Living Shoreline Solutions, Inc.

Repaired

Coastal Restoration and Mitigation Total Beach & Shoreline Management System



Living Shoreline Solutions Inc. brings 24 years of Research & Development, Peer Reviewed, Fully Patented Technologies with Proven, Project success rates that are unprecedented in the Field. To date, that Project Success Rate Remains 100%

WAD® (Wave Attenuation Device)



Living Shorelines Solutions, Inc.

Scientifically Designed and Engineered Barrier Reef System.



Dynamic, Complex, Marine Life Habitat

Durable, Stable and highly productive Essential Fish Habitat (EFH).

Measured, .47 Metric tons of Biomass Production per Square Meter surface area, annually. (Rodney Garner, Executive Summary on Fish Haven Productivity (GCMarSt) Queensland Australia



Site-Specifically Modeled and Engineered to Protect & Restore Coastal Zones and promote Productive Oyster Growth.

Portable and Adjustable for Dynamic Beach Rebuilding. Minimal impact on live bottom due to hollow design and small foot print.

Living Shorelines Solutions, Inc.

Wave Attenuation Device Applications (WAD®)

- Protective and Productive Barrier Reef Systems
- Productive Oyster Habitat (37% More)
- Sea Grass & Mangrove Restoration
- Essential Fish Habitat (EFH)
- Natural Shoreline Restoration
- On Shore Sand Dune Restoration
- Near Shore, On Shore Infrastructure Protection For roadways, bridges, critical transportation infrastructure.

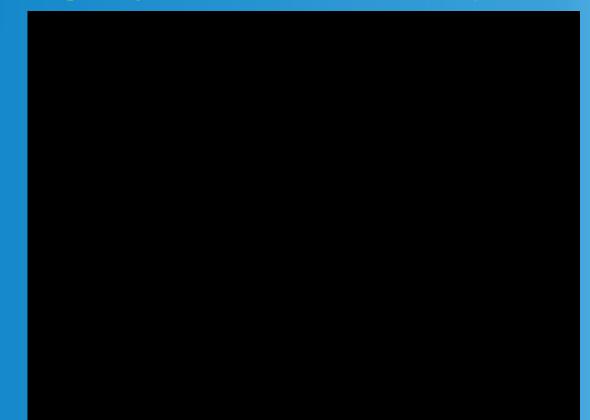
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Wave Attenuation Devices act as a Highly Efficient Breakwater



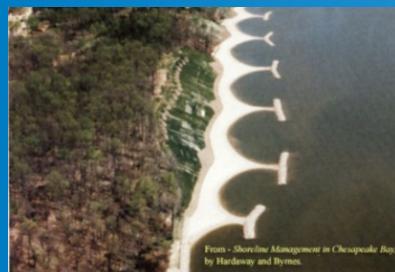
Observe the waves as they move through WADs and die out 3 feet behind WAD array.

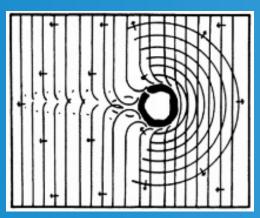
- Attenuate wave energy. WADs do NOT reflect wave energy.
- Energy dissipated as wave encounters angled WAD sides.
- Openings on face are tapered inwardly (V/P) Increase/Decrease
- Openings back 2 sides (2X with (V/P) Decrease/Increase greater
- Causing suspended sediment to fall out of water column.
- Depositing sediment shoreward of WAD array.



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Conventional Breakwater





WAVE

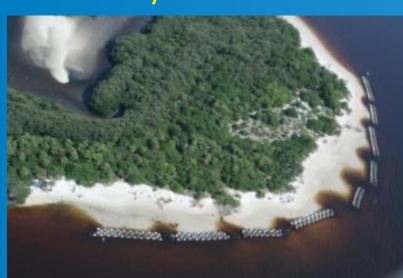
HIGH E ENERGY • Deflect wave energy by refraction and reflection causing scouring behind artificially renourished beach behind breakwaters.

• Direct wave energy attenuation through WAD array

• Notice accretion to the WADs. GAPs were clients' request. Continuous array is desired for full accretion profile.

• Energy attenuation supports sediment management and promotion of stable shoreline

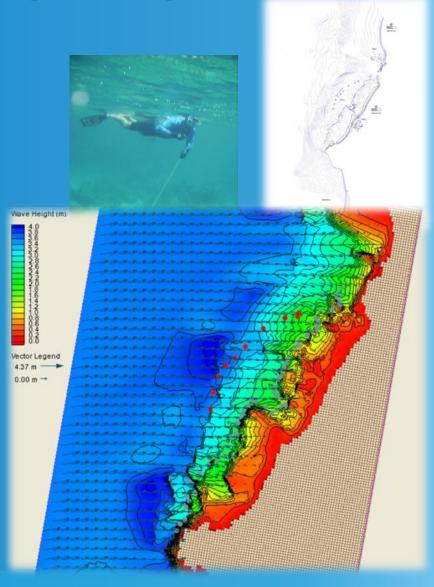
WAD Array



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Where do we start? Process is TURN-KEY, starting with a site visit and survey to determine the feasibility of designing a site-specific system, completing the following tasks:

- CLIENTS DESIRES
- Hydrographic Survey
- Coral Surveys
- Current conditions
- Geotechnical analysis
- Wind-Wave analysis
- Seasonal analysis
- CMS Wave Model for wave attenuation: OPTIONS
 PRESENTED FOR CLIENTS
 Priorities AND Budget



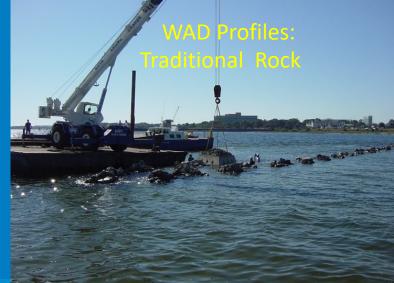
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At permit award, steel WAD forms are manufactured and shipped to local manufacturing yard where local labor and materials will be used.



Local assets will then be used to transport and deploy WADs in designed WAD arrays.



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DADE CITY, FLORIDA

or Flat, low profile, Rounded profile, Colored concrete or Submerged option All Client's desires

Audubon's Sunken Island Bird Sanctuary

ALAFIA RIVER

PROJECT AREA

- 75 year old man-made island
- Loss of breeding/nesting bird habitat
- Very unstable and subject to critical erosion

HILLSBOROUGH BAY

AERIAL OBTAINED FROM: FLORIDA AERIAL PHOTOGRAPHY ARCHIVE COLLECTION (APAC)

DATE OF PHOTOGRAPHY: OCTOBER 2008

THE STATE PLAN COORDINATE SYSTEM SHOWN IS BASED ON THE TRANSVERSE MERCATOR PROJECTION

	AERIAL BASEMAP	NOTICE: The information in this document was prepared by LMA, Inc. This document is not valid for construction unless signed & sealed by a Professional Engineer Iconsed in Florida.	REVISIONS		SCALE: 1'=600' JOB: 000-15.574 DATE: 03-01-2011
Landon, Moree & Associates, Inc. Civil & Environmental Engineers - Planners - Surveyors	PROJECT: SUNKEN ISLAND - WAVE ACTION DEFLECTION SYSTEM (WADS)	In order to further insure that no changes, alterations or modification have been made to the document, no reliance should ever be made on a documentation transmitted or reviewed by computer or other electronic means unlessit is first; compared to the original. UAA makes no warrantes,		DRAFT	02
31622 U.S. 19 NORTH PALM HARBOR, FLORIDA 34684 Phone: (727)799-6010, Fax: (727)787-4394 Toll Free: 1-800-262-7960, WWW.IMAENGR.COM		express or implied, concerning the accuracy of the information contained in any document transmitted or reviewed by computer or other electronic means.			oF 08

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LSS surveyed and modeled site conditions to design initial, 8 WAD array system with WADs 10 foot base, 5 feet tall, weighing ~8.100 lbs. each.

GENERAL CONSTRUCTION NOTES

- 1. All elevations refer to the Harth American Vertical Datum (1988).
- 2. Harizantal anandhales are relevenced to Fisrida Stale Plane, West Zone North American Datum of 1985 (HAD 93)
- 3. The Contractor shell make their ear extermination of the quotilities of anir register to conclute the construction groups on the parts, in Consciont with an index their on comparison of the ages required prior to define on any distribution of the ages required prior to define other on the other mate to due date.
- 4. The Contractor is responsible for verifying the location of of underground utilities or other objects prior to commonly even at the site. Any utilities or other flows comespid during construction shall be resolved at no credit to the Auduent Society of Hosting or Massic.
- 5. All areas or items outside the finits of construction that are domaged or disturbed by the contractor shall be restored to their original or better condition at no cost to the Audution Society of Florida or Massic.
- The Contractor shall check plans for conflicts and discopencies prior to construction. The Contractor shall not the angineer of record of any conflict before performing any work in the affected ano.
- It is the Contractor's responsibility to secone familier with the parmit one inspection requirements of the various governmental agencies. The Contractor that obtain all necessary permits prior to construction and schedue improviders according to agency historycle.
- All specifications and documents referred to shall be of latest revisions and/or latest edition unless otherafse natest.
- At work parformed shall comply with the regulations and ordinances of the various governmental agencies having jurisdiction over the work.
- 10. Repair and replacement of all private and public property affected by the work shall be restored to a condition a sead to or better than existing conditions unless specifically exempted by the plans.
- All deturbed areas with the project not designated for improvements are to be restored to original condition or better.
- 12. Record drawings: The Contractor shall be negronsible for having a neglatered load surveyor to record Thiomation o a set of the operand plane concurrently with construction programs. One (1) set of the final record drawings shall be submitted to the magnets. Record drawings while comply with the requirements in the Contract Agreement.
- 13. NADS construction under this Contract shall include programment, transportation, and placement of breakwater materias despited heavie and alware on the Contract Breakings. The Non-constate of Lumbharg of Secur, material, accompany with the Plance, Spacifications and requirements and farms within the Contract, and Project permits. All work to to be consucted in accordance with di federal, state and local permits and subharkations izable for the Plance.



- STANDARD MARATEE CONSTRUCTION CONDITIONS:
- The Contractor shall comply with the following manatee protection construction conditions:

a. The Contractor shall induced all presented associated with the project of the potential presence of monotese and the need to avoid collabore with monotese. All construction personnel are responsible for the presence of monotesity.

 The Contractor and answerd construction personal that there are allocat attribut positions for human homosphills, or highly monotones which are protected under the Marine Marines Protection N.J. of 1972, the Destingents Species Act of 1973, and the Distribution Marines Stantianzy Act.

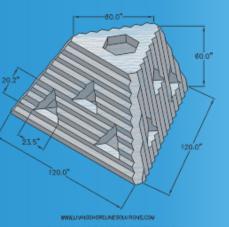
2. Sitiation barriers shall be made at material in Which manatees cannot become entangled, are property to secured, and are regularly monitored to andid manatee entropment Barriers, must not block manatee entry to ar with them exemplial habitat.

4. All vassels associated with the construction project shall operate at the value/file" speech at all times while in the construction ones and while in water where the doubt of the wasel provider less than a four fost depresent home the bottom. All vassels will follow routes of deep water winnerwer possible.

a II manutation are asses within 100 yords of the active daily construction/breading operation or vessel nearest, at appropriate precarities and to implemented to make projection of the monotex. These devices are appreciable, and the the second second

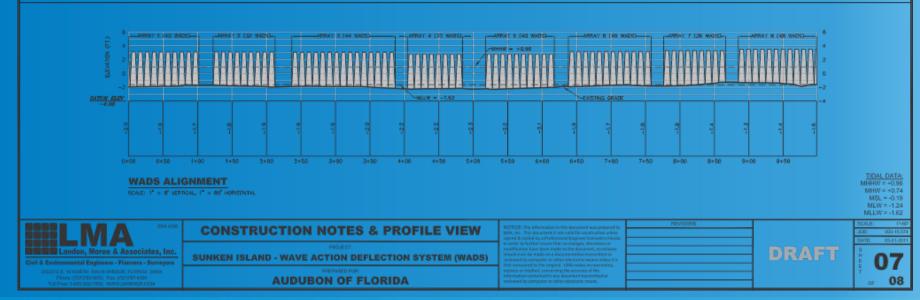
Any califision with analytic highly to a manuface should be reported immediately to the FMC natione at -BBC-404-FWCC. Calification and/or highly should also be reported to the U.S. Fign and Waldle Service in calcarential (In-40-322-3250) for Natth Nentris or Vera Bases (1-772-822-3200) in South Parista.

a Temporery wijns concerning monotase shaft is possible prior to and suring et construction/snotany states that is be removed by the Contractor upon completion of the properties of the measuring at the temporer of the state of temporer of the temporer of the temporer of tempore



WAVE ACTION DEFLECTION SYSTEM (WADS) N.T.S.

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First two of 8, WAD arrays in place. (Observe improved WAD design with horizontal corrugation on front face of WAD and vertical corrugation on back two sides to further attenuate wave energy.)



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Restoration sites and storms no longer have an adverse relationship

April 27, 2012 at high tide, 6 months following WAD deployment (late 2011)

Marine life access with segmented or overlapping gaps Turtle nesting , manatees etc.

Sunken Island Tampa Bay, FL

serrettes Representation with

June/July 2012 (9 mo. post installation) near high tide, shortly after Tropical Storm Debby (65 mph winds & \pm 10 in. of rain)



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Example of WAD effectivity Sunken Island, Tampa Bay, Florida

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Back-side of WAD array 1 & 2 after 4 months in place. Completely arrested erosion and accreted over 10,000 cubic meters of additional sand/shoreline to Sunken Island. Phase two to protect entire island is now underway.

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Sunken & Bird Island Bird Sanctuary Restoration Complete January 2020 after 10-year effort.







Completed Project in Negril Jamaica 39 Days after Installation

COCO PLUM DEVELOPMENTS, NEGRIL JAMAICA, W.I. INSET PICTURE TAKEN DAY BEFORE DEPLOYMENT, 21 MAY 2009





+ GAIN 65 FEET

SAT IMAGERY TAKEN ON JUNE 30 2009 39 DAYS LATER

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DADE CITY, FLORIDA

TAPE MEASURE FROM PORCH =4 FT TO WATER



+ GAIN 55 FEET

DEPLOYMENT COMPLETE DATE 22 MAY 2009 SAT IMAGERY TAKEN ON JUNE 30 2009 39 DAYS LATER

Living Shorelines Solutions, Inc.

DADE CITY, FLORIDA

SURVEYOR STANDING IN WATER AT BENCHMARK NOTE BLUE ARROW FOR PERSPECTIVE



+ GAIN 58 FEET

DEPLOYMENT COMPLETE DATE 22 MAY 2009 SAT IMAGERY TAKEN ON JUNE 30 2009 39 DAYS LATER

Living Shorelines Solutions, Inc.



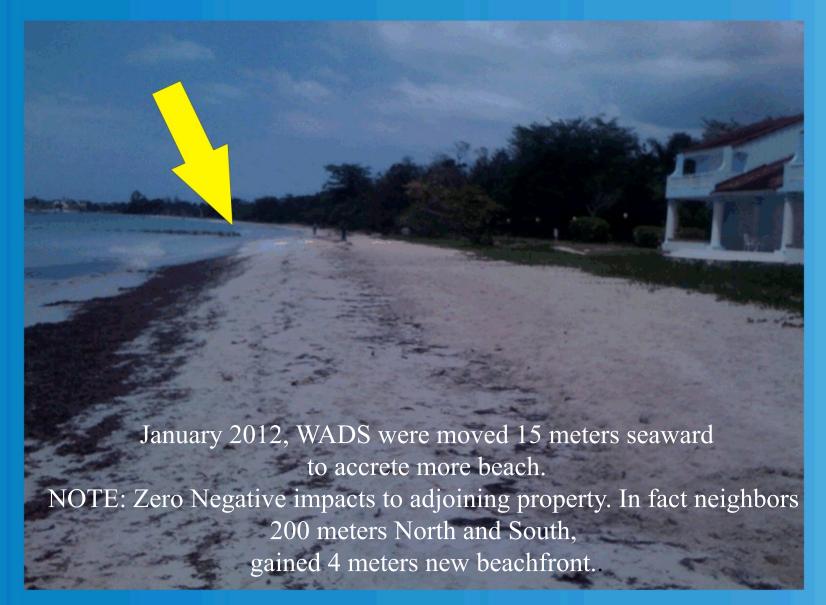


+ GAIN 75 FEET

DEPLOYMENT COMPLETE DATE 22 MAY 2009 SAT IMAGERY TAKEN ON JUNE 30 2009 39 DAYS LATER

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Note WADs and proximity to beach after 10 Months



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Negril Jamaica accretion of 14,000 cubic meters in 2 years

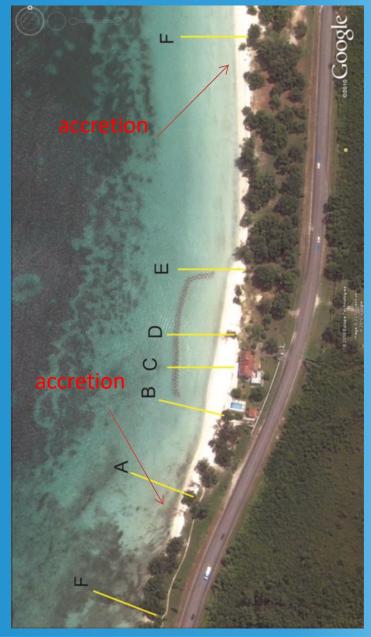
- WADs performed best in severe 0 weather reduce incident wave energy
- Estimated 1,857 metric tons of 0 additional marine biomass on an annual basis after first year
- No negative effect on adjacent area (long shore drift) only positive

COCO PLUM DEVELOPMENTS NEGRIL, JAMAICA

> HIGH TIDE MAY 22 2009 **10 MONTHS AGO**



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Hotel NH Cancun Mexico Submerged Barrier Reef System



Submerged Barrier Reef





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Oyster Reef off Au-Tigre, Louisiana after 3 months July –November 10 2013

STEPSTERIA A A PARTICIPATION OF THE PARTICIPATION O



Even beach profile change behind WADs. Note accretion behind WADs, but no rough weather to get greater amount of sediment further shoreward. This is primarily oyster reef, well away from the shoreline

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Cape Charles, Virginia over 14,000 cubic yards of accretion and significant production Of SAV (Sub-aquatic-vegetation)



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Cape Charles, Virginia



Cape Charles, VA Low tide at original deployment (left) and 3 years later (right)



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LA-16 USDA/NRCS Non Rock Alternative. Worst sediment conditions in the entire state with load factors not to exceed 150 PSF. WADs only free standing structure approved.







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Conoco Philips & Ducks Unlimited Phase 1 of Lost Lake Marshland Restoration. Project goal 10,000 Linear Feet. Completed Phase 1, April 2015.

> Lost Lake Phase 1 Completion 9/21/2015 ~shoreline profile 4 months earlier

Notice marsh naturally rebuilding, calm water clarity improvement and growth of SAV

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December 2019 Marsh Naturally restored out to the WAD array. Write a description for your map.

Ducks Unlimited

And the second second

Â

WAD

400 ft

Google Earth

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Delaware City Refinery Infrastructure Protection Project. Delaware River Monitoring Report In information Folder of DVD.





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EG Simmons Park Seagrass Restoration January 2018



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EG Simmons Park SAV 6 month monitoring January 2018



"The *Halodule* coverage has significantly expanded to an area of 9.69 acres, an increase of 2.25 acres from the coverage mapped in the beginning of this growing season." ESA Environmental Science Associates.

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Effective Erosion Control

- Habitat creation/protection
- Infrastructure/property protection
- Buffer from natural processes (i.e. storms, SLR)

Public Use Value

- Maintain/enhance beachfront areas and maintain land-to-water access
- Artificial reefs introduce new recreational value

Environmental Value

- Ecological uplift
- Minimal impact green technology
- Passive accretion/natural habitat progression

Durable and Stable Design

- Pyramidal and porous design promotes stability
- Proven to withstand major storms

Versatile and Cost Effective Project Design

- Variation in array
- Variation in WAD design
- Portable
- Installation Cost = or < conventional technologies</p>

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DADE CITY, FLORIDA

Allows for Tailored Design to Client Need and Site Specific Goals



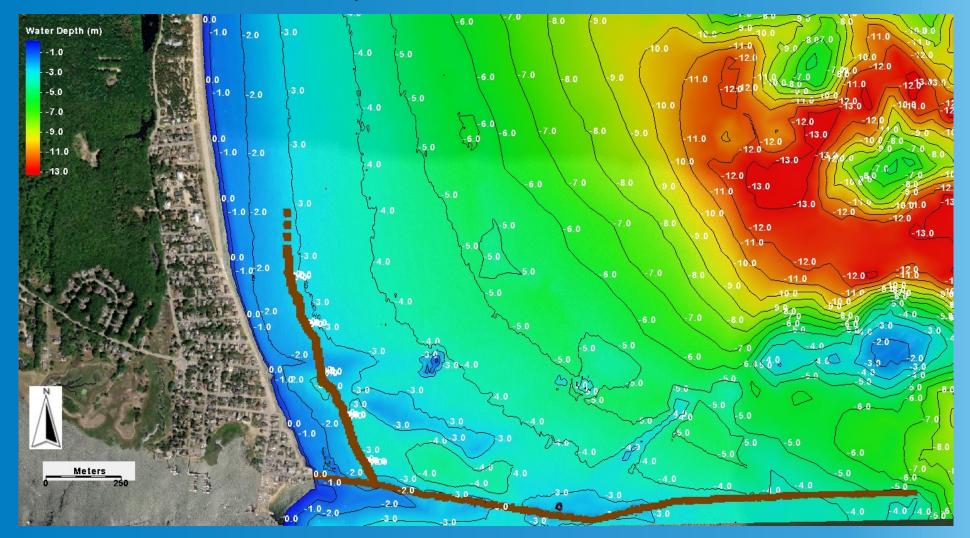
Statistical wave conditions based on the measured directional waves at NOAA gauge 44007 from 2009 to 2020.

			Average of top 1% (16'max)		Average	
Angle bracket	mid-point angle	Frequency of occurrence	wave height	peak wave period	wave height	peak wave period
	degrees	%	m	S	М	S
0-23	11.5	1.19	2.61	10.00	0.64	4.42
23-45	33.0	0.82	4.52	12.27	0.82	5.93
45-68	56.5	1.11	4.77	11.95	0.95	7.91
68-90	79.0	5.66	4.89	11.33	1.15	8.49
90-113	101.5	18.98	5.08	11.21	1.13	9.54
113-135	124.0	25.23	4.47	10.64	0.96	9.04
135-158	146.5	25.10	3.71	9.48	0.92	7.85
158-180	169.0	11.03	3.36	8.26	0.95	6.31
180-203	191.5	5.08	2.48	7.22	0.91	4.99
203-225	214.0	1.60	2.21	8.18	0.74	4.38
225-248	236.5	0.81	1.96	9.87	0.68	4.42
248-270	259.0	0.65	2.00	10.92	0.73	4.98
270-293	281.5	0.45	2.22	13.65	0.68	6.91
293-315	304.0	0.50	1.93	13.71	0.67	6.18
315-338	326.5	0.54	1.73	11.47	0.62	5.61
338-360	349.0	1.15	1.63	7.89	0.63	4.17

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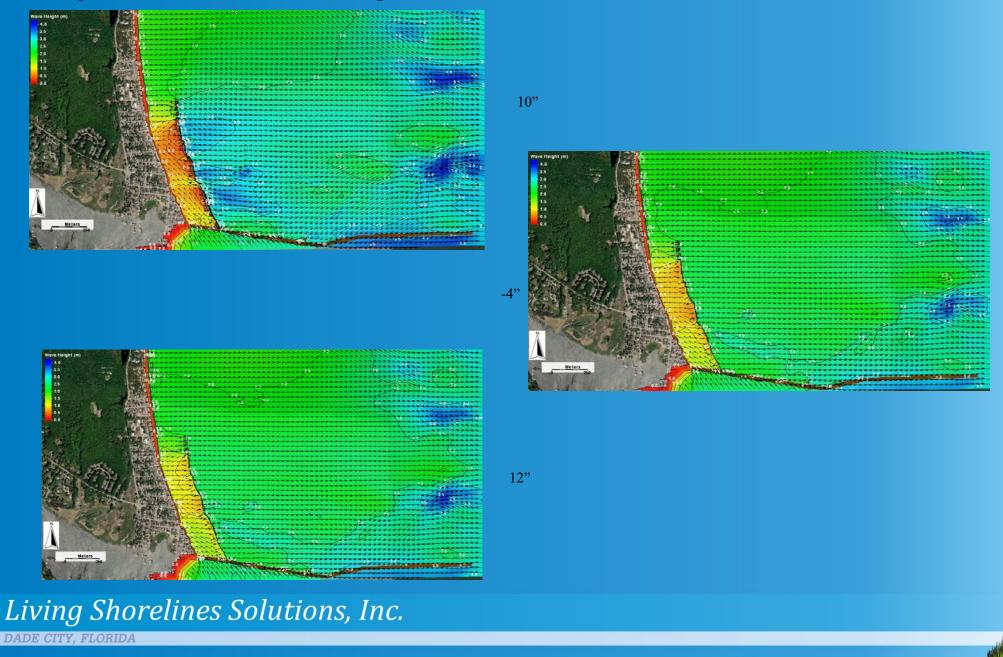
Three Alternatives: All 15' WAD @- 8.9' contour 525' offshore

- A1: 2,700+ LF Eagle Avenue
- A2: 2,900+ LF Island Avenue
- A3: 3,200+ LF Ferry Park



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Modeled Alternative 3 (A3) wave field associated with the 124-deg offshore incident wave (H_{sig} =4.47 m, T_p =10.64 s) under projected higher sea level superimposed on MHHW: Top panel: 0.1 m sea-level rise, middle panel: 0.46 m sea-level rise, lower panel: 0.67 m sea-level rise.

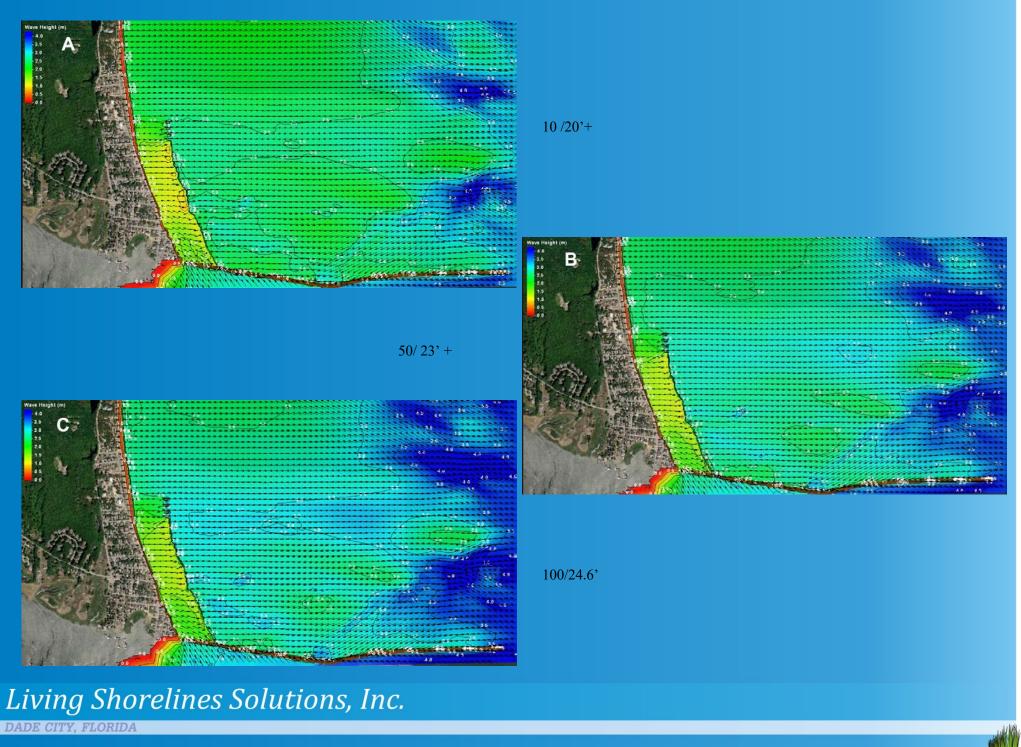


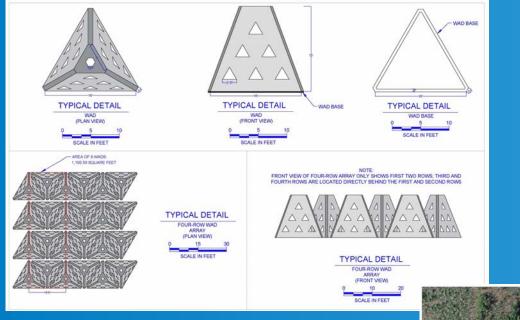
Extreme wave conditions used in the Woods Hole Group Environmental Laboratories and Aubrey Consulting (2006) modeling study.

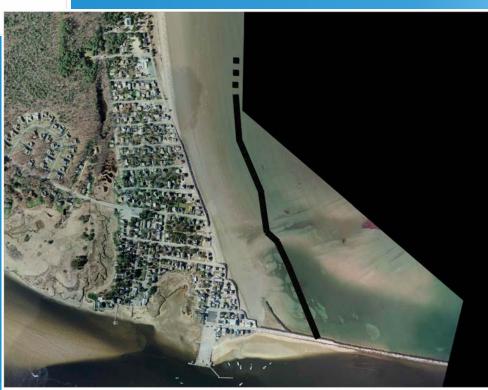
		wave height	wave period	incident angle	water level
		m	S	Degrees	m above MTL
10-year. (20+)	Α	6.2	14.4	60	2.4
50-year. (23+)	В	7.1	15.4	60	2.6
100-year. (24.6)	С	7.5	15.9	60	2.7
perfect storm (22.6)	D	6.9	14.3	37	2.4
Hurricane Bob. (19)	E	5.8	11.1	-20	1.8
Noreaster. (18.3)	F	5.6	11.1	50	2.4

WAD

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WAD

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Living Shorelines Solutions, Inc.



Fish Havens® provide dynamic, complex, marine life habitat and durable, stable and highly productive Essential Fish Habitat (EFH).



Measured: 0.47 metric tons of biomass production / meter ² of surface area annually.

Living Shorelines Solutions, Inc.



Executive Summary on Fish Haven® Productivity. "..... every square meter of..substrate...produces 0.47 metric tons

One notable project done in the Gulf of Mexico was

EXECUTIVE SUMMARY FISH HAVEN ARTIFICIAL REEFS PRODUCTIVITY

Artificial Reefs, Incorporated (ARI) & Coastal Restoration, Incorporated (CRI) USA, are sister engineering Firms involved with professional, "state-of-the-art" reef development and coastal protection projects. They hold numerous intellectual property rights and U.S. & International Patent rights (US 6.186.202B1) (Juternational Patent Applicedierating the development of those new patches.

March 3, 1999 PCT Docket No# 4480)) These and development of the World's Only "Scie marine life habitat/wave attenuation device avand marine life habitat characteristics of Haven/Coastal Haven series modules were marine rapid marine growth on all hard substrate su specifically engineered to act as wave attenuation

The hydrodynamic engineered shape specifically developed to promote a "designe surfaces. Combined with the engineered light biomass development and reef productivity. Ti amount of productive, hard substrate and spaavailable. The Fish Haven/ Coastal Haven "designed" reef /wave attenuation systems on developmental substrate and a more stable and biomass development. These features allow fish column when seeking optimum current and tem



place **750** Fish Haven weeks' time, covering in 85 feet of water. Th (24m2/unit of product (15m2/unit of product) Juniors (4m2/unit of productive substrate prowas <u>12,750 m2</u>; recommendations of Australia and close of

growth patterns here in the Northern Gulf of Mexico, (cooler reef placement) We had estimated and confirmed thousands development in the first six months following deployment. later, at the **one year** anniversary of placement, there was clo the amount of marine biomass development. (Including reside fish, invertebrates and crustaceans) the marine biomass on the structure has increased geometrically over time as added resulted in increased surface area for additional and branchi corals etc.



of marine biomass annually..."





Over the past 9 years, Artificial Reefs Inc. has placed over 12,000 artificial reefs systems, performing numerous studies and observations, we have been able to establish a base- line, conservative, estimate on marine life productivity, based on the productive substrate of the Fisl Haven System. That estimated number is, that <u>for every square meter</u> of productive substrate provided for in a designed artificial, *Fish Haven*, patch reef system, there will be, conservatively, a total of: 0.47 metric tons of marine biomass produced on an annual basis



several different size Fish Haven units, with d placed inside the larger outer unit. This permit to be protected and to thrive. Units and com apart in small patch reef configurations. As th and transit corridors between patches, develop.



At the six month, through one-year point, reports were from the reefs. Additionally, numerous transects were taken of / size estimates (per surface area) recorded at a distance of 15 given time, **138.5 kilograms/meter square** of <u>fish biomass</u> w reef structures. Unit measurements were taken from both pate averaged. In our typical patch reef configuration, with reef u lower-observed average of 115.6 kilograms/meters square, ar tons of marine fish biomass (resident reef species, crustacean-

OF QUEENSLAND

Centre for Marine Studies

Rodney Garner Graduate Certificate of Marine Studies (GCMarSt)

Living Shorelines Solutions, Inc.





Department of **Environmental Protection**

Jeb Bush

January 15 2004

David B. Struhe

Artificial Reef, Inc., Coastal Restoration, Inc., 6536 East Bay Blvd Gulf Breeze Florida 32563

Dear Mr. S. Bartkowski,

I wanted to first of all express my sincere appreciation for all the work and support you I wantet to the of an express my ancete appreciation tot at the work and support you be been approximately and the second second second second second second second second bedra acquire balance recognition at the way up to the Otice of the Vehicular Otice of the Vehicular States. As the supervisor of the restoration section for the Florida Department of Environmental protection and the supervisor that there are young the Single Theory of the Vehicular Department completion, I am thankful to you for introducing me to your Wave Attemation Device (WAD). The WAD was not only the manyer to com unoived erosion filterings and the supervisor that the supervisor the supervisor the supervisor the supervisor the supervisor the supervisor the supere but also allowed us to complete the project ahead of schedule.

Had you not introduced us to the WAD's practical application, 1 doubt we would have completed the project in time to qualify for the Presidential Award given by the Gulf Of Mexico Program. The excellent versatility of the WAD to be used as a very efficient intermunit on drive under almost any situation in rough and shallow waters as well as a haven for attracting and satisting biological diversity, make the best attraeusation drive for shore line arrannerst and reef construction I've ever seen

Sir, don't be surprised if you hear from some of my collengues inquiring on the use of your WADS in Linuppe and serving other countries dealing with serious ensoint issues. Since PGS the best outside the big denses of fissi is the scientific result, cannot the you how many linus processing the series of th

For future reference you may be interested to know that I am continuing to monitor the progress the WADS are achieving at Project GreenShores in Pensacola, Florida, Both the wave progress the WADS are extreming an royest orientations in reinstein, roma, both are ware energy attenuation and biological interest has attracted our partnership friends and colleagues a the United States Environmental Protection Agency on Sabine Island. That is where most of the

United States Department of the Interior FISH AND WILDLIFE SERVICE

Field Office 1601 Balboa Avenue Panama City, FL 32405-3721 Tel: (850) 769-0552 Fax: (850) 763-2177 January 8, 2004

Re

Mr. Scott Bartkowski, President Coastal Restoration. In 6536 East Bay Boulevard Gulf Breeze, Florida 3256

> Bay Environmental Study Team West Bay Sea Grass Pilot Project St. Andrew Bay, Bay County, FL

Dear Mr. Bartkowski

The Florida Gulf Coastal Program is dependent upon myriad partners to attain such goals as preservation, enhancement, and/or restoration of our important coastal habitats. These habitats are of critical value to literally hundreds of aquatic, bird, and mammal species. They are also of tremendous recreational and economic value to the general public. Partner corporations such as Coastal Restoration, Inc., help make attainment of program goals a reality.

I want to thank you and your corporation for the very generous donation documented in your oice #287. A donation of this magnitude really made the difference and resulted in a very successful pilot project. In addition, your employees exhibited a wonderful degree of professionalism and were an important component of our field team. Recent inspection of the wave attenuation devices indicates that they are indeed accomplishing what they were engineered to do. While we do not yet have the data we need on sea grass growth, we anticipate that such mation will be available after one complete growing season; i.e., by next October

We look forward to continuing working with you as a corporate partner, both in West Bay and at other locations where your contributions and products are needed. Thanks again for your role in this important restoration effort

hael S. Brim, Coordinato Florida Gulf Coastal Program

DADE CITY, FLORIDA

Letters of Recommendation THE WHITE HOUSE

Florida Fish and Wildlife Commission gave un used through out the entire project. Once again thanks for resolving the erosion issues for PGS and helping us meet the deadline that allowed us to bring home one of only two prestigiou Presidential awards for protecting waters of the Continental U.S. and that of The Gulf of Mexico

As you may have heard by now after thirty years of working in all areas of the Department of Environmental Protection, I will be retiring to work in the private sector. I have already been contacted about being privately retained to do many similar bioedine-armonica projects throughout the world based on my accesses, most notable Project GreenShore, I will be consulting with over seas entities. Federal, Statu and private property owners here in the status: ee consuming win over ease animet, recent, shall and private property owners into the states. As such, 1 look forward to continuing our professional relationship and continue fee deneavers of saving our shorelines with innovative ideas such as your Wave Attenuation Devises and hopefully with the same degree of associase as they proved in our project. Thanks again for your continued support as a partner in phase I & II of POS. I hope we have other opportunities to work together on similar projects.

arazo & As Environmental Engineering Consultants

Vendors *

WASHINGTON

October 29, 2003

Congratulations to the Members of the Project GreenShores Tea receiving the Coastal America 2003 Partnership Award. The av recognizes outstanding partnerships that make a significant contoward the restoration and protection of our Nation's coastal env

Project GreenShores resulted from partnerships between many Federal, State, and local organizations working together to res shallow area in the northern part of Pensacola Bay after years human impact. Through the development of a multi-phase res plan that included the promotion of community education and this vital area is becoming a thriving environment, rich in com pride. Your collaborative efforts to restore the nearshore oyst sea grass beds and saltmarsh habitats, including the support of Seabees, are to be commended. I appreciate your efforts to bri collective resources to meet common goals and better our enviro

Page 1 of 3 cept my best wishes for your continued success.

r. Scott Bartkowski, President ration. Inc. 536 East Bay Boulevard Gulf Breeze, FL 32561

Re: West Bay Seagrass Pilot Project St. Andrew Bay, Bay County, FL

Dear Mr. Bartkowski:

The http: Environmental Study Team would like to take this opportunity to flush you and your corporation for your partnership in this suggests restoration project. The donation documented in your insolver 4273 was noted generous and use an essential composent for this project to proceed. Yua and your employees were professional and a pleasare to laver on the same and as a partner. This project depends not only our agencies like the US hand withdish Exercice Plotted Card Consell Program. the data of the same grant, but is depends on calars volument, and partnerspections and as Coastal Restoration, like to many success and due good blangs for ear coastal believas.

St. Andrew B.E.S.T.

Bay Environmental Study Team

February 27, 2004

The institution of the wave attenuation devices was exactly according to design and has achieved exactly what we desired – a quiet zone in the hey to give the imaginated seagness a charact to get re-established. The wave reduction has been as successful that it exacted a anishedore out in the lay with the remain-passing housers constrines gril in them? This has resulted an aneed to stretch the design is and according the grint of general. It is a sufficient that the devices are to keep the boats from entering and dimensing the planted seagness? It is a sufficient that the devices are sufficient to the stretch of the stretch of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a stretch order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch of the design is a first order of the stretch o toing what we wanted

We will be conducting a full monitoring of the test plets in the near future and will have an initial collection of data. We will keep you informed as this multi-variate, field bioannay develops data sets.

I certainly look forward to a continued working relationship with you and your corporation. The entire BEST organization thanks you for your role in our bay restoration effort.

incerely yours. neil J. Land MD

Cell Banks, Perfer and Jaropatini, PL Data of Environmental Processors, F.G. opt of Engineers (1): Shored Formal Sciences Bankses, Perford Are Frees Rosses, Bank eres, Engine of Warnes Hanney, Akadem Sciency, Schwalten Berg, Carl Court of Baner Management Densier, FL, Dage of Community, Address, Carl Court of the Roser Management Densier, FL, Dage of Community, Roser, Allers of Baner Management Densier, FL, Dage of Community, Schwart, Thouse in the Roser, Nameron Densier, FL, Dage of Community, Roser, China, Management, Allers in Schwart, Namer Bank, Fan JT, Balling, Fachamer, Schwart, Thouse, of the in Schwart, Nameron Densier, FL, Dage of Community, Schwart, Thouse of Schwart, Nameron Densier, FL, Dage of Community, Schwart, Thouse of Schwart, Nameron Densier, FL, Dage of Community, Schwart, Thouse of Schwart, Nameron Densier, FL, Dage of Community, Schwart, Thouse, Schwart, Schwart, Thouse, Schwart, Thouse, Schwart, Thouse, Schwart, Thouse, Schwart, Thouse, Schwart, Schw Page 2 of 3

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56--Design, manufacture and install an artificial concrete modular marine reef/breakwater. The reef/breakwater shall be composed of pre-cast concrete artificial reef units configured and sized to protect the shoreline of Deadman's Island, Florida.

General Information

Document Type:	Presolicitation Notice
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Contracting Office Address

US Army Engineer District, Mobile, P. O. Box 2288, 109 Saint Joseph Street (zip 36602), Mobile, AL 36628-0001

Description

http://www1.eps.gov/spg/USA/COE/DACA01/W91278-04-R-0035/SynopsisP.html

Email your questions to US Army Engineer District, Mobile at linda.d.stanley@sam.usace.army.mi

http://www1.eps.gov/spg/USA/COE/DACA01/W91278-04-R-0035/SynopsisP.html



5/23/2004

habitat to sustain a coastal marine ecosystem in the area of Deadmans Island near Gulf Breeze Florida. This is a notice of sole source intent by the Mo bile District Corps of Engineers. Se Note 22. Mobile District intends to negotiate on a sole source basis with Artificial Reefs Inc., Gulf Brezer, Fl. (880) 934-7201. Artificial Reefs Product is patenteel and has been installedtested in other locations and is approved by the Florida Department of Environmental Protection. This is the only known product that can meet all of the following requirements. The artificial reef must be environmentally sensitive with similar characteristics of a natural barrie r reef, that would attract a full array of local marine species and promote marine or a manual memory can be a seen a growth on all arranges of the rect, provide engineered opennings to promote designed flow of micronutrient rich water across all surfaces and increase light access to promote the rapid growth of marine life. The design of the reef system must provide substantial cover and spawning habitat, contain the geometric and physical material properties similar to a breakwater in order to withstand wave heights and currents associated with a local 20-year storm events, as well as provide a structurally useful minimum 25 year life. The referenced ref must abate crosion of as protoed a indextually local minimum System it.e. The forefore the forefore the miss state tension of Deadmans Island, and allow the U. S. Army Corps of Engineers to plant aquatic vegetation along the shoreline to imp rove both the aquatic and terrestrial habitat on the project area. The barrier ref system shall be composed of pre-cast concrete units configured and sized to protect the shoreline of Deadmans Island near Gulf Breeze, FL from erosion processes resulting from average wind and wave conditions. The project site encompasses an area of approximately 134,000 feet, with slopes from the shoreline to about minus 3 feet or minus 4 feet. The bottom sediment is composed of sandy material. The crest elevation of the breakwater shall be one (1) foot above Mean High Water. Permitting requirements of Florida Department of Environmental Protection beam right water, restmining requirements of roma Exploriment or invitonmental in reduction analysis to determine effect to the rest of the robust of the reef/breakwater requires obtaining permits, namely Coastal Zo ne Certification and Water Quality rectivities water require paradiaming permits, intrinsity Unstati / 20 me Centrication and Water (Junity and Society (Junity) and Socie design/technical documents: 3) Technical specifications in Microsoft Word format: 4) composition of the second seco approval process and contract modification to proceed to the manufact uring cycle. The design, manufacture and installation must be completed by August 01, 2004. All responsible sources may submit an offer that will be considere d. **Original Point of Contac**

Design, manufacture and install an artificial pre-cast concrete modular marine reef to develop a

Linda Stanley. (251) 441-5539

5/23/2004

Living Shorelines Solutions, Inc.

Please Contact Living Shoreline Solutions Inc. 12646 Grand Traverse Drive Dade City, FL 33525 Bsns: (352) 588-5263 Fax: (352) 588-5301 Cell: (813) 245-9482 <u>TBrown@LivingShorelineSolutions.com</u> <u>SBartkowski@LivingShorelineSolutions.com</u>

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Living Shorelines Solutions, Inc.