



# TRASH TALK

## SITING A WASTE TO ENERGY FACILITY IN THE KINGSTON METROPOLITAN AREA, JAMAICA (2019)



### INTRODUCTION

In Caribbean Small Island Developing States (CSIDS), islands face a number of barriers and challenges that prevent sustained economic growth and prosperity in the region. Two such challenges that exist are improper solid waste management and unstable energy supply. These challenges are often exacerbated by burgeoning population, the rural exodus and increased economic consumption per capita. This means Caribbean municipalities are facing increased pressure to improve the solid waste management and electricity generation services islandwide. Jamaica, the biggest English-speaking Caribbean island, has implemented a national development plan, where they strive to diversify their fuel mix and improve solid waste management services. This study specifically focuses on municipal solid waste (MSW) as a source of renewable energy. MSW accounts for 50% of waste generated in Jamaica and can be used a sustainable feedstock for a waste-to-energy conversion plant.

### RESEARCH QUESTION

1. Which areas in Kingston are unsuitable for waste conversion facilities considering environmental and social factors that make up constraint criteria?
2. Which areas in Kingston are suitable for waste conversion facilities considering environmental and social factors that make up preference criteria?
3. Where is the most suitable location for a waste conversion facility in Kingston, Jamaica considering both constraint and preference criteria?

Figure 1: Locator Map

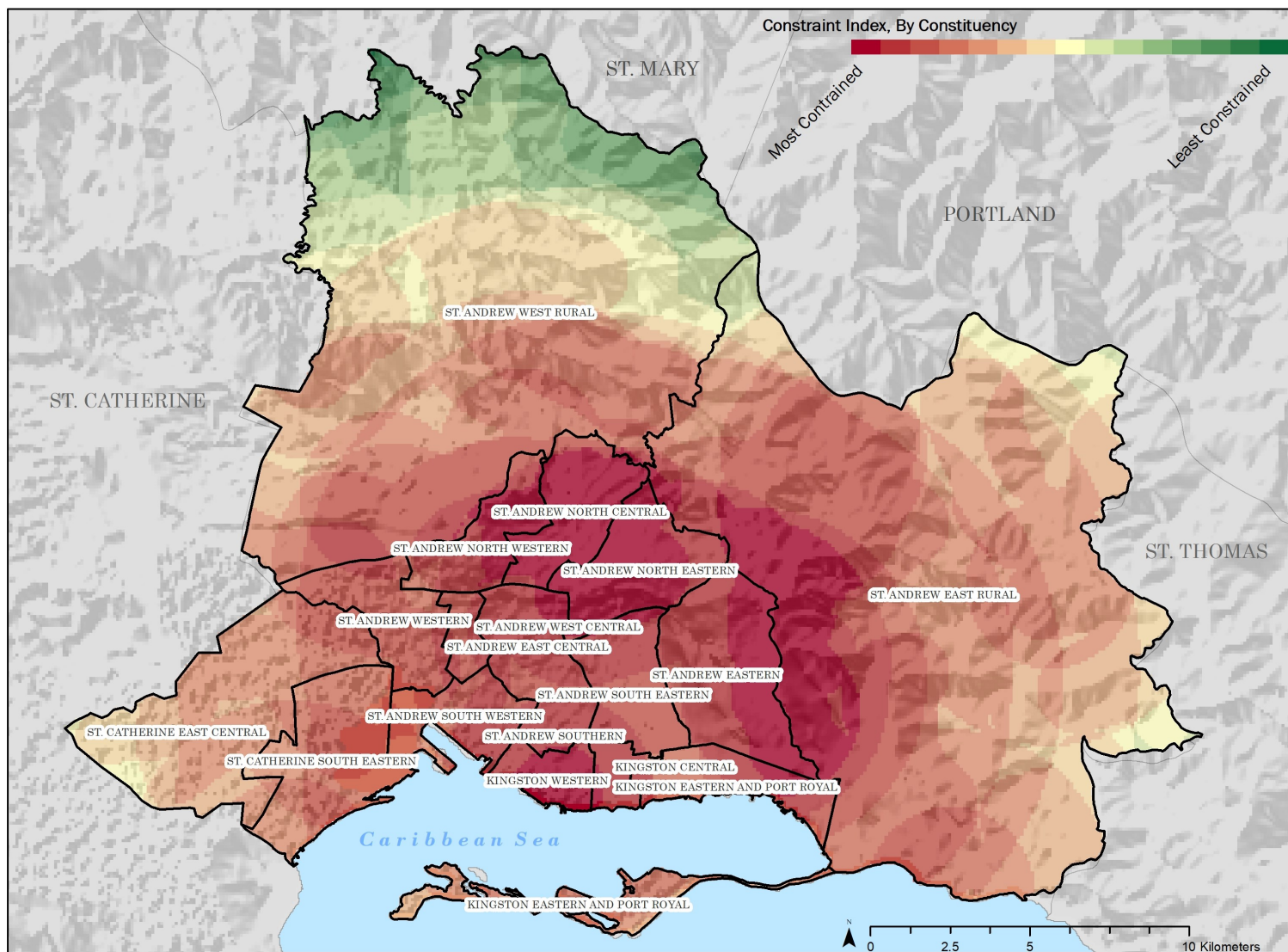


### METHODOLOGY

#### Constraint Assessment

A constraint index was created through a raster calculation incorporating reclassified scores (1-5) of four layers: (1) medical amenities, (2) schools and universities; (3) tourist attractions and (4) inland waterbodies. All scores held the same weight and were symbolized using a diverging colour model (Figure 2) with red indicating the most constrained areas (red) and the least constrained areas (green).

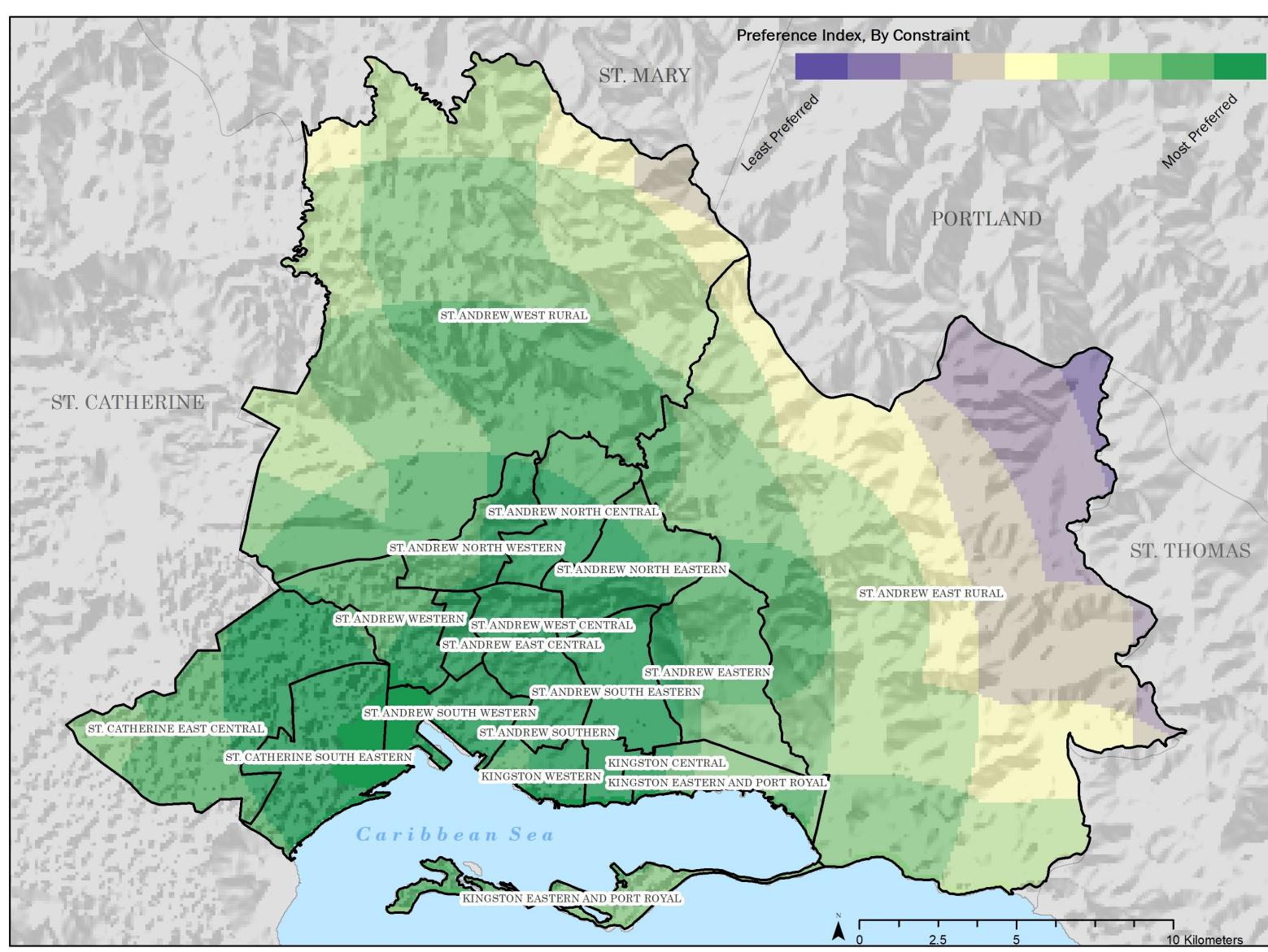
Figure 2: Constraint Index Map, By Constituency



#### Preference Assessment

A preference index was created through a raster calculation incorporating reclassified scores (1-5) of two layers: (1) major roads and (2) the municipal disposal site.

Figure 3: Preference Index Map, By Constituency

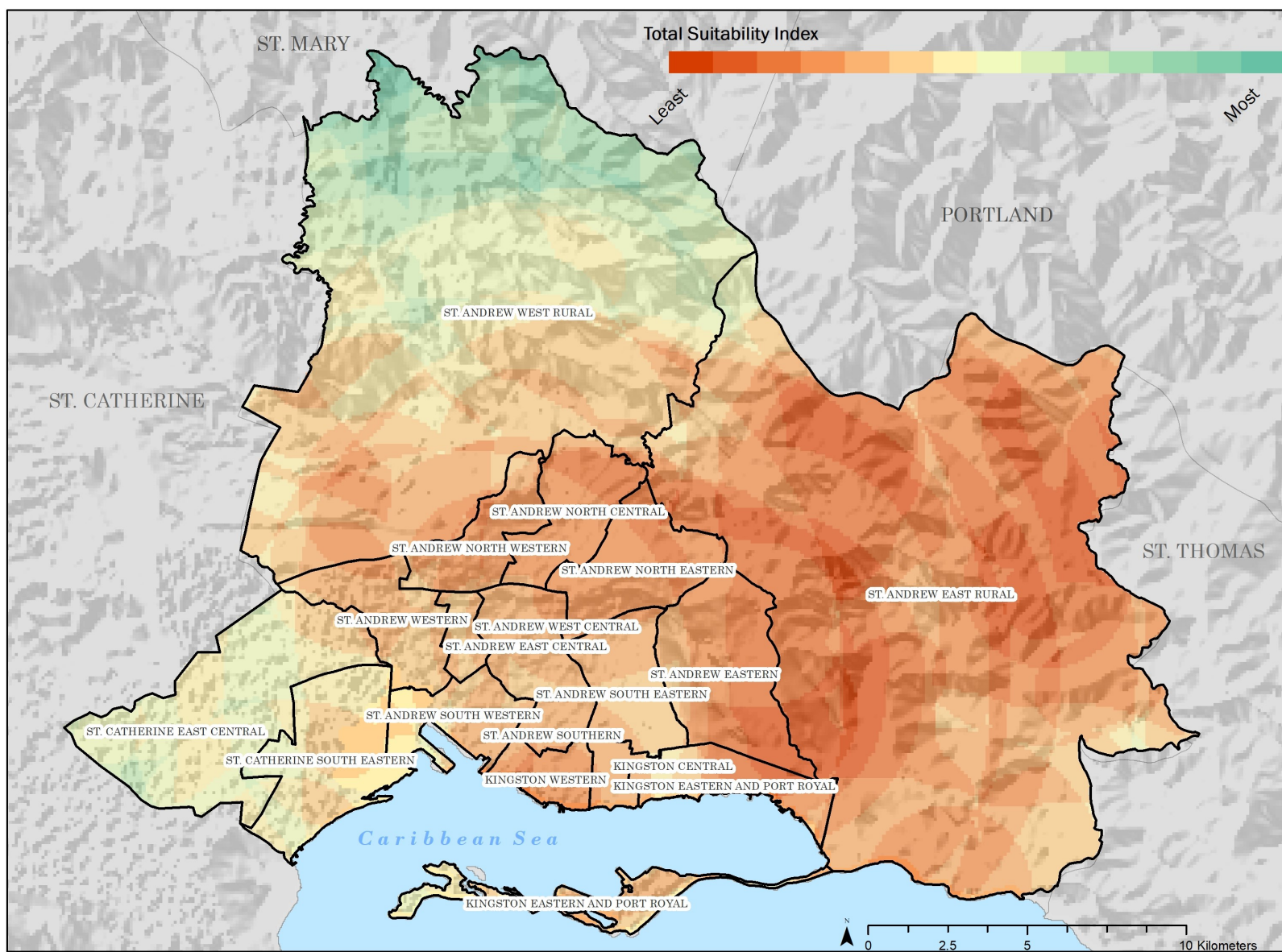


Both scores held the same weight and were symbolized using a divergent colour model (Figure 3).

#### Suitability Assessment

Both constraint and preference indexes were used in a raster calculation to discern which constituency is most suitable for a waste-to-energy incinerator. The additive suitability model is the sum of equal weighted criteria (Figure 4)

Figure 4: Additive Suitability Model, By Constituency



The weighted model used an analytic-hierarchy process (AHP) to determine which factors were most important to the incinerator siting (Table 1). These weighted factors were then used in a raster calculation to determine the most suitable area in the Kingston Metropolitan Area and subsequently used to create a weighted suitability map using a diverging colour model (Figure 5).

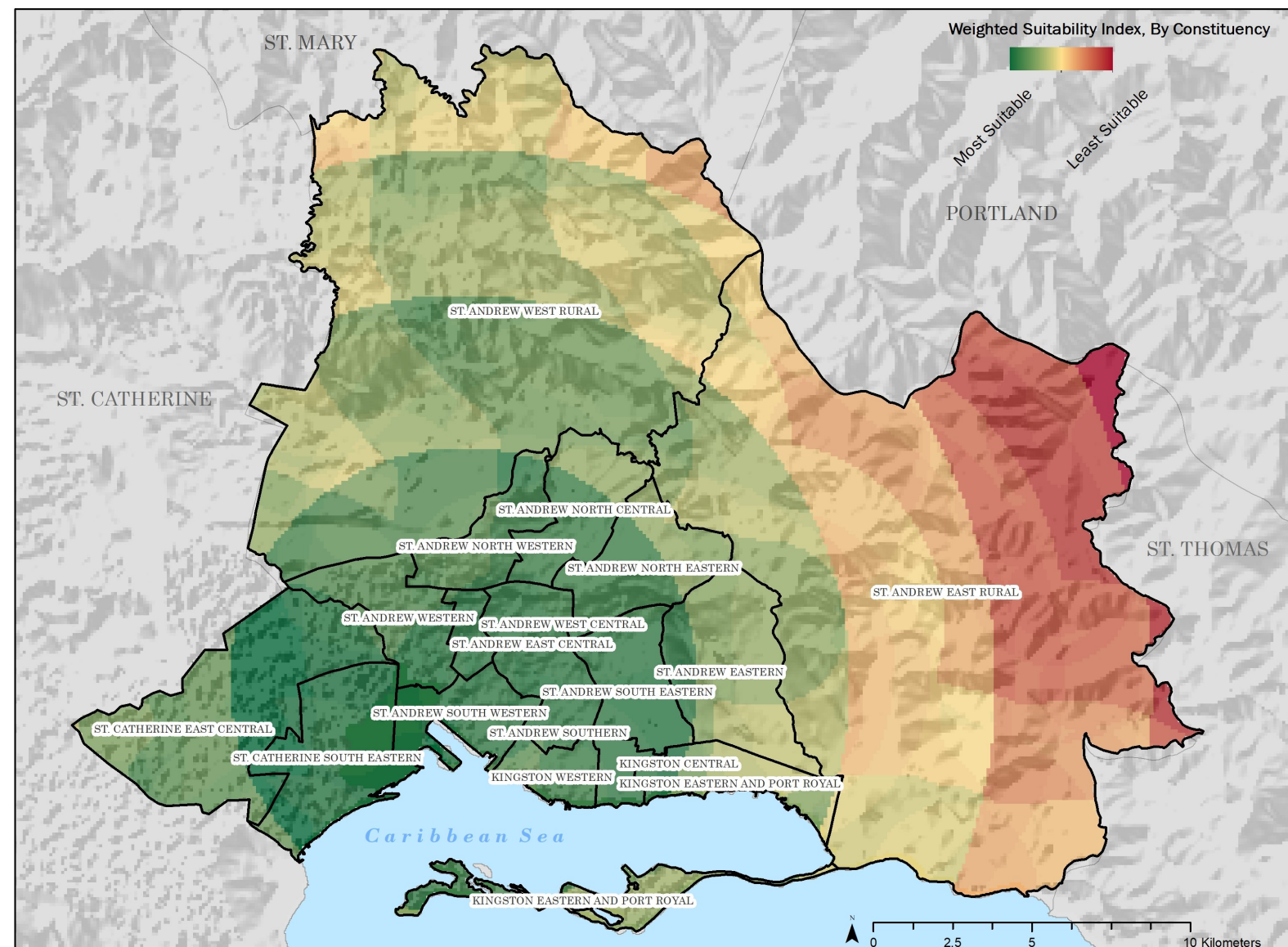
Table 1: Matrix of AHP and Weights Assigned

CRITERIA	WEIGHT
Proximity to Riverton Disposal Site	0.5
Proximity to Major Road	0.25
Proximity from Medical Facilities	0.0625
Proximity from Schools and Universities	0.0625
Proximity from Tourist Attractions	0.0625
Proximity from Inland Waterbodies	0.0625

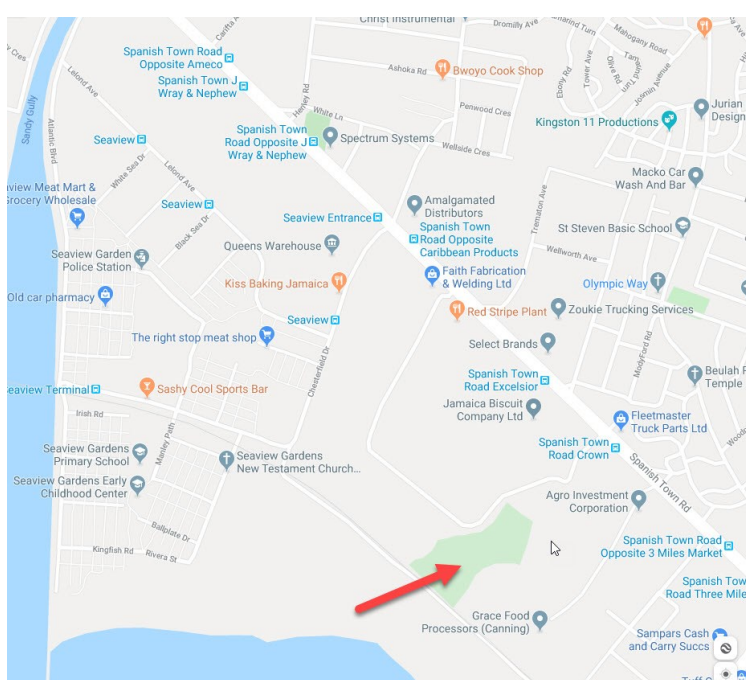
### RESULTS

The weighted model identified the **St. Andrew Southwestern Constituency** as the most suitable constituency to house an incineration facility.

Figure 5: Weighted Suitability Model, By Constituency



The constituency is mainly **industrial** as the open land neighbours manufacturing plants. The constituency identified also has **access to a major road** (Spanish Town Road) and is **away from rivers, streams and residential areas**. It is important to note, informal settlers, i.e. squatters, are not accounted for.



### CONCLUSION

The adoption of an incinerator with the purpose of energy generation is extremely feasible in the Caribbean island context. The results indicate that there is a constituency that is quite suitable considering all factors based on the weighted model.

### REFERENCES