



Sarasota Lift Station No. 87

Public Project Review Meeting
City of Sarasota, 1565 First Street, Media Studio

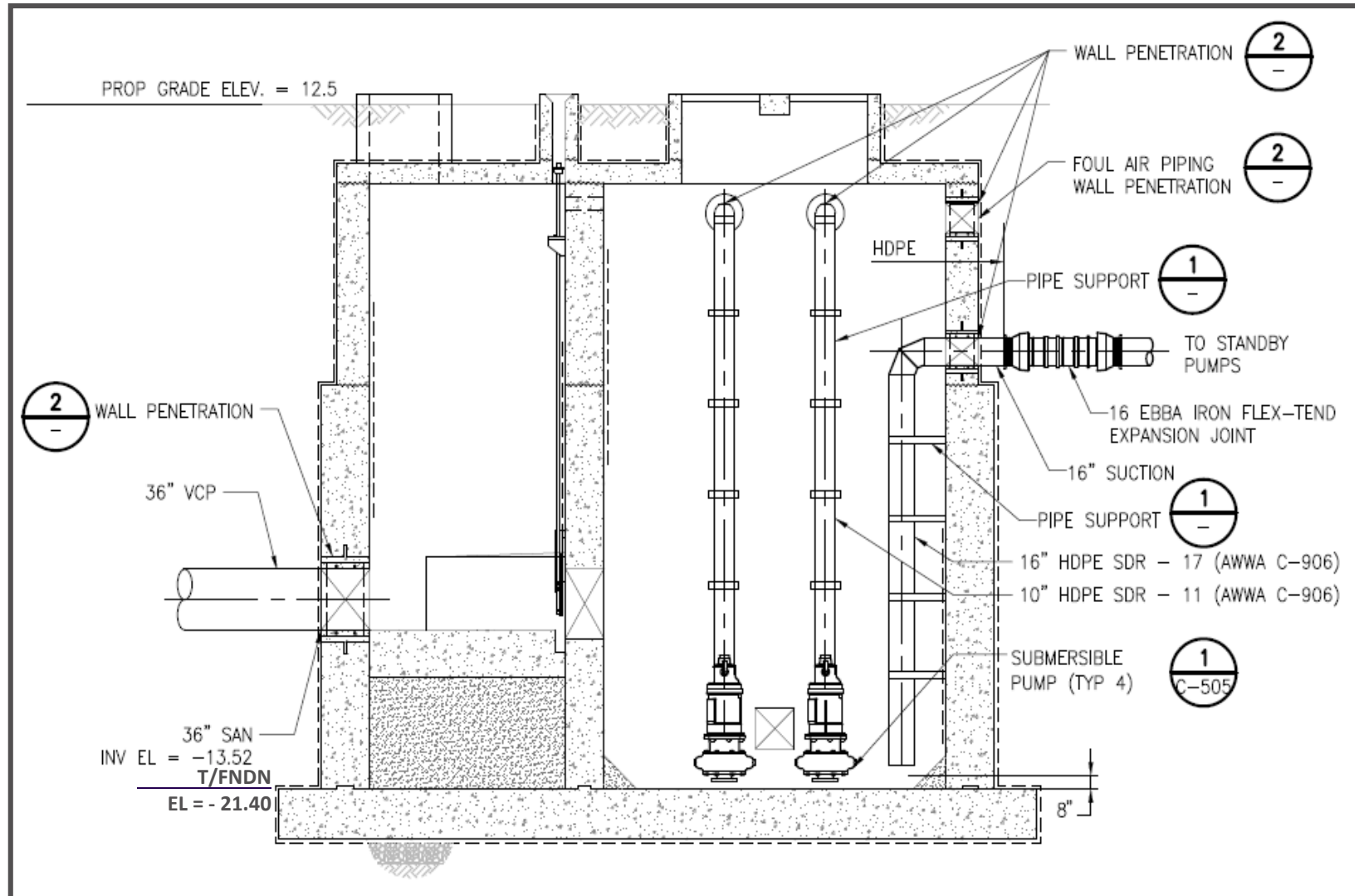
10:00 AM, Monday, March 10, 2014



Lift Station **87**



Lift Station No. 87 Wetwell





Hydraulic Analysis Results

- During extreme wet weather event
 - 33.34 MGD to WWTP
 - 9.92 mgd of 33.34 mgd from LS No. 87
- Scenario 1 – wetwell floor elevation unchanged (- 21.4)
 - LS No. 87 Capacity = 7,155 gpm (10.3 mgd)
 - Exceeds 9.92 mgd
 - Gravity sewer surcharged under all flow conditions
- Scenario 2 – wetwell floor elevation lowered (- 29.9)
 - LS No. 87 Capacity = 6,311 gpm (9.1 mgd)
 - When wetwell surcharges to elevation - 14.5 capacity increases to 9.92 mgd
 - Gravity sewer surcharged when flow exceeds peak hour flow (6.28 mgd)

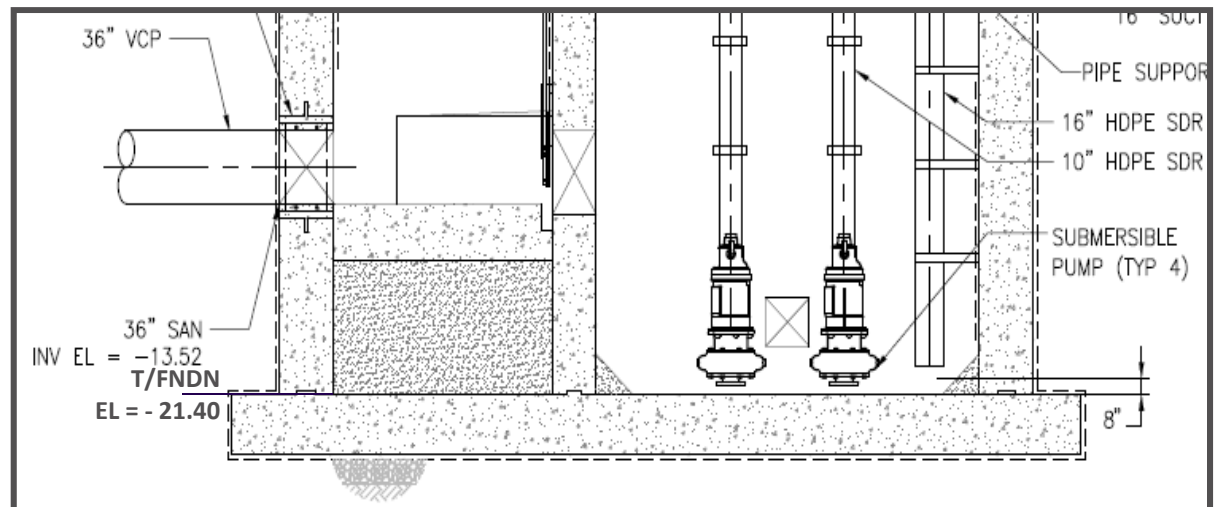
Revised Hudson Bayou Crossing Effect at LS No. 87

36" Influent Pipe

- Existing invert elevation = - 13.52
- Revised invert elevation = - 20.44
- Influent pipe will always operate in a surcharged condition

Submersible Raw Sewage Pumps

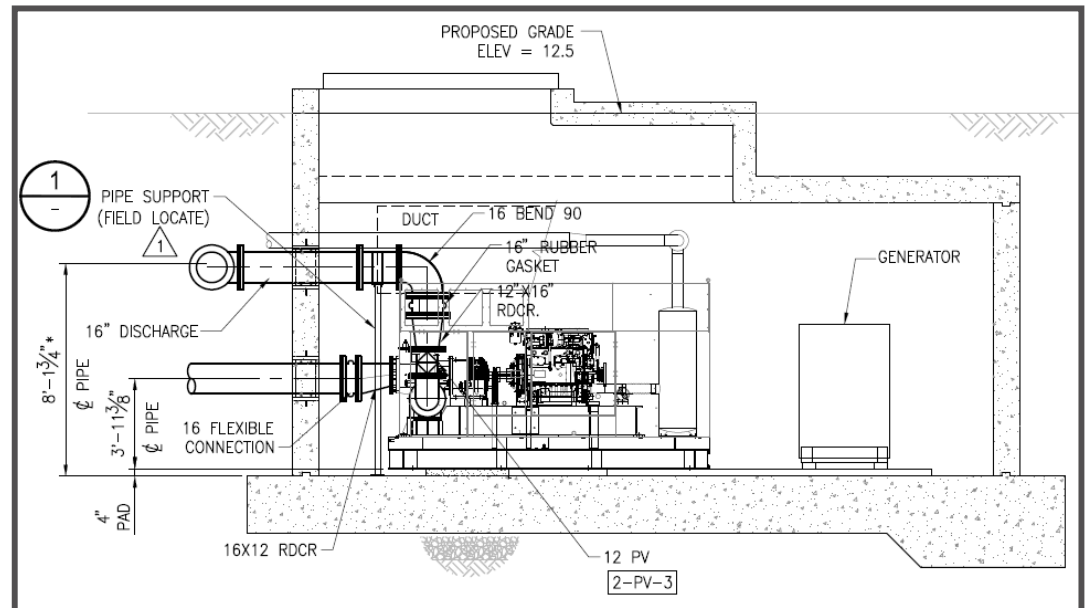
- No change in operation



Revised Hudson Bayou Crossing Effect at LS No. 87

Self Priming Wastewater Pumps

- 16" suction elevation = 1.55
- Revised invert elevation = - 20.44
- Vertical elevation delta = 21.99'
- Within static suction lift range





Lift Station No. 87

Option to Reduce Constant Surcharged Conditions in the 36" Influent Pipe

- Lower the foundation of the wetwell to elevation - 29.9

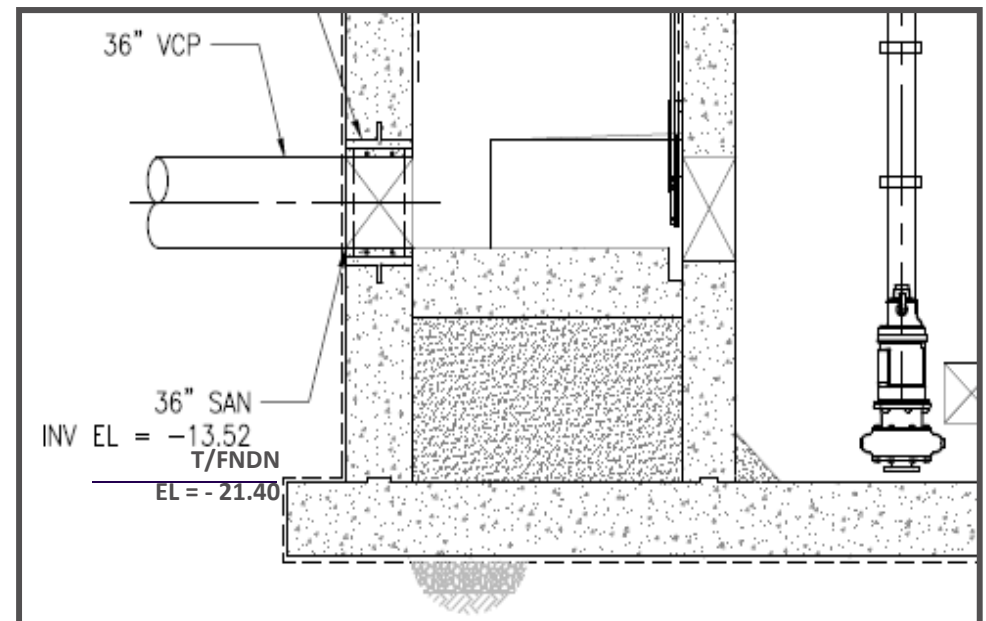
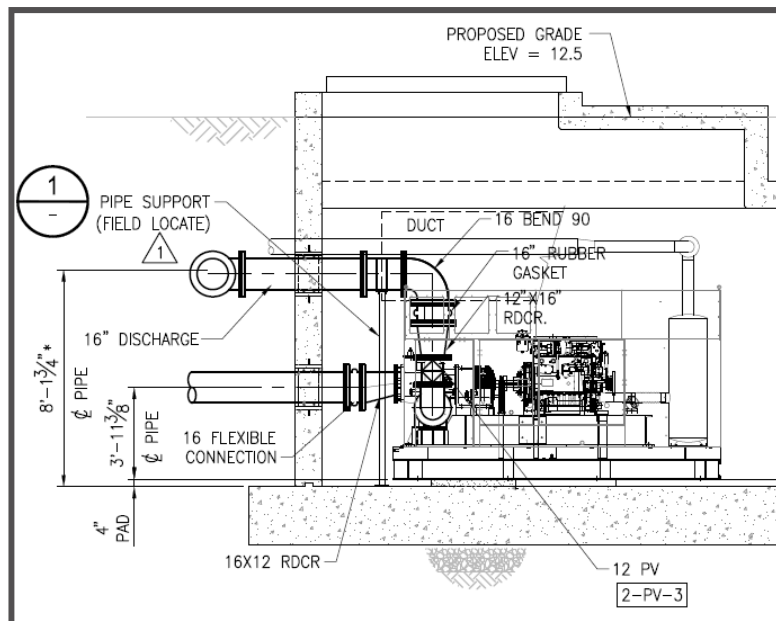
Systems Impacted by Elevation Change

- Self priming wastewater pumps static suction lift
- Influent pipe surcharge conditions above peak hour flow
- Increased odor control volume

Lift Station No. 87

Operating Options for the Self Priming Wastewater Pumps
Static Suction Lift Limitations at Revised Elevation - 29.9

- Lower the existing Standby Pump Room floor elevation
- Allow surcharge conditions to occur when self priming wastewater pumps are necessary





Lift Station No. 87

Operating Options at Revised Elevation - 29.9

- Influent pipe surcharge conditions above peak hour flow (6.28 mgd)
- Increased odor control volume
 - From 12,500 cubic feet to 13,400 cubic feet
 - Number of air changes remains greater than *Recommended Standards for Wastewater Facilities* requirement of 12 air changes per hour



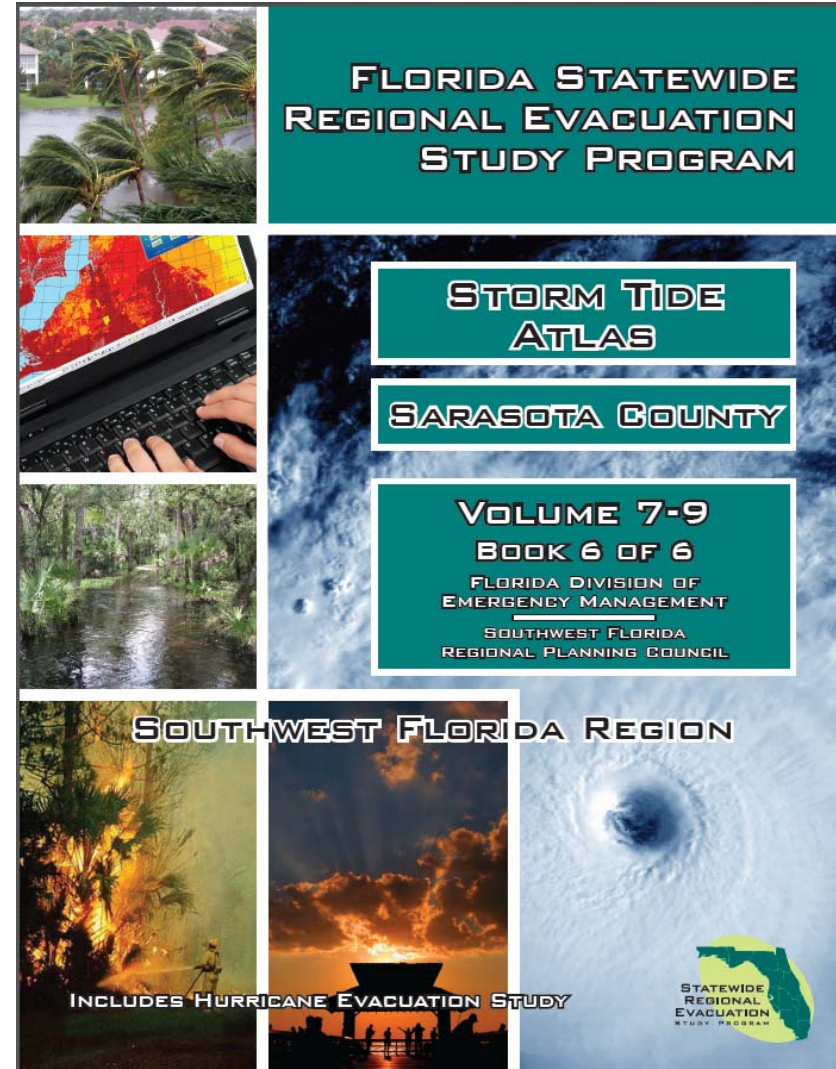
Lift Station No. 87

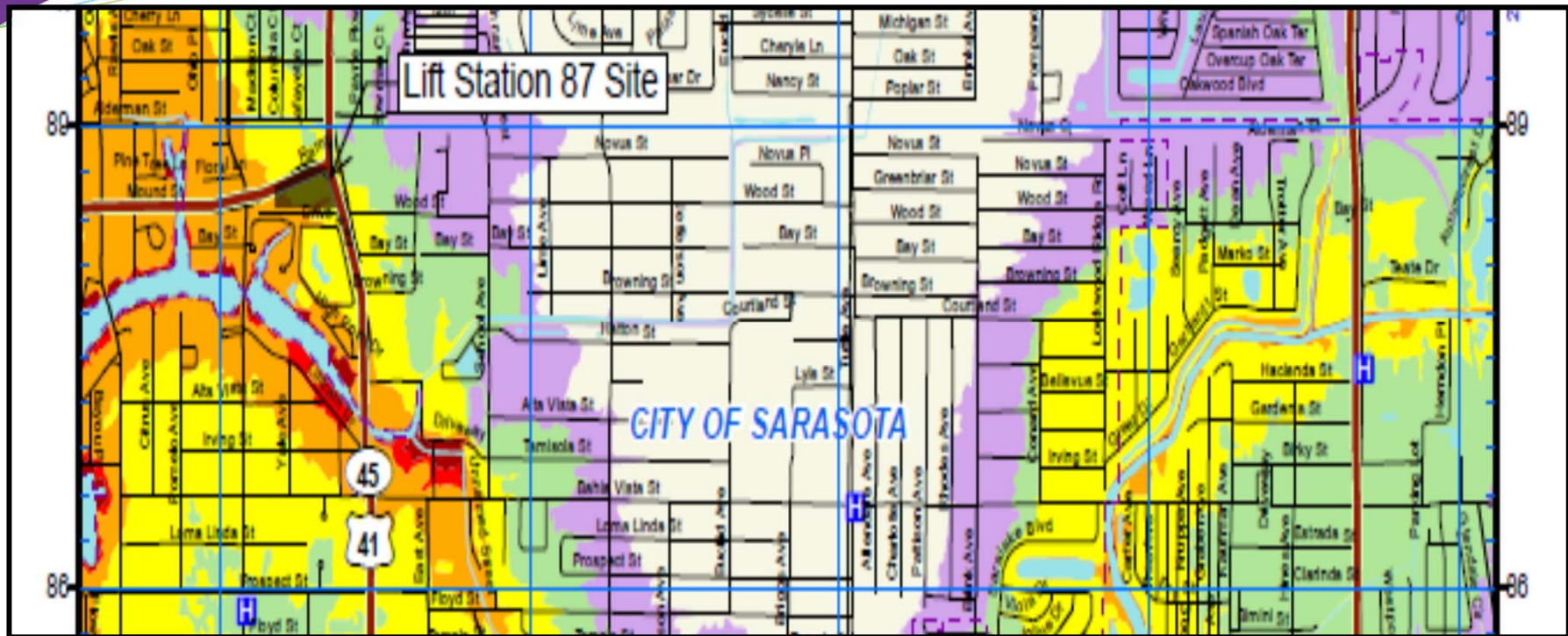
Options to Lower the Foundation of the Wetwell to Elevation - 29.9

- Lower the existing wetwell from elevation - 21.4
- Construct a new wetwell at the revised elevation

Storm Surge Analysis

- Storm surge elevations are based on information from the Statewide Regional Evacuation Study (SRES) Program.
- The Atlas maps identify those areas subject to potential storm tide flooding from the five categories of hurricane on the Saffir Simpson Hurricane Wind Scale as determined by NOAA's numerical storm surge model, SLOSH.





US National Grid
100,000-m Square ID
LL
Grid Zone Designation
17R

Datum = NAD 1983, 1,000-m USNG



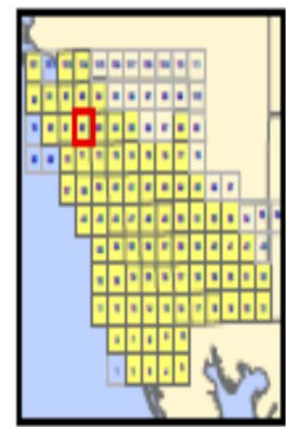
Notes:
1. Surge limits are based on still water storm tide height elevation above NAVD83 at high tide with no wave setup.
2. Total Storm Tide limits were derived from Maximum of Maximum surge heights over LIDAR based digital elevation.
3. The Points of Reference are locations determined to be relevant to emergency management officials.

Storm Tide Zones
Sarasota County, 2010
Scale - 1:24,000
0 2,000 Feet
USNG Page 17R LL 48 20
Map Plate 82

Legend

- Ref Point
- HOSPITAL
- City Limits
- Evacuation Route
- Existing Water

Cat	Color	TS
1	Red	1
2	Orange	2
3	Yellow	3
4	Light Green	4
5	Purple	5



This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

Storm Surge Analysis

Table 3 Potential Storm Tide Height (s) by County

(In Feet above NAVD88)

*Storm Strength	Charlotte	Collier	Lee	Sarasota	Lake O 16ft	Lake O 20ft
TS	Up to 5.2	Up to 5.8	Up to 6.1	Up to 5.6	NA	NA
1	Up to 7	Up to 8.2	Up to 8.7	Up to 6.9	Up to 21.1	Up to 25
2	Up to 17	Up to 14.1	Up to 15.5	Up to 15.4	Up to 26.6	Up to 30.6
3	Up to 26	Up to 19.5	Up to 23	Up to 26	Up to 33.2	Up to 35.5
4	Up to 32.3	Up to 24.5	Up to 27.6	Up to 33.2	Up to 36.4	Up to 37.2
5	Up to 37.7	Up to 41.9	Up to 41.7	Up to 35.4	Up to 38.9	Up to 40

**Based on the category of storm on the Saffir-Simpson Hurricane Wind Scale*

*** Surge heights represent the maximum values from SLOSH MOMs*



Storm Surge Structural Analysis

- An average factor of safety of **1.55** is used as reference to determine the cover slab condition at each storm elevation.
- Cover slab condition is considered **good** (cover slab is adequate) when factor of safety equal to or larger than **1.55**.
- Condition of the cover slab is considered **marginal** (cover slab may develop minor cracking) when the factor of safety is equal to or greater than **1.00** and less than **1.55**.
- Condition of the slab is considered **at risk** (cover slab may sustain severe cracking and excessive deflection) when the factor of safety is less than **1.00**.

Submersible Pump Station Structure Cover Slab Safety Factors

Storm Strength	Storm Elevation (Feet)	Moment Capacity Safety Factor	Shear Capacity Safety Factor	Cover Slab Condition
TS	Storm surge elevation is below site grade elevation	-	-	-
CAT 1	Storm surge elevation is below site grade elevation	-	-	-
CAT 2	15.4	2.73	3.08	GOOD
CAT3	26	1.26	1.43	MARGINAL
CAT4	33.2	0.93	1.05	AT RISK
CAT5	35.4	0.86	0.97	AT RISK

Standby Pump Room Structure Cover Slab Safety Factors

Storm Strength	Storm Elevation (Feet)	Moment Capacity Safety Factor	Shear Capacity Safety Factor	Cover Slab Condition
TS	Storm surge elevation is below site grade elevation	-	-	-
CAT 1	Storm surge elevation is below site grade elevation	-	-	-
CAT 2	15.4	0.31	0.59	AT RISK
CAT3	26	0.11	0.20	AT RISK
CAT4	33.2	0.07	0.14	AT RISK
CAT5	35.4	0.07	0.13	AT RISK

Odor Control Structure Cover Slab Safety Factors

Storm Strength	Storm Elevation (Feet)	Moment Capacity Safety Factor	Shear Capacity Safety Factor	Cover Slab Condition
TS	Storm surge elevation is below site grade elevation	-	-	-
CAT 1	Storm surge elevation is below site grade elevation	-	-	-
CAT 2	15.4	3.00	3.20	GOOD
CAT3	26	1.40	1.50	MARGINAL
CAT4	33.2	1.01	1.10	MARGINAL
CAT5	35.4	0.94	1.01	AT RISK

Electrical Room Structure Cover Slab Safety Factors

Storm Strength	Storm Elevation (Feet)	Moment Capacity Safety Factor	Shear Capacity Safety Factor	Cover Slab Condition
TS	Storm surge elevation is below site grade elevation	-	-	-
CAT 1	Storm surge elevation is below site grade elevation	-	-	-
CAT 2	15.4	2.13	2.72	GOOD
CAT3	26	1.30	1.43	MARGINAL
CAT4	33.2	0.93	1.05	AT RISK
CAT5	35.4	0.80	0.97	AT RISK



Storm Surge Structural Analysis

- Based on the storm surge structural analysis results, each cover slab structure, except the Standby Pump Room Structure cover slab, can resist loads generated by a **Category 2** storm surge.
- Modifications in the Standby Pump Room Structure to increase the factors of safety for a Category 2 storm surge to 1.55 or higher require adding intermediate supports under the in-slab beams.
- Extensive modifications would be required to increase the factors of safety to 1.55 for a Category 3 storm surge.



Questions