Miami Beach – Lessons Learned from Free Sand

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MIAMIBEACH RISING ABOVE

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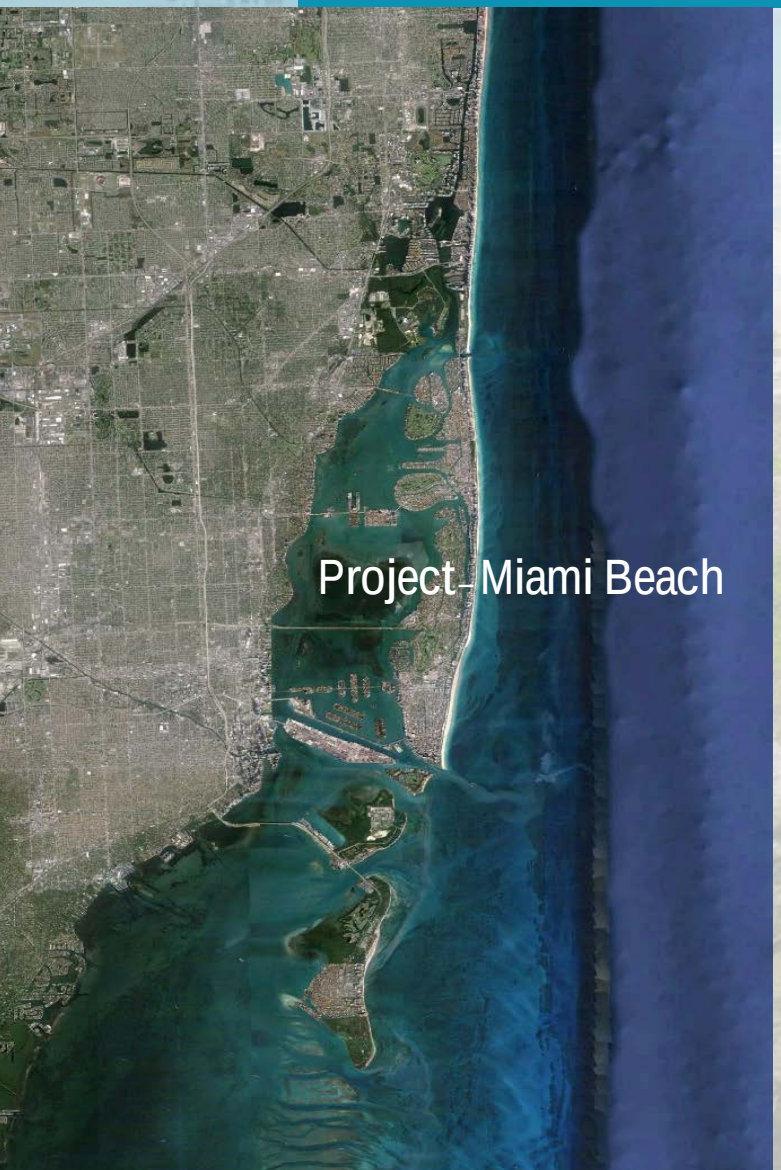
Presentation Agenda

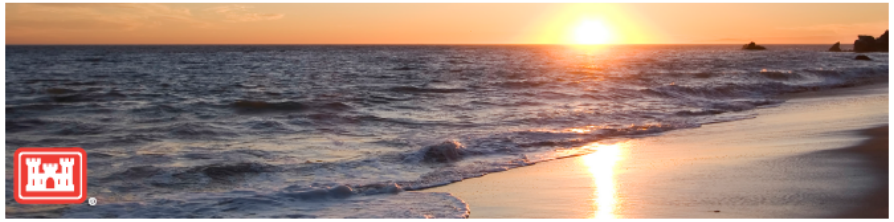


- Miami Dade County Beach Management
- Project of Opportunity – Oceanfront Development
- Beach Nourishment, Consent Order and Remediation
- City Ordinance Development
- Conclusions and Lessons Learned

Miami-Dade County Beach Management

DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT | Alternative Sand Source Investigation

FACTS & INFORMATION



FEBRUARY 2016

THE BACKGROUND

Beach renourishment has been an ongoing practice in southeast Florida since the late 1970s, providing essential economic, environmental and recreational benefit to coastal communities. Renourished beaches and dunes serve as a vital buffer between coastal infrastructure and the destructive forces of ocean waves and surge during storm events.

Figure 1: Southeast Florida region (Corps 2009)

The southeast Florida region encompasses five counties (St. Lucie, Martin, Palm Beach, Broward, and Miami-Dade) and approximately 200 miles of Florida shoreline (Figure 1). Throughout the region, twenty-four federal and non-federal beach nourishment projects provide storm damage reduction to infrastructure as well as incidental recreational opportunities for local, national and international visitors.

These constructed beaches mimic the protective and recreational functions of natural beaches, and the resulting benefits of beach nourishment projects are well documented. The 2008 Shore Protection Assessment completed an in-depth evaluation of benefits provided by the Martin County Shore Protection Project during the 2004 hurricane season. The study calculated more than $11 million in damages were prevented by the project. This equals approximately 20 percent of the 50 year total project cost, realized in one storm season. As an example of recreational benefits, Miami Beach had little beach tourism before construction of the Dade County Beach Erosion Control and Hurricane Protection Project in 1975. Since construction of the project, it is estimated that tourists contribute $11 billion annually to the Miami Beach economy, almost half of which comes from international tourists.

Sand dredged from offshore borrow sources in state and federal waters is typically used to renourish the beaches. The current practice is for projects to access borrow sources located in close proximity to the project, since they are often the most economical sand sources. Counties are often cost-sharing partners in the projects, along with the state of Florida and the federal government (in the case of federal projects). Many of these projects were initially constructed in the 1970's and 1980's, and are periodically renourished with sand over a typical project life of 50 years.

Renourishment needs of ongoing projects, initiation of new projects, existing environmental resources, and increasing environmental constraints have continued to reduce the available sand supply located offshore, particularly in Broward and Miami-Dade. In these southernmost counties, narrowing of the continental shelf limits investigation and access to sand sources. Currently, sand sources offshore of these two counties fall short of the counties' renourishment needs throughout their projects' remaining periods of federal participation.

Miami-Dade County, in particular, is running out of dependable, economical, and environmentally practicable offshore sand sources. In 1986, a congressional directive authorized the acquisition of non-domestic sand if such material is not available from domestic sources for environmental or economic reasons. Since that time, the U.S. Army Corps of Engineers (Corps) has been investigating the use of non-domestic sand for use on federal projects in southeast Florida, particularly in Miami-Dade County.

Investigations for Miami-Dade County indicated that some sources, particularly Bahamian aragonite, which has been used on non-federal projects in southeast Florida, looked promising. However, in 1999 the fiscal year 1999 Energy and Water Appropriations Bill directed that no funds provided for the Dade County, Florida shore protection project be used for acquisition of foreign source materials unless the Secretary of the Army provides written certification that domestic sources are not available.

PROJECT SCHEDULE:

The Corps is in the process of completing a Limited Re-evaluation Report (LRR) and NEPA documentation to utilize sand as discussed above. It is anticipated that this report will be approved around March 2016. From that point, the Corps would start permit applications and detailed designs with construction contracts awarded in 2016 (subject to appropriations).

A Team of Professionals, Making Tomorrow Better

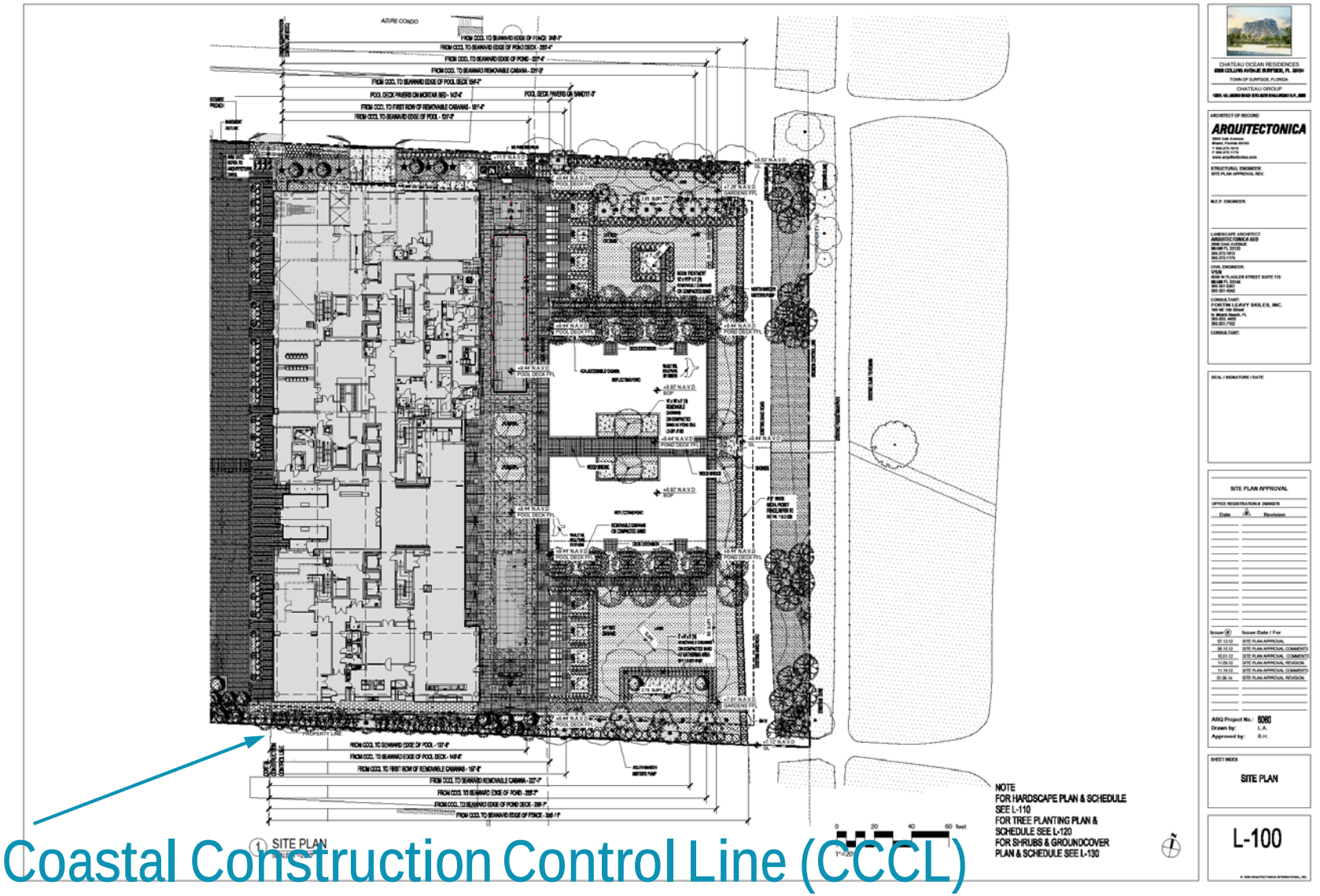
- Federal Government – US Army Corps of Engineers
- State Government - Owner & Regulator
- Miami Dade County – Local Sponsor
  - ~ 23 million cy over next 50yrs
  - ~ 3.6 million cy needed for the remaining period of federal participation:
    - *10 yrs: Baker's Haulover to Government Cut*
    - *23 yrs: Sunny Isles Segment*

Sunny Isles Truck Haul Nourishment Costs

- 2017 Project – Miami-Dade County
- Maintenance Project – Truck Haul
- Corps Estimate $71/cy – 100,000cy Project
- 8 bidders
- Beach fill unit costs ranged $60 -$105 per cy

Chateau Ocean Residences – Surfside, FL

Chateau Development Site Plan

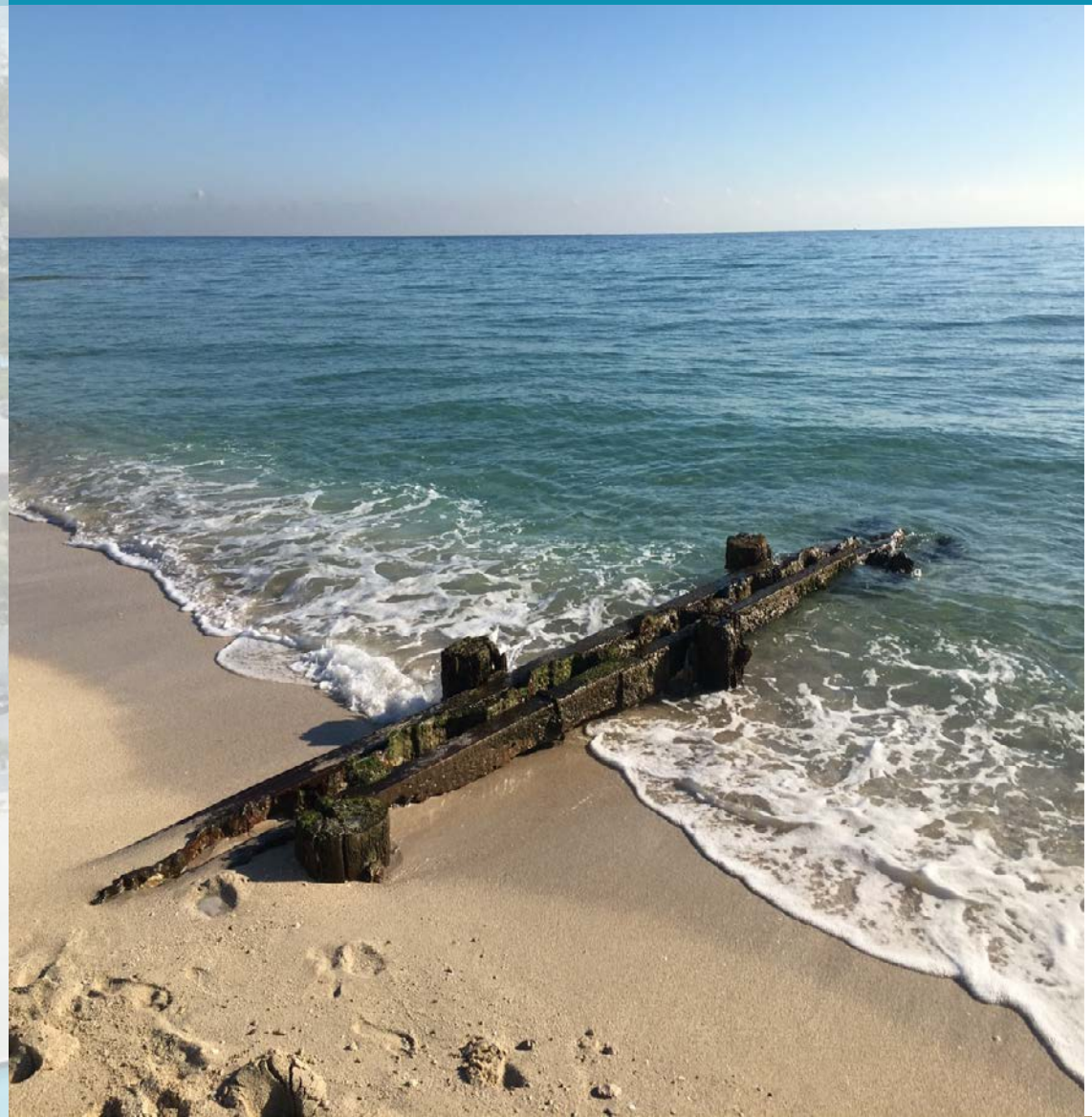


Coastal Construction Control Line (CCCL)

- FDEP CCCL Permit
- 20,855 cy excavation

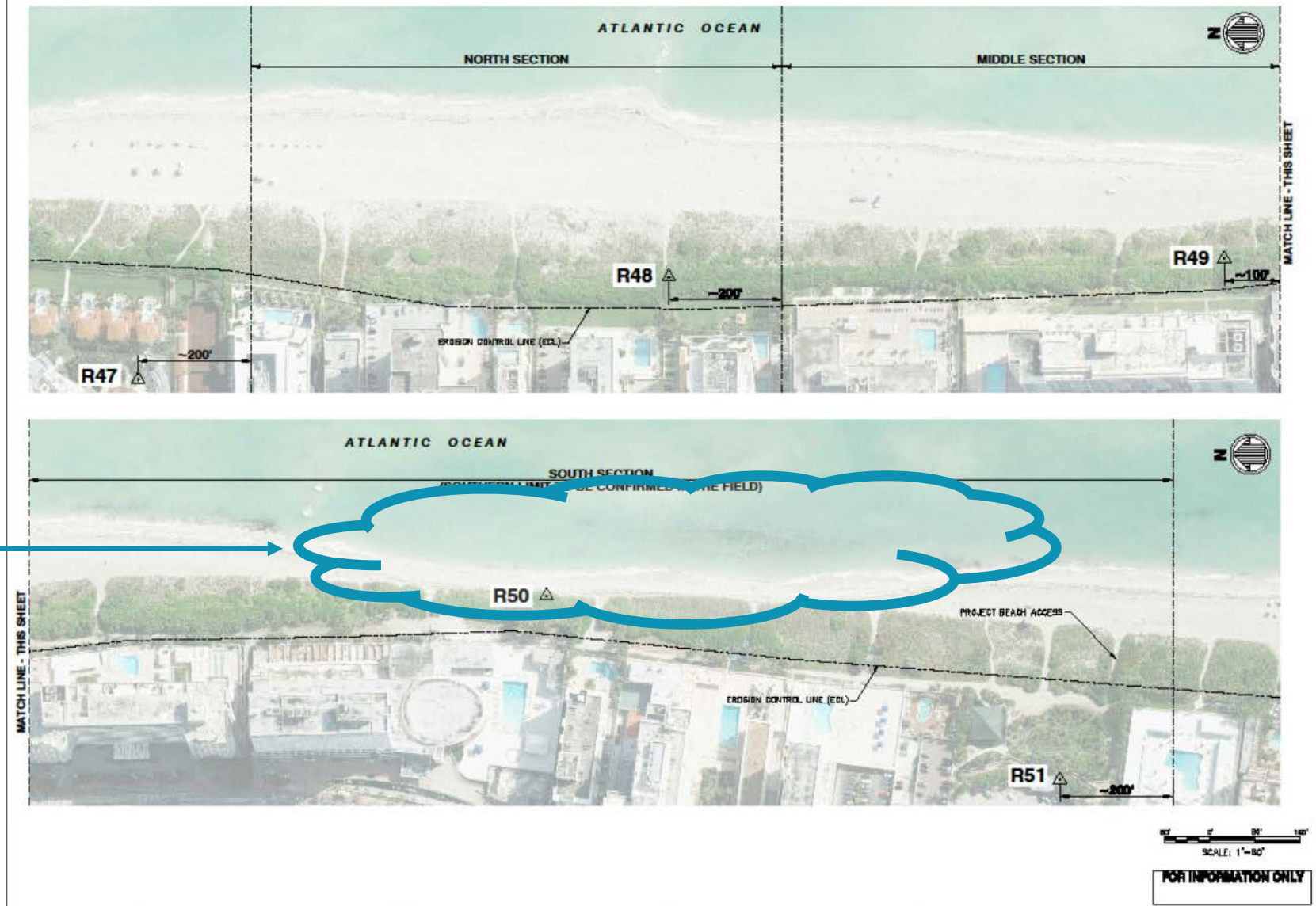
55 Street Erosional Hotspot – Miami Beach

55 Street Erosional Hotspot

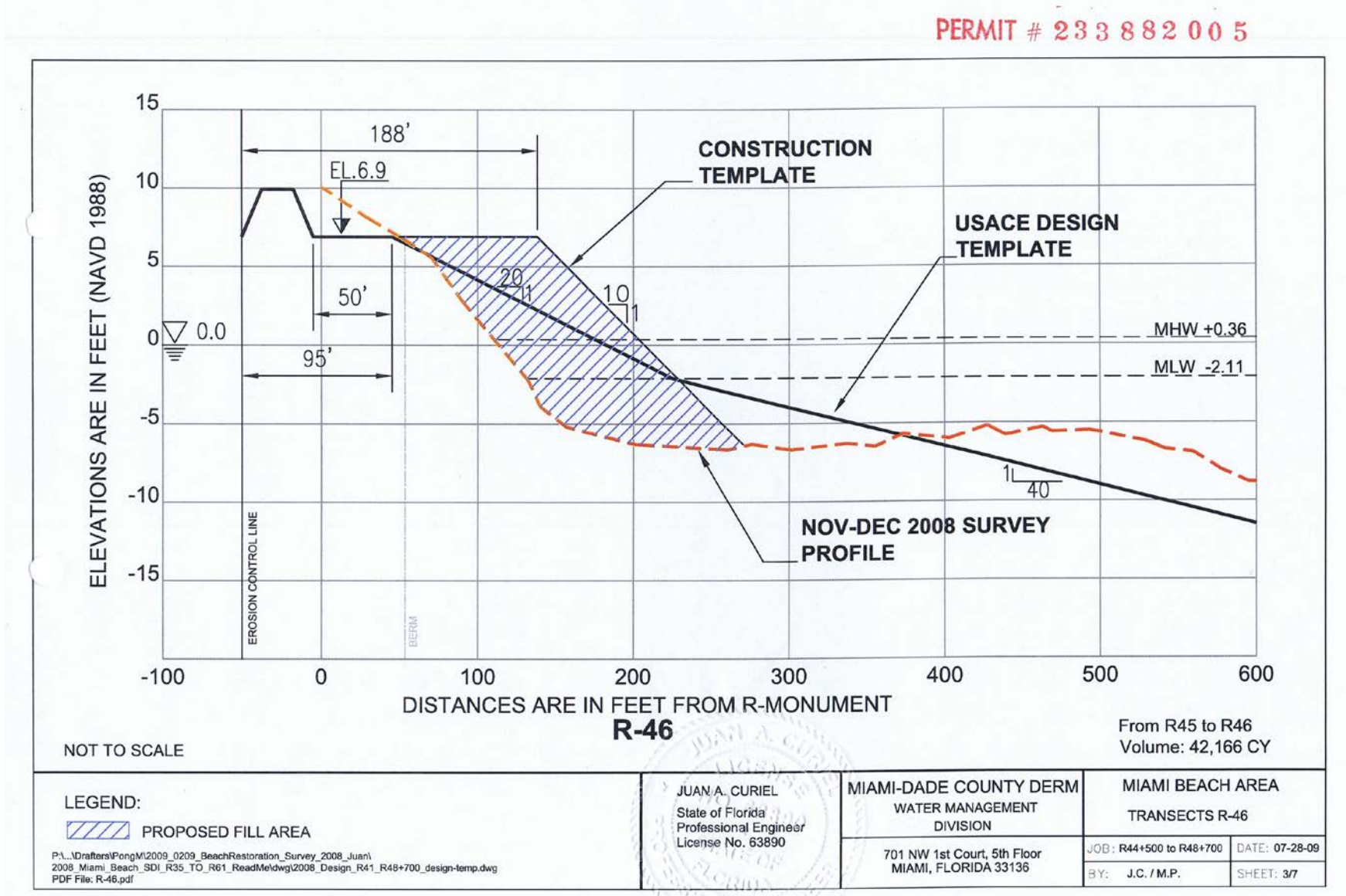


Beach Nourishment Plan Areas

Southern erosional hotspot



Fill section R-48



Observations after Fill Placement

Beach Nourishment Plan Areas

Northern area with most concentrated amount of debris

Southern erosional hotspot

Nourishment Timeline

- Public Outreach – Fall 2014
- CCCL Permit Modification Issued - February 2015
- Fill Placed March 2015
- FDEP Issued Compliance Letter – May 2015
- Consent Order Fill Remediation - March 2016
- Remediation Operations March-April, 2016
- Remediation Close Out - July, 2016

Debris and Thickness Observations

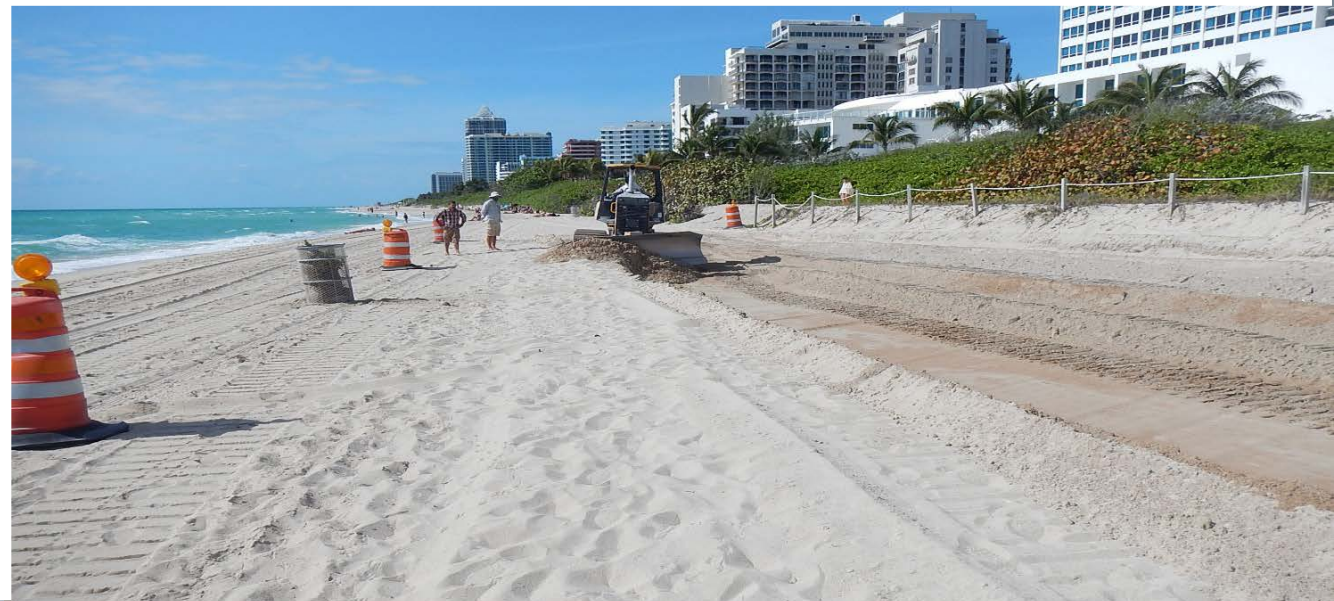
March 2016 Test Pit Excavation Data

55th Street Beach Fill (DEP Permit No. DA-647 M1)

R-48.2W to R4.9E

Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.2 W	Top Fill	7.5	1.1	R48.2 M	Top Fill	7.2	0.6	R48.2 E	Top Fill	7.4	0.3
	Btm. Fill	6.4			Btm. Fill	6.6			Btm. Fill	7.1	
	Pieces of debris		2 (concrete and old wood)		Pieces of debris		1 (old wood)		Pieces of debris		1 (glass)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.3 W	Top Fill	7.7	0.7	R48.3 M	Top Fill	7.6	1.4	R48.3 E	Top Fill	7.1	0.2
	Btm. Fill	7			Btm. Fill	6.2			Btm. Fill	6.9	
	Pieces of debris		2 (tile, old wood)		Pieces of debris		3 (old wood and metal)		Pieces of debris		1 (tile piece)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.4 W	Top Fill	7.6	1.2	R48.4 M	Top Fill	7.2	0.6	R48.4 E	Top Fill	6.7	0.7
	Btm. Fill	6.4			Btm. Fill	6.6			Btm. Fill	6	
	Pieces of debris		12 (glass, old wood, concrete, rubber sealant, rock)		Pieces of debris		4 (glass, concrete, rock)		Pieces of debris		4 (glass, concrete, rock)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.5 W	Top Fill	7.4	0.4	R48.5 M	Top Fill	7.5	0.7	R48.6 E	Top Fill	7.1	0.6
	Btm. Fill	7			Btm. Fill	6.8			Btm. Fill	6.5	
	Pieces of debris		10 (glass, old wood, metal, concrete, rock)		Pieces of debris		7 (glass, nails, old wood, concrete, plastic)		Pieces of debris		4 (glass, old wood, plastic)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.6 W	Top Fill	7.2	0.9	R48.6 M	Top Fill	7.5	0.6	R48.6 E	Top Fill	7.6	0.1
	Btm. Fill	6.3	(no photo)		Btm. Fill	6.9	(no photo)		Btm. Fill	7.5	
	Pieces of debris		4 (descript. not logged)		Pieces of debris		3 (descript. not logged)		Pieces of debris		2 (glass, nail, concrete)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.7 W	Top Fill	6.9	0.6	R48.7 M	Top Fill	7.3	0.6	R48.7 E	Top Fill	7.3	0.1
	Btm. Fill	6.3			Btm. Fill	6.7			Btm. Fill	7.2	
	Pieces of debris		11 (tile, glass, nails, concrete, old wood, rock)		Pieces of debris		4 (glass, concrete, plastic, old wood)		Pieces of debris		4 (tile, concrete, old wood, rock)
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.8 W	Top Fill	7.2	1.1	R48.8 M	Top Fill	7.5	0.5	R48.8 E	Top Fill		very thin fill layer
	Btm. Fill	6.1			Btm. Fill	7			Btm. Fill		
	Pieces of debris		12 (glass, nail, old wood, tile, concrete, rock)		Pieces of debris		5 (glass, concrete, rock, plastic)		Pieces of debris		0
Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft	Profile		NAVD	Depth of Fill in ft
R48.9 W	Top Fill	7.6	0.7	R48.9 M	Top Fill	7.5	0.3	R48.9 E	Top Fill	7.2	1.1
	Btm. Fill	6.9			Btm. Fill	7.2			Btm. Fill	6.1	
	Pieces of debris		10 (concrete, rock, old wood)		Pieces of debris		5 (concrete, rock)		Pieces of debris		5 (glass, concrete, rock, plastic)

Remediation Operations



Mined Sand Issues

Miami Beach Sand Ordinance – June 2016

1. Municipalities have authority to promulgate setbacks, building codes, and land development regulations stricter than the state
2. Sets forth physical characteristics and chemical composition
3. Require DERM Soil Classification Letter
4. Requires Developer to pay for the cost of beach compatibility testing

Conclusions and Lessons Learned

- Project of Opportunity – still recommended
- Costs of Beach Nourishment – continue to increase
- Proper Project oversight and QA/QC on sand source
- Joint Coastal Permits in Place for Maintenance
- Municipal Perspective
- City Ordinance Development – Beach Sand

Hurricane Irma Beach Impacts

Pre-Storm

Post-Storm

THANK YOU!