

## Coastal Hydrodynamic Modeling: Setbacks & Elevation

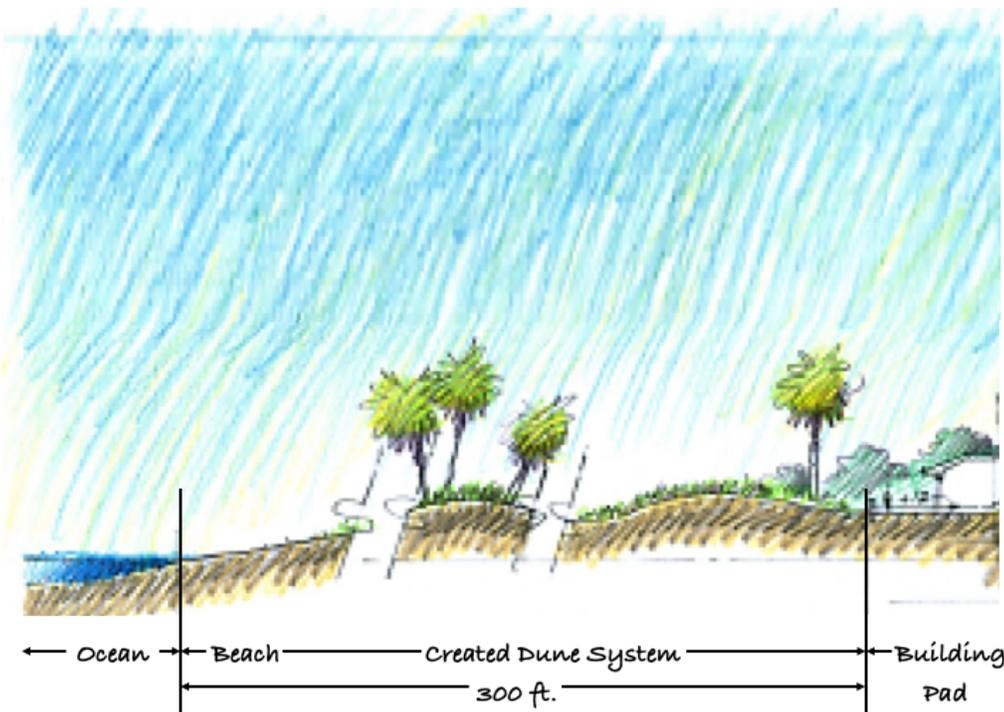
**Location:**  
Antigua & Barbuda

**Contracting Party:**  
Barbuda Ocean Club: Private Sector Partnership of Investors & Real Estate Developers

**Project Dates:**  
Sep 2017 – Ongoing

**Services Provided:**

- Hydrodynamic Analysis
- Sea level rise and climate change
- Setting setback and elevation standards
- Green-gray and nature based solutions
- Permitting
- Government relations



### Key Outcome:

Conducted hydrodynamic modeling to calculate a continuum of setback and elevation recommendations for coastal developments based on a suite of storm, flooding and sea level rise risks. Quantitatively incorporated nature-based elements that can adjust levels while retaining the same risk-level. Created innovative guidelines for using risk-management national standards. Our team is working with regulatory agencies to adopt the use of this science-based approach.

### Project Summary:

A critical component of any coastal development is the ability to build close to the water to maximize views and experience. However closer also means at higher risk from flooding, as does a lower floor elevation. Most places take a one-size-fits all approach to determining setbacks (prescribed distance from water or permanent vegetation) and elevations (minimum height above sea level for a building's finished floors). We have taken a risk-management, site-tailored one for our clients and community. Our team of coastal engineers and scientists conducted hydrodynamic models and vulnerability assessments over a range of scenarios. The US FEMA flood standards were used as a bench-mark. We developed a suite of setback and elevation recommendations based on risk-standards associated with local conditions. In some cases this allows for building closer to the ocean in others buildings must be farther back under the same risk criteria.

As with many countries, Antigua and Barbuda's policies regarding setbacks and elevations have remained unchanged for the last twenty years, while the underlying science has greatly advanced. Our state of the science analysis and climate risk assessment not only helped our clients, it facilitated a dialogue with government to create more robust and science-based approaches that can change national standards. By incorporating storm surge, flooding, and sea level rise into our models and implementing additional risk-managed development through green-gray infrastructure and nature-based solutions (e.g., the restoration and design of protective coastal dunes), homeowners can often build closer to the water, thereby maximizing their home values while minimizing risks. This solution integrates environmental concerns, resiliency, sustainability, and economics in one.

