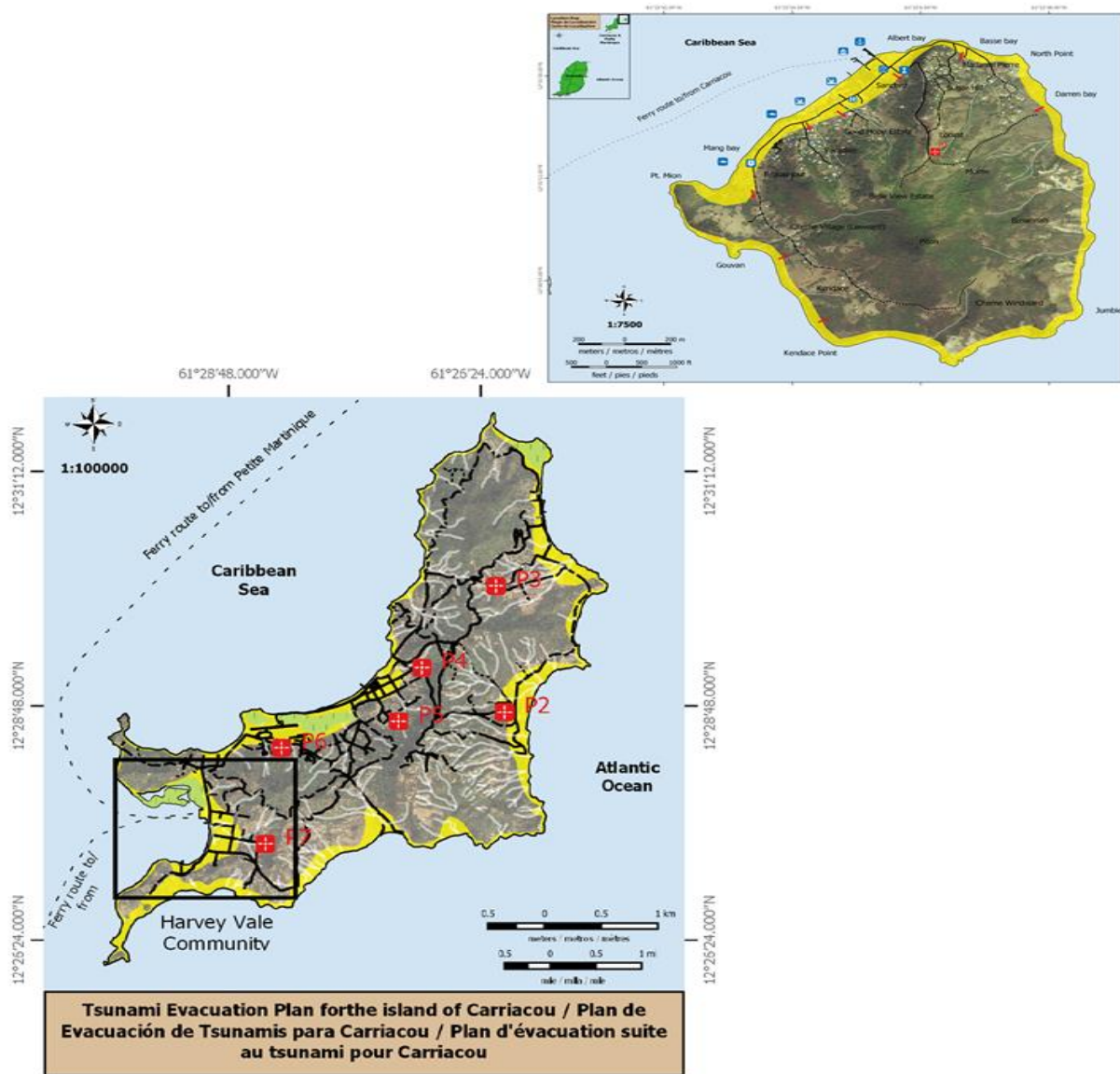


# TSUNAMI STANDARD OPERATING PROCEDURE (SOP) FOR CARRIACOU AND PETITE MARTINIQUE, GRENADA



National Disaster Management Agency (NaDMA)  
Carriacou and Petite Martinique

**September 13, 2019**

## **GENERAL INFORMATION**

This Standard Operating Procedure (SOP) is to provide guidance for actions to be taken in the event of a tsunami affecting Carriacou and Petite Martinique. It defines actions to be taken by institutions/community to coordinate early warning and response to mitigate the impact of a tsunami.

Tsunamis result typically from large earthquakes; however, tsunamis can also be generated from submarine and sub-aerial landslides, volcanic eruptions and asteroids. Tsunamis can affect a region from within minutes up to several hours following an earthquake.

This SOP outlines initial alert and warning protocols, and responsibilities and actions to be taken.

## **RISK PROFILE**

Grenada is part of a volcanically and tectonically active ridge formed along the Lesser Antilean island arc system. The island is at risk from local seismic and volcanic activity, as well as submarine or coastal landslides which can generate tsunamis. Most earthquake activity is concentrated to the east of the islands in the Lesser Antilles Subduction Zone. Grenada has two active volcanic centers, Mt. St. Catherine (land) and Kick Em Jenny (sub marine). 'Kick 'em Jenny' volcano is located just 21.8 km and 38 km South of Carriacou and Petite Martinique respectively and therefore if a tsunami were to be generated it would reach the islands within a couple of minutes. Submarine and coastal landslides could also generate tsunamis that could reach the shores of the islands within minutes and tens of minutes, depending on the source. Irrespective of the source, the potential impact of a tsunami to Carriacou and Petite Martinique is extremely high given the fact that most of the population lives along the coastline, but fortunately there are mountainous areas where the people could quickly evacuate and be safer. In addition to these sources, Carriacou and Petite Martinique are also at risk from tsunamis generated from regional and distant tsunamis. These would take between 1 and 3 or more than 3 hours, respectively.

## **NATIONAL TSUNAMI WARNING CENTER**

The Meteorological Office serves as the National Tsunami Warning Center and National Tsunami Warning Focal Point. It will evaluate the tsunami messages issued by the US Pacific Tsunami Warning Center. They will be responsible for determining the level of alert. This information will be communicated directly to the National Disaster Management Agency (NaDMA) and the Headquarters of the Royal Grenada Police Force.

## **TSUNAMI ALERT LEVELS FOR GRENADA**

The Grenada Meteorological Office will issue Tsunami alerts based on its assessment of the PTWC products and other information and data (Appendix 1). The four alert levels for Grenada are:

### **Tsunami Warning**

If Grenada is included within the countries where there might be hazardous tsunami waves, a warning will be issued only if the estimated time of arrival (ETA) is 3 hours or under. The arrival time could be as little as 5 to 60 minutes if the event is locally generated. Persons should be aware of the natural warning signs).

The Tsunami warning alert will be indicated by the color **RED**.

When a tsunami is imminent residents will be advised to run to higher ground away from the sea to the ASSEMBLY/MUSTER POINTS (Appendix 4). They must use all possible evacuation routes as indicated on the tsunami evacuation maps. The assembly points are indicated by red symbols on the maps. Local roads and paths can also be used to evacuate as long as they do not run parallel to the coast.

In addition to official alerts, if you **FEEL** a strong earthquake, **SEE** a sudden fall in sea level, **HEAR** a loud roar from the sea you should **RUN TO HIGH GROUND**.

### **Tsunami Advisory:**

A Tsunami Advisory is issued when there is a threat of possible dangerous currents and flooding. Residents are expected to move away from marinas and beaches and follow official instructions. If the event is generated regionally, the time span is 60 minutes to 3 hours.

The color used to indicate this level is **ORANGE**.

### **Tsunami Watch:**

In Grenada a Watch product is issued when there is a potential threat, but the Expected Time of Arrival (ETA) is greater than 3 hours. In this case the islands of Carriacou and Petite Martinique should remain on guard for further information and guidance.

The color for this alert level is **YELLOW**.

### **Tsunami Information Statement:**

A tsunami information statement is issued when an earthquake occurs, but there is no tsunami threat. The purpose of the statement is to keep citizens informed.

This alert is indicated by the color **GREEN**.

## **Tsunami Warning Protocol for Carriacou and Petite Martinique**

In the event of a tsunami threat to the parish of Carriacou and Petite Martinique information will be disseminated according to an established protocol (Appendix 3).

The Head office of the Royal Grenada Police Force in Carriacou and Petite Martinique acting as the Local Tsunami Warning Focal Point inform the people of Carriacou and Petite Martinique. The Carriacou and Petite Martinique district Police Station will then inform NaDMA District Coordinators and the churches to initiate the tolling of their bells. The district RGPF will then sound the following:

- Fire Station Sirens
- Police Sirens/Vehicle Loud Speakers

When a Tsunami warning is issued, given that the police headquarters of Carriacou and Petite Martinique are located in the evacuation zone, it will disseminate the alerts, if time permits and relocate to the following areas:

- Carriacou: Sharon George residence on Fort Hill
- Brent Delisle: Petite Martinique.

The NaDMA's Office Carriacou will inform the churches to initiate the tolling of their bells. The following churches would initiate the tolling of the Church Bells:

- Christ the King Anglican Church (Hillsborough)
- Holy Rosary Church (L'Esterre)
- St. Peter and Paul (Windward) Roman Catholic Church
- St. Francis Anglican Church (Hillsborough)
- St. Lawrence Catholic Church (Harvey Vale)
- Harbor Light of the Windward's Church (Mt. Pleasant)
- Sacred Heart Catholic Church (Petite Martinique)

Other mechanisms to alert the populations include the utilization of the police siren at the Lauriston Airport and the use of drums in the communities throughout the island.

This signals the beginning of the evacuation procedure. This process will continue until a Tsunami Cancellation and/or All Clear is given by NaDMA.

The evacuation process will be guided by evacuation maps and signage (Appendix 5 and 6).

The following table defines the further the roles and responsibilities for tsunami warning and response in Carriacou and Petite Martinique. Appendix 2 has a list of contacts and their contact information.

ROLES	RESPONSIBILITIES
ALARMS Sounding of sirens Ringing of bells Beating of drums	<ul style="list-style-type: none"> <li>▪ Carriacou and Petite Martinique Police</li> <li>▪ Christ the King Anglican Church (Hillsborough)</li> <li>▪ Holy Rosary Church (L'Esterre)</li> <li>▪ St. Peter and Paul (Windward) Roman Catholic Church</li> <li>▪ St. Francis Anglican Church (Hillsborough)</li> <li>▪ St. Lawrence Catholic Church (Harvey Vale)</li> <li>▪ Harbor Light of the Windward's Church (Mt. Pleasant)</li> <li>▪ Sacred Heart Catholic Church (Petite Martinique)</li> </ul>
Evacuation	Carriacou and Petite Martinique Police
Muster point management	District Management Committees
Shelter management	District Shelter Management Sub-committee
Search and rescue	Carriacou and Petite Martinique Police

## **Appendix 1**

### **Tsunami Alert Levels for Grenada**

Tsunami Alert Levels for Grenada, Carriacou and Petite Martinique Niveles de Alerta de Tsunami para Grenada, Carriacou y Petite Martinique Niveaux d'alerte aux tsunamis pour Grenada, Carriacou et Petite Martinique	
<ul style="list-style-type: none"> <li>• Danger/ Flooding Peligro / Inundación Danger / Inundation</li> <li>• Run to higher ground Corra hacia un lugar más alto Couvrez vers un terrain en hauteur</li> <li>• Follow emergency instructions Siga las instrucciones de emergencias Suivez es instructions d'urgence</li> </ul>	<b>WARNING</b> <b>AVISO</b> <b>ATTENTION</b>
<b>ADVISORY</b> <b>ADVERTENCIA</b> <b>ADVERTISSEMENT</b>	<ul style="list-style-type: none"> <li>• Dangerous currents possible Posibles corrientes peligrosas Courants dangereux possibles</li> <li>• Move out of the water, off the beaches and out of harbors and marinas Salir del agua, playa, puertos y marinas Sortez de l'eau, de la plage, des ports et marinas</li> <li>• Follow emergency instructions Siga las instrucciones de emergencias Suivez les instructions d'urgence</li> </ul>
<ul style="list-style-type: none"> <li>• Distant Event Evento Lejano Origine lointaine</li> <li>• Local threat under evaluation Peligro local bajo evaluación Menace locale en cours d'évaluation</li> <li>• Stay tuned for further official information Atento para más información oficial Restez à l'écoute pour plus d'informations officielles</li> </ul>	<b>WATCH</b> <b>VIGILANCIA</b> <b>VEILLE</b>
<b>BULLETIN</b> <b>BOLETÍN</b> <b>BULLETIN</b>	<ul style="list-style-type: none"> <li>• A small or distant event with no local threat Evento pequeño o distante sin peligro local Événement mineur ou lointain sans danger local</li> <li>• No warning, advisory or watch issued No se ha emitido Aviso, Advertencia o Vigilancia Pas d'Avis, Avertissement ou Veille émise</li> <li>• Information only Sólo información Pour information seulement</li> </ul>

## Appendix 2

### Tsunami Emergency contacts in Carriacou and Petite Martinique

Organization/Position	Name	Work #	Mobile #	Email
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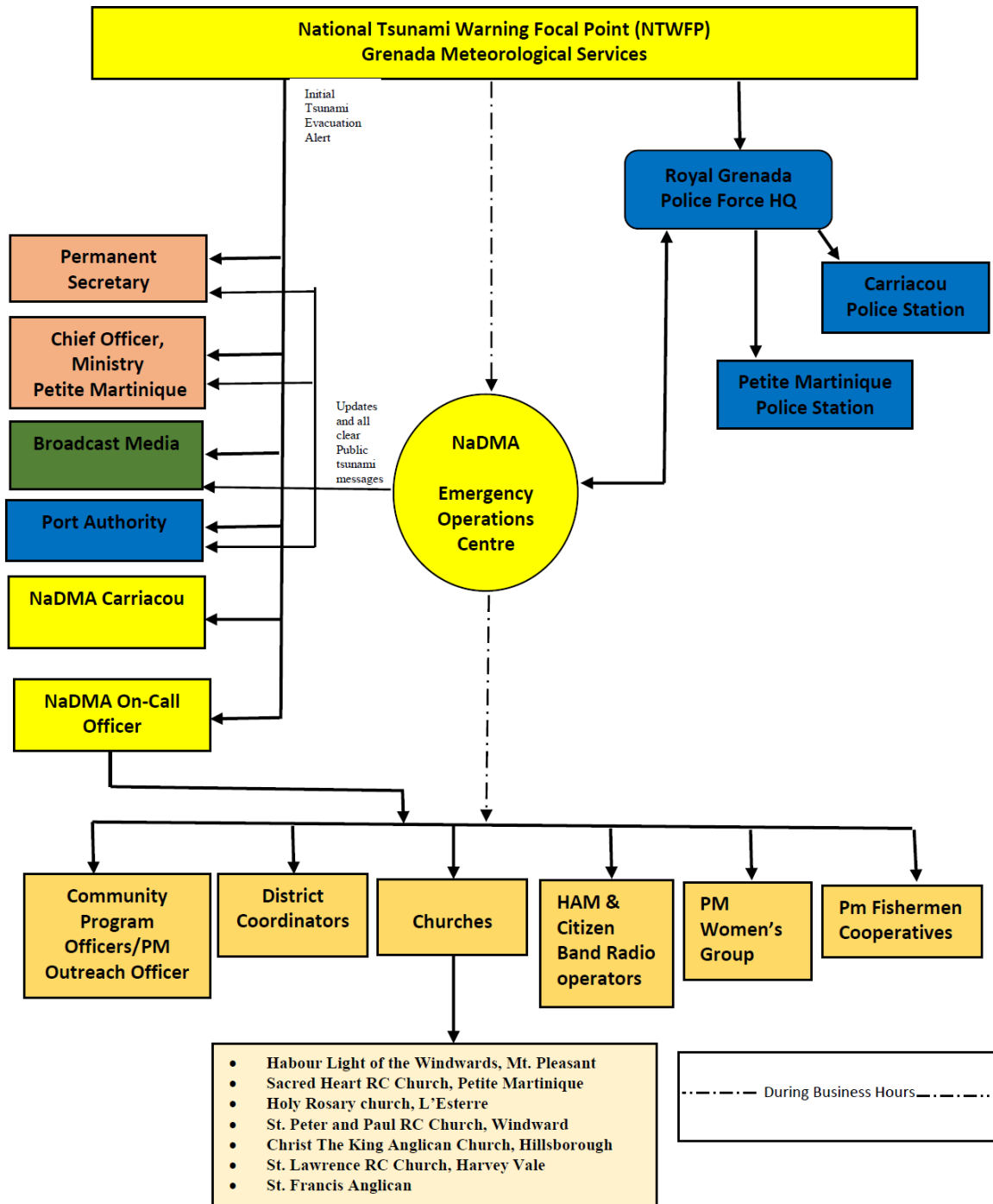


Meteorological Office	Mr. Hubert Whyte	444-4142 ext. 2023	534-5262	<a href="mailto:hwhyte@mbiagrenada.com">hwhyte@mbiagrenada.com</a> <a href="mailto:forcaster@mbiagrenada.com">forcaster@mbiagrenada.com</a>
Permanent Secretary, Ministry of Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management & Information	Mrs. Roxie Mc Leish Hutchinson	440-2708		<a href="mailto:krphutchinson@gmail.com">krphutchinson@gmail.com</a>
Permanent Secretary, Ministry of Carriacou & Petite Martinique Affairs & Local Government	Ms. Rholda Quamina	443-6026	404-8879	<a href="mailto:minccoupm@gmail.com">minccoupm@gmail.com</a>
Royal Grenada Police Force	ACP. Edwin Martin	440-3999 435-2346	405-5300	<a href="mailto:rgpf@spiceisle.com">rgpf@spiceisle.com</a> <a href="mailto:edwinmartin@yahoo.com">edwinmartin@yahoo.com</a>
Carriacou Police Station	Supt. Lynda Francis	443-7482	459-2352	<a href="mailto:lyndafrncs9@gmail.com">lyndafrncs9@gmail.com</a>
Petite Martinique Police Station		443-9044	405-3165	
National Disaster Management Agency	Supt. Sylvan Mc Intyre	440-8390	405-7451	<a href="mailto:sylvamac.biz@gmail.com">sylvamac.biz@gmail.com</a> <a href="mailto:nadma@spiceisle.com">nadma@spiceisle.com</a>
Community Program Officer, NaDMA, Carriacou	Ms. Bernice Date	443-9335	420-7301	<a href="mailto:datebernice@gmail.com">datebernice@gmail.com</a> <a href="mailto:nadmaccou@gmail.com">nadmaccou@gmail.com</a>
Assistant Community Program Officer, NaDMA Carriacou	Ms. Diana De Roche	443-9335	415-3996	<a href="mailto:dianaderoche@gmail.com">dianaderoche@gmail.com</a>
Outreach Officer, NaDMA, Petite Martinique	Ms. Aria Bethel	443-9409	421-0167	<a href="mailto:aria_bethel19@outlook.com">aria_bethel19@outlook.com</a>
District Disaster Coordinator Carriacou	Ms. Ethlin Alexander	443-8351	456-152	<a href="mailto:ettiealexander@gmail.com">ettiealexander@gmail.com</a>
Deputy District Disaster Coordinator, Carriacou	Ms. Kisha McFarlane	443-6026	416-6522	<a href="mailto:kisham23@hotmail.com">kisham23@hotmail.com</a>
NaDMA District Coordinator (AG), Petite Martinique	Mr. Gary Blair		414-3915	<a href="mailto:lovemrsmooth@hotmail.com">lovemrsmooth@hotmail.com</a>
Deputy District Coordinator Petite Martinique	Ms. Angiel Deroche	443-9061	538-7041	<a href="mailto:angiederochr@yahoo.co.uk">angiederochr@yahoo.co.uk</a>
Chief Officer, Ministry, Petite Martinique	Ms. Maxanne Francis	443-9067 443-9273	403-4654	<a href="mailto:maxannefrancis@gmail.com">maxannefrancis@gmail.com</a>
Petite Martinique Women's Group	Mrs. Akeisha Clarke Frank		535-0893	<a href="mailto:akeishasclarke@gmail.com">akeishasclarke@gmail.com</a>
St. Francis Anglican Church, Hillsborough				
St. Lawrence Catholic Church, Harvey Vale				
Christ the King Anglican Church, Hillsborough				
St. Peter and Paul Roman Catholic Church, Windward	Mr. Terrance Mc Lawrence	403-0964		
Sacred Heart Roman Catholic Church, Petite Martinique				
Holy Rosary Church, L' Esterre	Sebastian Stiell/ Elizabeth John	459-9881		<a href="mailto:Sebastian_Stiell@hahoo.com">Sebastian_Stiell@hahoo.com</a>
Harbor Light of the Windward's Church, Mt. Pleasant				
PRO, Ministry of Carriacou & Petite Martinique Affairs			410-8646	<a href="mailto:minccoupm@gmail.com">minccoupm@gmail.com</a>
Grenada Ports Authority	Mr. Dexter Leggard	443-8399	536-0436	<a href="mailto:dexterleggard@gmail.com">dexterleggard@gmail.com</a>
Fisheries Officer, Carriacou	Mr. Junior McDonald	443-6026	417-2188	

Petite Martinique Fishermen Cooperatives	Mr. Dexter Miller	443-6026 443-9046	416-2873	<a href="mailto:dextermiller42@gmail.com">dextermiller42@gmail.com</a>
Youth Emergency Action Committee (YEAC)	Ms. Sheena Bristol	443-8519	414-1063	<a href="mailto:sheenabristol@gmail.com">sheenabristol@gmail.com</a> <a href="mailto:yeacgrenada@gmail.com">yeacgrenada@gmail.com</a>
Vibes Radio Station	Mr. Kimberlain Mills	443-0101	439-0101	<a href="mailto:vibes101@gmail.com">vibes101@gmail.com</a>
Sister Isle Radio	Mr. Linton Lendore	443-8141	406-2301	<a href="mailto:sisterisle@gmail.com">sisterisle@gmail.com</a>
Harbour Light of the Windwards	Mr. Randy Cornelius	443-7628	414-0931	<a href="mailto:harbourlight@spiceisle.com">harbourlight@spiceisle.com</a>
Ham Radio Operators & Citizen Band Radio Operator	Mr. Dennise Cummings	443-7386	457-4125	
	Mr. Randy Cornelius	443-7628	414-0931	<a href="mailto:harbourlight@spiceisle.com">harbourlight@spiceisle.com</a>
Officer, Grenada Red Cross Society, Carriacou	Ms. Ruth Clement	443-6026	423-5014	<a href="mailto:redcrossccou@gmail.com">redcrossccou@gmail.com</a>
Carriacou Fisher Folk	Mr. Christopher Bartholomew		537-9110	
	Brian Whyte		415-1503	

## Appendix 3

## Communication Matrix



## **Appendix 4**

### **Assembly (Muster) Points in Carriacou and Petite Martinique**

Mrs. Marcelle Bethel yard (P1)

Open area in front Mt. Pleasant Medical (P2)

Open area near Mr. Lennox Cox (Pro) Shop (P3)

Open area near Boyok Lawrence shop (P4)

Open area in Prospect Hall crossroad (P5)

Open area in front Mrs. Lynette Gay residence (P6)

Harvey Vale Government School Compound (P7)

***RESIDENTS WILL RUN AWAY FROM THE SEA AND NOT ALONG THE COAST***

## Appendix 5

### TSUNAMI SIGNS USED INCARRIACOU & PETITE MARTINIQUE



## **Appendix 6**

Tsunami Evacuation Maps

(to be included once approved by Cabinet)