

A nighttime photograph of a city skyline reflected in water. Several boats are docked in the foreground, and the city lights are visible in the background. A semi-transparent blue banner is overlaid on the bottom half of the image.

NAVIGATING CONSENT DECREES

Words of Wisdom

“When the end of the world comes, I want to be in Cincinnati because it’s always twenty years behind the times.” – **Mark Twain**

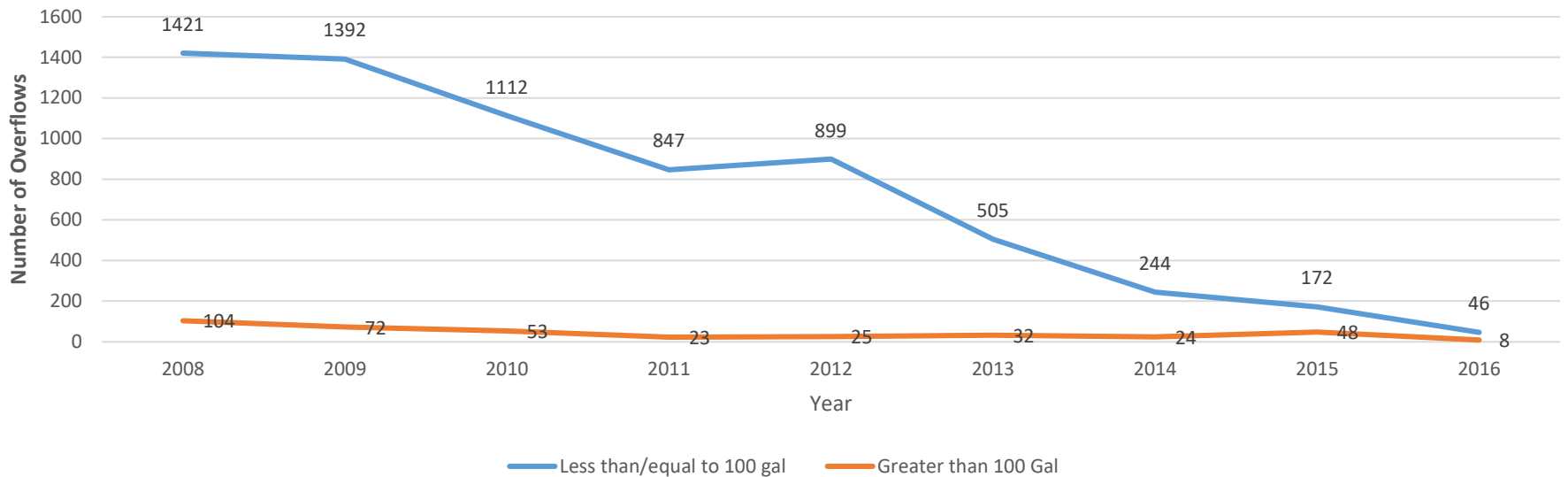


Define an SSO?



- * What is the Minimum Volume?
- * EPA vs TCEQ
- * SSO vs a Spill

SSO Volume by Year



General Triggers for Enforcement

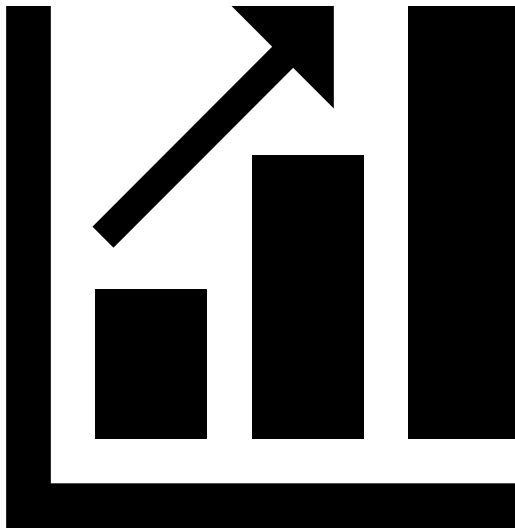


- * Red Flags
 - * >5 SSOs per 100 Miles of Main (Closely Monitor)
 - * An SSO that effects Public Health (Instant Enforcement)
 - * Fish Kills (Possibly Instant Enforcement)

Corpus Christi before Enforcement



Too Many SSOs & DMR Excursion = Administrative order or Consent Decree



- * *An administrative order (AO) is an agreement between an individual, business, or other entity and a regulatory body. In this agreement, the offender agrees to pay for damages caused by violations and to cease activities that caused those violations.*
- * *A consent decree is an order made by a judge with the consent of all parties involved in a dispute or action. It reflects the agreement of the parties and is typically used in legal proceedings. Unlike an AO, a consent decree is filed in court and is part of litigation*

What Happens Next?

Years of Negotiation Followed by normally 10 years to comply

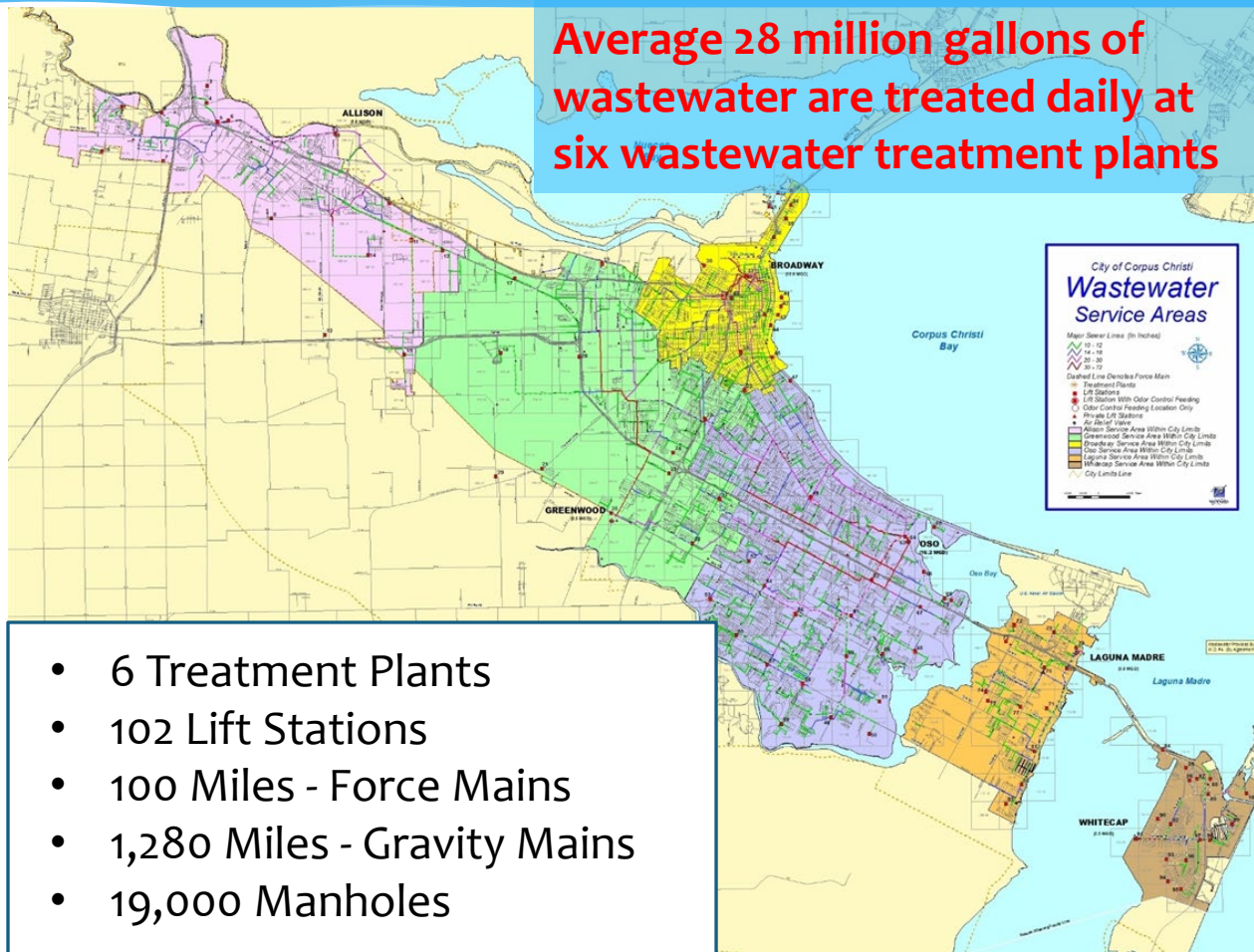
- ❖ Specific requirements
 - ❖ CMOM Plan
 - ❖ Overflow Response Plan
 - ❖ High frequency cleaning program
 - ❖ System-wide cleaning program
 - ❖ System-wide inspection program (CCTV)
 - ❖ Lift station and force main condition assessment and remedial measures
 - ❖ FOG control program
 - ❖ Root control program
 - ❖ Capacity Assurance (Hydraulic Model) and remediation
- ❖ Firm delivery dates with stipulated penalties



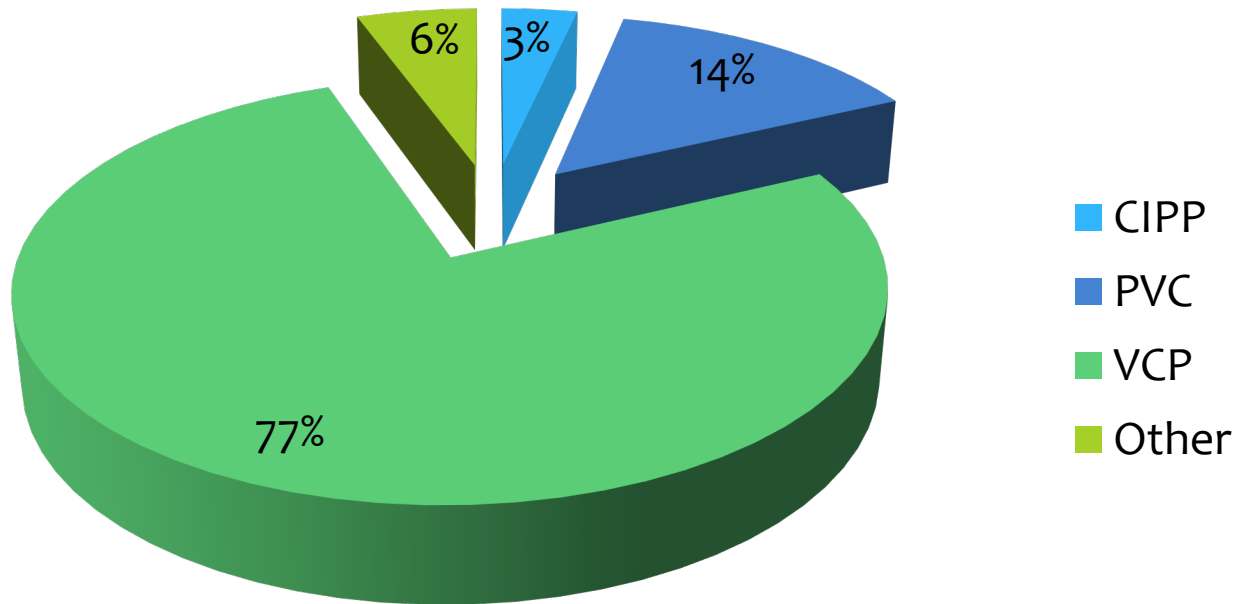
Cost Doesn't Matter to the TCEQ/EPA

Corpus Christi Wastewater System

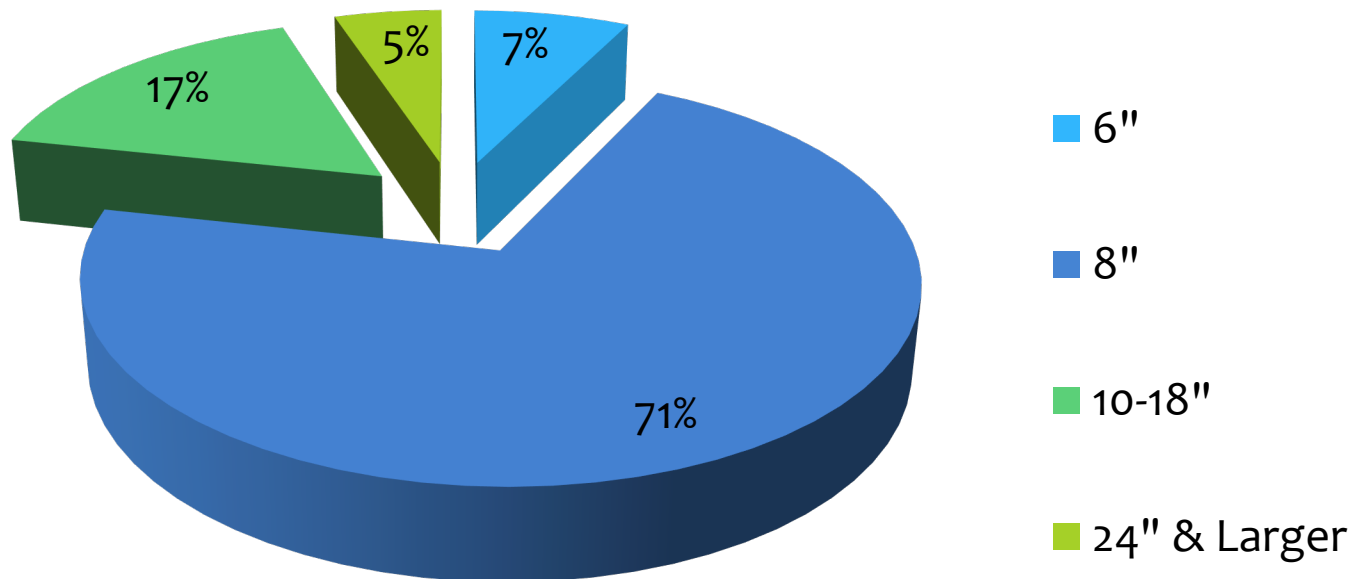
Average 28 million gallons of wastewater are treated daily at six wastewater treatment plants



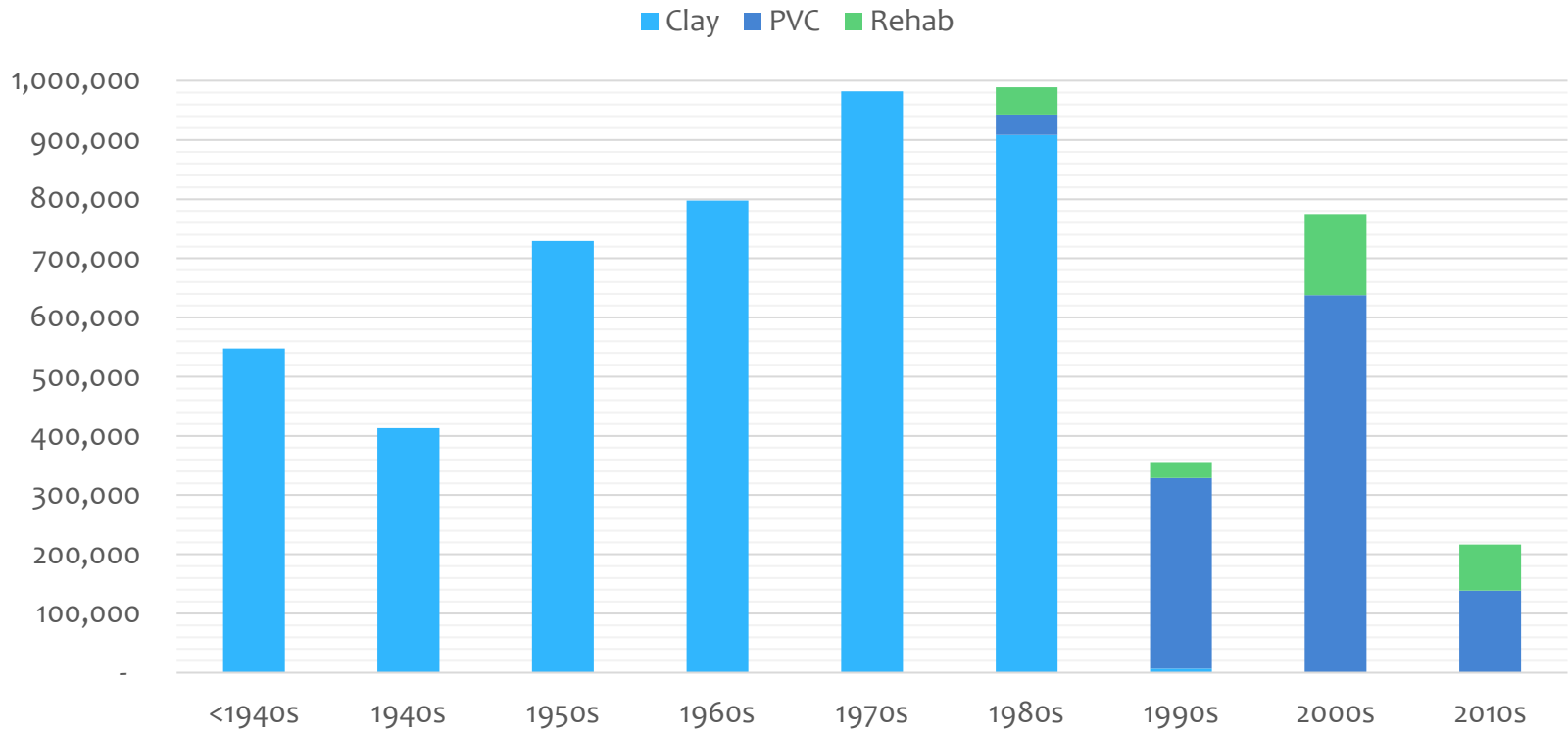
Material Types



Collection System by Diameter

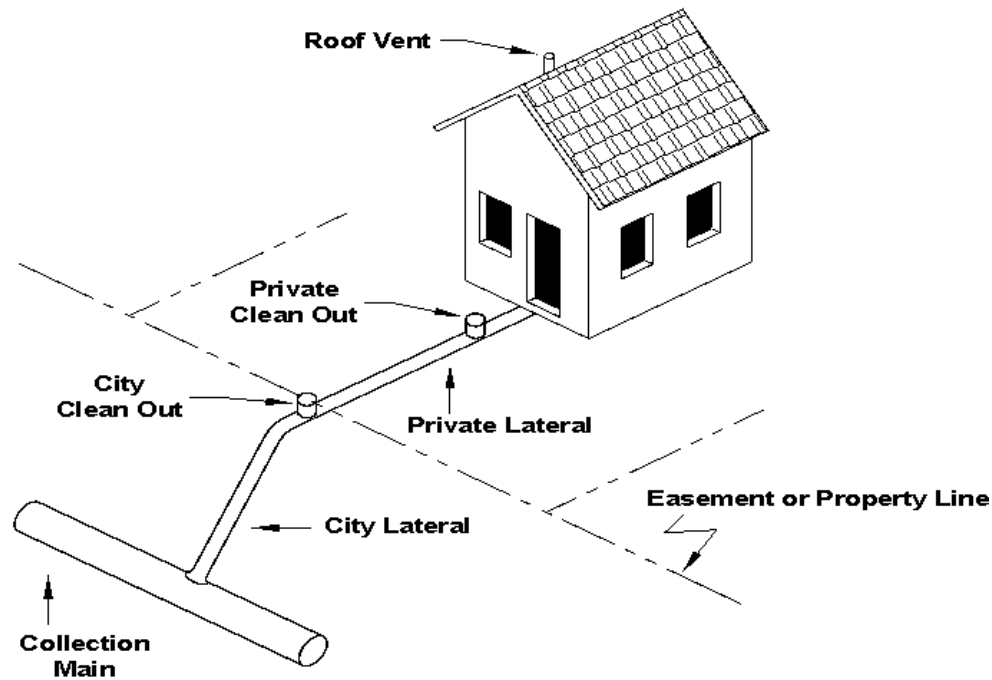


Collection System Age

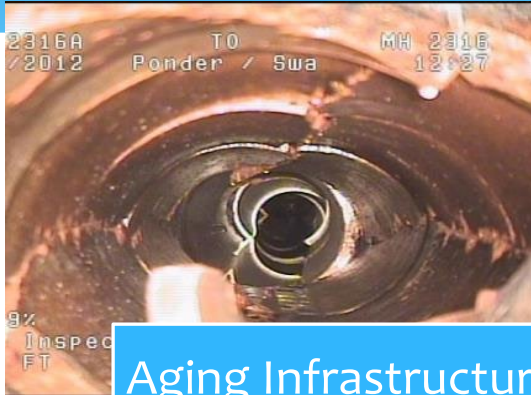


What is maintained by the City

YOUR WASTEWATER PIPE SYSTEM



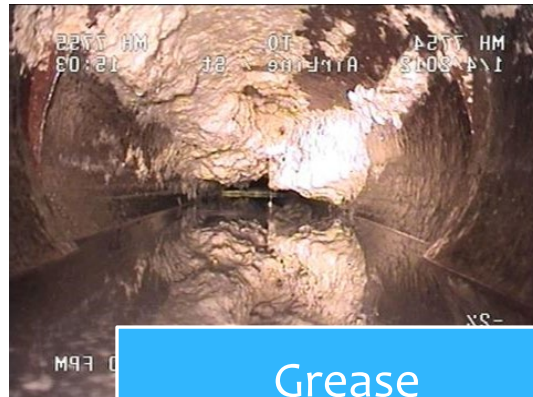
Collection System Challenges



Aging Infrastructure



SSOs & Backups



Grease

Other Challenges: Cave-Ins



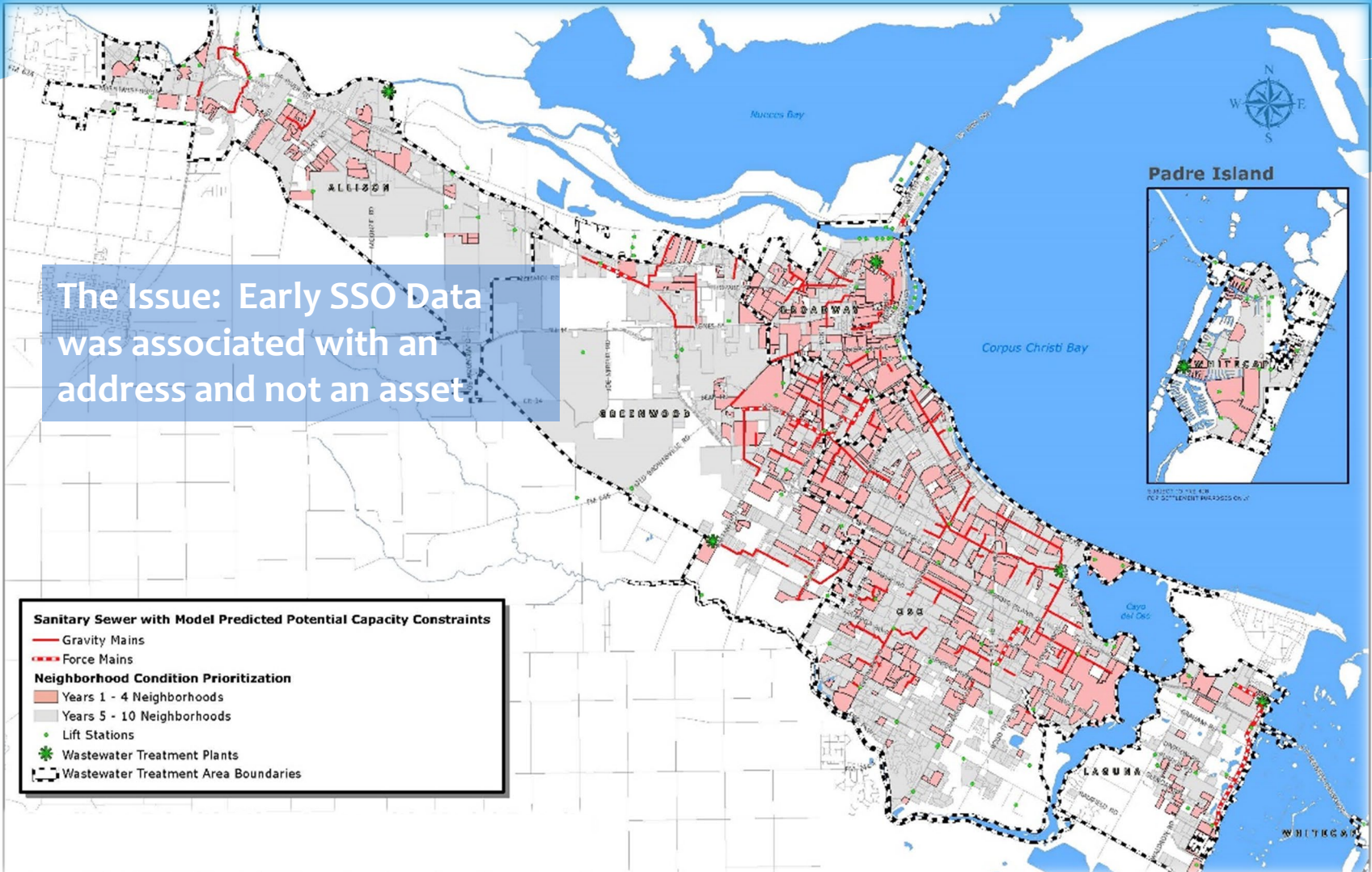
Key Facts



- * 47% of the System was installed prior to 1970
- * 52% of Large Diameter Lines have been rehabbed
- * 78% of Large Diameter Lines have been rehabbed or installed after 1980
- * 45% of the System is located in “backyard” easements
- * 80% of the Manholes are brick manholes
- * 76% of the system is clay pipe

Neighborhood Approach

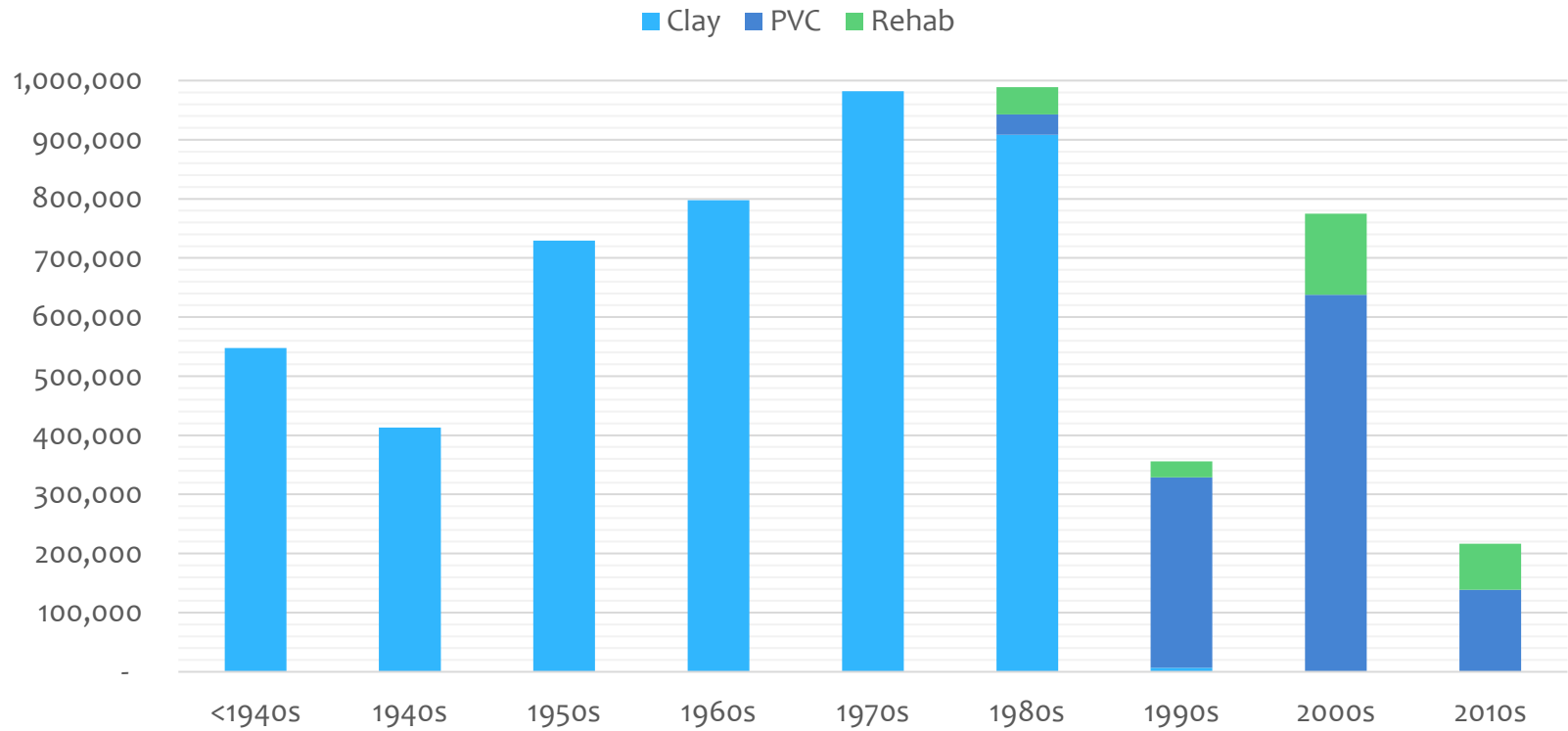
The Issue: Early SSO Data was associated with an address and not an asset



Early Action Items

- * Developed checklist for review of lift stations
- * Inspected manholes and conducted smoke testing
- * Inspected air release valves
- * Updated standard detail drawings
- * Prepared small and large diameter cleaning and CCTV specifications
- * Prepared upgrade to the City's work order software
- * Figure out potential yield rates from CCTV findings

Collection System Age



Condition Rating - D

Manhole has moderate structural defects that may include cracks, loose bricks, separated casting, moderate root intrusion, broken cover and defects that may impact system hydraulics due to structural issues or contribute to significant infiltration/inflow. Some visible staining due to infiltration/inflow may be present. Active infiltration may have been observed. Moderate to severe defects may include loose casting, moderate to severe corrosion of metal surfaces, deterioration of concrete mortar between bricks, etc.

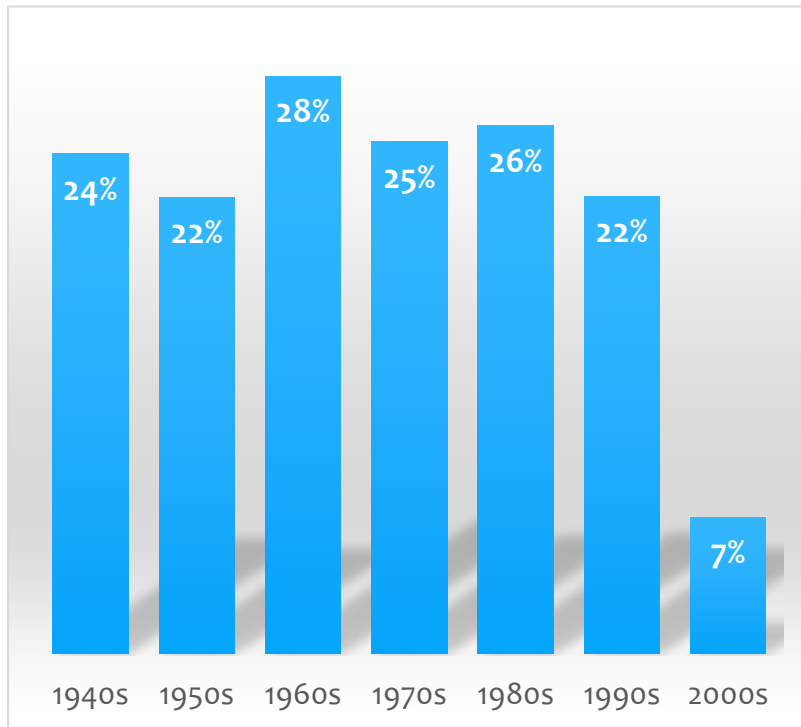


Condition Rating - E

Manhole may have severe structural defects that may include potential for structural failure, missing bricks, separated/broken casting, severe root intrusion, broken/missing cover and defects that may impact system hydraulics or contribute to significant infiltration/inflow. Visible staining due to infiltration/inflow may be present. Active infiltration may have been observed. Severe defects may include separated/broken casting/cover, severe corrosion of metal surfaces, missing mortar between bricks, etc. Manhole inspection was completed and the manhole will be addressed in the remediation plan or immediate repair may be warranted based on condition.



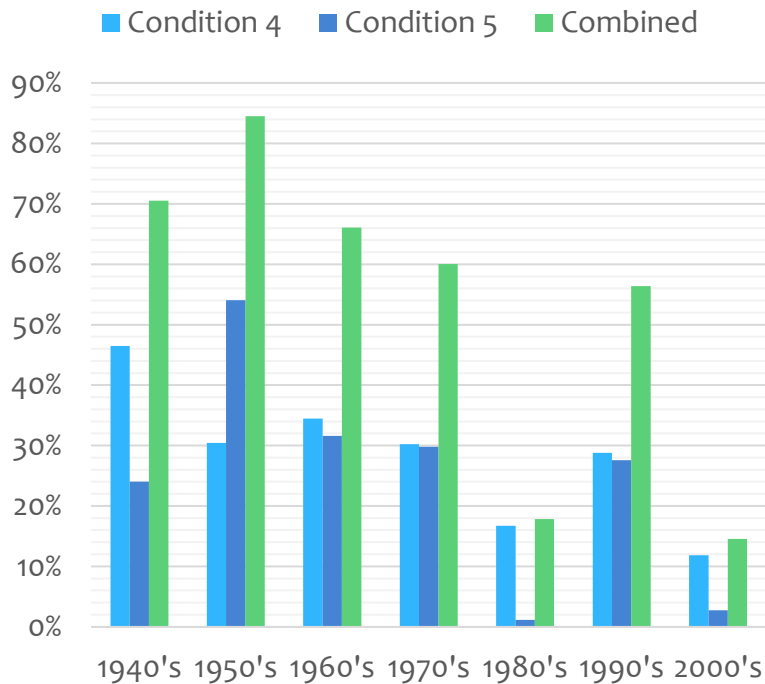
Manholes Yield Rates



- * Category
- * A = Very Good
- * B = Good
- * C = Fair
- * D = Poor
- * E = Very Poor

Mainline Yield Rates

PACP O&M Quick Score Rating



Condition Grade	Description	Estimated Time to Failure
0	No Structural Defects but has O&M Defects	Unlikely in foreseeable future
1	Excellent Structural, minor defects	Unlikely in foreseeable future
2	Good Structural, defects have not begun to deteriorate	20 years or more
3	Fair Structural, Moderate defects that will continue to deteriorate	10 to 20 years
4	Poor Structural, Severe defects that will become grade 5 in the foreseeable future	5-10 years
5	Immediate Attention, defects requiring immediate attention	Has failed or will likely fail in next 5 years

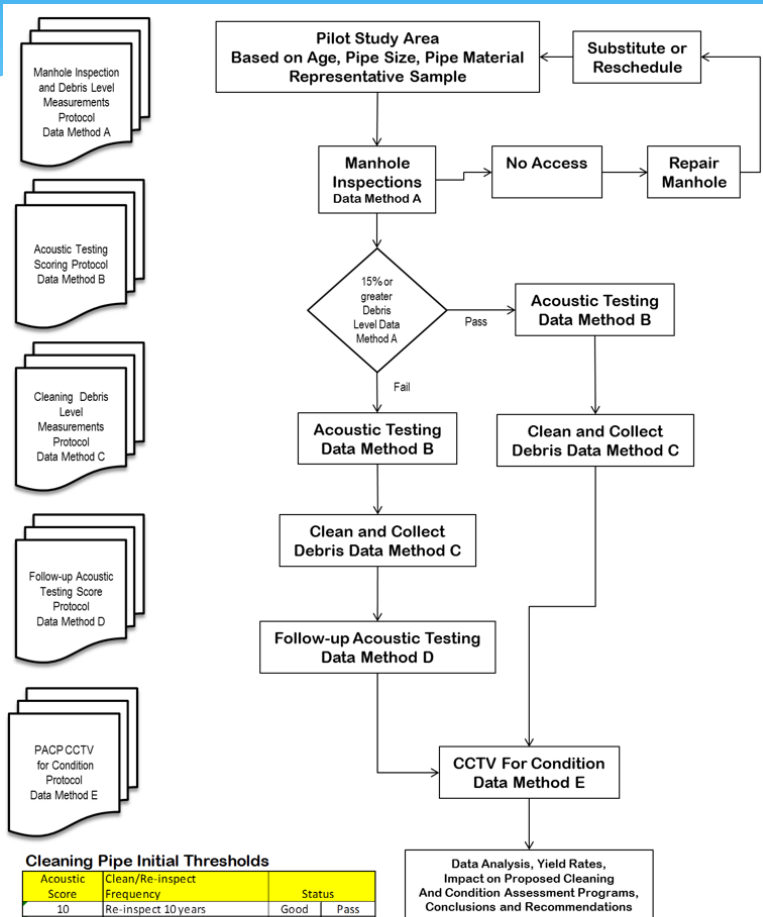
New Technology: Acoustic Testing

The technology developed at the University of North Carolina uses sound waves generated at a transmitter and a microphone receiver that analyzes the sound. The low frequency sonic wave generated from the transmitter at one manhole propagates from the speaker and travels thru the pipeline and is received by a microphone acting as a receiver of the sound. Once started, the test is totally automatic.

Output Data from Acoustic Testing

- * Measurement ID
- * Operator ID's
- * Date/Time
- * Measurement Duration
- * Calculated Pipe Length
- * Measurement Status
- * Assessment Number (0-10)
- * Pipe Status (Block, Good, Fair)
- * GPS coordinates

Process for Acoustic Testing



* Pre & Post-Cleaning Testing

Acoustic Score	Pipe Status
0-1	Blocked/Fail
2-3	Poor/Fail
4-6	Fair/Fail
7-10	Good/Pass

Cleaning Pipe Initial Thresholds

Acoustic Score	Clean/Re-inspect Frequency	Status
10	Re-inspect 10 years	Good Pass
9	Re-inspect 10 years	Good Pass
8	Re-inspect 10 years	Good Pass
7	Re-inspect 10 years	Good Pass
6	Clean	Fair Fail
5	Clean	Fair Fail
4	Clean	Fair Fail
3	Clean	Poor Fail
2	Clean	Poor Fail
1	Clean	Blockage Fail
0	Clean	Blockage Fail

*Unless cleaning findings indicate a need for a more frequent cleaning

Acoustic Testing Results

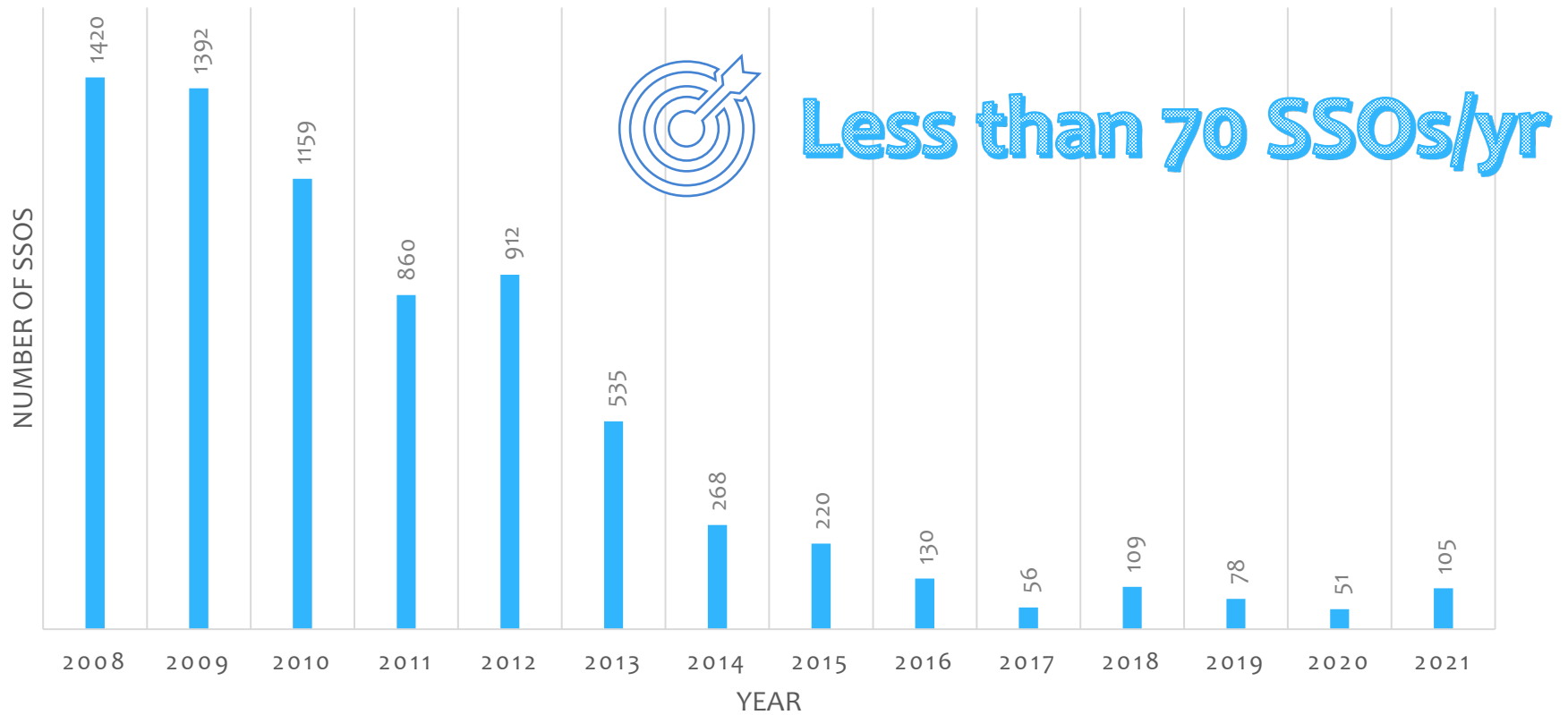
Pre-Cleaning

Decade	Acoustic Score											Total	Fail	%	Pass	%
	0	1	2	3	4	5	6	7	8	9	10					
1940's	19	1	1	0	1	1	2	0	1	0		26	25	96.2%	1	3.8%
1950's	34	4	5	2	7	2	1	1	4	1		61	55	90.2%	6	9.8%
1960's	42	6	7	10	5	11	11	15	11	3		121	92	76.0%	29	24.0%
1970's	16	9	4	7	9	6	13	17	24	8		113	64	56.6%	49	43.4%
1980's	5	4	1	2	1	4	13	9	20	5		64	30	46.9%	34	53.1%
1990's	36	6	2	4	7	8	9	20	12	5		109	72	66.1%	37	33.9%
2000's	4	3	0	3	1	6	13	24	40	17	1	112	30	26.8%	82	73.2%
	156	33	20	28	31	38	62	86	112	39	1	606	368	60.7%	238	39.3%

Post-Cleaning

Decade	Acoustic Score											Total	Fail	%	Pass	%
	0	1	2	3	4	5	6	7	8	9	10					
1940's	15	0	1	3	4	1	0	1	0	0		25	24	96.0%	1	4.0%
1950's	20	6	4	6	3	7	5	2	2	0		55	51	92.7%	4	7.3%
1960's	24	5	4	7	6	6	14	4	18	4		92	66	71.7%	26	28.3%
1970's	12	3	5	6	6	6	4	9	8	3	2	64	42	65.6%	22	34.4%
1980's	1	3	1	3	3	4	5	3	4	3		30	20	66.7%	10	33.3%
1990's	29	4	2	7	7	7	5	2	7	2		72	61	84.7%	11	15.3%
2000's	3	0	1	2	2	3	5	6	8	0		30	16	53.3%	14	46.7%
	104	21	18	34	31	34	38	27	47	12	2	368	280	76.1%	88	23.9%

SSO History



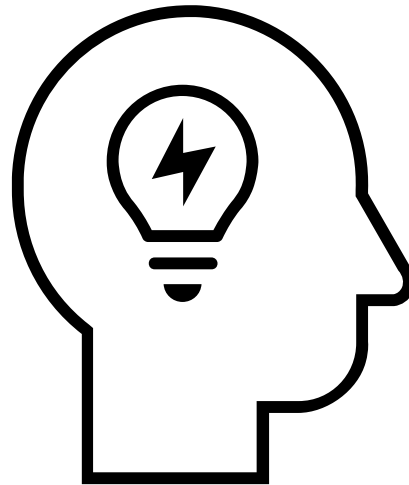
Lessons Learned

- * Review and update your GIS on a regular basis
- * Establish Cause of SSO's
 - * Utilize GIS & Work Order System to analysis chronic SSOs by asset
 - * Establish detailed procedures for investigation and tracking SSOs
- * The rehabilitation of the City's large diameter mains in the 80s and 90s is saving Corpus Christi money today
- * Make sure new technology fits your system and processes

Around the State

- * San Antonio – Great Work Order Data so a very targeted approach to specific asset classes of pipe
- * Corpus Christi – Limited Work Order Data (But Great GIS) – using spatial data to focus on SSO hot spots
- * Tyler – Systematic approach prioritized with flow monitoring with annual remedial measures plans
- * Houston – Use of AI and other software for CCTV review and management

Big Take Away



Don't Get in this Position!!!



Reduce the number of Sanitary Sewer Overflows reported each year

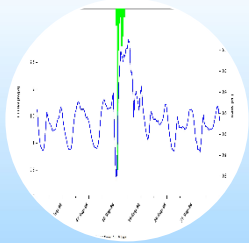


Address Sanitary Sewer Overflows before human health and safety or the environment is impacted



Address Sanitary Sewer Overflows before they become an enforcement issues

But How? Have a CMOM Plan



Capacity Assurance

- Hydraulic Model
- Removing PCCs



Pretreatment Program



Condition Assessment

- Mains
- Laterals
- Lift Stations



Cleaning Program

- Hot Spots
- System Wide



SSORP



Capacity Assure – How do I know I have issues?



Lift Stations: Run longer than normal or has more frequent starts or stops after rain events



Backup Mains: stoppages and sanitary sewer overflows



Peak Flows: wastewater treatment plants see significant peaks in flow

Remember This Slide!!!



Evaluate 10% of the collection system each year and prepare rehabilitation plan and budget for the next year



Commit to evaluating the entire system on a 10-year cycle and consider joining the SSOI Program



Monitor SSOs/100 miles of sewer (This is the benchmark)



Monitor trends and make repairs while they are minor and less expensive

Benefits of TCEQ SSOI



A participating system will not be subject to formal enforcement by TCEQ for most continuing SSO violations, as long as the overflows are addressed by the SSO plan. *Note:* Participation in the TCEQ's SSO Initiative does not preclude federal enforcement action by the Environmental Protection Agency.



Participation allows the municipality to direct resources towards corrective actions rather than having to pay penalties associated with an enforcement order in addition to the corrective actions.



Participation ensures that SSOs addressed by the SSO plan will not affect the system's compliance-history rating.



Building a gathering place for the family...PRICELESS.



Questions?

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