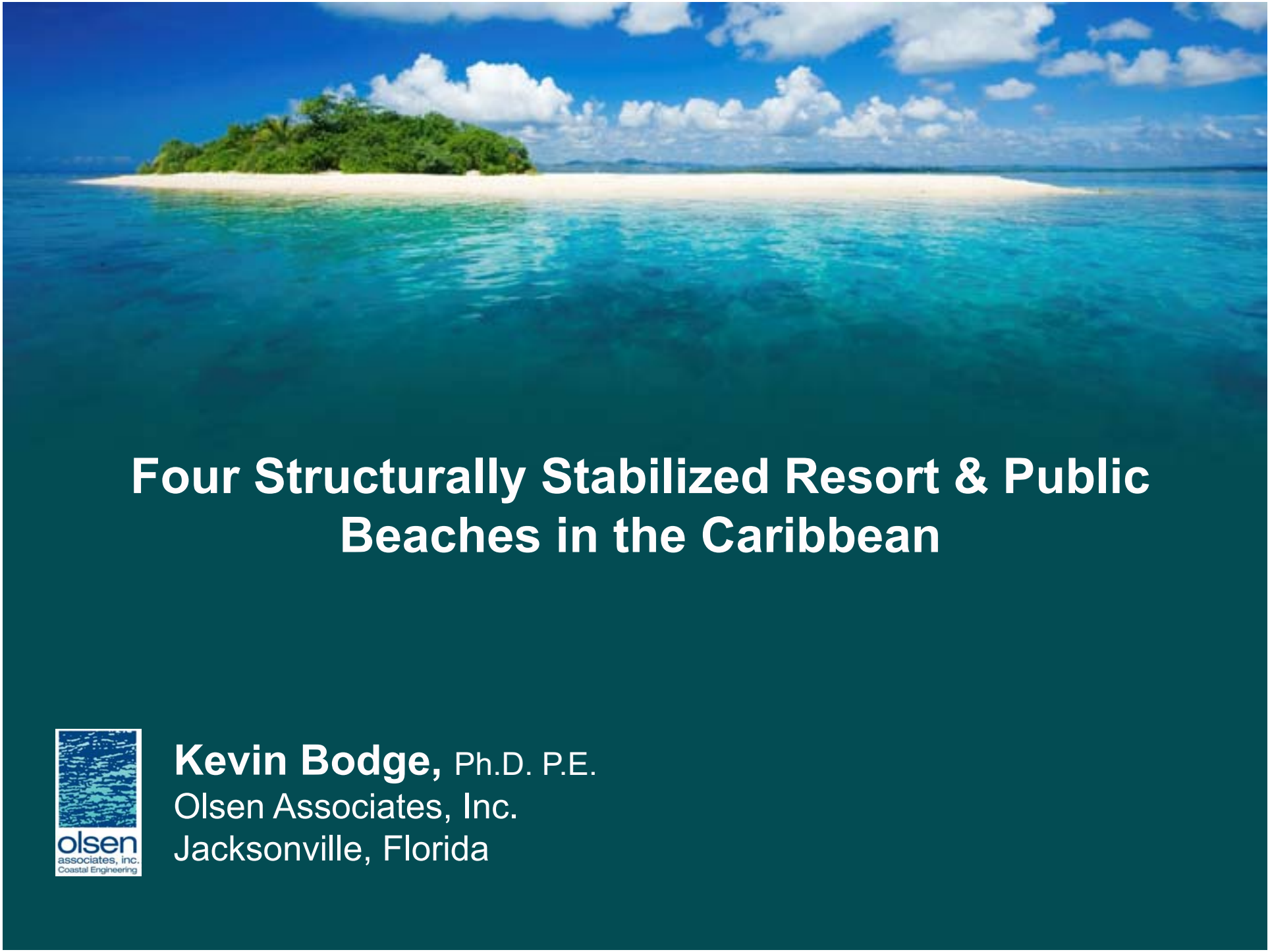
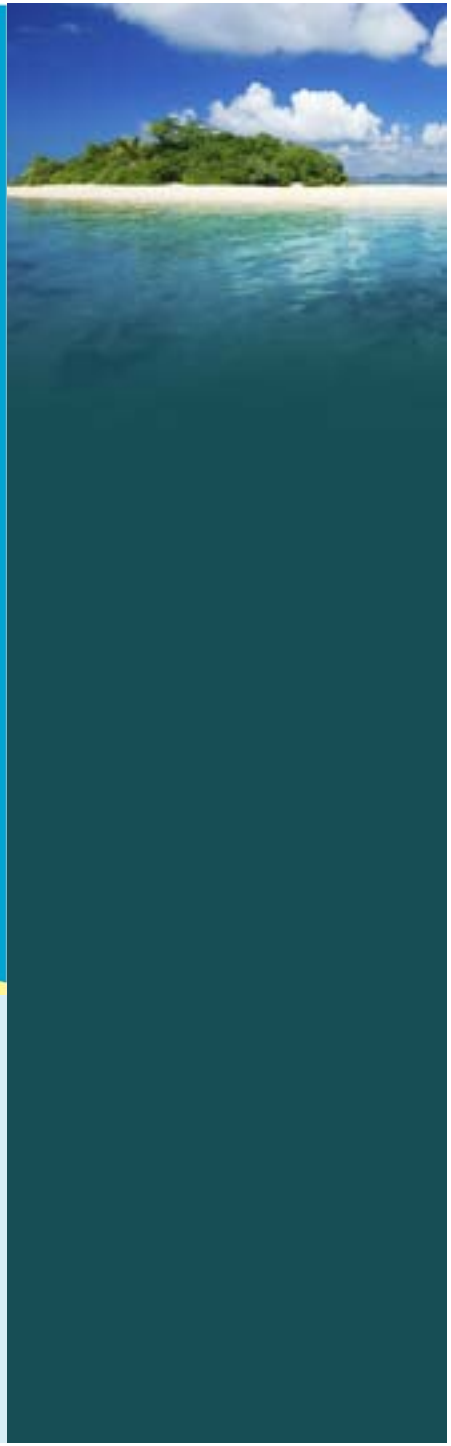


Four Structurally Stabilized Resort & Public Beaches in the Caribbean

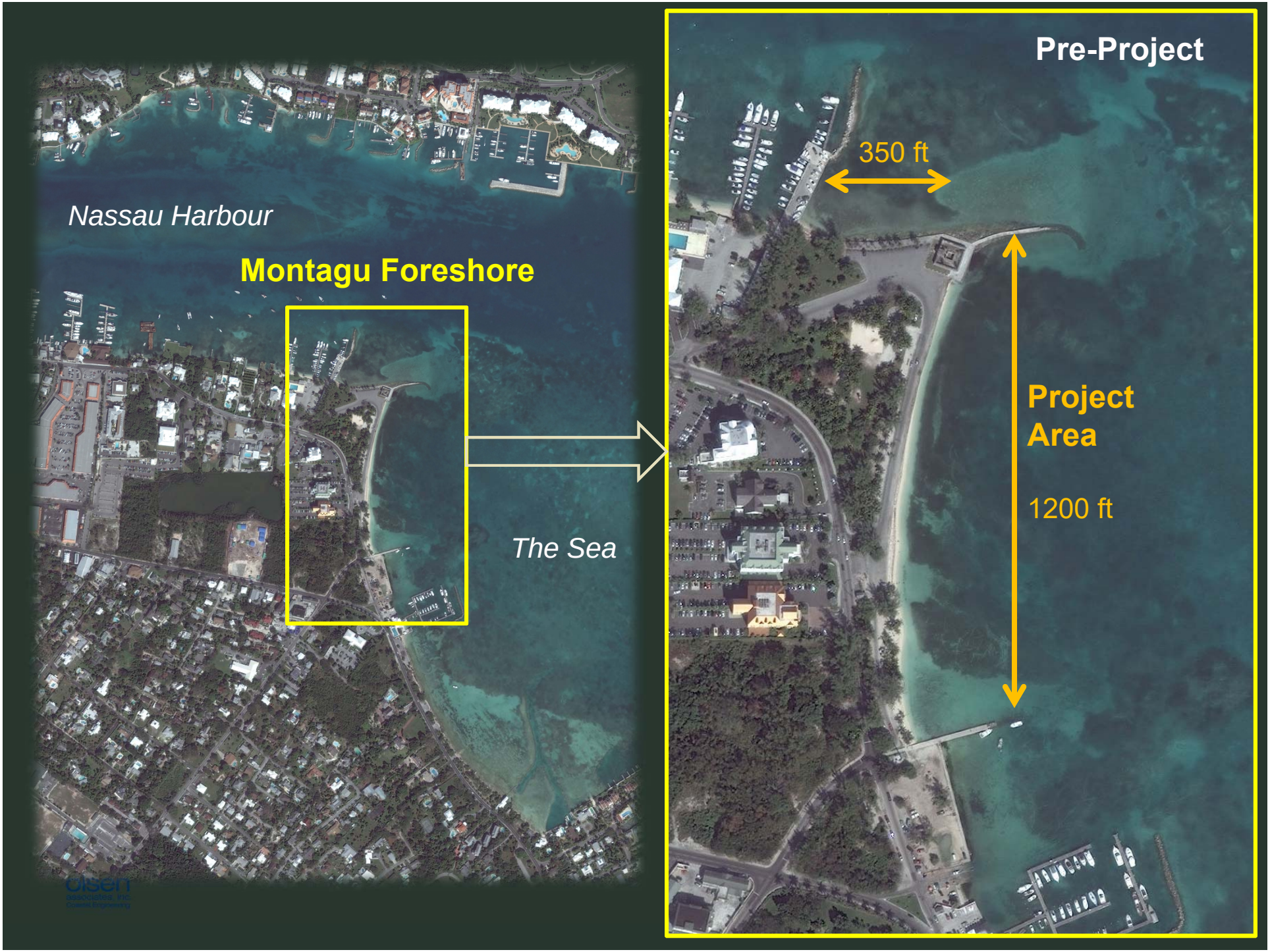
Kevin Bodge, Ph.D. P.E.
Olsen Associates, Inc.
Jacksonville, Florida



- **New Providence Island, Bahamas**
- **Grenada**

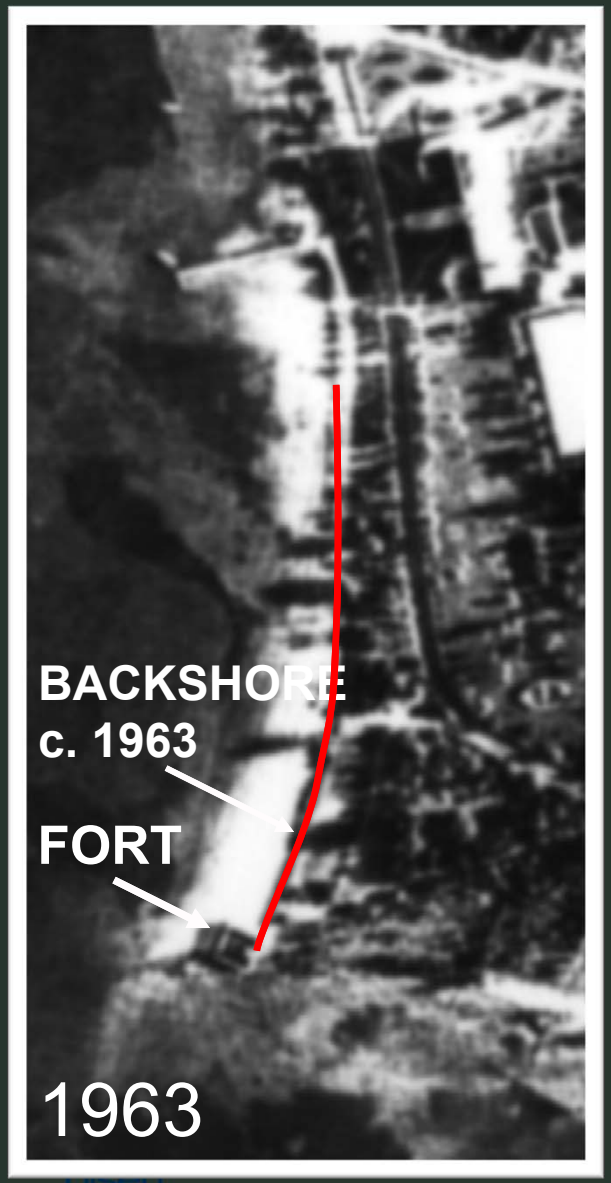
olsen associates, inc.
Coastal Engineering

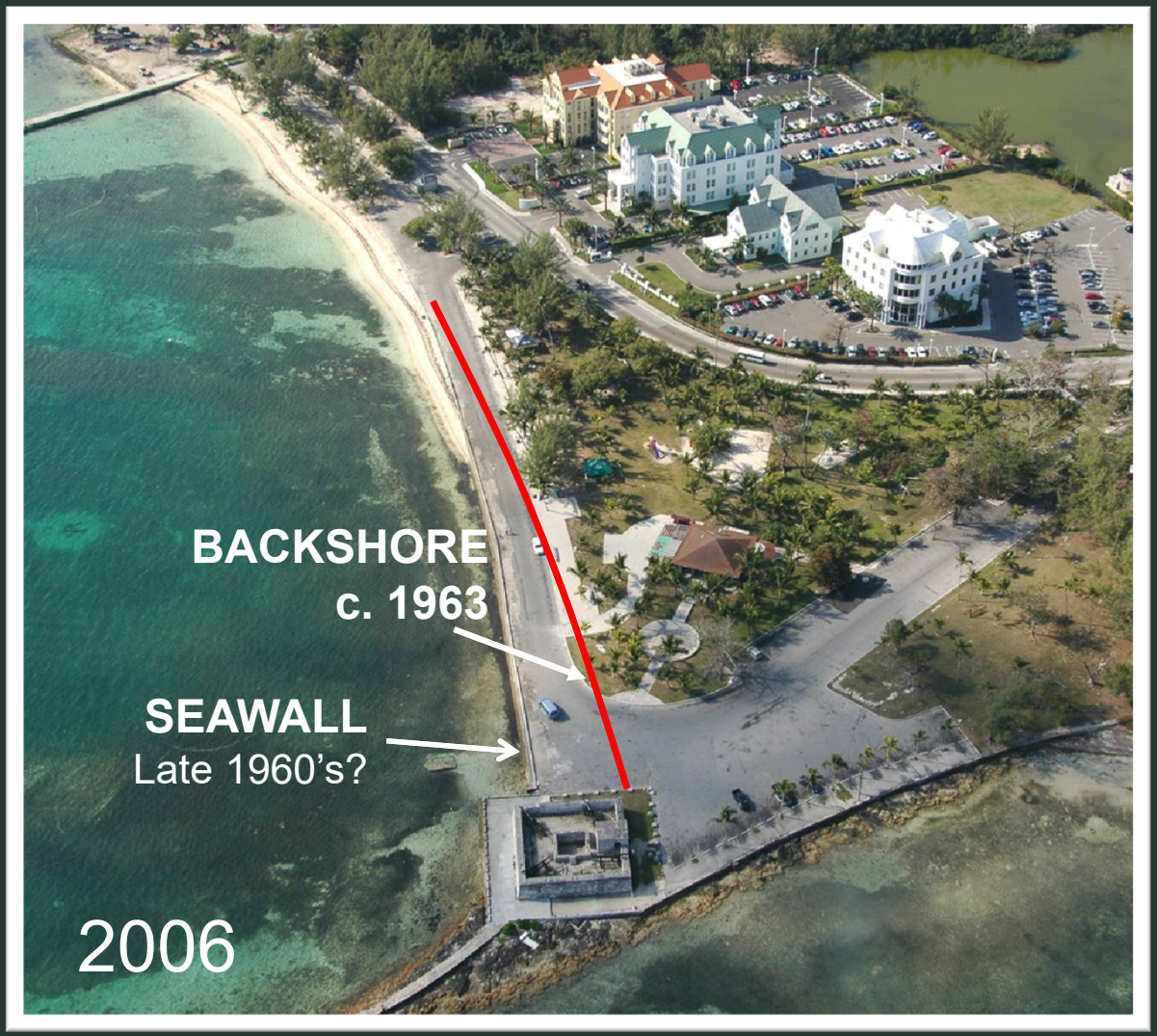
Montagu Foreshore
Nassau, Bahamas

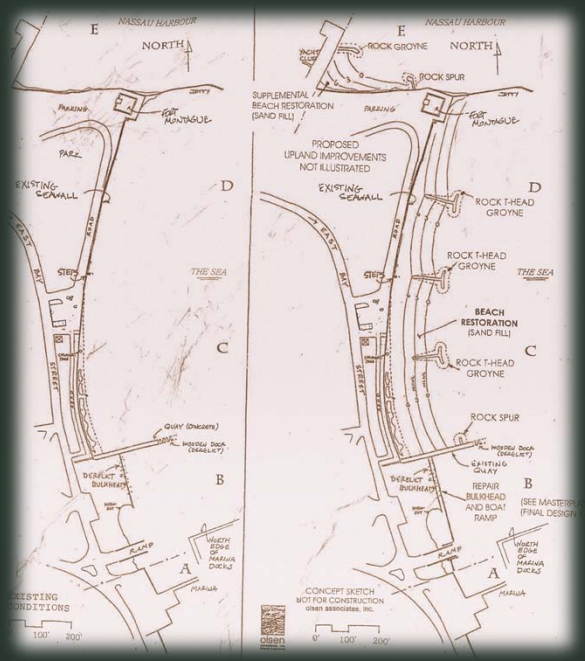

Nassau Harbour
Montagu Foreshore
The Sea
Pre-Project
350 ft
Project Area
1200 ft

The Montagu Beach Hotel *1964 Postcard*

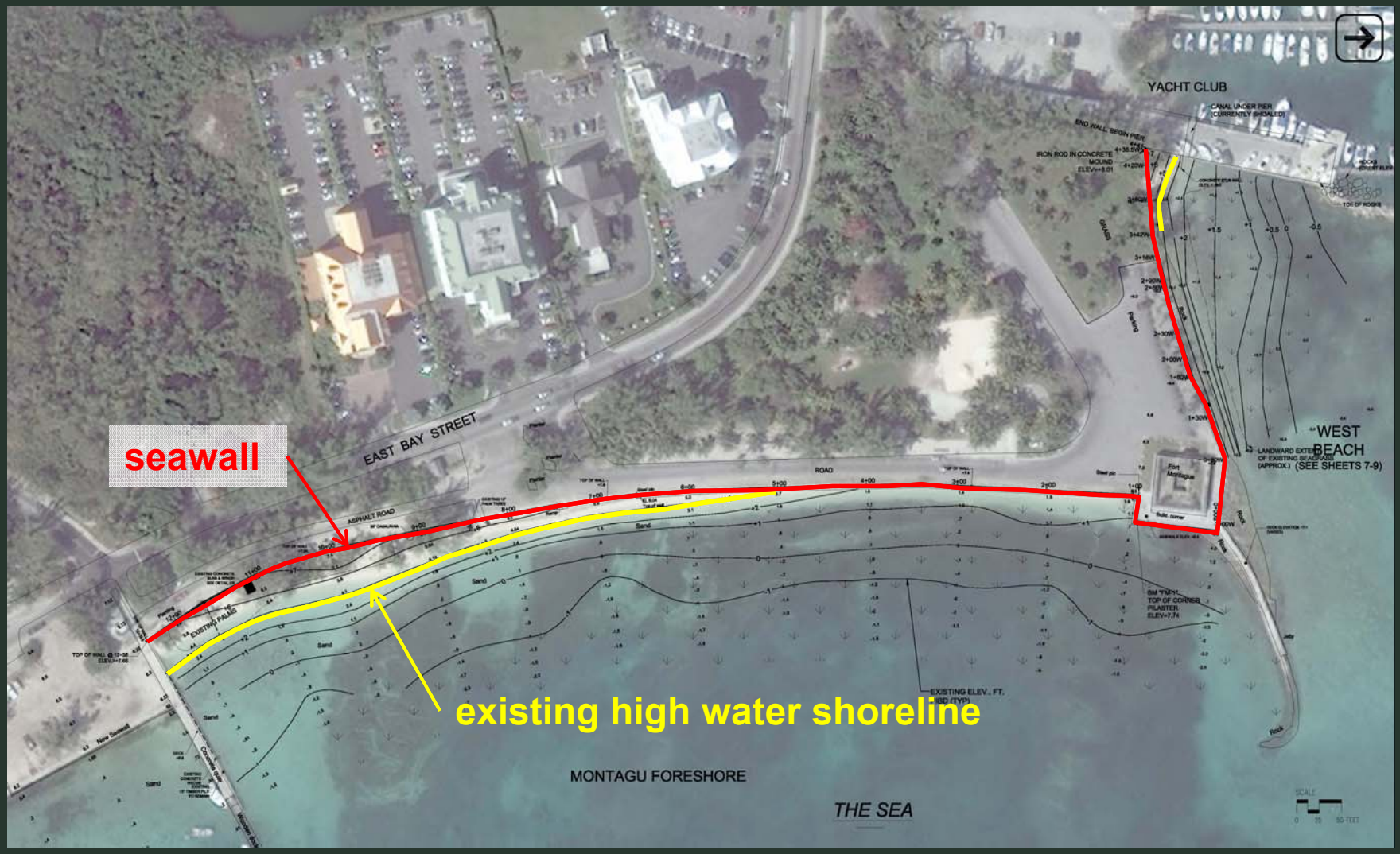

Feb 2006


BACKSHORE
c. 1963
FORT
1963

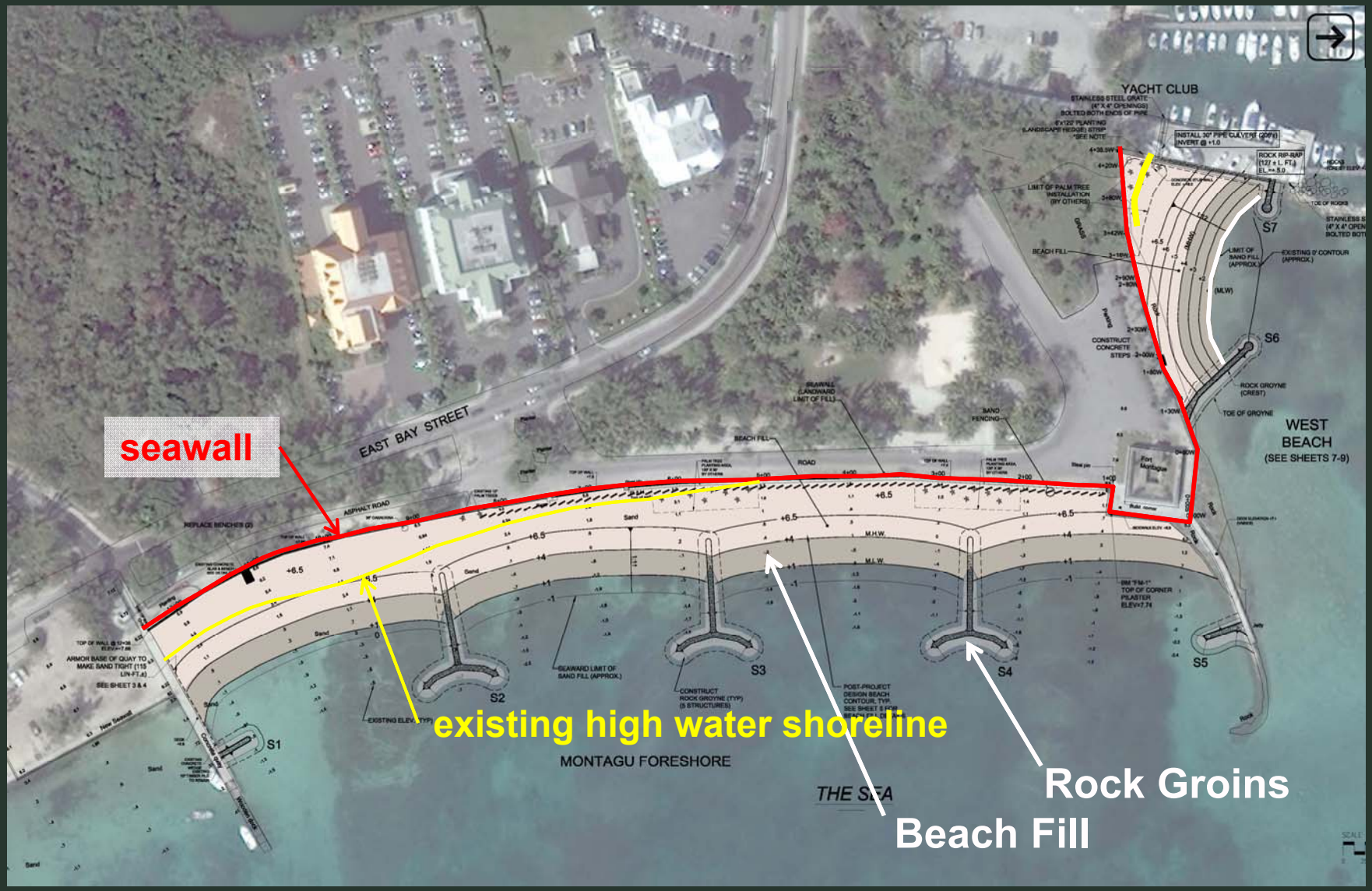

BACKSHORE
c. 1963
SEAWALL
Late 1960's?
2006



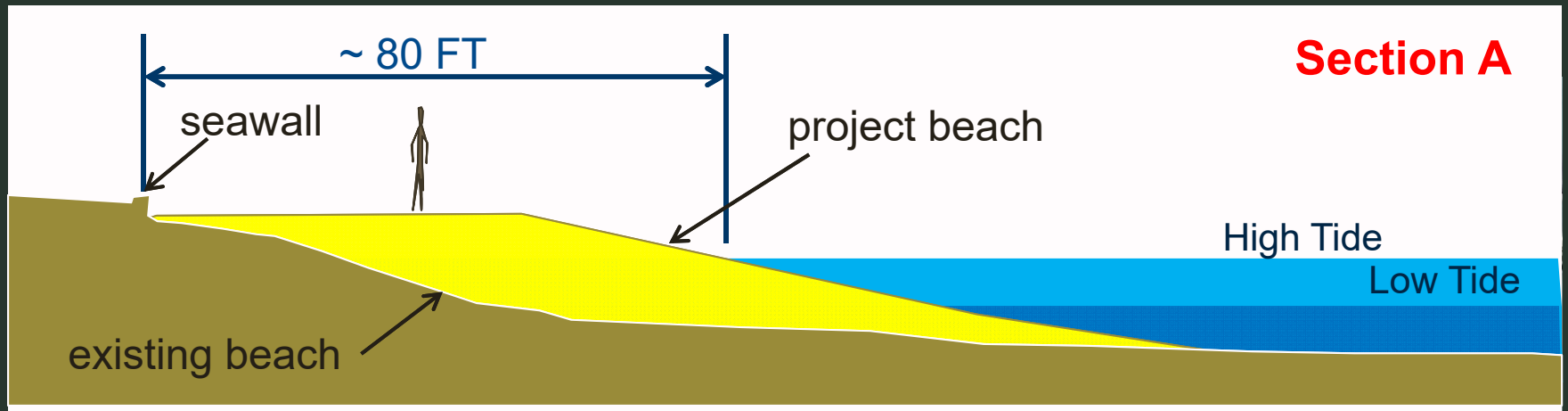
Early 1990's . . . to . . . 2011

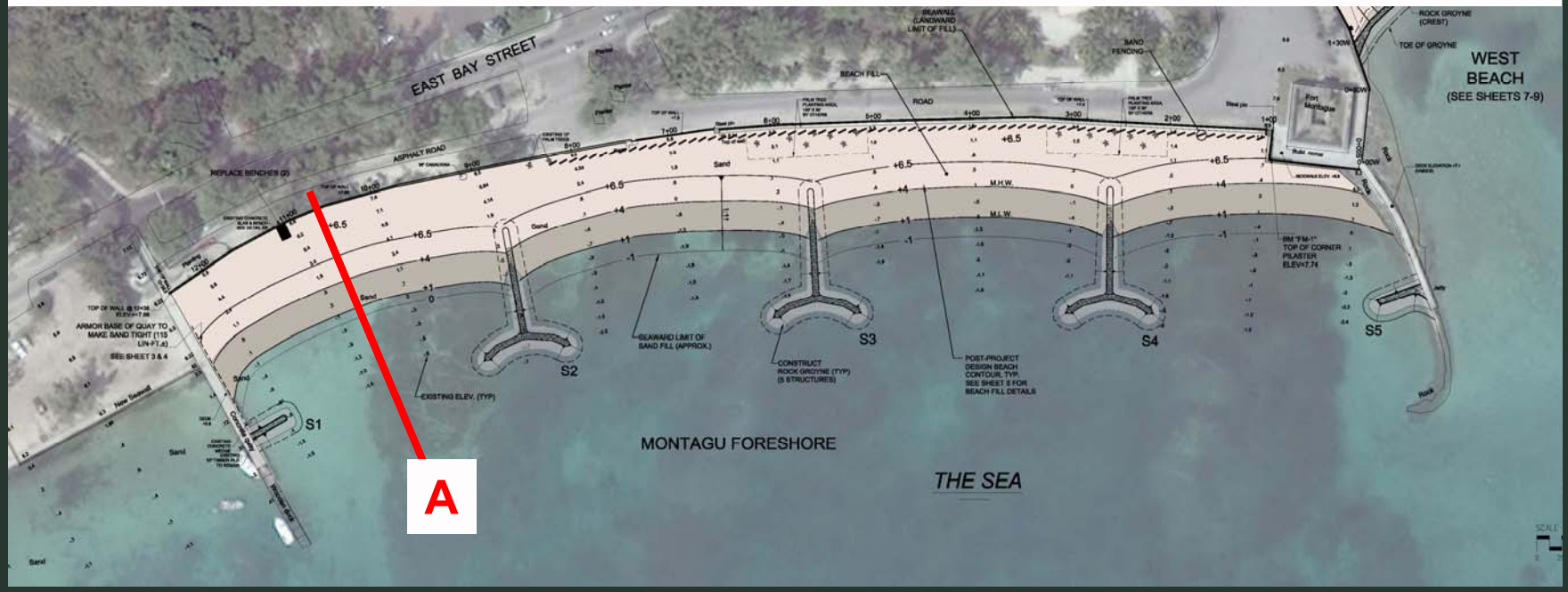


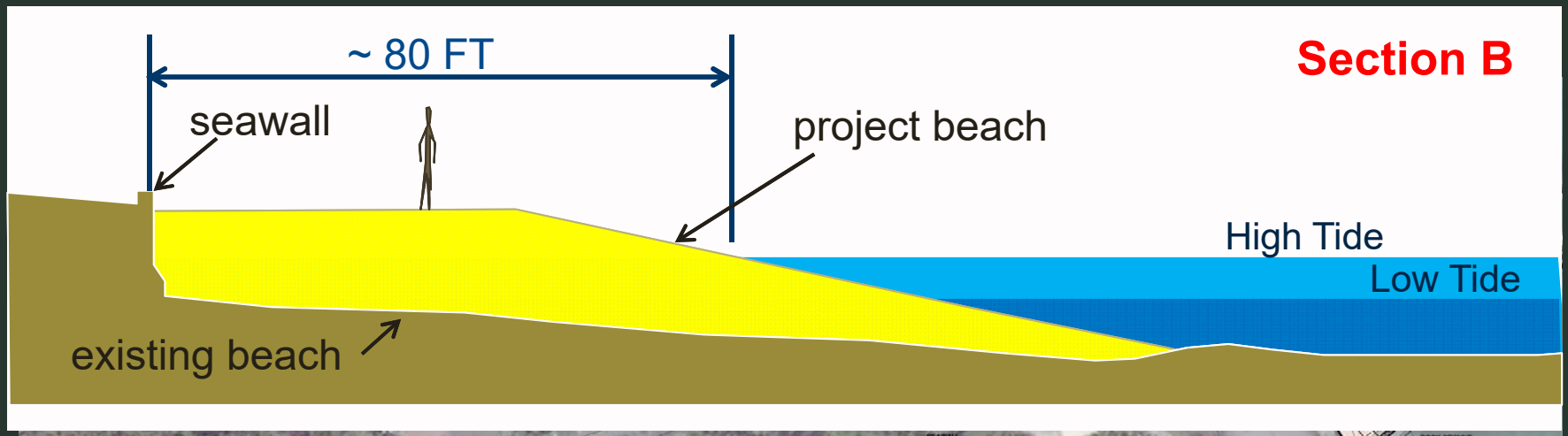
Pre-Project Conditions

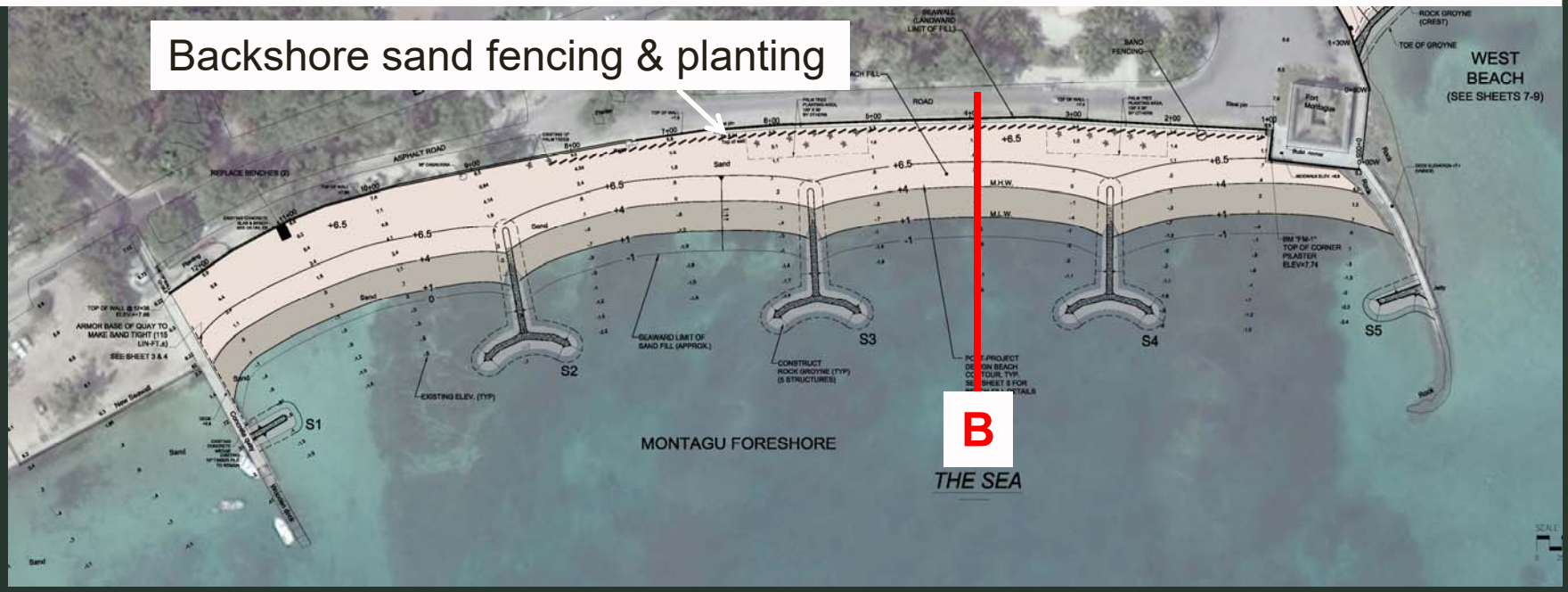


Proposed Beach Improvements

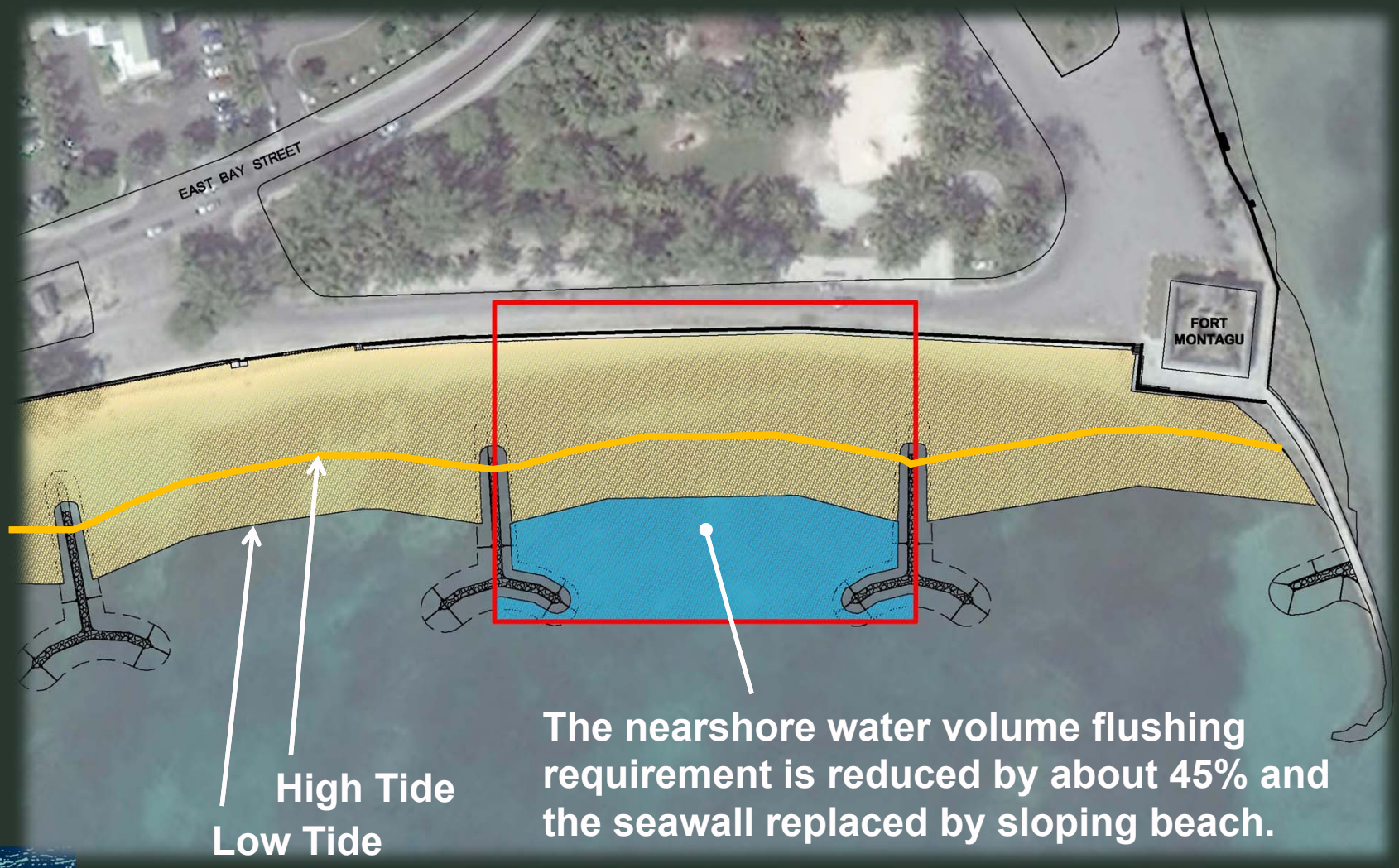

~ 80 FT
Section A
seawall
project beach
High Tide
Low Tide
existing beach


EAST BAY STREET
WEST BEACH
(SEE SHEETS 7-9)
MONTAGU FORESHORE
THE SEA
A
S1
S2
S3
S4
S5


~ 80 FT
Section B
seawall
project beach
High Tide
Low Tide
existing beach


Backshore sand fencing & planting
WEST BEACH
(SEE SHEETS 7-9)
S1
S2
S3
S4
S5
B
MONTAGU FORESHORE
THE SEA

Project Shoreline



Pro-Bono Public Beach Improvement - 2011

Kerzner International
Olsen Associates, Inc
Bahamas Marine Construction
EDSA
and others

Construction:
Sept 2011 – February 2012

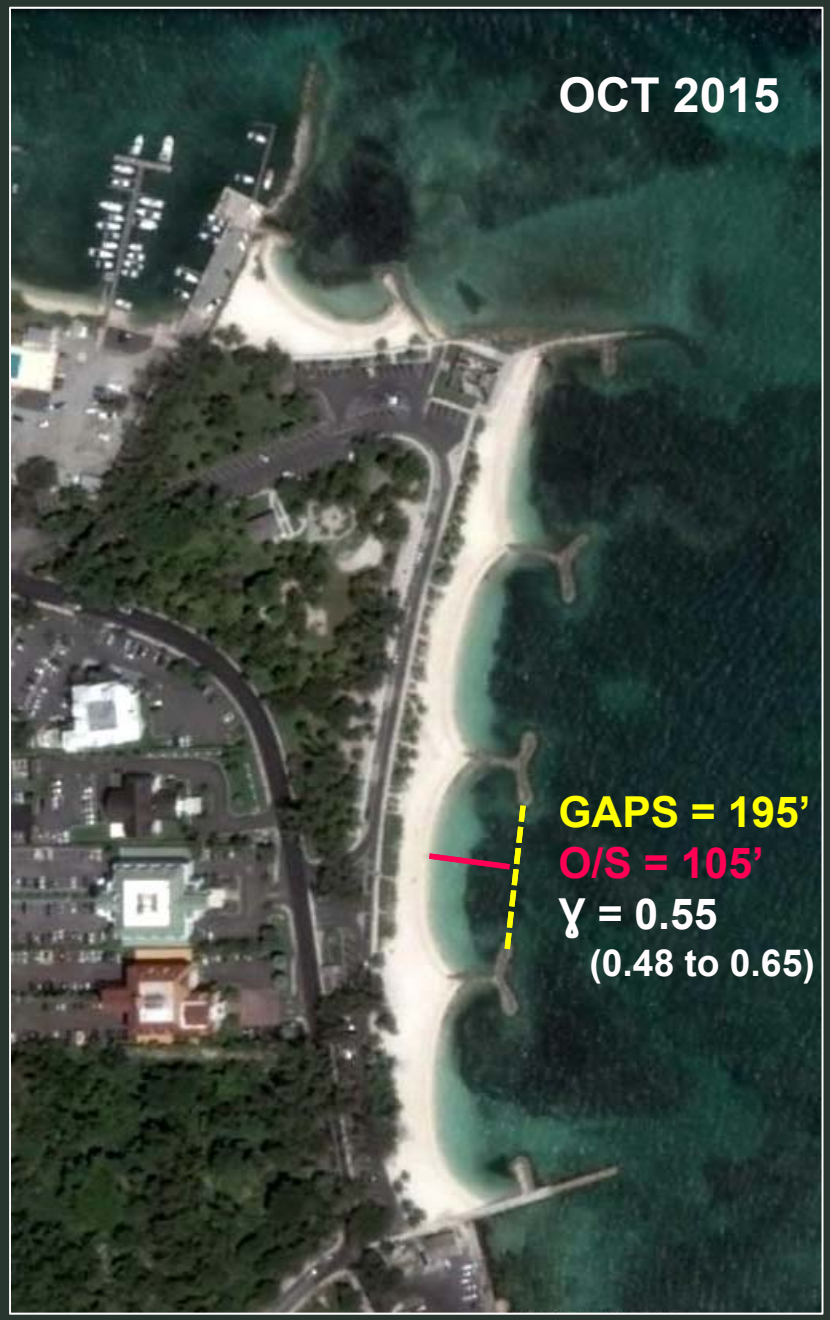
PRE

POST-
PROJECT

PRE

POST

~ 4 Years Post-Construction




UNITED STATES
Gulf of Mexico
Atlantic Ocean
Nassau
THE BAHAMAS
Havana
CUBA
Gran Humedal del Norte de Ciego de Ávila
Ciénaga de Zapata
TURKS AND CAICOS ISLANDS
North, Middle and East Caicos Islands
MEXICO
CAYMAN ISLANDS
Pico Real de Turquino
Pico Duarte
Banco de la Plata
HAITI
Montego Bay
Negril
JAMAICA
Kingston
Blue Mountain Reserve
Port-au-Prince
Morne de la Selle
Santo Domingo
DOMINICAN REPUBLIC
BRITISH VIRGIN ISLANDS
US VIRGIN ISLANDS
San Juan
PUERTO RICO
ANGUILLA
ANTIGUA AND BARBUDA
ST. KITTS AND NEVIS
Plymouth
MONTSERRAT
Basse-Terre
GUADELOUPE
Roseau
DOMINICA
Fort-de-France
MARTINIQUE
ST. LUCIA
ST. VINCENT AND THE GRENADINES
BARBADOS
Belmopan
BELIZE
HONDURAS
Tegucigalpa
Cayos Miskitos
Caribbean Sea
ARUBA
Oranjestad
NETHERLANDS ANTILLES
GRENADA
Port-of-Spain
TRINIDAD AND TOBAGO
NICARAGUA
Managua
COSTA RICA
San José
Caracas
Pacific Ocean
Panamá City
PANAMA
COLOMBIA
VENEZUELA
Georgetown
GUYANA
N
0 100 200 300 400 500
Miles

Sandals La Source, Grenada

Sandals La Source, Grenada

Sandals La Source, Grenada

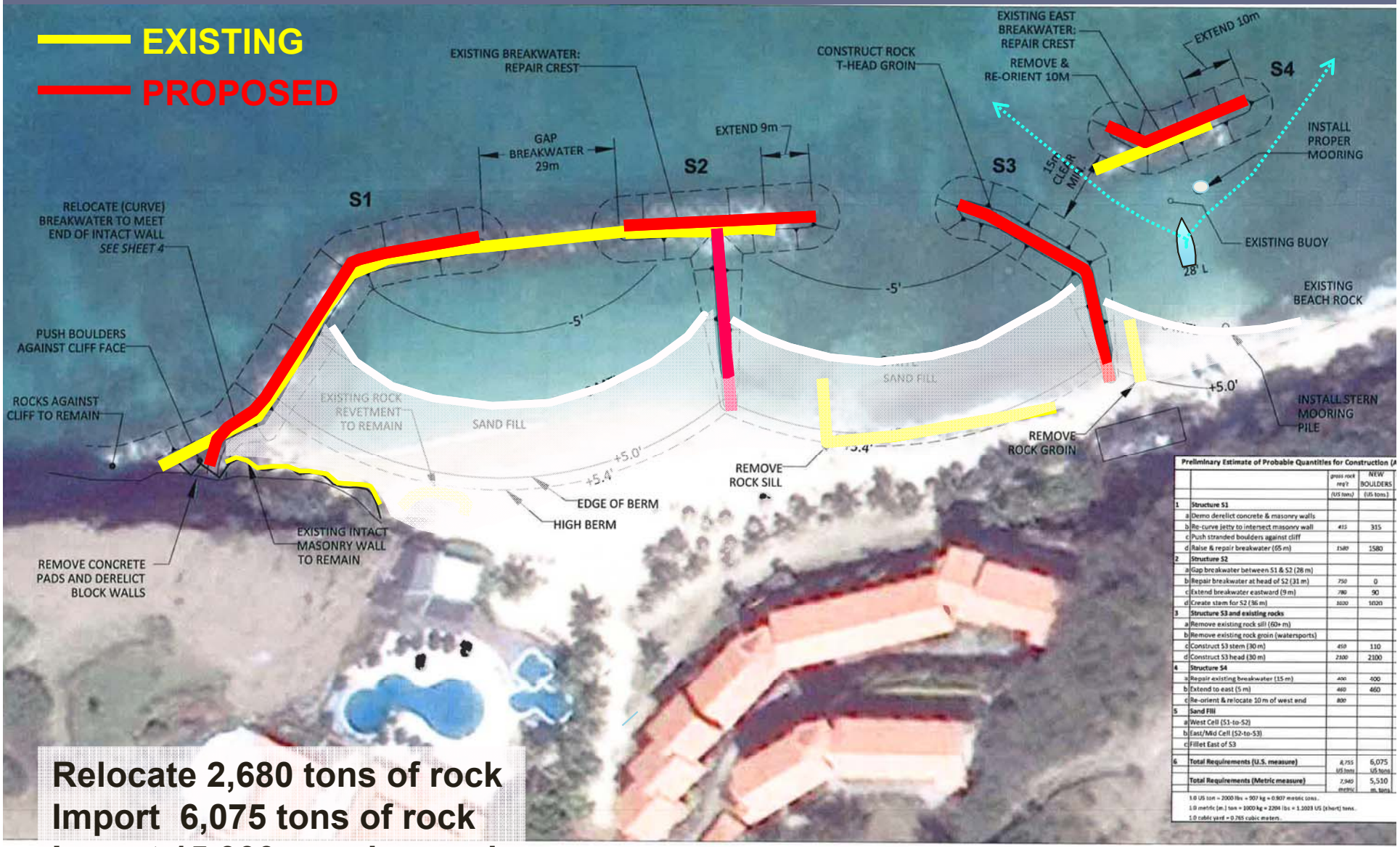
June 2011


11.29.2012


11.30.20

olsen
associates, inc.
Coastal Engineering

PLAN OF IMPROVEMENTS



Relocate 2,680 tons of rock
Import 6,075 tons of rock
Import 15,000 cu.yds. sand

Preliminary Estimate of Probable Quantities for Construction (A

		gross rock req'd (US tons)	NEW BOULDERS (US tons)
1	**Structure S1**		
a	Demo derelict concrete & masonry walls		
b	Re-curve jetty to intersect masonry wall	415	315
c	Push stranded boulders against cliff		
d	Raise & repair breakwater (65 m)	1580	1580
2	**Structure S2**		
a	Gap breakwater between S1 & S2 (28 m)		
b	Repair breakwater at head of S2 (31 m)	750	0
c	Extend breakwater eastward (9 m)	780	90
d	Create stem for S2 (36 m)	1020	1020
3	**Structure S3 and existing rocks**		
a	Remove existing rock sill (60+ m)		
b	Remove existing rock groin (watersports)		
c	Construct S3 stem (30 m)	450	110
d	Construct S3 head (30 m)	2100	2100
4	**Structure S4**		
a	Repair existing breakwater (15 m)	400	400
b	Extend to east (5 m)	460	460
c	Re-orient & relocate 10 m of west end	800	
5	**Sand Fill**		
a	West Cell (S1-to-S2)		
b	East/Mid Cell (S2-to-S3)		
c	Fillet East of S3		
6	**Total Requirements (U.S. measure)**	8,755 US tons	6,075 US tons
	Total Requirements (Metric measure)	7,940 metric	5,510 m. tons

1.0 US ton = 2000 lbs = 907 kg = 0.907 metric tons.
1.0 metric (m.) ton = 1000 kg = 2204 lbs = 1.1023 US (short) tons.
1.0 cubic yard = 0.765 cubic meters.

SCALE 0 5 10 Meters

REVISIONS				
LTR	DESCRIPTION	BY	DATE	APPRVD

olsen associates, inc.

SANDALS LA SOURCE
GRENADA
BEACH IMPROVEMENTS

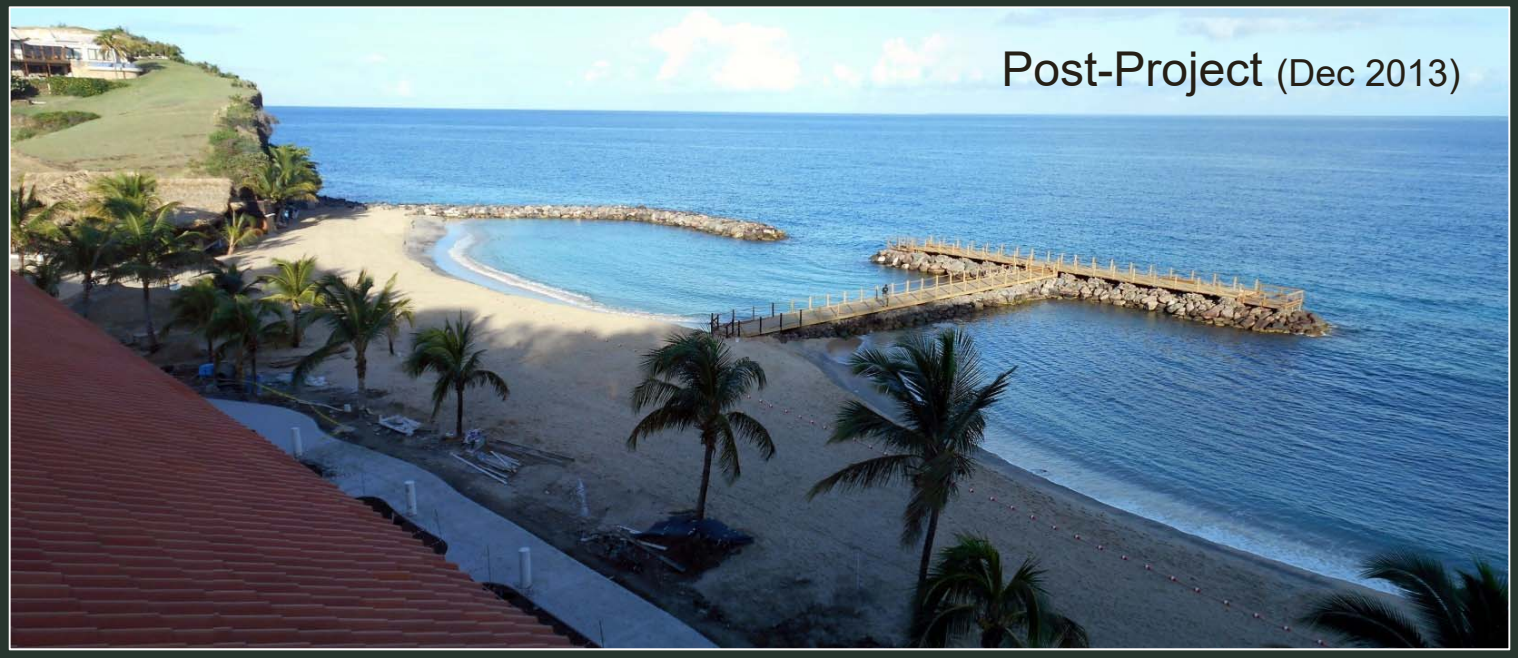
PLAN OF IMPROVEMENTS

DRAWN BY: ML	DATE: 05/17/13
CHECKED BY: KB	DATE: 05/17/13
REVISED BY:	DATE:

Concept Plan: Dec. 2012
Construction Plans: May 2013
Construction Completed: Dec. 2013

Pre-Project (Nov 2012)

Post-Project (Dec 2013)



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Coastal Engineering

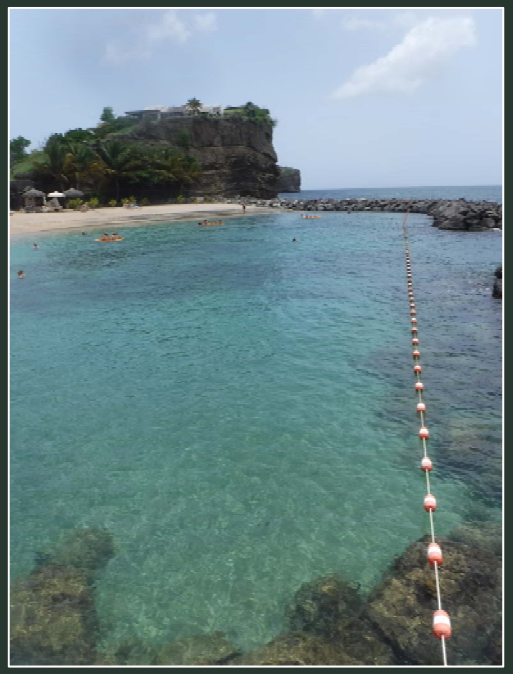
Pre-Project
(Nov 2012)

Post-Project (July 2015)

Pre-Project
(Nov 2012)

Post-Project (July 2015)

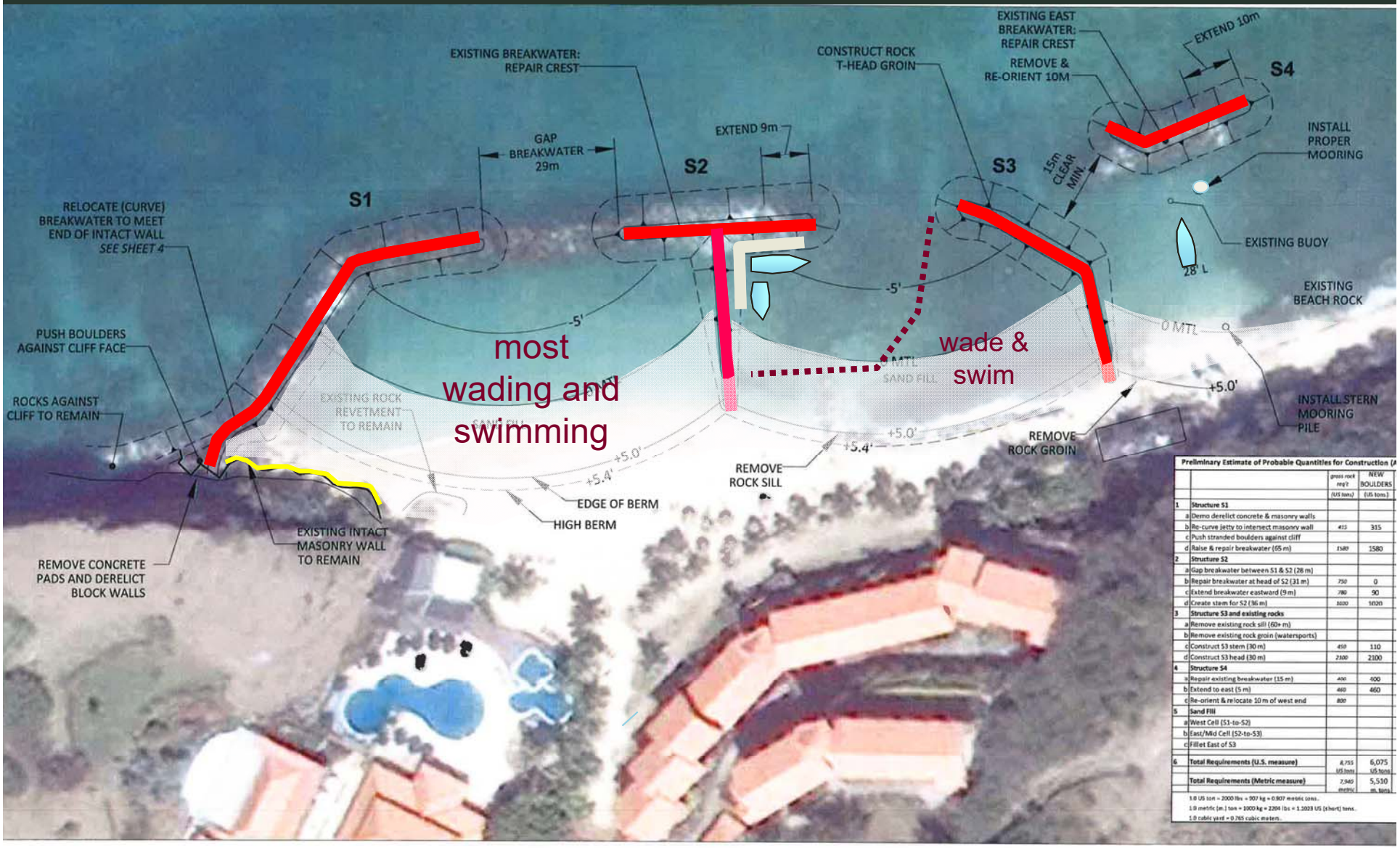
Habitat protection along leeward side of existing breakwater



MANTA

2015 – Plan to relocate boat activities within eastern beach cell, to improve reliability and safety.

MODIFIED IMPROVEMENTS



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SCALE 0 5 10 Meters

REVISIONS				
LTR	DESCRIPTION	BY	DATE	APPRVD

olsen associates, inc.

SANDALS LA SOURCE
GRENADA
BEACH IMPROVEMENTS

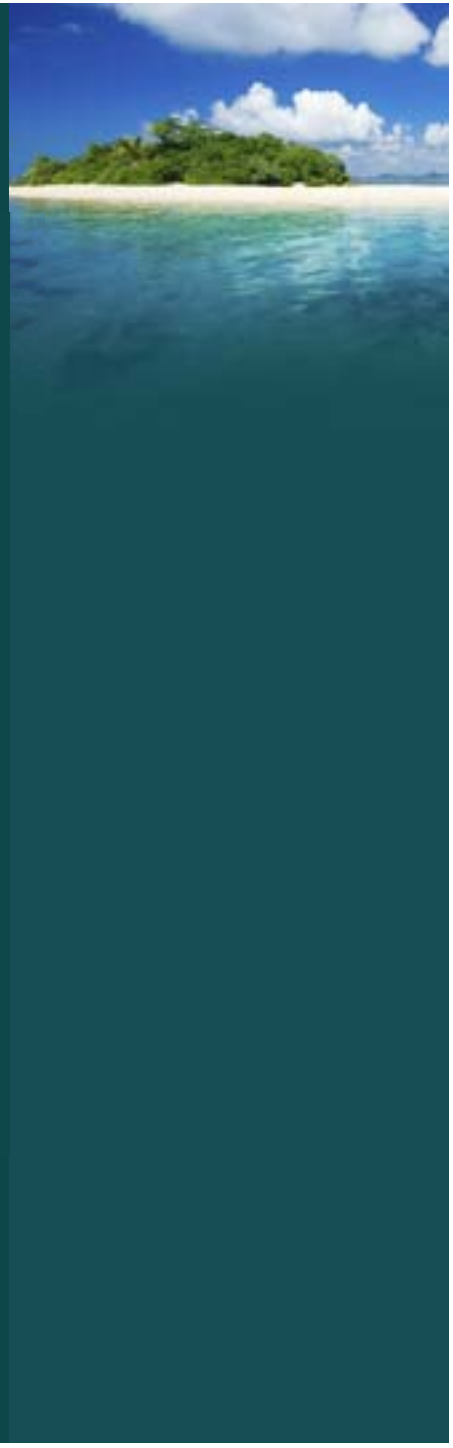
PLAN OF IMPROVEMENTS

DRAWN BY: ML	DATE: 05/17/13
CHECKED BY: KB	DATE: 05/17/13
REVISED BY:	DATE:

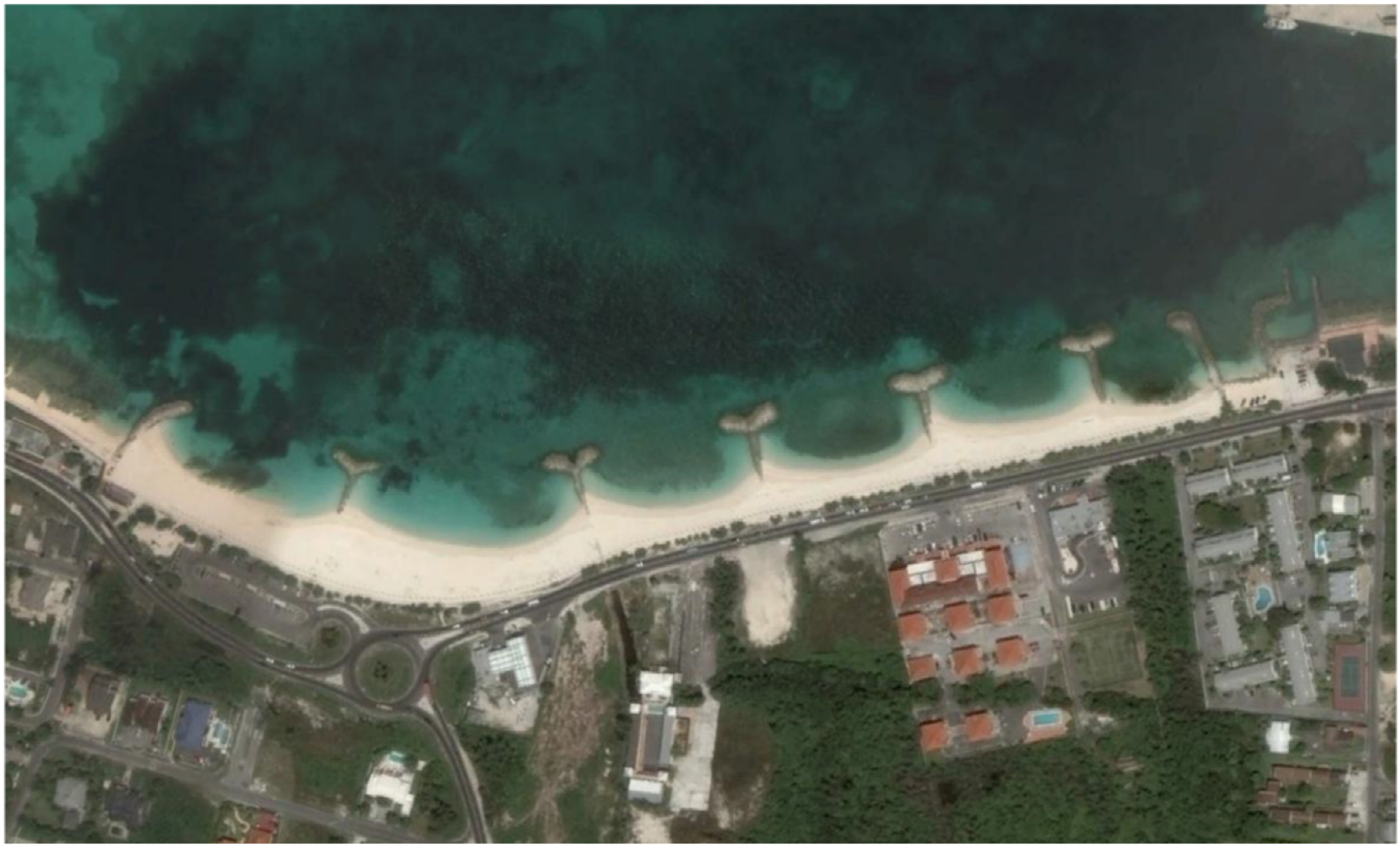
olsen
associates, inc.
Coastal Engineering


GAP = 67’
O/S = 135’
ɣ = 2.0
GAP = 75’
O/S = 128’
ɣ = 1.7
Noting that cells are underfilled, per plan.

Sandals La Source, Grenada



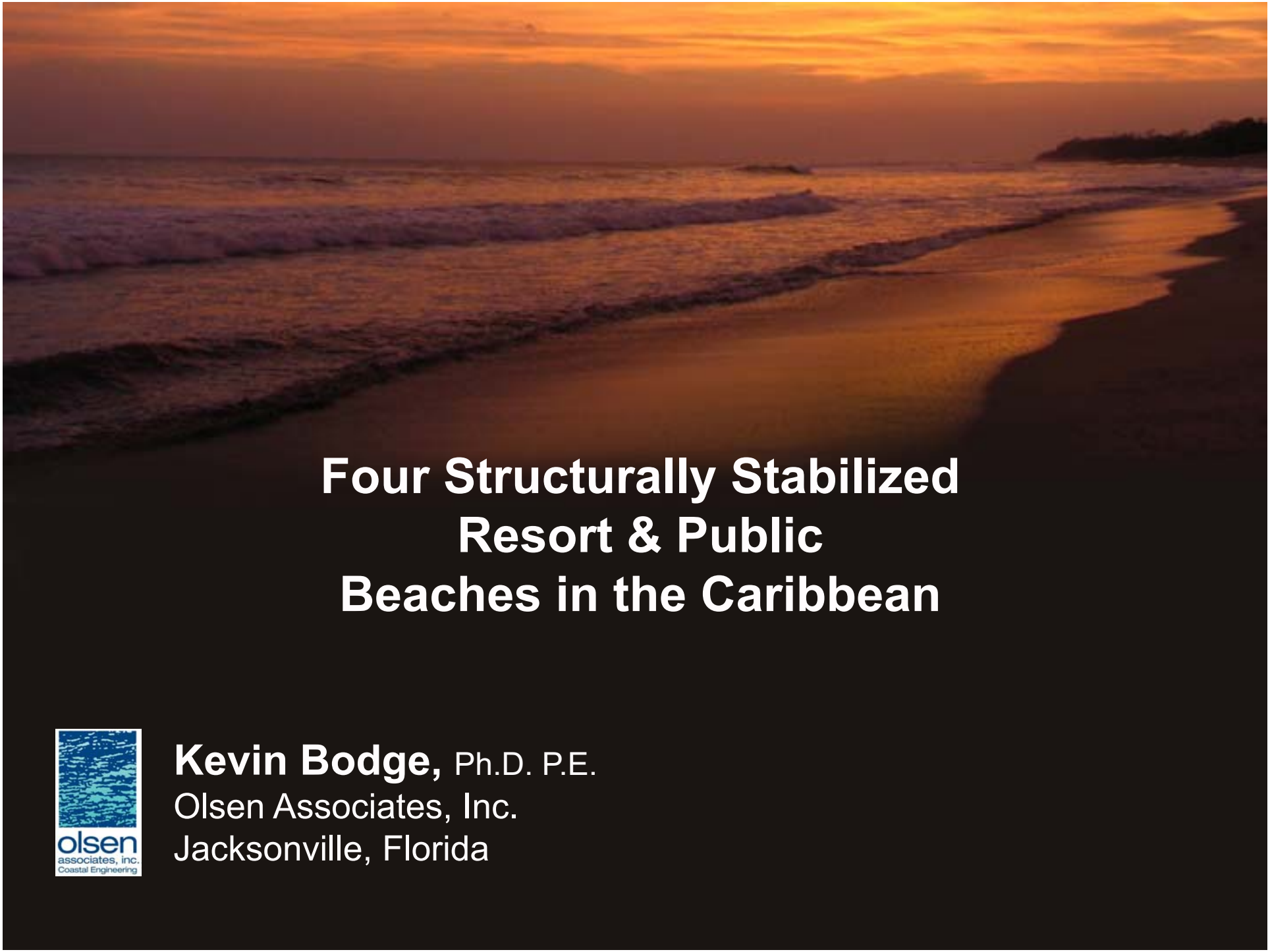
Saunders Beach, New Providence Island, Bahamas: 2nd public beach improvement project (2011-12)



Saunders Beach, New Providence Island, Bahamas

Palm Cay, New Providence Island, Bahamas (Feb 2012)

Palm Cay, New Providence Island, Bahamas (Feb 2012)



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