

Tunapuna/Piarco Preliminary Vulnerability Assessment



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For the Office of Disaster Preparedness and Management

The following report is intended to provide a brief overview of the existing levels of vulnerability within the Tunapuna/Piarco and Arima Municipality, inclusive of critical facilities. It is not designed to capture complete vulnerability or include in-depth analysis and should not be used thusly. It provides a foundation upon which detailed vulnerability and risk assessments can be built.

Hazard Profile

Tunapuna Piarco has the potential for the occurrence of the following hazards:

Natural	Anthropogenic	Key
Fires		Hydrological
Epidemics		Atmospheric/ Metrological
Flooding	Civil Unrest	Seismic
Landslides	Industrial/ Technological Hazards	Technological
Hurricanes & Tropical Cyclones		Social
Earthquakes		Biological
		Belonging to several categories

Table 1: Tunapuna Piarco potential hazards

The extent to which the above hazards affect the area vary, however flooding (Flash and Riverine) has the most significant impact in terms to both frequency and damage magnitude, followed by landslides.

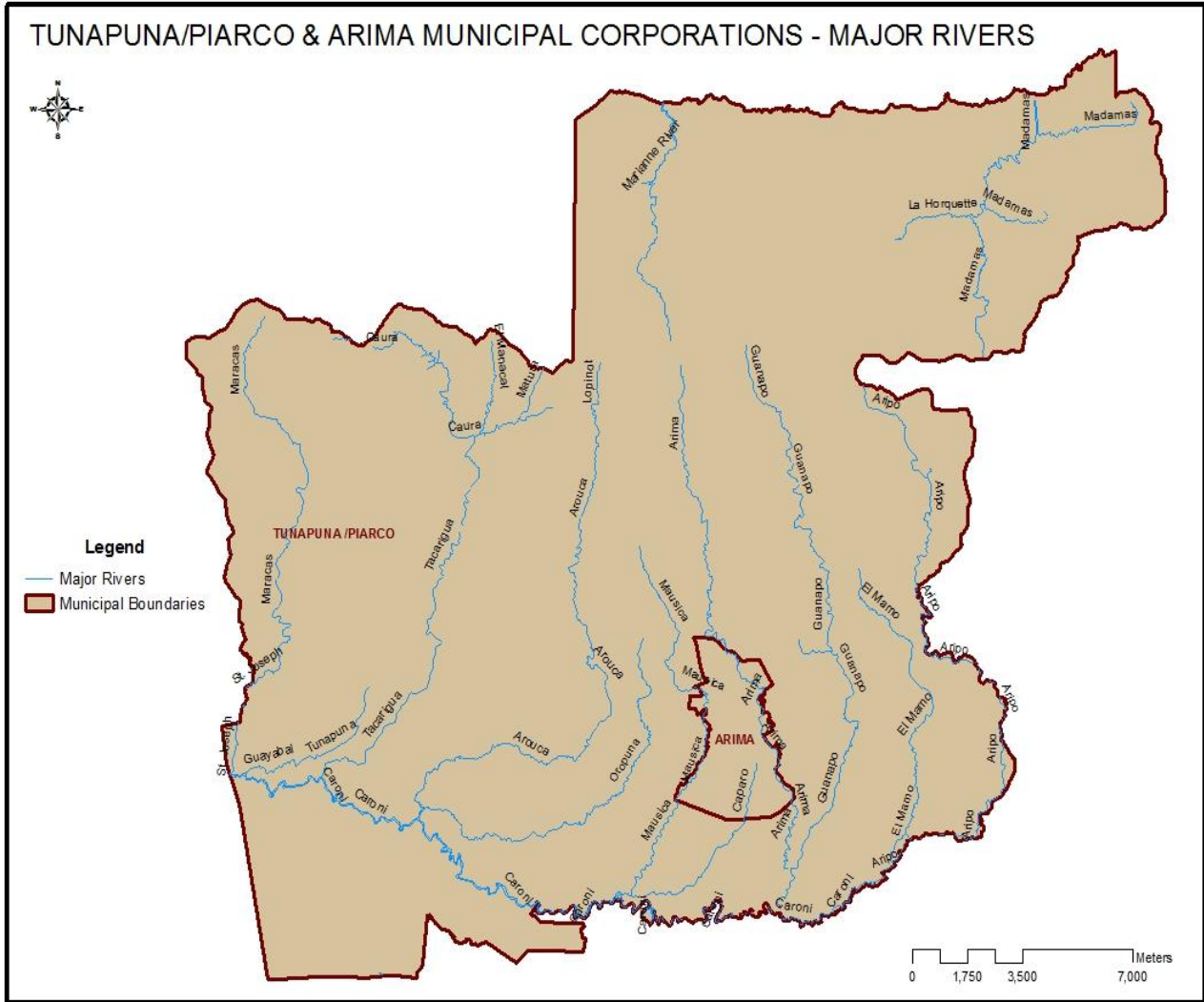
Flood Prone Areas

Tunapuna /Piarco are dominated by the northern range, with elevations of approximately 457 to 610 meters. The natural drainage channels on the northern side of the range are steep, narrow, gorge-like valleys through which flow the Yarra, Madamas and Marianne Rivers among others. The landward slopes are less steep, with the Maracas Valley being wider and deeper than others. Many of the **large rivers in North Trinidad have their sources in these slopes** (see Map 1)**including the Maracas /St.Joseph , Caura/ Tacarigua, Lopinot /Arouca, Mausica , Arima ,Oropuna , Guanapo ,El Mamo and Aripo Rivers which all flow into the Caroni River.** The southern portion of the municipality falls within the northern basin extending from the foothills of the northern range to those of the central range and consists of the floodplains and alluvial flats of the Caroni river system and the northern terraces.

Tunapuna/ Piarco are **particularly vulnerable to flooding in areas along the foothills of the Northern Range.** This type of flooding is largely due to increased urban runoff, which is further exacerbated by an inadequate and clogged drainage systems and water courses, poor maintenance of drains and culverts, in discriminate dumping of garbage into waterways, poor maintenance of river channels and changes in land use over time. These factors along with the presence of several rivers and relative elevation indicate that this municipality is susceptible to both flash and riverine flooding. Riverine flooding is worsened by quarrying activities, which leads to river sedimentation and the siltation of drainage channels reducing the river's hydraulic capacity resulting in flooding.

The following are areas within the municipality which are susceptible to flooding:

1. Kelly Village
2. St. Helena
3. Piarco
4. Carapo
5. Las Lomas
6. San Raphael
7. Tumpuna Road
8. Guanapo
9. Acono Road
10. Thomas Trace
11. Caurita Road
12. 1st Street, Five Rivers
13. Valsayn North and South
14. Lower Bon Air Village
15. Golden Grove Road
16. Church Street Extension
17. Balthazar Street to Macoya Road
18. Hydraulic Road
19. College Trace
20. Centenary Street Extension
21. Macoya Trace
22. Hardial Avenue
23. St. Augustine Trace
24. Tacarigua Road
25. Caura Royal Road
26. Main Road Maloney Street
27. Pasea Extension Road
28. Ponder Drive
29. Spring Village
30. Lower Curepe
31. Bamboo Grove #2
32. Warner Street
33. Freeman Road
34. Bryce Trace
35. Streatham Lodge Extension
36. Sellier Street
37. Caroni Village Streets
38. Marcano Street
39. La Solita Road
40. Lower Fairley Street
41. Eastern Main Road
42. Pentecostal Street
43. Waterfall Road
44. Lower Mc Lean Street
45. Gordon Street
46. Cavascuervos Road
47. Lower Tunapuna Road
48. Warner Trace
49. Thomas Trace
50. Warrenville
51. Bejucal
52. Cawpore
53. Caroni Savanna Road
54. . El Carmen
55. Frederick Settlement
56. La Paille



Map 1 Major rivers within the Tunapuna/Piarco and Arima Municipality .

Towards the north of the municipality, both land elevation (northern range), and river concentration increases, this can lead to landslide susceptibility, as steep slope angles with water acting as a trigger create ideal conditions for mass wasting. Excavation and quarrying practices serve to exacerbate the situation, leading to slope instability and the resultant landslides.

Landslide Prone Areas

1. Along the Lopinot Road
2. Areas along the Blanchisseuse Road
3. Areas along the Aripo road
4. Paria Morne Bleu Road and North Coast Road
5. Brasso Seco Village

Industrial Hazards

The potential for industrial /technological hazards is great as well, due to the presence of several industrial sites within the area such as the Macoya Trincity Industrial Estate.

Industrial/Technological Areas

1. Piarco International Airport – Piarco
2. Nestle Factory-Eastern corner of CRH and UBH
3. Orange Grove Estate , Blue waters plant etc
4. Wallerfield Industrial Estate – Wallerfield
5. Wallerfield Industrial and Technology Park – Wallerfield
6. **Frederick Settlement Industrial Estate – Fredrick Settlement**
 - Aerosol Filling Plant and Plastic Blow Molding & Injection Plant ,
 - Agro-Processing ,
 - Aluminum Doors and windows and the processing ,
 - cleaning of ferrous and non-ferrous materials;
 - assembly and re-packaging auto parts and accessories ;
 - building components ranging from wooden doors, pre-fab concrete benches to wooden cupboards, breads and other baked goods;
 - canning of fruits and vegetables ;
 - cartoon and food boxes;
 - commercial printing and publishing; construction and hardware products;
 - diaries and vinyl heat sealed and sewn promotional items;
 - distribution of hardware and building materials;
 - electrical switchgear and lighting fixtures;
 - engineering and repairing of rectifiers and uninterruptable power supplies;
 - establishing of fish processing plant, fabrication of interior outing and joinery works;
 - fruit concentrated &pulps packaging of vegetables ;
 - Importation, marketing and distribution of brewed products namely beer, Shandy, Malta and Stout, labels ;
 - Supply and installation of windows, doors and other hardware items.
7. **O’Meara Industrial Estate – O’Meara Road**
8. **Trincity Industrial Estate – Trincity**
 - Assembly of antennae , light fittings
 - Bureau of standards
 - Carpet underlay and other foam products
 - Electroplating in copper , brass , nickel chrome
 - Fruit processing candied and glazed fruit and dough fillings
 - Furniture manufacture and processing of curled and bristled core fiber from coconuts and impregnated fiber roof times
 - Packaging and distribution of food products, bulk of rice and processed meats, tools dies moulds and precision parts.

9. Macoya Industrial Estate – Macoya

- Building processing and manufacturing of chemical products cabinets , kitchens and wardrobes caskets and coffins from local and trinboard, from, local lumber and particle board and furniture
- Commercial printing and publishing ,
- Food additives and household products
- Hamburger patties, industrial maintenance , manufacturing and distribution of household and industrial cleaning precuts
- Mosquitoes mats and electronic destroyers
- Operating laboratory and research facilities workshops , offices ,
- Processing and packaging of seafood,
- Straight pins office and industrial staples
- Vinyl stationery and promotional items

Secondary Hazards

A major secondary hazard to which the Tunapuna/Piarco and Arima areas are at risk to are health and medical issues, such as the **spread of diseases and water contamination** as a result of flooding. The **Guanapo landfill** is located in close proximity to the Petit Caigual and Guanapo River, flooding of these rivers can potentially increase the **transmission of both water borne and vector borne disease**.

One of the country's major aquifers , the Northern Gravels , is found within the municipality .The Guanapo landfill covers an area of approximately 0.07km² and is reported to accept an average of 253 000 kg (253 tonnes) of waste per day (CSO)¹. This dumping site has the potential to have a direct negative impact on the underlying aquifer and all surface water downstream of the site. In fact, the landfill is bordered by slopes, as seen in figure 1, whose runoff can potentially flow directly on the site. In addition, there are several private residences closely surrounding the site, both formal and informal (squatter settlements) which will be highly vulnerable should flooding and water contamination occur. Cover material is excavated from the hills north of the site and used to cover incoming waste. This site is reported by SWMCOL² to have already exceeded its lifespan. Serious natural hazards such as intense earthquakes and hurricanes can trigger industrial hazards, the risk of which should always be considered due to the concentration of industrial activity within this area.

¹ Central Statistics Office , Chapter 12 , Solid Waste

² Trinidad and Tobago Solid Waste Management Company Limited

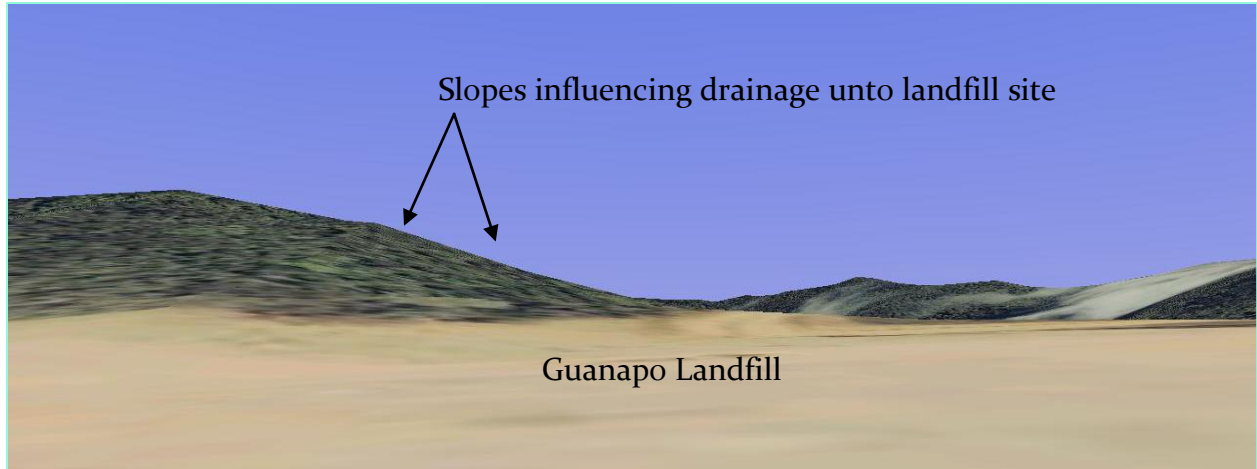


Figure 1: Source: Google Earth



Figure 2(left) : Heights of Guanapo showing quarrying



Figure 3(right): Close up image of Guanapo Landfill



Figure 4 : Scavenger at Guanapo Landfill



Proximity of Landfill to settlements, Source: Google Earth

Critical facilities

Name	Type/ Function	Owner/ Operator	Contact	Address	Hazard Susceptibility
Health					
Blanchisseuse and Brasso Seco Health Centre	Health Centre	Ministry of Health	669 4118	Paria Main Road , Lower Village , Blanchisseuse	H, E, SS
Arouca Health Centre	Health Centre	Ministry of Health	642-1065	Corner George Street and Golden Grove Road, Arouca	
Caura Chest Hospital	Hospital	Ministry of Health	662-2211	Caura Royal Road El Dorado	
Maloney Health Centre	Health Centre	Ministry of Health	642-1330	Maloney Boulevard, Maloney Gardens	
La Horquetta Health Centre	Health Centre	Ministry of Health	643-0911	Arthur Murray Crescent, La Horquetta Phase III	
St. Helena Health Centre	Health Centre	Ministry of Health	669-1183 669-7027	North Bank Road, St. Helena	
Tacarigua Health Centre	Health Centre	Ministry of Health	662-4819	El Dorado Road, Tunapuna	
Arima District Health Facility	Health Centre	Ministry of Health	667-4714	Queen Mary Avenue, Arima	
Legal					
Tunapuna Magistrates Court	Judiciary/ Magistracy	Ministry of Legal Affairs	622 4808	Tunapuna Administrative Complex	
Arima Magistrates Court	Judiciary/ Magistracy	Ministry of Legal Affairs	667-3579	5 Hollis Avenue , Arima	
Arima Registrar General's Department	Legal Aid & Advisory Authority	Ministry of Legal Affairs	667 – 1700	32 Pro Queen Street, Arima	
Utilities/ Facilities					
Water and Sewage Authority (WASA)	Head Office	Ministry of Works and Transport	662-2302/7	Farm Road, St. Joseph, Trinidad	
Macoya Market				Southern Eastern Corner of CRH and Macoya Road	
Transportation					
Piarco International Airport	International Airport	Airports Authority of Trinidad and Tobago	669-4868	Golden Grove Road , Piarco	

Airports Authority of Trinidad and Tobago	Administrative Body	Ministry of Works and Transport	669 - 2288 669-5311	Airports Administration Centre Piarco International Airport South Terminal Golden Grove Road, Piarco	
Education					
Eastern Caribbean Institute of Agriculture and Forestry (ECIAF)	Regional Tertiary level Educational Institute	Government /UNDP	646-2650	Caroni North Bank Road	
Cipriani Labour College	Tertiary level Education Institute	MSTTE	662-5014	Churchill Roosevelt Highway ,Valsayn	
Helping Youth Prepare for Employment (HYPE)	Tertiary level Education Institute	Ministry of Science, Technology and Tertiary Education	663-9797	Century Drive, Macoya	
Metal Industries Company Ltd (MIC)	Manufacturing and Training	UNDP/ Government	663-4642	Century Drive, Trincity Industrial Estate, Macoya Private Bag 121B Port-of-Spain	
The University of the West Indies	Regional Tertiary level Educational Institute	Regional Governments	663-1334 662-4394	Eastern Main Road, St. Augustine	
The University of the West Indies Continuing Studies	Tertiary level Education Institute	Regional Governments	645-3232 Ext 3514	St. John's Road, St. Augustine Gordon Street, St. Augustine	
The West Indies School of Theology	Tertiary level Education Institute	Regional Governments	663-1501	Maracas Royal Road, Maracas St. Joseph	
UTT O'Meara Campus	Tertiary level Education Institute	MSTTE		O Meara Campus Lots 74 98 O Mera Industrial Park Arima	

UTT Wallerfield	Tertiary level Education Institute	MSTTE		Under Construction	
Emergency Service					
Piarco Fire Station	Fire Station	Ministry of National Security	669-4226	Piarco Airport	
Tunapuna Fire Station	Fire Station	Ministry of National Security	662-4707	Eastern Main Road, Tunapuna	
Arima Fire Station	Fire Station	Ministry of National Security	667-3148	Green Street, Arima	
Police Stations					
Piarco Police Station	Police Station	Ministry of National Security	669-4366	Golden Grove Road Piarco	
La Horquetta/ Divisional Headquarters		Ministry of National Security	643-3857	De Freitas Boulevard Maloney Gardens Arima	
Caroni Police Station		Ministry of National Security	662-4291	Southern Main Road (near Young Singh Factory) Caroni	
Maloney Police Post"		Ministry of National Security	646-6504	Jacana Boulevard Maloney Gardens	
"Pinto Police Post"		Ministry of National Security	667-5217	#3 Pinto Road Arima	
Malabar Police Post		Ministry of National Security	643-2358	#10 Banyan Boulevard Malabar	
Arouca Police Station		Ministry of National Security	642-4870 642-0767	Five Rivers Junction Arouca	
Arima Police Station		Ministry of National	667-3563 667-2910	Broadway (roughly 100 meters north of	

Tunapuna Police Station		Security		the Dial) Arima	
St. Joseph Police Station		Ministry of National Security	662-4038	Eastern Main Road (next to the Mosque) St. Joseph)	
Maracas St. Joseph Police Station		Ministry of National Security	663-1264	LP #51 El Chorro Road Maracas/St. Joseph	
Blanchisseuse Police Station		Ministry of National Security	669-3868	North Coast Road Blanchisseuse	
Shelters					
Maloney Government	Primary School	MOE	A York 646-2797 643-4779	Flamingo Blvd West Maloney.	
Maloney Indoor Sporting Arena.	Sporting Complex	MOS	H. William 646-3260 680-1312	Flamingo Blvd. Maloney.	
Maloney Regional Complex Maloney Gardens.			S. Hinkson 642-8231 786-0405	Maloney Gardens.	
Eastern Regional Indoor Sporting Complex.	Sporting Complex	MOS	K. Modeste 640-1885 470-9993 G. Smith 498-1034	Orange Road Grove Road, Tacarigua.	
Morne La Croix Community Centre	Community Centers		Sonnyboy & Gloria Gomez 753-9889	Blanchisseuse Road	
Brasso Seco Community Centre	Community Centre		Krystal Daspaldo 487-6307	Off Madamas Road After TT Post	
Blanchisseuse High School	Secondary School		P. Kallo 669-5549 369-6423 J. Hashim 482-2706 Mrs. Jagge ssar	Paria Main Road La Fillette	

			704-8401		
La Horquetta South Government Primary	Primary School	MOE	Katie Ellis Andrew 729-9992	Gladiolus Crescent La Horquetta	
Red Hill Community Centre.	Community Centre	MSD	Patricia – 794-5588	Settlement St. Red Hill	
Pinto Community Centre	Community Centre	MSD	Mrs. Patricia Liverpool 667-4128 309-1321		
Aripo RC Primary School Aripo Main Road	Primary School	MOE	A. Joseph 643-2471 Cell 367- 5007	Aripo Main Road	
Aripo Community Centre			Gordon Valentin 350-3188	Main Road, Aripo	
La Horquetta North Government School			Mr A Baptiste 643-4727 361-7328	Lady Bug Avenue, La Horquetta	
La Horquetta Regional Complex			Ms H Benn 643-2865 682-2328	Next to The Police Station Phase II, Majorie Padmore Avenue	
Blanchisseuse Community Centre			Contact Ms. Roxanne 669-3988 383-1233	Recreation Ground Blanchisseuse	
La Veronica RC School			Ms Indira Newton 669-2732 740-6505	Lopinot Settlement Lopinot	
Five Rivers Community Centre			Contact Info. not available	5 th Street, Five Rivers Arouca.	

Tacarigua Community Centre			Mr .Boyce 640-1118 or 740-4520	Off Bally on left form Thavenot Street Tacarigua	
El Dorado Community Centre.			Jagdath 714-0397 725-4577 Gildarie 308- 3761	Caura Royal Rd El Dorado	
St Mary's Anglican			Ms.Green 687-3020 640-6087	School Eastern Main Road, Tacarigua	
Tunapuna Government Secondary School			Trudy Ramsubek 662-4718 342-5369	Taylor street Tunapuna	
Wharf Trace Community Centre			Mr. Armstrong 663-0868	Wharf Trace	
St David's RC Church/School			K. Holder 782-2035 672-3108 Bernadett Maugh 669-2474	South Bank Road Kelly Village Caroni	
Lakshmi Girls High School			Mrs .A Bessassar 663-1380	Eastern Main Road St Augustine	
St Augustine Regional Complex			F. Louis 663-1831 662-4708	St John Road St Augustine	
El Dorado Youth and Apprenticeship Centre			Winston Baldeosin 662-4854, 645-7357 733-2311	St. Cecilia Road, El Dorado	
Curepe			No	Lyndon Street	

Presbyterian School			contact data available	Curepe	
St. Augustine South Primary School				Bedasie Street St Augustine South	
Arima					
Arima Boys' Government	Primary School -	MOE		King Street Arima	
Arima Centenary Government	Primary School	MOE		- El Carmen Street, Arima	
Arima Community Centre	Community Centre	MSD		- #3 Anglican Street, Arima	
Arima Girls' Government	Primary School -	MOE		St. Joseph Street, Arima	
Arima Girls'	R.C. Primary School	MOE		Corner Church and Woodford Streets, Arima	
Arima Government	Secondary School	MOE		Marie Street, Arima	
Arima Presbyterian	Primary School	MOE		Tumpuna Road, Arima	
Holy Cross College	Secondary School	MOE		Calvary Hill	
Malabar Community Centre	Community Centre	MSD		Malabar Main Road, Arima	
Malabar Composite School	Secondary School	MOE		Flamingo Boulevard, Phase 4 Malabar, Arima	
Arima Boys' R.C.	Primary School	MOE		3A Woodford Street, Arima	

Critical Routes

These routes were selected based on the role they may play in terms of transport, access and evacuation /egress.

1. **Churchill Roosevelt Highway**
2. **Priority Bus Route**
3. **Eastern Main Road**

These are all major roadways and are highlighted as emergency access or exit routes for the municipality.

4. **Arima Blanchisseuse Road** connects with other roads such as the Brasso Seco Road, and the Paria Morne Bleu Road which provides access to the more rural areas. If this road were to be disabled several small rural areas would be cut off.

Vulnerable Areas /Populations/ Special Needs

1. **Rural** Northern Range Villages such as La Laja and Brasso Seco (one of the ten poorest communities in the country)and **low income** settlements such as La Mango
2. Blanchisseuse Village(**Coastal Community**)- the north coastline is subject to seasonal high tidal activity , typically of occurring from January to March.
3. St. Mary's **Children's Home** in Tacarigua
4. **Squatter** settlements such as those located in the Dookiesing Extension area, and parts of St. Augustine South, Pinto Road , Maturita and Bangladesh in St. Joseph

Environmentally sensitive areas

- Tunapuna /Piarco consists of **16 water sheds** named for the rivers which drain the surrounding areas.
- There are two small **wetlands** in the north coast of the municipality, the Marianne River Marsh and that of the Yarra River. These areas play a crucial role in the coastal marine biodiversity.
- The area is the location to **nine protected areas** namely the, Northern range Reserves, A, B, and C , and the Arima , Blanchisseuse , Paria , St. David , Yarra, and Tacarigua Reserves.
- **Asa Wright Nature Centre**