

ZEN AND THE ART OF STORMWATER MASTER PLANNING

AN INQUIRY INTO VALUES

Presented to the
Florida Stormwater Association
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A MOMENT OF ZEN

“Sometimes it’s a little better to travel than to arrive.”





Overview

- Published in 1974
- Explores life and how to best live it.
- Discussions on the world of ideas and **conflict & resolution**
- Eastern and Western Religion and Philosophy
- How to pursue technology in a way **that enriches human life** as opposed to **degrading** it





Overview

- Not really about **Zen**
- Not really about **Motorcycle Maintenance**
- Provides a lens to discuss conflicts and problems
- Thesis on **Quality**
- How to categorize thinking and binary choices and traps in thinking





Narrative Themes

- **Classic vs. Romantic**
 - Contrast between rational, objective thought with more artistic, subjective ways of thinking. (neither is adequate)
- **Duality**
 - Subjective vs. Objective
 - Art and Technology
 - Yes/No/Mu
- **Quality**
 - In ZAMM – The pursuit of defining it caused the narrator down his path
 - Examination of philosophy results in quality bridging the divide





Symbols and Motifs

- **Motorcycle Maintenance**
 - Practical approach for facilitating awareness of quality
 - An approach to maintain balance in everyday life
- **Mu “無” (no-thing)**
 - Refusal to concretize things in dualistic logic
- **Identity Issues**
 - Phaedrus





Synopsis or Analysis

- Road trip begins and introduces characters, discussions on technology, and chautauquas
- The **concept of care** (motorcycle maintenance) and understanding the underlying form of things
- Inductive and deductive reasoning – **more than one way** of understanding things “**Peace of mind**” while working
- A broader understanding of reasoning needs to take place to understand **Quality**
 - **Stuckness** (looking at problem from a rigid view and allowing quality into the work)
- **Gumption** – what motivates one to perform a quality task
 - Traps include setbacks (external) and hang-ups (internal)
 - Value, Truth, Muscle Traps





Vision and Action: Working Together to Create Safe and Sustainable Watersheds

- Stormwater Master Planning
 - Resilience and SLR
 - Integrated Water Resources Management
- MS4 Permit Compliance
- Community Rating System
- Stormwater Utilities





What is a Stormwater Master Plan?

The Stormwater Master Plan (SMP) is

- A Citywide, long-term vision document that will guide major investment in the city's stormwater infrastructure
- A combination of the need for protection of life and property against the threat of **local and regional** flooding, and meeting regulatory requirements intended to protect the environment
- Includes considerations for **sea level rise, resiliency and sustainability**
- An SMP is an element included in the analysis of the **Community Rating System** and as such benefits residential insurance rates





What is a Stormwater Master Plan?

The SMP is the beginning, not the end

SMP is	SMP is Not
Guiding Vision	Detailed Design Document
Prioritization Methodology	Cookbook approach with Step-by-Step instructions
Conceptual Cost Estimates	Detailed Cost Estimates
Master Site Plans, Pipeline Alignments	Precise field evaluations (survey, subsurface conditions, etc.)
Recommended water quality locations	Evaluation of utility rates needed to implement the SMP



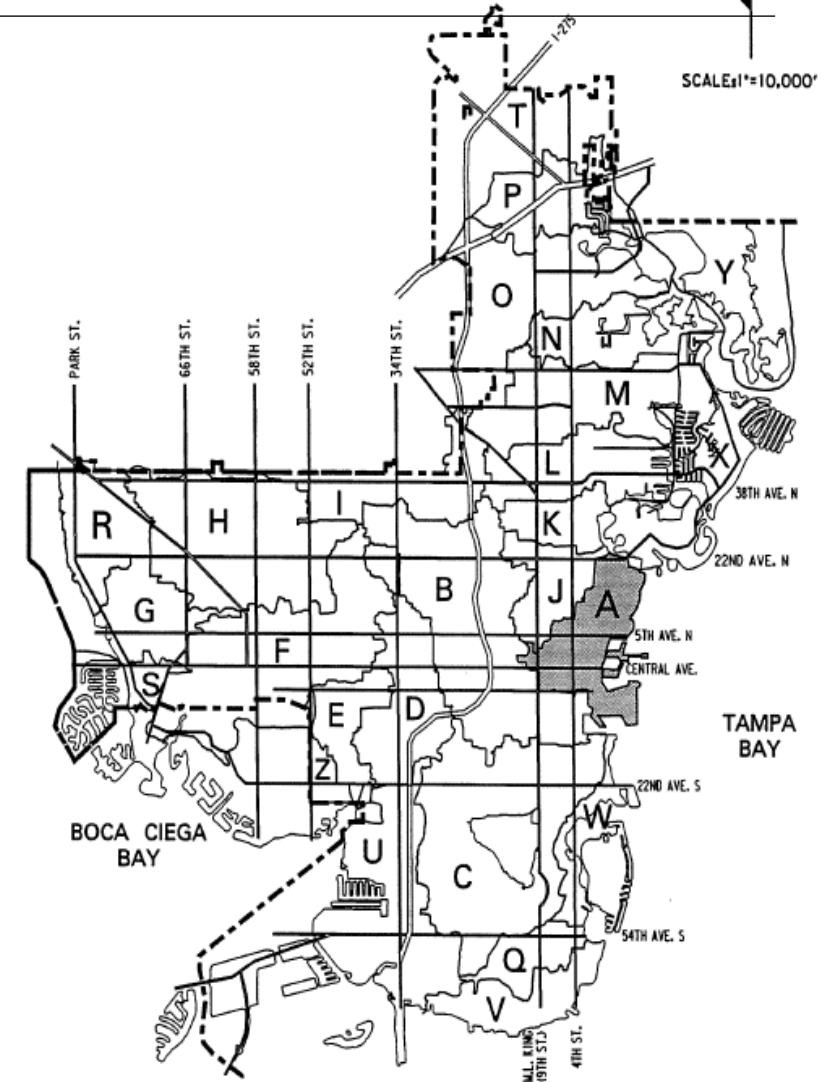


What has been a Stormwater Master Plan?

The current Stormwater Master Plan:

- Was completed in 1994
- Delineated the City into 26 drainage basins
- Design conditions for local streets:
 - ✓ 3.2-inch rainfall in 10 YR/1HR
- Recommended 338 projects at an estimated cost of \$610 million*
- City completed about 1/3 of the projects at a cost of \$211 million*

**costs adjusted to 2019*





How Is This New Stormwater Master Plan Developed?

This new plan includes:

- **Detailed data gathering and analysis** – LiDAR* as well as field survey of the City's stormwater system and surface
- **Coordination with other programs and initiatives** – Developed to be consistent with the other City initiatives such as the Integrated Sustainability Action Plan (ISAP), and Vision 2050
- **Data verification** – The City has installed water level gauges in the stormwater system and utilized the data from the flow meters compared to the recorded rain event to further refine the model accuracy. The City will continue to utilize flowmeters to ensure the model integrity following completion of the Plan
- **Continuous input from our residents** – Data received from seeclickfix, neighborhood meetings, etc. regarding concerns from residents is utilized in calibrating the model for accuracy

**LiDAR - Light Detection and Ranging or 3-D laser scanning*





How Is This New Stormwater Master Plan Developed?

This new plan includes:

- **Coordination with Regulatory Agencies**– The Plan is being developed for compliance with the Southwest Florida Water Management District (SWFWMD), with a focus on 100-yr rain event(s)
- **Establish the Model Condition for Analysis** – A 100-yr/24hr rain event is utilized which is a storm of severity that has a probability of occurring 1% in any given year
- **Independent Review** – In addition to the partnership of the regulatory review, the City has partnered with SWFWMD for a third party independent review of the model being developed and the Plan
- **Accounting for Sea Level Rise** – Consistent with the City’s policies and utilized the NOAA Intermediate High Sea Level Rise projections
- **Variable analysis based on risk** – Level of Service and Risk are reviewed for each basin





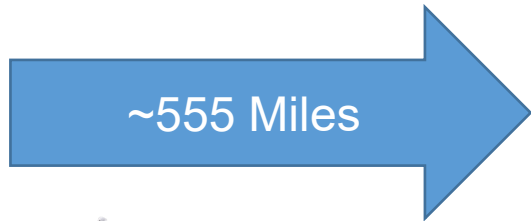
Creating a Model of a Stormwater System

How long is our system and how complex is it?

- The SMP computer model is 10 times more detailed than the 1994 model due to advances in stormwater modelling software in the past 30 years
- The total linear footage installed pipe in the entire City is = 2,932,240 ft. => 555 Miles

Basin ID	Number of Features				
	SubBasins	Channel	Pipe	Drop Structures	Weirs
A	665	0	988	28	1643
B	1847	25	3014	79	5011
C	948	48	1261	21	2605
D	662	6	979	30	1724
E	381	23	548	15	997
F	888	56	1552	39	2486
G	416	23	560	12	1112
H	750	72	1427	75	2273
I	392	0	890	16	1183
J	358	0	575	5	990
K	220	1	392	16	690
L	391	23	838	17	1257
M	554	5	1076	22	1658
N	266	16	466	14	1000
O	563	91	1055	36	3025
P	384	81	507	85	2256
Q	137	9	272	14	391
R	338	8	433	27	926
S	203	0	235	2	512
T	645	193	967	78	3750
U	609	49	981	72	1782
V	232	2	504	7	708
W	171	0	346	4	463
X	424	12	822	11	1180
Y	4	0	0	0	20
Z	180	0	248	6	479
Total	12628	743	20936	731	40121

From:
St.
Petersburg

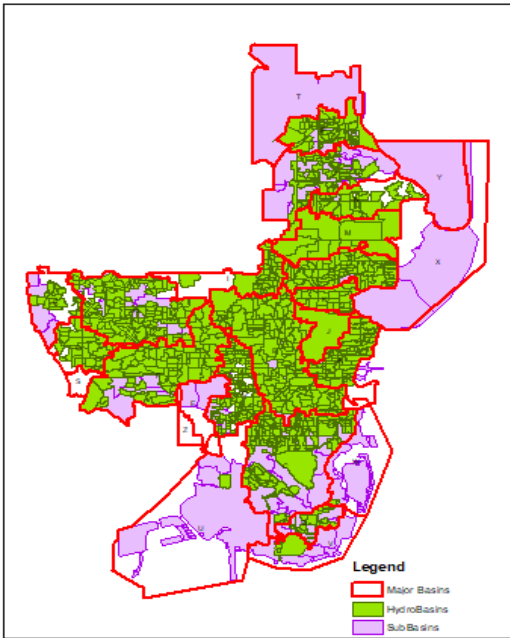


To:
Myrtle Beach,
South Carolina



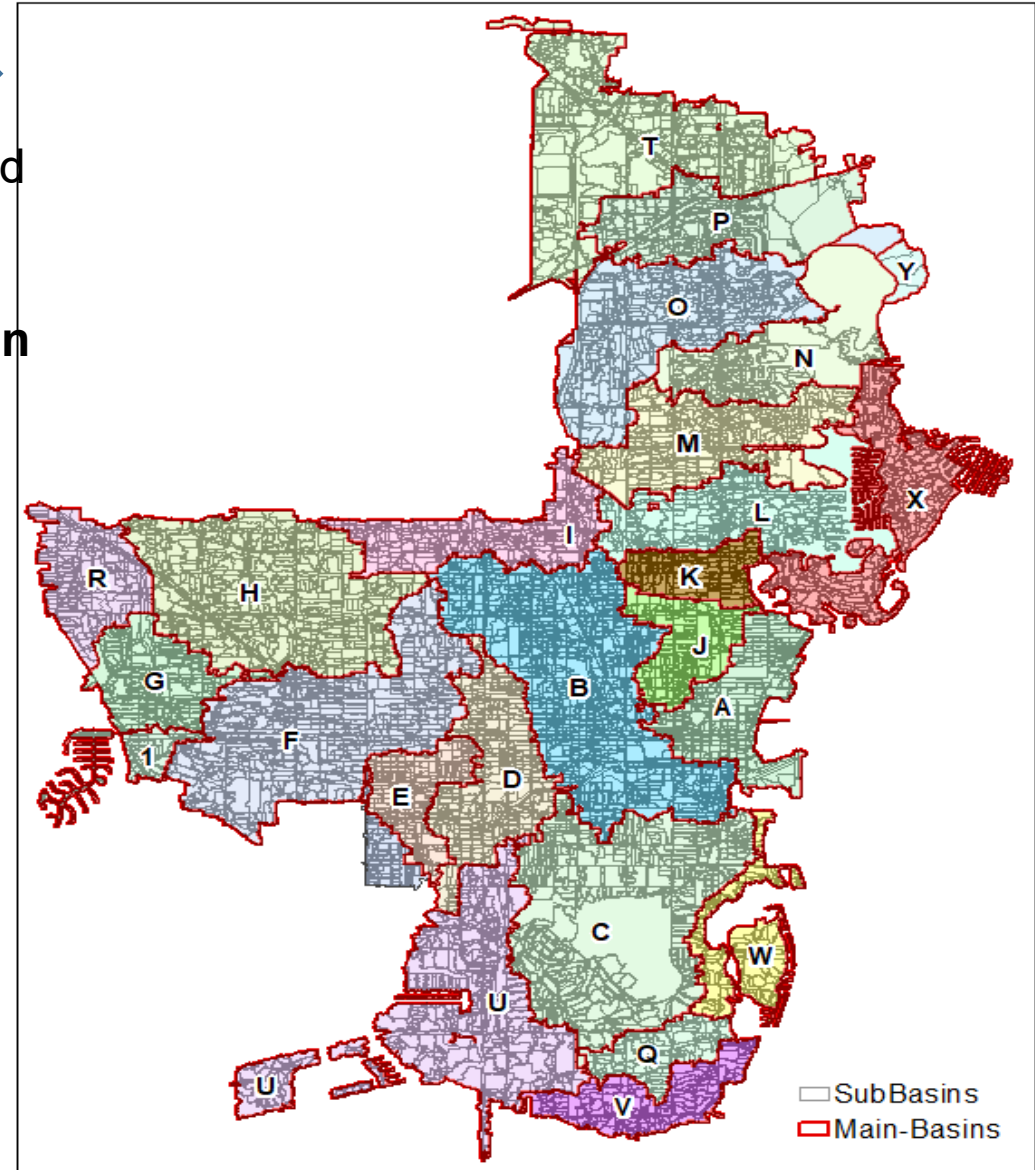


Creating a Model of a Stormwater System



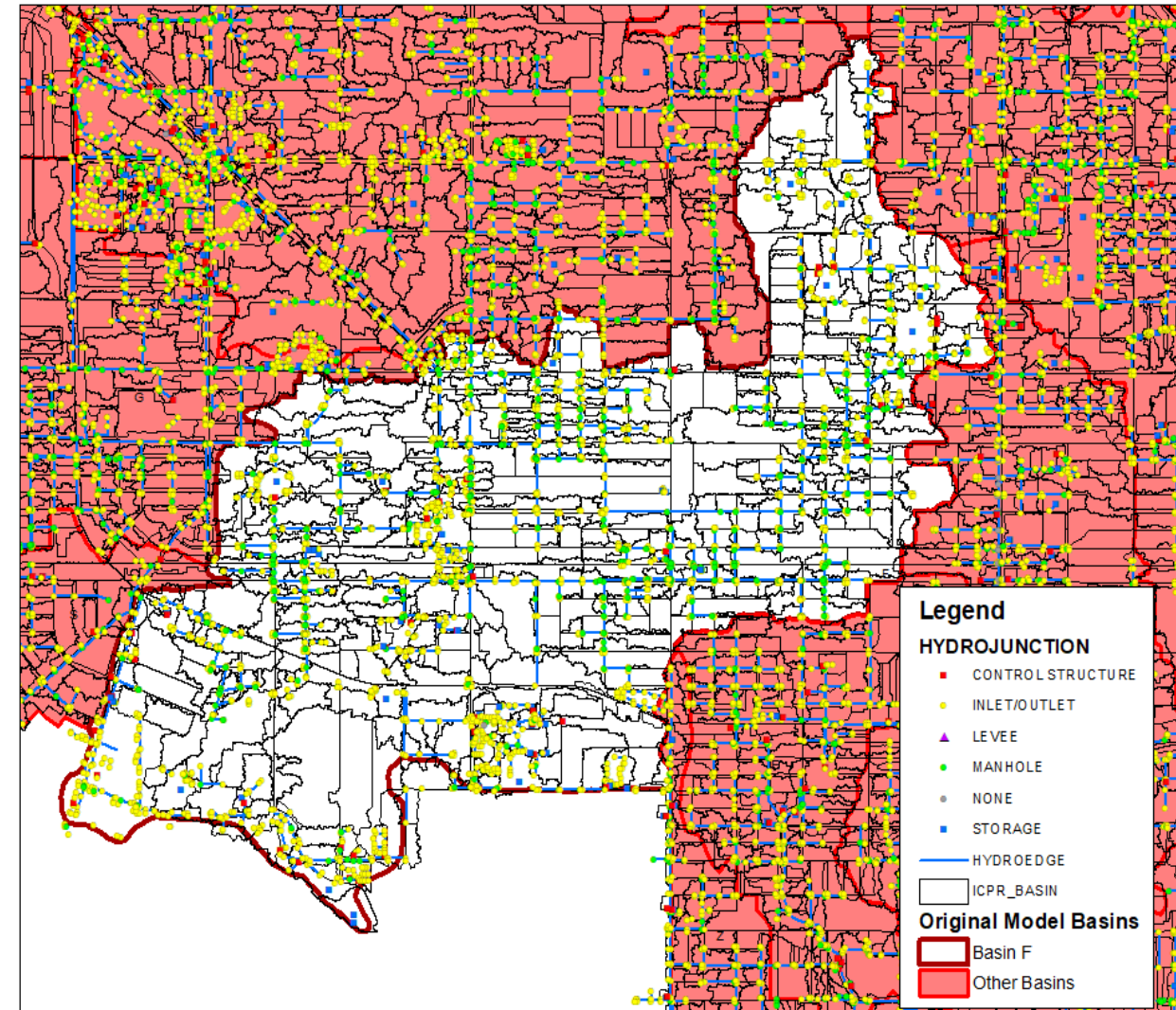
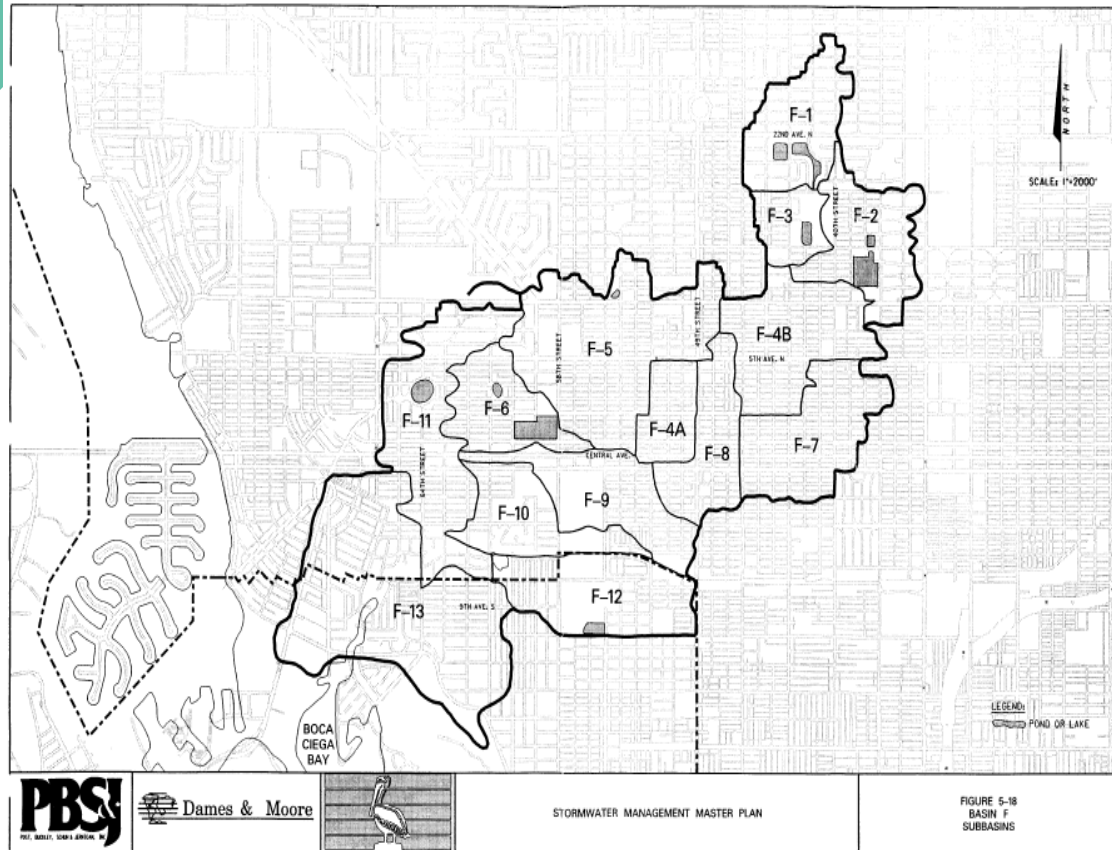
- A new more detailed model was developed for the City
- More accurate asset and **field information**
- More accurate data:
 - Pinellas County 2018 LiDAR
 - City, County, and State project plans
 - Field survey of 2200 assets to supplement LiDAR data

Stormwater Master Plan	1994	Current
Total Model SubBasins	1,186	12,628+





Data Refinement: Detailed Updates (Example: Basin F)



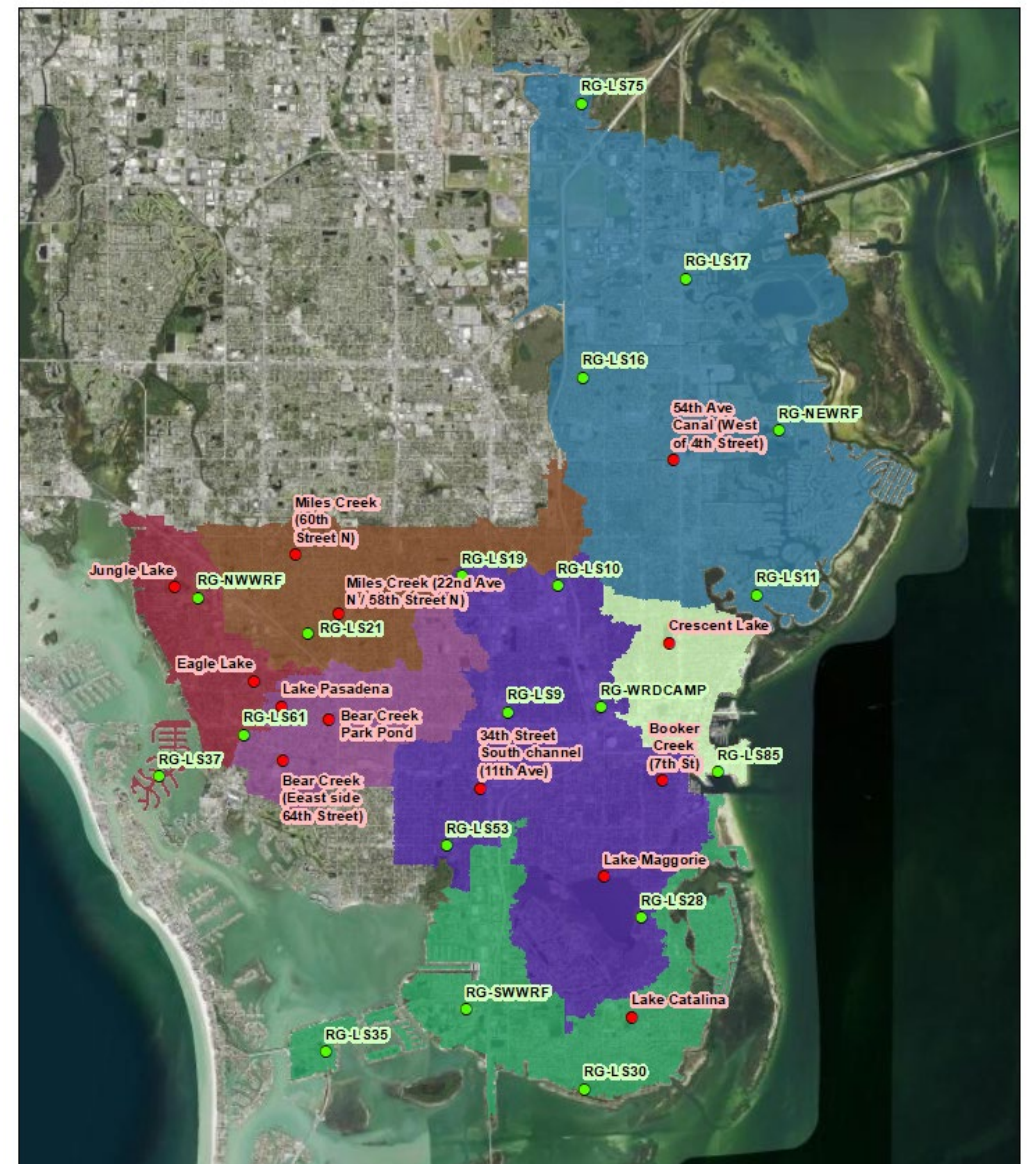
	HYDROJUNCTIONS	HYDROEDGES	ICPR_NODES	ICPR_LINKS
TOTAL	36,221	30,231	21,633	21,866





Basin Grouping

- Watershed was divided in to 7 groups based on the discussions with the City and District
 - Grouping based on hydrology characteristics of watershed (evaluated from outfall behaviors)
 - Every “grouping” has at least 1 water level data logger reference
- Benefits:
 - Reduced model run time
 - Segregated models for specific areas of interest
 - More manageable geodatabases
 - Can be updated separately in future updates
 - Can be run for separate BMP evaluation/studies
 - Grouped areas would still incorporate neighboring basin interactions



©Jacobs 2020

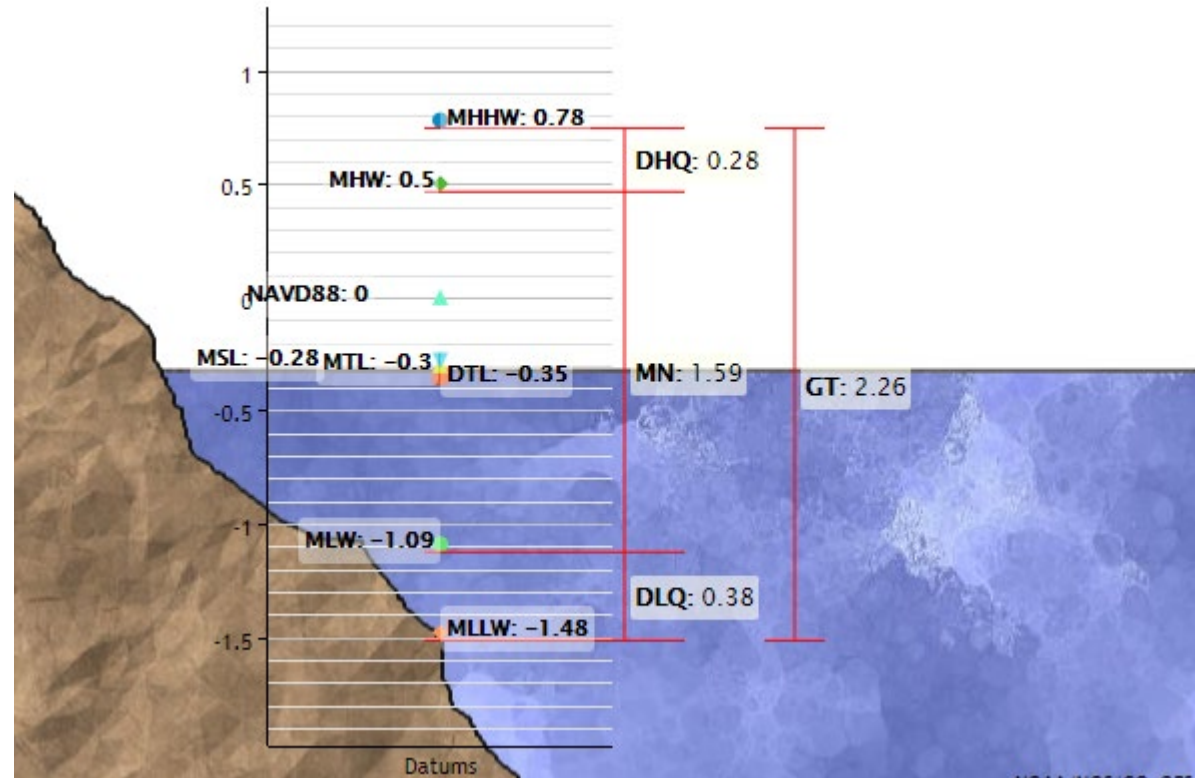




Establishing Current and Future Conditions

Year	NOAA Int-Low (feet)	NOAA Intermediate (feet)	NOAA High (feet)
2000 ³	0	0	0
2030	0.56	0.79	1.25
2040	0.72	1.08	1.77
2050	0.95	1.44	2.56
2060	1.15	1.87	3.48
2070	1.35	2.33	4.56
2080	1.54	2.82	5.71
2090	1.71	3.38	7.05
2100	1.90	3.90	8.50

2050 NOAA Intermediate SLR projections will be adopted for SMP future conditions modeling.



Source: NOAA Tides and Currents

Tidal Reference Points: Vertical Datums (St. Pete tide gauge #8726520, based on 1983-2001 epoch)





What is the Benefit of a Stormwater Master Plan?

- Allows the **City to strategically plan** capital improvements to be more cost effective in mitigating risk
- Being strategic in planning allows for **effective analysis of rates**
- Is an element of the **Community Rating System** and provide benefit to residential insurance rates
 - City has a current rating of 5 which equates to a 25% discount
 - With the successful completion of this SMP, the City has a potential of achieving a rating of 4
- Allows for better forecasting during storm events to alert residents of risk
- With updated policies and ordinances, this will assist in improving water quality in our lakes, ponds and Tampa Bay





A MOMENT OF ZEN

“What has become an urgent necessity, is a way of looking at the world that does violence neither these two types of understanding and unites them as one.”

2.0	Watershed Evaluation
2.1	Collection and Assembly of existing topographic and watershed feature data
2.2	Initial GIS Processing
2.3	Evaluation of GIS and topographic data for issues and voids
2.4	Public Notification of watershed work
2.5	Pre field reconnaissance evaluation
2.6	Acquisition of data
2.7	Data Refinement and Development
2.8	Geodatabase of model features and Watershed Evaluation Report
2.9.1	Surface Water Resource Assessment Analysis and Approach
2.9.2	Crescent Lake Preliminary Management Plan
2.10	Project Management and QA/QC
2.11	Watershed Evaluation Peer Review and Final approved deliverables for the Watershed Evaluation
3	Watershed Management Plan
3.1	Watershed Model Parameterization
3.2	Watershed Model Development and Verification
3.3	Floodplain Analysis Peer Review
3.4	Public Notification, Review, and Comment Period
3.5	Project Management and QA/QC
3.6	Final Approved Deliverables for the Watershed Management Plan
4.0	Watershed Management Plan Alternatives Analysis
4.1	Level-of-service Determination
4.2	Surface Water Resource Assessment (Water Quality Only) (includes 1 meeting)
4.3	Best Management Practice (BMP) Alternative Analysis (includes 2 meetings)
4.4	Project Management and QA/QC
4.5	Final approved deliverables for the WMP Alternatives Analysis

2.2 WATERSHED EVALUATION

2.2.1 Assembly and Evaluation of Watershed Data

2.2.1.1 Drainage Pattern and Watershed Boundary

2.2.1.2 Areas of Development

2.2.1.3 Initial GIS Processing

2.2.1.4 Topographic Voids

2.2.1.5 Hydrologic Characteristics and Percolation

2.2.1.6 Historical Water Levels

2.2.1.7 Data Acquisition Plan

2.2.1.8 Pre-field Reconnaissance Evaluation

2.2.1.9 Task Memorandum

2.2.1.10 Pre-Submittal Meeting (as needed)

2.2.1.11 District Approval and Notice

2.2.2 Hydrologic and Hydraulic Feature Database

2.2.2.1 Acquisition of Data

2.2.2.2 HydroNetwork Development

2.2.2.3 Topographic Information Refinement

2.2.2.4 Hydrologic Feature Database

2.2.2.5 Pre-Submittal Meeting (as needed)

2.2.2.6 District Review and Approval

2.2.3 Preliminary Model Features

2.2.3.1 Additional GIS Processing

2.2.3.2 Preliminary Model Schematic

2.2.3.3 Model Parameterization Approach

2.2.3.4 Watershed Evaluation Report

2.2.3.5 Pre-Submittal Meeting (as needed)

2.2.3.6 District Review

2.2.4 Peer Review of Watershed Evaluation

2.2.4.1 Peer Review Kick-off Meeting and Presentation

2.2.4.2 Meeting to Present Peer Review Comments

2.2.4.3 Meeting to Discuss Approach of Responding to Peer Review Comments

2.2.5 Final Approved Watershed Evaluation Deliverables

2.2.5.1 Revised Deliverables

2.2.5.2 Pre-Submittal Meeting (as needed)

2.2.5.3 District Approval and Notice



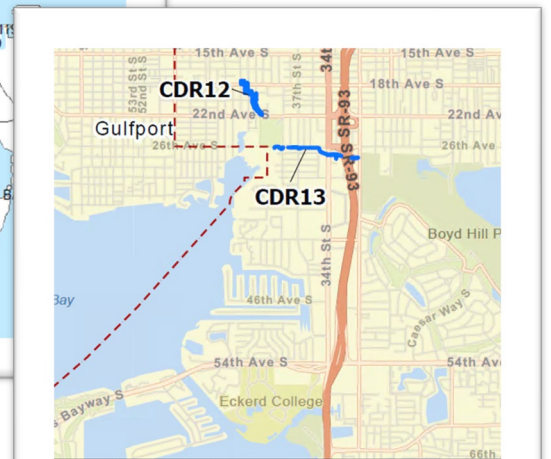
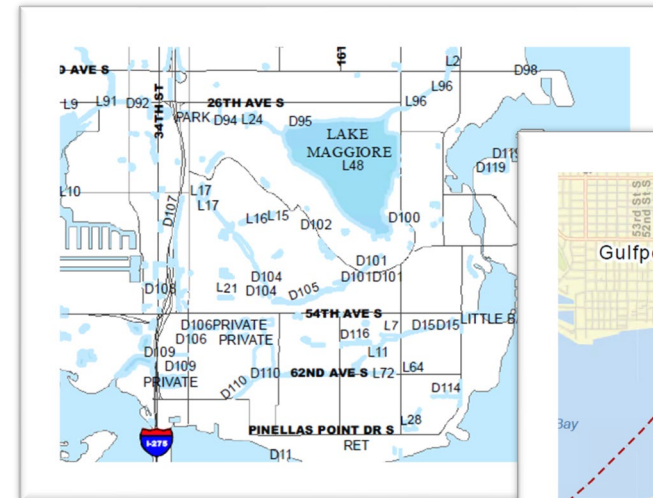


A MOMENT OF ZEN

“Care and quality are internal and external aspects of the same thing. A person who sees quality and feels it as he works is a person who cares. A person who cares about what he sees and does is a person who is bound to have some characteristics of quality.”

MOWING CREW				OPR		
Date	Initials	Location ID	Location	Inlet Insepection	Outfall Insepection	Maint Perf R
6/30/20		D 1	GAND Y TO 108 AV.			
4/21/20	TD	D 2	102 AV N, 8 ST N TO			
7/3/19		D 3	94 AV & 12 ST N @			
8/14/19	TW	D 3	94 AV N - 92 TO			
10/24/19	TD	D 3	12 ST, 92 TO 94 AV I			
2/7/20	TB	D 3	12 ST N @ 92-94 AV			
4/20/20	TD	D 3	12 ST N, 94-92 AV N			
8/14/19	TW	D 4	94 AV N - 9 TO 14 S			
10/24/19	TD	D 4	94 AV, 9 TO 14 ST N			
3/17/20		D 5	93 AV N TO GAND Y			

Date	Location	# Grates	Cle.
1	Central Av W of Ferg's (btwn 13 & 16 St)	2	
2	Central Av @ 23 St N	1	
3	1320 Central Av (@ Ferg's Restaurant)	2	
4	1246 Central Av	2	
5	Commercial Av S (btwn Central & 1 Av S) West from 11 St S	2	
6	1 Av S @ 11 St	1	
7	1 Av S @ 3 St	1	
8	3 Av S @ 2 St	3	
9	7 Av S @ 1 St (Albert Whitted Airport)	2	
10	6 Av S @ MLK St	2	
11	1235 10 Av S	1	
12	11 Av S & 6 St S		
13	21 Av S - first alley west of 16 St S	1	
14	1 Av N & 19 St N NEC	1	
15	1 Av N & 22 St N NEC	1	
16	1 Av N & 24 St N SFC	1	



Natural Channel Debris Removal Map
ENGINEERING AND CAPITAL IMPROVEMENTS DEPARTMENT
CITY OF ST PETERSBURG





A MOMENT OF ZEN

“We take a handful of sand from the endless landscape of awareness around us and call that handful of sand the world”

- The SMP is an element of the **Integrated Master Plan** which provides an overall plan that complies with regulations:

Potable Water	Reclaimed Water	Wastewater	Stormwater
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- Develop a comprehensive approach to address aging assets
- Develop a methodology and sequence for capital investments
- Incorporate sustainability and resiliency
- Update existing or develop new regulatory compliance strategies and policies



THANK YOU

