 3
SP02	6:12	2n	12	13 - 11	11 - 9	10 - 6	9 - 1	18 - 8	15 - 9	14 - 3	12 - 7	21 - 2	19 - 1	17 - 10	16 - 0
SP02	6:12	2n	14	15 - 5	13 - 1	11 - 9	10 - 2	20 - 9	17 - 7	15 - 9	13 - 10	25 - 0	22 - 4	20 - 3	17 - 10
SP02	7:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	7:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	7:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	7:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	7:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	7:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 0	24 - 7	22 - 6
SP02	7:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	7:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	7:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	7:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	7:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	7:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	18 - 11

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE G-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-36

Sheet Number 36 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure B, K_{zt} = 2.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	8:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	8:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	8:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	8:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	8:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	8:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 0	24 - 7	22 - 6
SP02	8:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	8:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	8:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	8:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	8:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	8:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	18 - 11
SP02	9:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	9:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	9:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	9:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	9:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	9:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 11	24 - 7	22 - 6
SP02	9:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	9:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	9:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	9:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	9:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	9:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	18 - 11
SP02	10:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	10:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	10:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	10:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	10:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	10:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 0	24 - 7	22 - 6
SP02	10:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	10:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	10:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	10:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	10:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	10:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	18 - 11
SP02	11:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	11:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	11:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	11:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	11:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	11:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 0	24 - 7	22 - 6
SP02	11:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	11:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	11:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	11:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	11:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	11:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	18 - 11
SP02	12:12	1	4	4 - 9	4 - 4	4 - 1	3 - 8	5 - 8	5 - 2	4 - 10	4 - 6	6 - 5	5 - 9	5 - 5	5 - 0
SP02	12:12	1	6	7 - 10	7 - 0	6 - 4	5 - 7	9 - 6	8 - 6	8 - 0	7 - 4	10 - 11	9 - 8	9 - 0	8 - 4
SP02	12:12	1	8	10 - 10	9 - 6	8 - 6	7 - 5	13 - 4	11 - 10	11 - 0	10 - 0	15 - 3	13 - 7	12 - 8	11 - 6
SP02	12:12	1	10	14 - 6	12 - 1	10 - 7	9 - 2	17 - 11	15 - 11	14 - 9	12 - 11	20 - 1	18 - 3	17 - 1	15 - 6
SP02	12:12	1	12	18 - 2	15 - 0	13 - 3	11 - 5	21 - 10	19 - 10	18 - 7	16 - 2	24 - 5	22 - 2	20 - 10	19 - 4
SP02	12:12	1	14	19 - 11	17 - 2	14 - 11	12 - 11	25 - 8	22 - 3	20 - 3	18 - 2	26 - 0	26 - 0	24 - 7	22 - 6
SP02	12:12	2n	4	4 - 3	3 - 8	3 - 4	3 - 0	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 7
SP02	12:12	2n	6	7 - 2	6 - 2	5 - 6	4 - 10	8 - 8	7 - 10	7 - 3	6 - 7	9 - 10	8 - 10	8 - 3	7 - 7
SP02	12:12	2n	8	9 - 9	8 - 3	7 - 5	6 - 5	11 - 11	10 - 7	9 - 11	8 - 9	13 - 6	12 - 1	11 - 3	10 - 4
SP02	12:12	2n	10	12 - 1	10 - 1	9 - 1	7 - 11	15 - 7	13 - 9	12 - 5	10 - 9	17 - 9	15 - 11	14 - 10	13 - 8
SP02	12:12	2n	12	14 - 8	12 - 5	11 - 0	9 - 7	19 - 6	16 - 10	15 - 0	13 - 2	22 - 1	19 - 10	18 - 6	17 - 1
SP02	12:12	2n	14	16 - 3	13 - 8	12 - 4	10 - 9	22 - 2	18 - 8	16 - 9	14 - 7	26 - 0	24 - 0	21 - 8	19 - 0

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE H-EXP. B, Kzt = 2.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-37

Sheet Number 37 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	3:12	1	4	5 - 1	4 - 6	4 - 3	3 - 11	6 - 2	5 - 6	5 - 2	4 - 9	7 - 0	6 - 3	5 - 10	5 - 5
DFL1	3:12	1	6	8 - 6	7 - 7	7 - 1	6 - 6	10 - 7	9 - 4	8 - 8	7 - 11	12 - 5	10 - 10	10 - 0	9 - 1
DFL1	3:12	1	8	12 - 4	10 - 9	9 - 11	8 - 11	15 - 6	13 - 7	12 - 6	11 - 3	17 - 11	15 - 10	14 - 7	13 - 2
DFL1	3:12	1	10	17 - 2	15 - 1	13 - 10	12 - 5	20 - 6	18 - 7	17 - 6	15 - 9	23 - 0	20 - 10	19 - 7	18 - 2
DFL1	3:12	1	12	21 - 0	19 - 1	17 - 11	15 - 10	25 - 1	22 - 8	21 - 4	19 - 9	26 - 11	25 - 6	23 - 11	22 - 2
DFL1	3:12	1	14	24 - 11	22 - 6	20 - 8	18 - 4	26 - 0	26 - 0	25 - 3	23 - 4	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	3:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 3	5 - 4	4 - 9	4 - 5	4 - 1	6 - 1	5 - 5	5 - 0	4 - 7
DFL1	3:12	2n	6	7 - 6	6 - 8	6 - 0	5 - 2	9 - 3	8 - 3	7 - 8	6 - 11	10 - 8	9 - 5	8 - 9	8 - 0
DFL1	3:12	2n	8	10 - 7	9 - 4	8 - 5	7 - 3	13 - 1	11 - 7	10 - 9	9 - 9	14 - 11	13 - 4	12 - 5	11 - 3
DFL1	3:12	2n	10	14 - 3	12 - 9	11 - 2	9 - 6	17 - 6	15 - 7	14 - 6	13 - 3	19 - 10	17 - 10	16 - 7	15 - 2
DFL1	3:12	2n	12	18 - 0	15 - 5	13 - 8	11 - 9	21 - 10	19 - 7	18 - 3	16 - 7	25 - 1	22 - 4	20 - 9	19 - 1
DFL1	3:12	2n	14	21 - 3	17 - 10	15 - 10	13 - 8	26 - 0	23 - 9	21 - 10	19 - 0	26 - 0	26 - 0	25 - 3	23 - 1
DFL1	4:12	1	4	5 - 1	4 - 6	4 - 3	3 - 11	6 - 2	5 - 6	5 - 2	4 - 9	7 - 0	6 - 3	5 - 10	5 - 5
DFL1	4:12	1	6	8 - 6	7 - 7	7 - 1	6 - 6	10 - 7	9 - 4	8 - 8	7 - 11	12 - 5	10 - 10	10 - 0	9 - 1
DFL1	4:12	1	8	12 - 4	10 - 9	9 - 11	8 - 11	15 - 6	13 - 7	12 - 6	11 - 3	17 - 11	15 - 10	14 - 7	13 - 2
DFL1	4:12	1	10	17 - 2	15 - 1	13 - 10	12 - 5	20 - 6	18 - 7	17 - 6	15 - 9	23 - 0	20 - 10	19 - 7	18 - 2
DFL1	4:12	1	12	21 - 0	19 - 1	17 - 11	15 - 10	25 - 1	22 - 8	21 - 4	19 - 9	26 - 11	25 - 6	23 - 11	22 - 2
DFL1	4:12	1	14	24 - 11	22 - 6	20 - 8	18 - 4	26 - 0	26 - 0	25 - 3	23 - 4	26 - 0	26 - 0	26 - 11	26 - 0
DFL1	4:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 3	5 - 4	4 - 9	4 - 5	4 - 1	6 - 1	5 - 5	5 - 0	4 - 7
DFL1	4:12	2n	6	7 - 6	6 - 8	6 - 0	5 - 2	9 - 3	8 - 3	7 - 8	6 - 11	10 - 8	9 - 5	8 - 9	8 - 0
DFL1	4:12	2n	8	10 - 7	9 - 4	8 - 5	7 - 3	13 - 1	11 - 7	10 - 9	9 - 9	14 - 11	13 - 4	12 - 5	11 - 3
DFL1	4:12	2n	10	14 - 3	12 - 9	11 - 2	9 - 6	17 - 6	15 - 7	14 - 6	13 - 3	19 - 10	17 - 10	16 - 7	15 - 2
DFL1	4:12	2n	12	18 - 0	15 - 5	13 - 8	11 - 9	21 - 10	19 - 7	18 - 3	16 - 7	25 - 1	22 - 4	20 - 9	19 - 1
DFL1	4:12	2n	14	21 - 3	17 - 10	15 - 10	13 - 8	26 - 0	23 - 9	21 - 10	19 - 0	26 - 0	26 - 11	25 - 3	23 - 1
DFL1	5:12	1	4	5 - 3	4 - 9	4 - 5	4 - 1	6 - 5	5 - 9	5 - 4	4 - 11	7 - 4	6 - 7	6 - 1	5 - 7
DFL1	5:12	1	6	8 - 10	7 - 11	7 - 5	6 - 10	10 - 8	9 - 7	9 - 0	8 - 3	12 - 0	10 - 10	10 - 2	9 - 4
DFL1	5:12	1	8	11 - 11	10 - 9	10 - 1	9 - 3	14 - 4	12 - 11	12 - 1	11 - 2	16 - 1	14 - 7	13 - 8	12 - 7
DFL1	5:12	1	10	15 - 5	14 - 0	13 - 1	11 - 10	18 - 5	16 - 8	15 - 8	14 - 6	20 - 9	18 - 9	17 - 7	16 - 4
DFL1	5:12	1	12	18 - 11	17 - 2	15 - 7	13 - 10	22 - 7	20 - 5	19 - 2	17 - 9	25 - 4	22 - 11	21 - 7	20 - 0
DFL1	5:12	1	14	22 - 5	19 - 4	17 - 6	15 - 7	26 - 11	24 - 2	22 - 9	20 - 5	26 - 0	26 - 0	25 - 6	23 - 7
DFL1	5:12	2n	4	4 - 5	3 - 11	3 - 8	3 - 5	5 - 6	4 - 11	4 - 6	4 - 2	6 - 5	5 - 8	5 - 3	4 - 10
DFL1	5:12	2n	6	7 - 11	7 - 0	6 - 6	5 - 7	9 - 8	8 - 8	8 - 1	7 - 4	11 - 0	9 - 10	9 - 2	8 - 5
DFL1	5:12	2n	8	11 - 0	9 - 10	9 - 2	7 - 11	13 - 3	12 - 0	11 - 2	10 - 2	15 - 0	13 - 6	12 - 8	11 - 8
DFL1	5:12	2n	10	14 - 5	13 - 0	11 - 9	10 - 2	17 - 4	15 - 7	14 - 7	13 - 6	19 - 8	17 - 8	16 - 6	15 - 2
DFL1	5:12	2n	12	17 - 10	15 - 6	13 - 11	12 - 4	21 - 6	19 - 5	18 - 2	16 - 5	24 - 1	21 - 11	20 - 6	18 - 11
DFL1	5:12	2n	14	20 - 10	17 - 8	15 - 10	13 - 11	25 - 4	23 - 0	21 - 4	18 - 9	26 - 11	25 - 9	24 - 3	22 - 6
DFL1	6:12	1	4	5 - 3	4 - 9	4 - 5	4 - 1	6 - 5	5 - 9	5 - 4	4 - 11	7 - 4	6 - 7	6 - 1	5 - 7
DFL1	6:12	1	6	8 - 10	7 - 11	7 - 5	6 - 10	10 - 8	9 - 7	9 - 0	8 - 3	12 - 0	10 - 10	10 - 2	9 - 4
DFL1	6:12	1	8	11 - 11	10 - 9	10 - 1	9 - 3	14 - 4	12 - 11	12 - 1	11 - 2	16 - 1	14 - 7	13 - 8	12 - 7
DFL1	6:12	1	10	15 - 5	14 - 0	13 - 1	11 - 10	18 - 5	16 - 8	15 - 8	14 - 6	20 - 9	18 - 9	17 - 7	16 - 4
DFL1	6:12	1	12	18 - 11	17 - 2	15 - 7	13 - 10	22 - 7	20 - 5	19 - 2	17 - 9	25 - 4	22 - 11	21 - 7	20 - 0
DFL1	6:12	1	14	22 - 5	19 - 4	17 - 6	15 - 7	26 - 11	24 - 2	22 - 9	20 - 5	26 - 0	26 - 11	25 - 6	23 - 7
DFL1	6:12	2n	4	4 - 5	3 - 11	3 - 8	3 - 5	5 - 6	4 - 11	4 - 6	4 - 2	6 - 5	5 - 8	5 - 3	4 - 10
DFL1	6:12	2n	6	7 - 11	7 - 0	6 - 6	5 - 7	9 - 8	8 - 8	8 - 1	7 - 4	11 - 0	9 - 10	9 - 2	8 - 5
DFL1	6:12	2n	8	11 - 0	9 - 10	9 - 2	7 - 11	13 - 3	12 - 0	11 - 2	10 - 2	15 - 0	13 - 6	12 - 8	11 - 8
DFL1	6:12	2n	10	14 - 5	13 - 0	11 - 9	10 - 2	17 - 4	15 - 7	14 - 7	13 - 6	19 - 8	17 - 8	16 - 6	15 - 2
DFL1	6:12	2n	12	17 - 10	15 - 6	13 - 11	12 - 4	21 - 6	19 - 5	18 - 2	16 - 5	24 - 1	21 - 11	20 - 6	18 - 11
DFL1	6:12	2n	14	20 - 10	17 - 8	15 - 10	13 - 11	25 - 4	23 - 0	21 - 4	18 - 9	26 - 0	25 - 9	24 - 3	22 - 6
DFL1	7:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	7:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	7:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	7:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	7:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	25 - 2	23 - 8	22 - 0
DFL1	7:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 0	24 - 11	23 - 2	26 - 0	26 - 0	26 - 11	25 - 11
DFL1	7:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	7:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	7:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	7:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	7:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	7:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 0	24 - 5	22 - 8	20 - 0	26 - 0	26 - 0	25 - 9	23 - 9

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE A-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-38

Sheet Number 38 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL1	8:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	8:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	8:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	8:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	8:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 11	25 - 2	23 - 8	22 - 0
DFL1	8:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 0	24 - 11	23 - 2	26 - 0	26 - 0	26 - 0	25 - 11
DFL1	8:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	8:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	8:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	8:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	8:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	8:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 0	24 - 5	22 - 8	20 - 0	26 - 0	26 - 0	25 - 9	23 - 9
DFL1	9:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	9:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	9:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	9:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	9:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 11	25 - 2	23 - 8	22 - 0
DFL1	9:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 0	24 - 11	23 - 2	26 - 0	26 - 0	26 - 11	25 - 11
DFL1	9:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	9:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	9:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	9:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	9:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	9:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 11	24 - 5	22 - 8	20 - 0	26 - 0	26 - 0	25 - 9	23 - 9
DFL1	10:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	10:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	10:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	10:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	10:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 0	25 - 2	23 - 8	22 - 0
DFL1	10:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 11	24 - 11	23 - 2	26 - 0	26 - 0	26 - 11	25 - 11
DFL1	10:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	10:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	10:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	10:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	10:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	10:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 0	24 - 5	22 - 8	20 - 0	26 - 11	26 - 0	25 - 9	23 - 9
DFL1	11:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	11:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	11:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	11:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	11:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 11	25 - 2	23 - 8	22 - 0
DFL1	11:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 0	24 - 11	23 - 2	26 - 0	26 - 11	26 - 0	25 - 11
DFL1	11:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	11:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	11:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	11:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	11:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	11:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 0	24 - 5	22 - 8	20 - 0	26 - 0	26 - 11	25 - 9	23 - 9
DFL1	12:12	1	4	5 - 5	4 - 11	4 - 7	4 - 3	6 - 7	5 - 10	5 - 6	5 - 1	7 - 6	6 - 8	6 - 3	5 - 9
DFL1	12:12	1	6	9 - 1	8 - 2	7 - 7	6 - 11	11 - 1	9 - 11	9 - 2	8 - 5	12 - 9	11 - 4	10 - 6	9 - 7
DFL1	12:12	1	8	12 - 8	11 - 3	10 - 5	9 - 7	15 - 7	13 - 10	12 - 10	11 - 9	17 - 10	15 - 10	14 - 8	13 - 5
DFL1	12:12	1	10	17 - 2	15 - 1	14 - 0	12 - 10	20 - 4	18 - 6	17 - 5	15 - 10	22 - 9	20 - 8	19 - 6	18 - 1
DFL1	12:12	1	12	20 - 11	19 - 0	17 - 10	15 - 9	24 - 9	22 - 6	21 - 2	19 - 8	26 - 11	25 - 2	23 - 8	22 - 0
DFL1	12:12	1	14	24 - 7	22 - 4	20 - 5	18 - 3	26 - 0	26 - 0	24 - 11	23 - 2	26 - 0	26 - 0	26 - 0	25 - 11
DFL1	12:12	2n	4	4 - 11	4 - 4	4 - 1	3 - 10	6 - 0	5 - 4	5 - 0	4 - 8	6 - 10	6 - 1	5 - 8	5 - 3
DFL1	12:12	2n	6	8 - 3	7 - 5	6 - 11	6 - 4	10 - 0	9 - 0	8 - 5	7 - 9	11 - 5	10 - 2	9 - 6	8 - 9
DFL1	12:12	2n	8	11 - 4	10 - 1	9 - 5	8 - 5	13 - 8	12 - 4	11 - 6	10 - 6	15 - 7	13 - 11	13 - 1	12 - 0
DFL1	12:12	2n	10	14 - 11	13 - 4	12 - 4	10 - 9	18 - 1	16 - 2	15 - 1	13 - 11	20 - 6	18 - 5	17 - 2	15 - 9
DFL1	12:12	2n	12	18 - 7	16 - 5	14 - 9	12 - 11	22 - 6	20 - 2	18 - 10	17 - 5	25 - 7	22 - 11	21 - 5	19 - 8
DFL1	12:12	2n	14	22 - 4	18 - 9	16 - 10	14 - 8	26 - 11	24 - 5	22 - 8	20 - 0	26 - 0	26 - 0	25 - 9	23 - 9

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE B-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-39

Sheet Number 39 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	3:12	1	4	4 - 11	4 - 5	4 - 2	3 - 10	6 - 0	5 - 5	5 - 0	4 - 8	6 - 10	6 - 2	5 - 9	5 - 3
DFL2	3:12	1	6	8 - 4	7 - 5	6 - 11	6 - 3	10 - 3	9 - 1	8 - 5	7 - 9	12 - 1	10 - 6	9 - 8	8 - 10
DFL2	3:12	1	8	11 - 11	10 - 5	9 - 8	8 - 4	15 - 1	13 - 2	12 - 2	10 - 11	17 - 7	15 - 5	14 - 2	12 - 10
DFL2	3:12	1	10	16 - 8	14 - 8	13 - 5	11 - 3	20 - 1	18 - 2	17 - 0	15 - 4	22 - 6	20 - 5	19 - 2	17 - 9
DFL2	3:12	1	12	20 - 7	18 - 8	17 - 6	14 - 5	24 - 6	22 - 3	20 - 11	19 - 4	26 - 0	24 - 11	23 - 5	21 - 9
DFL2	3:12	1	14	24 - 4	21 - 6	19 - 6	17 - 4	26 - 0	26 - 0	24 - 8	22 - 8	26 - 0	26 - 0	26 - 0	25 - 8
DFL2	3:12	2n	4	4 - 3	3 - 9	3 - 5	3 - 1	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 6
DFL2	3:12	2n	6	7 - 4	6 - 4	5 - 7	4 - 10	9 - 0	8 - 0	7 - 5	6 - 9	10 - 4	9 - 2	8 - 6	7 - 10
DFL2	3:12	2n	8	10 - 3	8 - 11	7 - 10	6 - 8	12 - 9	11 - 4	10 - 5	9 - 6	14 - 7	13 - 0	12 - 1	11 - 0
DFL2	3:12	2n	10	13 - 11	11 - 10	10 - 4	8 - 10	17 - 1	15 - 3	14 - 2	12 - 9	19 - 5	17 - 5	16 - 2	14 - 10
DFL2	3:12	2n	12	17 - 5	14 - 5	12 - 9	10 - 11	21 - 4	19 - 1	17 - 10	15 - 5	24 - 6	21 - 9	20 - 3	18 - 7
DFL2	3:12	2n	14	19 - 11	16 - 8	14 - 9	12 - 9	26 - 0	23 - 0	20 - 5	17 - 10	26 - 0	26 - 11	24 - 8	22 - 6
DFL2	4:12	1	4	4 - 11	4 - 5	4 - 2	3 - 10	6 - 0	5 - 5	5 - 0	4 - 8	6 - 10	6 - 2	5 - 9	5 - 3
DFL2	4:12	1	6	8 - 4	7 - 5	6 - 11	6 - 3	10 - 3	9 - 1	8 - 5	7 - 9	12 - 1	10 - 6	9 - 8	8 - 10
DFL2	4:12	1	8	11 - 11	10 - 5	9 - 8	8 - 4	15 - 1	13 - 2	12 - 2	10 - 11	17 - 7	15 - 5	14 - 2	12 - 10
DFL2	4:12	1	10	16 - 8	14 - 8	13 - 5	11 - 3	20 - 1	18 - 2	17 - 0	15 - 4	22 - 6	20 - 5	19 - 2	17 - 9
DFL2	4:12	1	12	20 - 7	18 - 8	17 - 6	14 - 5	24 - 6	22 - 3	20 - 11	19 - 4	26 - 0	24 - 11	23 - 5	21 - 9
DFL2	4:12	1	14	24 - 4	21 - 6	19 - 6	17 - 4	26 - 0	26 - 0	24 - 8	22 - 8	26 - 0	26 - 11	26 - 0	25 - 8
DFL2	4:12	2n	4	4 - 3	3 - 9	3 - 5	3 - 1	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 6
DFL2	4:12	2n	6	7 - 4	6 - 4	5 - 7	4 - 10	9 - 0	8 - 0	7 - 5	6 - 9	10 - 4	9 - 2	8 - 6	7 - 10
DFL2	4:12	2n	8	10 - 3	8 - 11	7 - 10	6 - 8	12 - 9	11 - 4	10 - 5	9 - 6	14 - 7	13 - 0	12 - 1	11 - 0
DFL2	4:12	2n	10	13 - 11	11 - 10	10 - 4	8 - 10	17 - 1	15 - 3	14 - 2	12 - 9	19 - 5	17 - 5	16 - 2	14 - 10
DFL2	4:12	2n	12	17 - 5	14 - 5	12 - 9	10 - 11	21 - 4	19 - 1	17 - 10	15 - 5	24 - 6	21 - 9	20 - 3	18 - 7
DFL2	4:12	2n	14	19 - 11	16 - 8	14 - 9	12 - 9	26 - 0	23 - 0	20 - 5	17 - 10	26 - 0	26 - 0	24 - 8	22 - 6
DFL2	5:12	1	4	5 - 2	4 - 8	4 - 4	4 - 0	6 - 3	5 - 7	5 - 3	4 - 10	7 - 2	6 - 5	6 - 0	5 - 6
DFL2	5:12	1	6	8 - 8	7 - 9	7 - 3	6 - 8	10 - 5	9 - 4	8 - 9	8 - 1	11 - 9	10 - 7	9 - 11	9 - 2
DFL2	5:12	1	8	11 - 8	10 - 6	9 - 10	8 - 10	14 - 0	12 - 8	11 - 10	10 - 11	15 - 9	14 - 3	13 - 4	12 - 4
DFL2	5:12	1	10	15 - 1	13 - 8	12 - 7	11 - 1	18 - 1	16 - 4	15 - 4	14 - 2	20 - 3	18 - 4	17 - 3	15 - 11
DFL2	5:12	1	12	18 - 6	16 - 3	14 - 9	13 - 1	22 - 1	20 - 0	18 - 10	17 - 2	24 - 10	22 - 6	21 - 2	19 - 7
DFL2	5:12	1	14	21 - 3	18 - 3	16 - 7	14 - 8	26 - 0	23 - 8	21 - 9	19 - 4	26 - 0	26 - 11	25 - 0	23 - 2
DFL2	5:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 2	5 - 5	4 - 9	4 - 5	4 - 1	6 - 3	5 - 6	5 - 1	4 - 8
DFL2	5:12	2n	6	7 - 9	6 - 10	6 - 1	5 - 2	9 - 5	8 - 6	7 - 11	7 - 2	10 - 9	9 - 8	9 - 0	8 - 3
DFL2	5:12	2n	8	10 - 8	9 - 7	8 - 7	7 - 5	13 - 0	11 - 8	10 - 10	10 - 0	14 - 8	13 - 3	12 - 5	11 - 4
DFL2	5:12	2n	10	14 - 1	12 - 4	11 - 0	9 - 7	17 - 0	15 - 3	14 - 3	13 - 1	19 - 2	17 - 4	16 - 2	14 - 10
DFL2	5:12	2n	12	17 - 3	14 - 7	13 - 2	11 - 6	21 - 1	18 - 11	17 - 8	15 - 6	23 - 7	21 - 5	20 - 1	18 - 6
DFL2	5:12	2n	14	19 - 7	16 - 7	14 - 11	13 - 2	24 - 10	22 - 2	20 - 1	17 - 8	26 - 0	25 - 3	23 - 9	22 - 1
DFL2	6:12	1	4	5 - 2	4 - 8	4 - 4	4 - 0	6 - 3	5 - 7	5 - 3	4 - 10	7 - 2	6 - 5	6 - 0	5 - 6
DFL2	6:12	1	6	8 - 8	7 - 9	7 - 3	6 - 8	10 - 5	9 - 4	8 - 9	8 - 1	11 - 9	10 - 7	9 - 11	9 - 2
DFL2	6:12	1	8	11 - 8	10 - 6	9 - 10	8 - 10	14 - 0	12 - 8	11 - 10	10 - 11	15 - 9	14 - 3	13 - 4	12 - 4
DFL2	6:12	1	10	15 - 1	13 - 8	12 - 7	11 - 1	18 - 1	16 - 4	15 - 4	14 - 2	20 - 3	18 - 4	17 - 3	15 - 11
DFL2	6:12	1	12	18 - 6	16 - 3	14 - 9	13 - 1	22 - 1	20 - 0	18 - 10	17 - 2	24 - 10	22 - 6	21 - 2	19 - 7
DFL2	6:12	1	14	21 - 3	18 - 3	16 - 7	14 - 8	26 - 0	23 - 8	21 - 9	19 - 4	26 - 0	26 - 0	25 - 0	23 - 2
DFL2	6:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 2	5 - 5	4 - 9	4 - 5	4 - 1	6 - 3	5 - 6	5 - 1	4 - 8
DFL2	6:12	2n	6	7 - 9	6 - 10	6 - 1	5 - 2	9 - 5	8 - 6	7 - 11	7 - 2	10 - 9	9 - 8	9 - 0	8 - 3
DFL2	6:12	2n	8	10 - 8	9 - 7	8 - 7	7 - 5	13 - 0	11 - 8	10 - 10	10 - 0	14 - 8	13 - 3	12 - 5	11 - 4
DFL2	6:12	2n	10	14 - 1	12 - 4	11 - 0	9 - 7	17 - 0	15 - 3	14 - 3	13 - 1	19 - 2	17 - 4	16 - 2	14 - 10
DFL2	6:12	2n	12	17 - 3	14 - 7	13 - 2	11 - 6	21 - 1	18 - 11	17 - 8	15 - 6	23 - 7	21 - 5	20 - 1	18 - 6
DFL2	6:12	2n	14	19 - 7	16 - 7	14 - 11	13 - 2	24 - 10	22 - 2	20 - 1	17 - 8	26 - 0	25 - 3	23 - 9	22 - 1
DFL2	7:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	7:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	7:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	7:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	7:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
DFL2	7:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 0	26 - 0	26 - 11	25 - 5
DFL2	7:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	7:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	7:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	7:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	7:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	7:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 0	26 - 0	25 - 2	23 - 2

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE C-EXP. D, Kzt =1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-40

Sheet Number 40 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
DFL2	8:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	8:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	8:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	8:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	8:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
DFL2	8:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 11	26 - 0	26 - 11	25 - 5
DFL2	8:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	8:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	8:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	8:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	8:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	8:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 11	26 - 0	25 - 2	23 - 2
DFL2	9:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	9:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	9:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	9:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	9:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
DFL2	9:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	25 - 5
DFL2	9:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	9:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	9:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	9:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	9:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	9:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 0	26 - 0	25 - 2	23 - 2
DFL2	10:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	10:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	10:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	10:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	10:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 11	24 - 8	23 - 3	21 - 7
DFL2	10:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	25 - 5
DFL2	10:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	10:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	10:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	10:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	10:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	10:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 0	26 - 0	25 - 2	23 - 2
DFL2	11:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	11:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	11:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	11:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	11:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
DFL2	11:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 0	26 - 0	26 - 0	25 - 5
DFL2	11:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	11:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	11:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	11:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	11:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	11:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 0	26 - 11	25 - 2	23 - 2
DFL2	12:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
DFL2	12:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
DFL2	12:12	1	8	12 - 5	10 - 11	10 - 2	9 - 2	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
DFL2	12:12	1	10	16 - 8	14 - 9	13 - 8	12 - 1	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
DFL2	12:12	1	12	20 - 6	18 - 7	17 - 4	14 - 8	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
DFL2	12:12	1	14	24 - 1	21 - 2	19 - 4	17 - 4	26 - 0	26 - 0	24 - 5	22 - 4	26 - 0	26 - 0	26 - 11	25 - 5
DFL2	12:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
DFL2	12:12	2n	6	8 - 1	7 - 3	6 - 9	5 - 11	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
DFL2	12:12	2n	8	11 - 0	9 - 11	9 - 1	7 - 11	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
DFL2	12:12	2n	10	14 - 7	12 - 11	11 - 7	10 - 1	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
DFL2	12:12	2n	12	18 - 2	15 - 5	13 - 10	12 - 2	22 - 0	19 - 9	18 - 5	16 - 5	25 - 0	22 - 5	20 - 11	19 - 3
DFL2	12:12	2n	14	20 - 11	17 - 8	15 - 9	13 - 9	26 - 0	23 - 10	21 - 6	18 - 9	26 - 0	26 - 0	25 - 2	23 - 2

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE D-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-41

Sheet Number 41 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	3:12	1	4	4 - 11	4 - 5	4 - 2	3 - 10	6 - 0	5 - 5	5 - 0	4 - 8	6 - 10	6 - 2	5 - 9	5 - 3
SP01	3:12	1	6	8 - 4	7 - 5	6 - 11	6 - 5	10 - 3	9 - 1	8 - 5	7 - 9	12 - 1	10 - 6	9 - 8	8 - 10
SP01	3:12	1	8	11 - 11	10 - 5	9 - 8	8 - 9	15 - 1	13 - 2	12 - 2	10 - 11	17 - 7	15 - 5	14 - 2	12 - 10
SP01	3:12	1	10	16 - 8	14 - 8	13 - 5	11 - 10	20 - 1	18 - 2	17 - 0	15 - 4	22 - 6	20 - 5	19 - 2	17 - 9
SP01	3:12	1	12	20 - 7	18 - 8	17 - 7	15 - 10	24 - 6	22 - 3	20 - 11	19 - 4	26 - 0	24 - 11	23 - 5	21 - 9
SP01	3:12	1	14	24 - 4	21 - 11	19 - 11	17 - 9	26 - 0	26 - 0	24 - 8	22 - 11	26 - 0	26 - 0	26 - 0	25 - 8
SP01	3:12	2n	4	4 - 3	3 - 9	3 - 6	3 - 3	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 6
SP01	3:12	2n	6	7 - 4	6 - 6	6 - 0	5 - 4	9 - 0	8 - 0	7 - 5	6 - 9	10 - 4	9 - 2	8 - 6	7 - 10
SP01	3:12	2n	8	10 - 3	9 - 2	8 - 6	7 - 5	12 - 9	11 - 4	10 - 5	9 - 6	14 - 7	13 - 0	12 - 1	11 - 0
SP01	3:12	2n	10	13 - 11	12 - 4	10 - 9	9 - 3	17 - 1	15 - 3	14 - 2	12 - 11	19 - 5	17 - 5	16 - 2	14 - 10
SP01	3:12	2n	12	17 - 7	15 - 5	13 - 8	11 - 9	21 - 4	19 - 1	17 - 10	16 - 4	24 - 6	21 - 9	20 - 3	18 - 7
SP01	3:12	2n	14	20 - 4	17 - 1	15 - 2	13 - 1	26 - 0	23 - 2	20 - 11	18 - 3	26 - 0	26 - 11	24 - 8	22 - 6
SP01	4:12	1	4	4 - 11	4 - 5	4 - 2	3 - 10	6 - 0	5 - 5	5 - 0	4 - 8	6 - 10	6 - 2	5 - 9	5 - 3
SP01	4:12	1	6	8 - 4	7 - 5	6 - 11	6 - 5	10 - 3	9 - 1	8 - 5	7 - 9	12 - 1	10 - 6	9 - 8	8 - 10
SP01	4:12	1	8	11 - 11	10 - 5	9 - 8	8 - 9	15 - 1	13 - 2	12 - 2	10 - 11	17 - 7	15 - 5	14 - 2	12 - 10
SP01	4:12	1	10	16 - 8	14 - 8	13 - 5	11 - 10	20 - 1	18 - 2	17 - 0	15 - 4	22 - 6	20 - 5	19 - 2	17 - 9
SP01	4:12	1	12	20 - 7	18 - 8	17 - 7	15 - 10	24 - 6	22 - 3	20 - 11	19 - 4	26 - 0	24 - 11	23 - 5	21 - 9
SP01	4:12	1	14	24 - 4	21 - 11	19 - 11	17 - 9	26 - 0	26 - 0	24 - 8	22 - 11	26 - 11	26 - 0	26 - 0	25 - 8
SP01	4:12	2n	4	4 - 3	3 - 9	3 - 6	3 - 3	5 - 2	4 - 7	4 - 4	4 - 0	5 - 11	5 - 3	4 - 11	4 - 6
SP01	4:12	2n	6	7 - 4	6 - 6	6 - 0	5 - 4	9 - 0	8 - 0	7 - 5	6 - 9	10 - 4	9 - 2	8 - 6	7 - 10
SP01	4:12	2n	8	10 - 3	9 - 2	8 - 6	7 - 5	12 - 9	11 - 4	10 - 5	9 - 6	14 - 7	13 - 0	12 - 1	11 - 0
SP01	4:12	2n	10	13 - 11	12 - 4	10 - 9	9 - 3	17 - 1	15 - 3	14 - 2	12 - 11	19 - 5	17 - 5	16 - 2	14 - 10
SP01	4:12	2n	12	17 - 7	15 - 5	13 - 8	11 - 9	21 - 4	19 - 1	17 - 10	16 - 4	24 - 6	21 - 9	20 - 3	18 - 7
SP01	4:12	2n	14	20 - 4	17 - 1	15 - 2	13 - 1	26 - 0	23 - 2	20 - 11	18 - 3	26 - 0	26 - 0	24 - 8	22 - 6
SP01	5:12	1	4	5 - 2	4 - 8	4 - 4	4 - 0	6 - 3	5 - 7	5 - 3	4 - 10	7 - 2	6 - 5	6 - 0	5 - 6
SP01	5:12	1	6	8 - 8	7 - 9	7 - 3	6 - 8	10 - 5	9 - 4	8 - 9	8 - 1	11 - 9	10 - 7	9 - 11	9 - 2
SP01	5:12	1	8	11 - 8	10 - 6	9 - 10	9 - 1	14 - 0	12 - 8	11 - 10	10 - 11	15 - 9	14 - 3	13 - 4	12 - 4
SP01	5:12	1	10	15 - 1	13 - 8	12 - 10	11 - 6	18 - 1	16 - 4	15 - 4	14 - 2	20 - 3	18 - 4	17 - 3	15 - 11
SP01	5:12	1	12	18 - 6	16 - 9	15 - 7	13 - 10	22 - 1	20 - 0	18 - 10	17 - 5	24 - 10	22 - 6	21 - 2	19 - 7
SP01	5:12	1	14	21 - 8	18 - 7	16 - 11	15 - 0	26 - 0	23 - 8	22 - 2	19 - 8	26 - 0	26 - 11	25 - 0	23 - 2
SP01	5:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 3	5 - 6	5 - 1	4 - 8
SP01	5:12	2n	6	7 - 9	6 - 10	6 - 4	5 - 9	9 - 5	8 - 6	7 - 11	7 - 2	10 - 9	9 - 8	9 - 0	8 - 3
SP01	5:12	2n	8	10 - 8	9 - 7	8 - 11	8 - 2	13 - 0	11 - 8	10 - 10	10 - 0	14 - 8	13 - 3	12 - 5	11 - 4
SP01	5:12	2n	10	14 - 1	12 - 8	11 - 5	9 - 11	17 - 0	15 - 3	14 - 3	13 - 2	19 - 2	17 - 4	16 - 2	14 - 10
SP01	5:12	2n	12	17 - 6	15 - 5	13 - 11	12 - 4	21 - 1	18 - 11	17 - 9	16 - 4	23 - 7	21 - 5	20 - 1	18 - 6
SP01	5:12	2n	14	20 - 0	16 - 11	15 - 3	13 - 5	24 - 10	22 - 7	20 - 6	18 - 0	26 - 0	25 - 3	23 - 9	22 - 1
SP01	6:12	1	4	5 - 2	4 - 8	4 - 4	4 - 0	6 - 3	5 - 7	5 - 3	4 - 10	7 - 2	6 - 5	6 - 0	5 - 6
SP01	6:12	1	6	8 - 8	7 - 9	7 - 3	6 - 8	10 - 5	9 - 4	8 - 9	8 - 1	11 - 9	10 - 7	9 - 11	9 - 2
SP01	6:12	1	8	11 - 8	10 - 6	9 - 10	9 - 1	14 - 0	12 - 8	11 - 10	10 - 11	15 - 9	14 - 3	13 - 4	12 - 4
SP01	6:12	1	10	15 - 1	13 - 8	12 - 10	11 - 6	18 - 1	16 - 4	15 - 4	14 - 2	20 - 3	18 - 4	17 - 3	15 - 11
SP01	6:12	1	12	18 - 6	16 - 9	15 - 7	13 - 10	22 - 1	20 - 0	18 - 10	17 - 5	24 - 10	22 - 6	21 - 2	19 - 7
SP01	6:12	1	14	21 - 8	18 - 7	16 - 11	15 - 0	26 - 0	23 - 8	22 - 2	19 - 8	26 - 0	26 - 0	25 - 0	23 - 2
SP01	6:12	2n	4	4 - 4	3 - 10	3 - 7	3 - 4	5 - 5	4 - 9	4 - 5	4 - 1	6 - 3	5 - 6	5 - 1	4 - 8
SP01	6:12	2n	6	7 - 9	6 - 10	6 - 4	5 - 9	9 - 5	8 - 6	7 - 11	7 - 2	10 - 9	9 - 8	9 - 0	8 - 3
SP01	6:12	2n	8	10 - 8	9 - 7	8 - 11	8 - 2	13 - 0	11 - 8	10 - 10	10 - 0	14 - 8	13 - 3	12 - 5	11 - 4
SP01	6:12	2n	10	14 - 1	12 - 8	11 - 5	9 - 11	17 - 0	15 - 3	14 - 3	13 - 2	19 - 2	17 - 4	16 - 2	14 - 10
SP01	6:12	2n	12	17 - 6	15 - 5	13 - 11	12 - 4	21 - 1	18 - 11	17 - 9	16 - 4	23 - 7	21 - 5	20 - 1	18 - 6
SP01	6:12	2n	14	20 - 0	16 - 11	15 - 3	13 - 5	24 - 10	22 - 7	20 - 6	18 - 0	26 - 0	25 - 3	23 - 9	22 - 1
SP01	7:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	7:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	7:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	7:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	7:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
SP01	7:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 0	26 - 0	24 - 5	22 - 8	26 - 0	26 - 0	26 - 11	25 - 5
SP01	7:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	7:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	7:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	7:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	7:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	7:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE E-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-42

Sheet Number 42 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP01	8:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	8:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	8:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	8:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	8:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
SP01	8:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 0	26 - 0	24 - 5	22 - 8	26 - 0	26 - 0	26 - 0	25 - 5
SP01	8:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	8:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	8:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	8:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	8:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	8:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2
SP01	9:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	9:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	9:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	9:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	9:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
SP01	9:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 0	26 - 11	24 - 5	22 - 8	26 - 0	26 - 11	26 - 0	25 - 5
SP01	9:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	9:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	9:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	9:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	9:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	9:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2
SP01	10:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	10:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	10:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	10:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	10:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 11	24 - 8	23 - 3	21 - 7
SP01	10:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 11	26 - 0	24 - 5	22 - 8	26 - 11	26 - 0	26 - 0	25 - 5
SP01	10:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	10:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	10:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	10:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	10:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	10:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2
SP01	11:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	11:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	11:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	11:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	11:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
SP01	11:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 0	26 - 0	24 - 5	22 - 8	26 - 0	26 - 0	26 - 0	25 - 5
SP01	11:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	11:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	11:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	11:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	11:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	11:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2
SP01	12:12	1	4	5 - 4	4 - 10	4 - 6	4 - 2	6 - 5	5 - 9	5 - 4	5 - 0	7 - 4	6 - 6	6 - 1	5 - 7
SP01	12:12	1	6	8 - 10	7 - 11	7 - 5	6 - 9	10 - 10	9 - 8	9 - 0	8 - 3	12 - 6	11 - 0	10 - 3	9 - 5
SP01	12:12	1	8	12 - 5	10 - 11	10 - 2	9 - 4	15 - 2	13 - 6	12 - 7	11 - 5	17 - 6	15 - 6	14 - 4	13 - 2
SP01	12:12	1	10	16 - 8	14 - 9	13 - 8	12 - 7	19 - 11	18 - 2	17 - 0	15 - 5	22 - 4	20 - 3	19 - 1	17 - 9
SP01	12:12	1	12	20 - 6	18 - 7	17 - 6	15 - 9	24 - 3	22 - 1	20 - 9	19 - 3	26 - 0	24 - 8	23 - 3	21 - 7
SP01	12:12	1	14	24 - 1	21 - 7	19 - 9	17 - 7	26 - 0	26 - 0	24 - 5	22 - 8	26 - 11	26 - 11	26 - 11	25 - 5
SP01	12:12	2n	4	4 - 9	4 - 3	4 - 0	3 - 9	5 - 10	5 - 3	4 - 10	4 - 6	6 - 8	5 - 11	5 - 7	5 - 2
SP01	12:12	2n	6	8 - 1	7 - 3	6 - 9	6 - 2	9 - 9	8 - 9	8 - 2	7 - 7	11 - 1	9 - 11	9 - 4	8 - 7
SP01	12:12	2n	8	11 - 0	9 - 11	9 - 3	8 - 6	13 - 5	12 - 1	11 - 3	10 - 3	15 - 2	13 - 8	12 - 9	11 - 9
SP01	12:12	2n	10	14 - 7	13 - 1	12 - 0	10 - 5	17 - 8	15 - 10	14 - 9	13 - 7	20 - 0	18 - 0	16 - 10	15 - 5
SP01	12:12	2n	12	18 - 2	16 - 4	14 - 9	12 - 11	22 - 0	19 - 9	18 - 5	17 - 0	25 - 0	22 - 5	20 - 11	19 - 3
SP01	12:12	2n	14	21 - 5	18 - 0	16 - 2	14 - 1	26 - 0	23 - 10	22 - 0	19 - 2	26 - 0	26 - 0	25 - 2	23 - 2

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE F-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-43

Sheet Number 43 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	3:12	1	4	4 - 8	4 - 2	3 - 11	3 - 5	5 - 9	5 - 1	4 - 9	4 - 5	6 - 6	5 - 10	5 - 5	5 - 0
SP02	3:12	1	6	7 - 11	7 - 1	6 - 6	5 - 7	9 - 8	8 - 7	8 - 0	7 - 4	11 - 3	9 - 11	9 - 2	8 - 5
SP02	3:12	1	8	11 - 2	9 - 10	8 - 9	7 - 7	14 - 2	12 - 5	11 - 5	10 - 4	16 - 7	14 - 6	13 - 4	12 - 1
SP02	3:12	1	10	15 - 8	13 - 3	11 - 4	9 - 6	19 - 2	17 - 5	16 - 0	14 - 5	21 - 6	19 - 6	18 - 4	16 - 10
SP02	3:12	1	12	19 - 8	17 - 6	14 - 11	12 - 6	23 - 5	21 - 3	19 - 11	18 - 5	26 - 0	23 - 10	22 - 5	20 - 9
SP02	3:12	1	14	22 - 2	19 - 0	17 - 3	14 - 1	26 - 0	24 - 11	22 - 7	20 - 1	26 - 0	26 - 0	26 - 11	24 - 6
SP02	3:12	2n	4	4 - 0	3 - 5	3 - 1	2 - 9	4 - 11	4 - 4	4 - 1	3 - 8	5 - 7	5 - 0	4 - 8	4 - 3
SP02	3:12	2n	6	6 - 11	5 - 8	5 - 0	4 - 5	8 - 6	7 - 7	7 - 0	6 - 2	9 - 10	8 - 8	8 - 1	7 - 4
SP02	3:12	2n	8	9 - 9	8 - 0	7 - 0	6 - 0	12 - 1	10 - 8	9 - 11	8 - 7	13 - 10	12 - 4	11 - 5	10 - 4
SP02	3:12	2n	10	12 - 6	10 - 1	8 - 11	7 - 8	16 - 2	14 - 5	12 - 10	10 - 11	18 - 5	16 - 6	15 - 4	14 - 0
SP02	3:12	2n	12	15 - 5	12 - 9	11 - 3	9 - 7	20 - 3	17 - 10	15 - 10	13 - 8	23 - 2	20 - 8	19 - 3	17 - 9
SP02	3:12	2n	14	17 - 4	14 - 4	12 - 8	10 - 10	24 - 0	19 - 10	17 - 9	15 - 4	26 - 11	25 - 2	23 - 4	20 - 2
SP02	4:12	1	4	4 - 8	4 - 2	3 - 11	3 - 5	5 - 9	5 - 1	4 - 9	4 - 5	6 - 6	5 - 10	5 - 5	5 - 0
SP02	4:12	1	6	7 - 11	7 - 1	6 - 6	5 - 7	9 - 8	8 - 7	8 - 0	7 - 4	11 - 3	9 - 11	9 - 2	8 - 5
SP02	4:12	1	8	11 - 2	9 - 10	8 - 9	7 - 7	14 - 2	12 - 5	11 - 5	10 - 4	16 - 7	14 - 6	13 - 4	12 - 1
SP02	4:12	1	10	15 - 8	13 - 3	11 - 4	9 - 6	19 - 2	17 - 5	16 - 0	14 - 5	21 - 6	19 - 6	18 - 4	16 - 10
SP02	4:12	1	12	19 - 8	17 - 6	14 - 11	12 - 6	23 - 5	21 - 3	19 - 11	18 - 5	26 - 0	23 - 10	22 - 5	20 - 9
SP02	4:12	1	14	22 - 2	19 - 0	17 - 3	14 - 1	26 - 0	24 - 11	22 - 7	20 - 1	26 - 0	26 - 0	26 - 11	24 - 6
SP02	4:12	2n	4	4 - 0	3 - 5	3 - 1	2 - 9	4 - 11	4 - 4	4 - 1	3 - 8	5 - 7	5 - 0	4 - 8	4 - 3
SP02	4:12	2n	6	6 - 11	5 - 8	5 - 0	4 - 5	8 - 6	7 - 7	7 - 0	6 - 2	9 - 10	8 - 8	8 - 1	7 - 4
SP02	4:12	2n	8	9 - 9	8 - 0	7 - 0	6 - 0	12 - 1	10 - 8	9 - 11	8 - 7	13 - 10	12 - 4	11 - 5	10 - 4
SP02	4:12	2n	10	12 - 6	10 - 1	8 - 11	7 - 8	16 - 2	14 - 5	12 - 10	10 - 11	18 - 5	16 - 6	15 - 4	14 - 0
SP02	4:12	2n	12	15 - 5	12 - 9	11 - 3	9 - 7	20 - 3	17 - 10	15 - 10	13 - 8	23 - 2	20 - 8	19 - 3	17 - 9
SP02	4:12	2n	14	17 - 4	14 - 4	12 - 8	10 - 10	24 - 0	19 - 10	17 - 9	15 - 4	26 - 0	25 - 2	23 - 4	20 - 2
SP02	5:12	1	4	4 - 11	4 - 5	4 - 1	3 - 8	6 - 0	5 - 4	5 - 0	4 - 7	6 - 10	6 - 1	5 - 8	5 - 2
SP02	5:12	1	6	8 - 3	7 - 5	6 - 11	6 - 0	9 - 11	8 - 11	8 - 4	7 - 8	11 - 2	10 - 1	9 - 5	8 - 8
SP02	5:12	1	8	11 - 2	10 - 0	9 - 2	8 - 1	13 - 4	12 - 1	11 - 4	10 - 5	15 - 0	13 - 7	12 - 9	11 - 9
SP02	5:12	1	10	14 - 5	12 - 5	11 - 2	9 - 10	17 - 3	15 - 7	14 - 8	13 - 1	19 - 4	17 - 6	16 - 6	15 - 3
SP02	5:12	1	12	17 - 2	14 - 9	13 - 5	11 - 10	21 - 2	19 - 1	17 - 7	15 - 7	23 - 8	21 - 6	20 - 2	18 - 8
SP02	5:12	1	14	18 - 10	16 - 2	14 - 8	13 - 0	24 - 8	21 - 3	19 - 3	17 - 1	26 - 0	25 - 5	23 - 10	21 - 6
SP02	5:12	2n	4	4 - 1	3 - 6	3 - 2	2 - 10	5 - 1	4 - 6	4 - 2	3 - 10	5 - 11	5 - 2	4 - 10	4 - 5
SP02	5:12	2n	6	7 - 4	6 - 2	5 - 4	4 - 8	9 - 0	8 - 0	7 - 6	6 - 9	10 - 3	9 - 2	8 - 6	7 - 10
SP02	5:12	2n	8	10 - 2	8 - 8	7 - 9	6 - 7	12 - 5	11 - 1	10 - 4	9 - 3	14 - 0	12 - 7	11 - 9	10 - 9
SP02	5:12	2n	10	12 - 10	10 - 9	9 - 7	8 - 4	16 - 2	14 - 6	13 - 2	11 - 6	18 - 4	16 - 5	15 - 4	14 - 2
SP02	5:12	2n	12	15 - 6	13 - 2	11 - 10	10 - 3	20 - 1	17 - 8	15 - 10	13 - 11	22 - 7	20 - 5	19 - 1	17 - 7
SP02	5:12	2n	14	17 - 3	14 - 6	13 - 1	11 - 6	22 - 10	19 - 7	17 - 7	15 - 5	26 - 0	24 - 2	22 - 5	19 - 10
SP02	6:12	1	4	4 - 11	4 - 5	4 - 1	3 - 8	6 - 0	5 - 4	5 - 0	4 - 7	6 - 10	6 - 1	5 - 8	5 - 2
SP02	6:12	1	6	8 - 3	7 - 5	6 - 11	6 - 0	9 - 11	8 - 11	8 - 4	7 - 8	11 - 2	10 - 1	9 - 5	8 - 8
SP02	6:12	1	8	11 - 2	10 - 0	9 - 2	8 - 1	13 - 4	12 - 1	11 - 4	10 - 5	15 - 0	13 - 7	12 - 9	11 - 9
SP02	6:12	1	10	14 - 5	12 - 5	11 - 2	9 - 10	17 - 3	15 - 7	14 - 8	13 - 1	19 - 4	17 - 6	16 - 6	15 - 3
SP02	6:12	1	12	17 - 2	14 - 9	13 - 5	11 - 10	21 - 2	19 - 1	17 - 7	15 - 7	23 - 8	21 - 6	20 - 2	18 - 8
SP02	6:12	1	14	18 - 10	16 - 2	14 - 8	13 - 0	24 - 8	21 - 3	19 - 3	17 - 1	26 - 0	25 - 5	23 - 10	21 - 6
SP02	6:12	2n	4	4 - 1	3 - 6	3 - 2	2 - 10	5 - 1	4 - 6	4 - 2	3 - 10	5 - 11	5 - 2	4 - 10	4 - 5
SP02	6:12	2n	6	7 - 4	6 - 2	5 - 4	4 - 8	9 - 0	8 - 0	7 - 6	6 - 9	10 - 3	9 - 2	8 - 6	7 - 10
SP02	6:12	2n	8	10 - 2	8 - 8	7 - 9	6 - 7	12 - 5	11 - 1	10 - 4	9 - 3	14 - 0	12 - 7	11 - 9	10 - 9
SP02	6:12	2n	10	12 - 10	10 - 9	9 - 7	8 - 4	16 - 2	14 - 6	13 - 2	11 - 6	18 - 4	16 - 5	15 - 4	14 - 2
SP02	6:12	2n	12	15 - 6	13 - 2	11 - 10	10 - 3	20 - 1	17 - 8	15 - 10	13 - 11	22 - 7	20 - 5	19 - 1	17 - 7
SP02	6:12	2n	14	17 - 3	14 - 6	13 - 1	11 - 6	22 - 10	19 - 7	17 - 7	15 - 5	26 - 0	24 - 2	22 - 5	19 - 10
SP02	7:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	7:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	7:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	7:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	7:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 0	23 - 7	22 - 2	20 - 7
SP02	7:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 0	24 - 5	22 - 4	19 - 11	26 - 0	26 - 0	26 - 0	24 - 3
SP02	7:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	7:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	7:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	7:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	7:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	7:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE G-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-44

Sheet Number 44 of 45

RAFTERS ALLOWABLE SPANS
USVI

Date: 3/6/2018
Governing Code: 2018 IBC/ASCE 7-16
Risk Category: II
Base Wind Speed: 165 MPH

Dead Load: 10 PSF
Deflection Limits: L/180
Limits and Assumption: See Appendix General Notes
Per ASCE 7-16, Zone 1 refers to the interior zone and Zone 2n refers to the edge zone of the roof. User may conservatively assume that Zone 2n extends four feet from the roof edge.

Exposure D, K_{zt} = 1.0

Governing Span (ft-in)

Wood Species	Slope	Zone	Nominal Depth (in)	Nominal 2 inch Thick Sections				Nominal 3 inch Thick Sections				Nominal 4 inch Thick Sections			
				Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing	Span @12" Spacing	Span @16" Spacing	Span @19.2" Spacing	Span @24" Spacing
SP02	8:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	8:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	8:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	8:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	8:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 0	23 - 7	22 - 2	20 - 7
SP02	8:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 0	24 - 5	22 - 4	19 - 11	26 - 0	26 - 0	26 - 0	24 - 3
SP02	8:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	8:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	8:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	8:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	8:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	8:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3
SP02	9:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	9:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	9:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	9:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	9:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 11	23 - 7	22 - 2	20 - 7
SP02	9:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 11	24 - 5	22 - 4	19 - 11	26 - 0	26 - 11	26 - 0	24 - 3
SP02	9:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	9:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	9:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	9:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	9:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	9:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3
SP02	10:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	10:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	10:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	10:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	10:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 0	23 - 7	22 - 2	20 - 7
SP02	10:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 0	24 - 5	22 - 4	19 - 11	26 - 0	26 - 0	26 - 0	24 - 3
SP02	10:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	10:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	10:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	10:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	10:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	10:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3
SP02	11:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	11:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	11:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	11:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	11:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 0	23 - 7	22 - 2	20 - 7
SP02	11:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 0	24 - 5	22 - 4	19 - 11	26 - 0	26 - 0	26 - 0	24 - 3
SP02	11:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	11:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	11:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	11:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	11:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	11:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3
SP02	12:12	1	4	5 - 1	4 - 7	4 - 4	4 - 0	6 - 1	5 - 6	5 - 2	4 - 9	6 - 11	6 - 2	5 - 9	5 - 4
SP02	12:12	1	6	8 - 5	7 - 7	7 - 0	6 - 2	10 - 3	9 - 2	8 - 7	7 - 10	11 - 9	10 - 5	9 - 9	8 - 11
SP02	12:12	1	8	11 - 8	10 - 4	9 - 7	8 - 4	14 - 4	12 - 10	11 - 11	10 - 10	16 - 6	14 - 8	13 - 7	12 - 6
SP02	12:12	1	10	15 - 9	13 - 8	12 - 2	10 - 4	19 - 1	17 - 4	16 - 0	14 - 7	21 - 4	19 - 5	18 - 3	16 - 10
SP02	12:12	1	12	19 - 7	17 - 4	15 - 1	13 - 0	23 - 3	21 - 1	19 - 10	18 - 3	26 - 0	23 - 7	22 - 2	20 - 7
SP02	12:12	1	14	21 - 10	18 - 11	17 - 3	14 - 7	26 - 0	24 - 5	22 - 4	19 - 11	26 - 0	26 - 0	26 - 0	24 - 3
SP02	12:12	2n	4	4 - 6	4 - 1	3 - 9	3 - 4	5 - 7	5 - 0	4 - 7	4 - 4	6 - 4	5 - 8	5 - 3	4 - 11
SP02	12:12	2n	6	7 - 8	6 - 10	6 - 2	5 - 5	9 - 4	8 - 4	7 - 10	7 - 2	10 - 7	9 - 6	8 - 10	8 - 2
SP02	12:12	2n	8	10 - 6	9 - 2	8 - 3	7 - 3	12 - 9	11 - 5	10 - 8	9 - 9	14 - 5	13 - 0	12 - 2	11 - 1
SP02	12:12	2n	10	13 - 6	11 - 4	10 - 2	8 - 10	16 - 10	15 - 1	13 - 10	12 - 2	19 - 0	17 - 1	15 - 11	14 - 8
SP02	12:12	2n	12	16 - 5	13 - 10	12 - 5	10 - 10	20 - 11	18 - 9	16 - 11	14 - 8	23 - 10	21 - 4	19 - 11	18 - 4
SP02	12:12	2n	14	18 - 3	15 - 4	13 - 9	12 - 1	25 - 0	20 - 10	18 - 9	16 - 4	26 - 0	25 - 7	24 - 0	21 - 3

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

BY COMMISSIONER: DAWN L. HENRY

DRAWING TITLE: RAFTER DESIGN TABLE H-EXP. D, Kzt = 1.0

Note: Prior to construction contact U.S.V.I. Department of Planning and Natural Resources, Division of Permits for building requirements in the Virgin Islands. This information has been developed solely as guidance and is believed to meet the U.S.V.I. Building Code. All drawings must be separately approved by DPNR, Division of Permits upon submission of a building permit application.

Sheet Number:

A-45

Sheet Number 45 of 45