2021 Strategic Plan Workshop

March 17, 2021

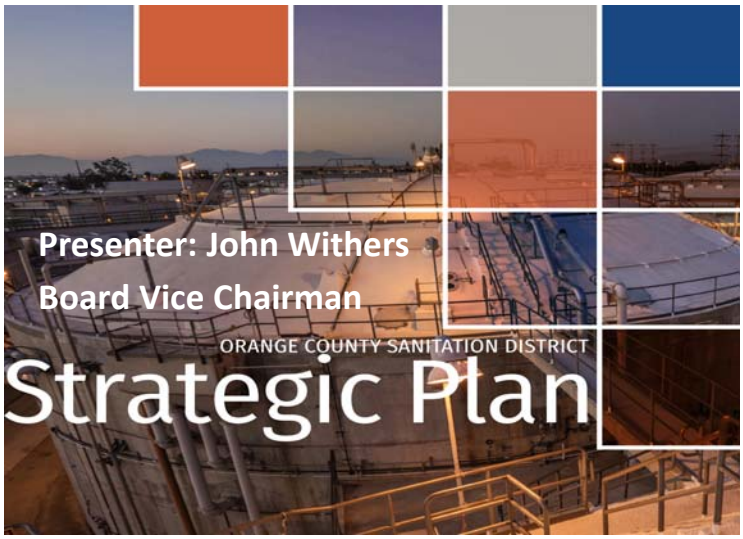
1

The Process

2

2

Strategic Planning



3

3

Previous Policy Topics Presented

1. Budget Controls and Fiscal Discipline
2. Cybersecurity
3. Property Management
4. Resilient Staffing
5. Safety and Physical Security

4

4

Budget Controls and Fiscal Discipline

Policy Statement:

OC San will prudently manage the public funds that it collects. It will take a long-term planning approach to its facilities and rate setting that provides a stable setting program, prudent reserves, and pay-as-you-go philosophy for operating and replacing capital expenses.

5

5

Cybersecurity

Policy Statement:

OC San must maintain adequate cybersecurity (information technology security) techniques that protect computer assets, networks, programs, data, and industrial control equipment from unauthorized access or attacks that are aimed for exploitation.

6

6

Property Management

Policy Statement:

OC San owns and operates assets throughout its service area located in property owned in fee, through easements and in the public right-of-way. The Sanitation District will identify and protect all of its property rights to assure that its assets are not encumbered or encroached upon so that the facilities may be properly operated, maintained, upgraded, and replaced.

7

7

Resilient Staffing

Policy Statement:

OC San will attract and retain high quality talent to support its mission and continue to be an industry leader. It will safeguard leadership continuity and support effective performance of the organization by proactively monitoring the changing work environment and requirements to ensure development programs are relevant and build a skilled bench of readily available successors for key leadership and mission-critical positions.

8

8

Safety and Physical Security

Policy Statement:

OC San will ensure the safety and security of employees, contractors, and visitors through standard practices, policies, and procedures that support a safe and secure environment, provide an appropriate level of security, and safeguard OC San's property and physical assets.

9

9

Schedule

FEBRUARY 17 WORKSHOP #1

- Budget Controls & Fiscal Discipline
- Cybersecurity
- Property Management
- Resilient Staffing
- Safety & Physical Security

MARCH 17 WORKSHOP #2

- Asset Management
- Energy Independence
- Climate & Catastrophic Event Resiliency
- Water Reuse
- Chemical Sustainability

APRIL 21 WORKSHOP #3

- Environmental Water Quality
- Food Waste Treatment
- Biosolids
- Constituents of Emerging Concern

- **January/February**
  - Employee Involvement
- **May/June**
  - Recap w/Board & Follow Up
  - Policy Paper Development
  - EMT Retreat
- **July/August**
  - Strategic Plan Development
- **September**
  - Draft Strategic Plan Presented to Board
- **November**
  - Final Strategic Plan Presented to Board for Adoption

10

10

Strategic Planning Development

Today's Policy Discussions:

1. Asset Management
2. Energy Independence
3. Climate and Catastrophic Event Resiliency
4. Water Reuse
5. Chemical Sustainability

11

11

Asset Management

Presented by:

Rob Thompson,

Assistant General Manager

12

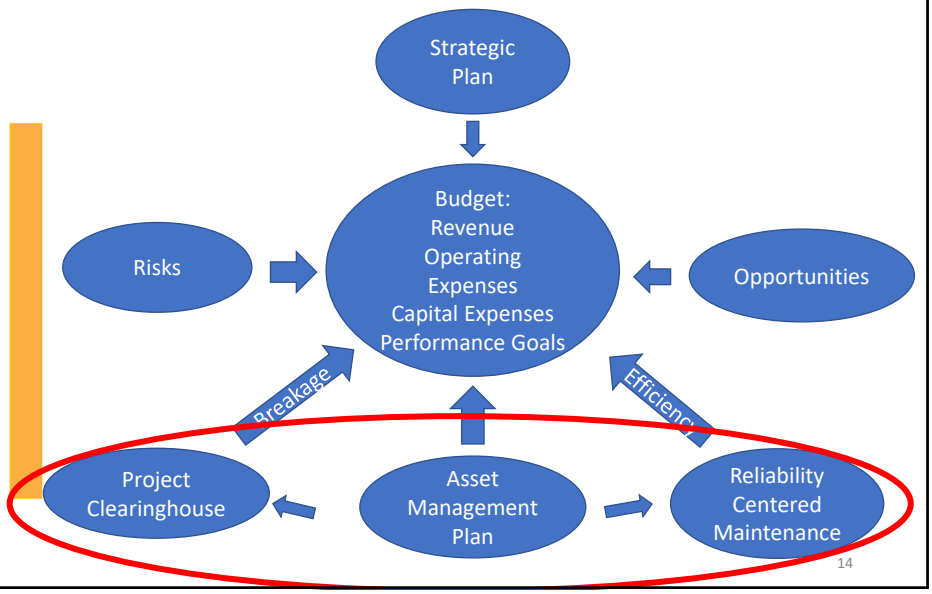
OC San's Asset Management

OC San will assess and manage the collection system and treatment plant systems and assets to improve resilience and reliability while lowering lifecycle costs. This will be accomplished through adaptive operations, coordinated maintenance, condition assessment, and planned capital investment. Staff will balance maintenance, refurbishment, and replacement strategies to maximize useful life, system availability and efficiency.

13

13

OC San's Planning Environment



14

14

Basic Premise

All Infrastructure has a life span.

- Concrete and steel 80 years
- Coatings 10 to 20 years
- Mechanical systems 15 to 25 years
- Electrical equipment 20 years
- Industrial controls and computers 10 to 20 years

15

15

Basic Premise (continued)

OC San should have a project to refurbish or replace each system.

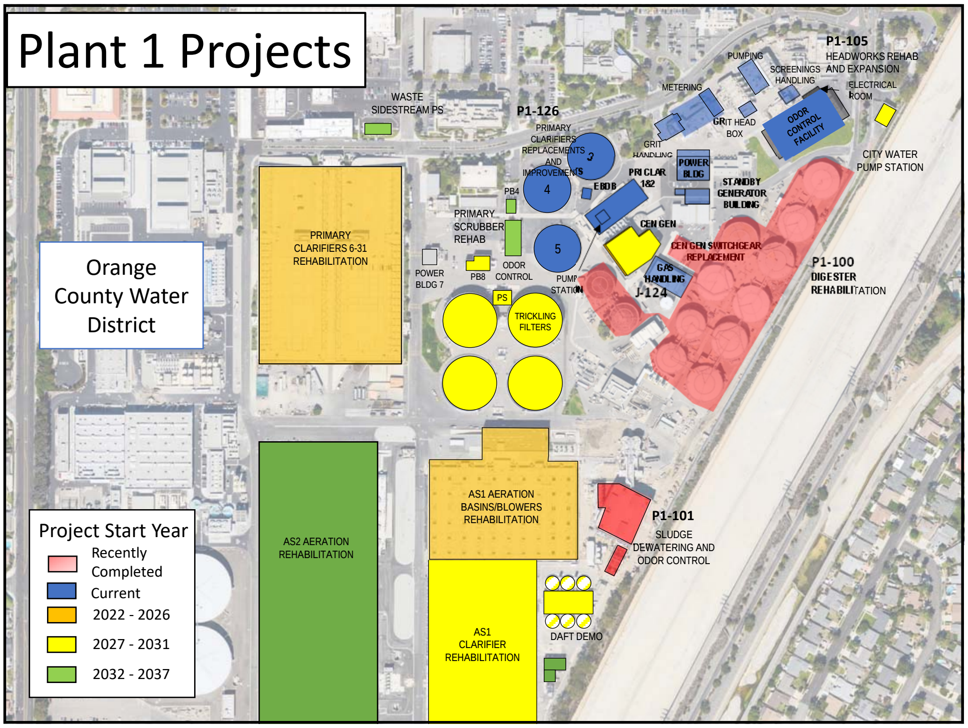
- Collection pipe 50 years
- Pumpstation 30 years
- Unit process 20 years

(Actual timing adjusted by detailed assessment and analysis.)

Added Benefit: Staggered projects are good for planning, delivery, cashflow and operations. It also enables planned technology and risk updates.

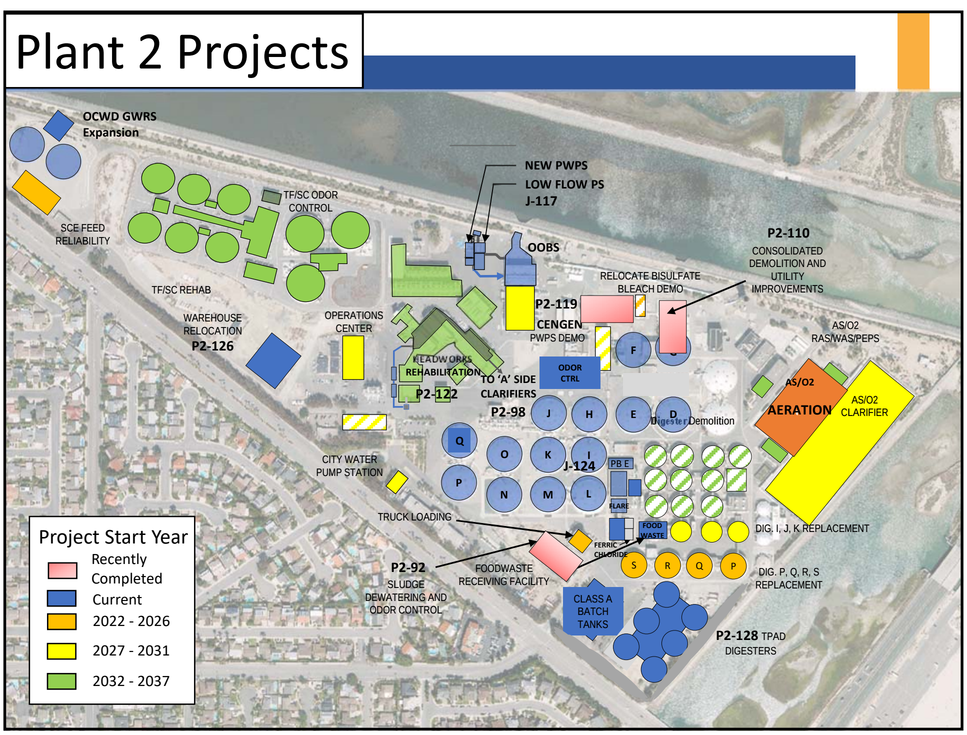
16

16



Plant 1 Projects
Orange County Water District
P1-105
HEADWORKS REHAB AND EXPANSION
PUMPING
SCREENINGS HANDLING
ELECTRICAL ROOM
METERING
ODOR CONTROL FACILITY
GRIT HEAD BOX
GRIT HANDLING
CITY WATER PUMP STATION
WASTE SIDESTREAM PS
P1-126
PRIMARY CLARIFIERS REPLACEMENTS AND IMPROVEMENTS
POWER BLDG
PRI CLAR 1&2
STANDBY GENERATOR BUILDING
EBOB
CEN GEN
CEN GEN SWITCHGEAR REPLACEMENT
PB4
PRIMARY SCRUBBER REHAB
PRIMARY CLARIFIERS 6-31 REHABILITATION
POWER BLDG 7
PB8
ODOR CONTROL
PUMP STATION
PS
TRICKLING FILTERS
GAS HANDLING
J-124
P1-100
DIGESTER REHABILITATION
AS1 AERATION BASINS/BLOWERS REHABILITATION
AS2 AERATION REHABILITATION
P1-101
SLUDGE DEWATERING AND ODOR CONTROL
DAFT DEMO
AS1 CLARIFIER REHABILITATION
Project Start Year
Recently Completed
Current
2022 - 2026
2027 - 2031
2032 - 2037

17

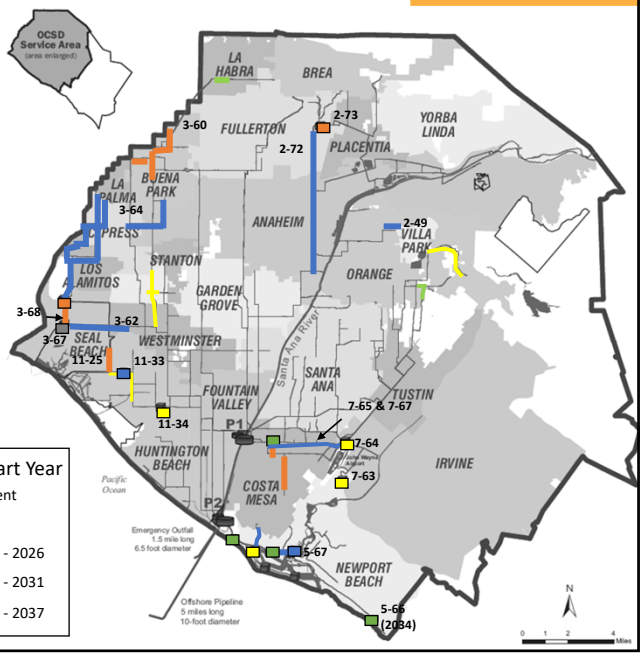


Plant 2 Projects
OCWD GWRS Expansion
SCE FEED RELIABILITY
TF/SC ODOR CONTROL
TF/SC REHAB
NEW PWPS
LOW FLOW PS
J-117
OOBS
P2-110
CONSOLIDATED DEMOLITION AND UTILITY IMPROVEMENTS
RELOCATE BISULFATE BLEACH DEMO
WAREHOUSE RELOCATION
P2-126
OPERATIONS CENTER
HEADWORKS REHABILITATION
P2-122
P2-119
CENGEN
PWPS DEMO
ODOR CTRL
TO 'A' SIDE CLARIFIERS
P2-98
AS/O2 RAS/WAS/PEPS
AS/O2
AERATION
AS/O2 CLARIFIER
Digester Demolition
J-124
PB E
FLARE
CITY WATER PUMP STATION
TRUCK LOADING
FOOD WASTE
FERRIC CHLORIDE
DIG. I, J, K REPLACEMENT
DIG. P, Q, R, S REPLACEMENT
P2-92
SLUDGE DEWATERING AND ODOR CONTROL
FOODWASTE RECEIVING FACILITY
CLASS A BATCH TANKS
P2-128 TPAD DIGESTERS
Project Start Year
Recently Completed
Current
2022 - 2026
2027 - 2031
2032 - 2037

18

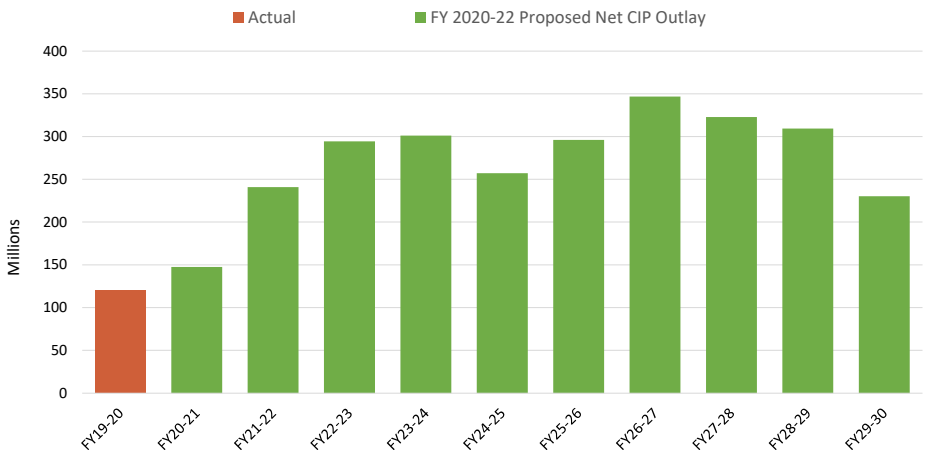
Regional Sewer Projects

La Habra
Buena Park
La Palma
Westminster
Seal Beach
Fountain Valley
Costa Mesa
Santa Ana
Tustin
Orange
Villa Park
Anaheim
Placentia
Fullerton



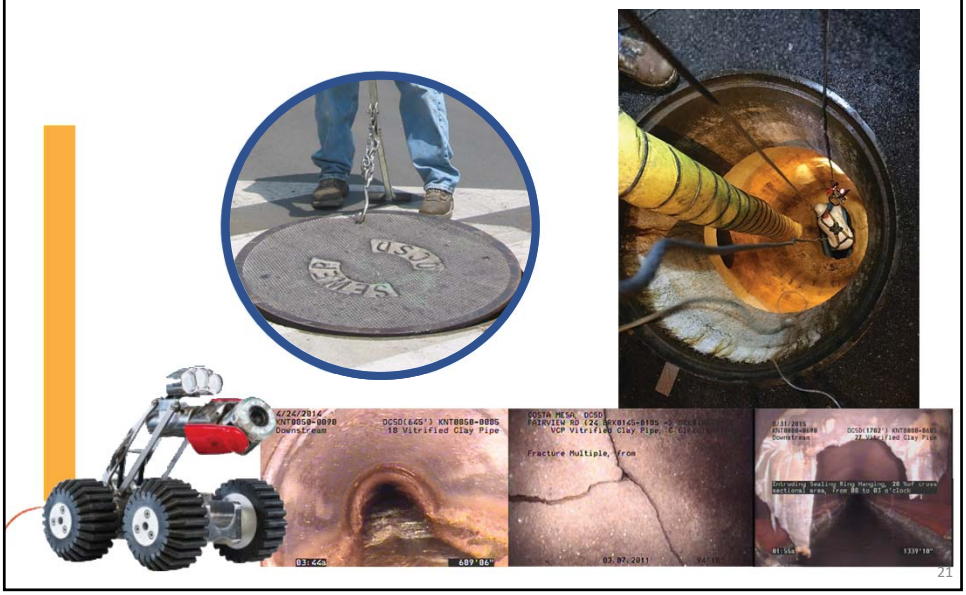
19

10-Year Net CIP Outlay: $2.7 Billion



20

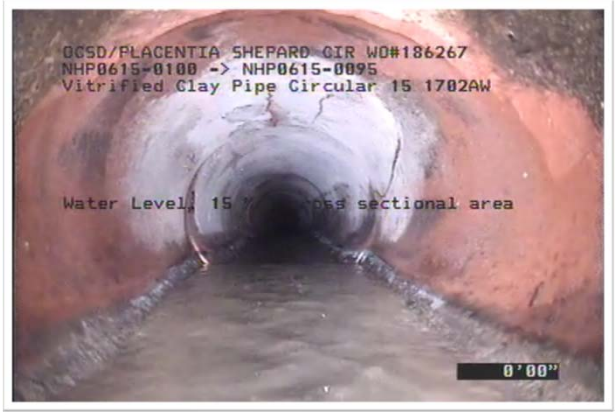
Sewer System is Evaluated by CCTV & Inspection



21

21

CCTV of OC San Pipeline



22

22

Condition Assessment Identifies Maintenance, Rehabilitation and Replacement Needs






23

23

Condition of Assets

Asset Type	A-Side				B-Side					C-Side				
	PSB-D	PSB-E	PSB-F	PSB-G	PSB-H	PSB-I	PSB-J	PSB-K	PSB-L	PSB-M	PSB-N	PSB-O	PSB-P	PSB-Q
Civil														
Effluent Piping	5	5	5	5	3	3	3	3	3	3	3	3	3	3
Structural														
General	3	3	3	3	2	2	3	3	3	3	1	1	1	1
Dome	4	4	4	4	3	3	4	4	4	3	3	3	3	3
Mechanical														
Piping	4	4	4	4	3	4	3	4	4	3	3	3	3	3
Internal Mechanism	2	2	4	4	2	2	4	4	4	2	2	2	2	2
Fans & Pumps	3		3		3		3		3		3		3	
HVAC & Ventilation	3		3		3		3		3		3		3	
Gates	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electrical														
MCC	4	4	4	4	3	3	3	3	3	3	3	3	3	3
Instrumentation														
PLC, Flow Meters	3	3	3	3	3	3	3	3	3	3	3	3	3	3

24

24

Proactive Maintenance

Maintain assets in a ready state

- Clearinghouse Committee coordinates decision making
- Individual repair/refurbish/replace decisions are made understanding the greater unit process life-cycle.
- Keep the assets working and available
- Reliability Center Maintenance tools
  - Vibration, thermal, ultrasound, oil analysis, motion amplification, hammer, manufactures upgrades…

25

25

Final Thoughts

Asset Management is a District wide work process not just a book on the shelf.

- Driven by the Managers from every division
- Every process, pump station, drainage system has an Asset Engineer Owner
- Asset Engineers coordinate operations, maintenance and project execution.
- Every Major repair/failure considered
- Monthly updates to 1/10 of the asset areas

26

26

Initiatives

- **Initiative:** Create an annual Asset Management Plan documenting the condition of the collection system and treatment plants, and upcoming maintenance or capital projects
- **Initiative:** Coordinate the efforts of operations, collections, mechanical maintenance, electrical maintenance, instrument maintenance and engineering through process teams to assure the OC San resources are focused on the high priority work functions.
- **Initiative:** Maintain a 20-year forecast of all CIP projects needed to maintain or upgrade the OC San's nearly $11 billion in assets on a prioritized risk basis to establish rate structures.

27

27

Questions

28

28

Energy Policy

Presented by:

Rob Thompson,
Assistant General Manager

29

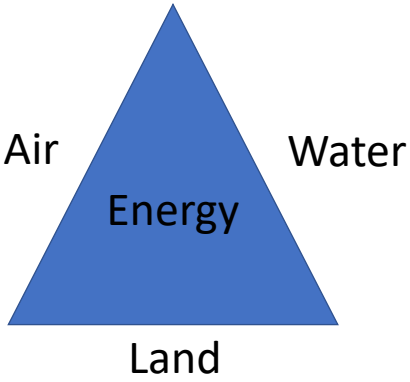
Energy Independence Policy

The Orange County Sanitation District will strive to be a net energy exporter. Electrical, thermal, and methane gas generation will be maximized. Energy utilization will be minimized using sound engineering and financial principles.

30

30

Why is Energy a Core Function?



Energy is integral to the treatment process that converts impurities to benign components that must go somewhere. For example, solids from water are converted to gas and biosolids.

31

31

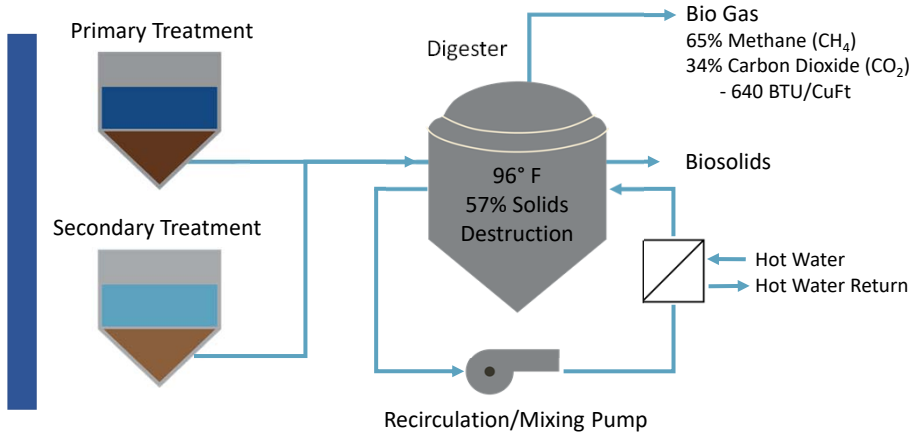
Energy Use

- OC San is very efficient in its energy utilization
  - Premium efficiency motors
  - Variable speed pumping systems
  - Use of gravity systems/minimum water lifts
  - Turbo air blowers
  - Fine bubble diffusers
  - Lighting Systems
  - High efficiency boilers
- Energy Audits

32

32

Energy Recovery—*Bio Gas Creation*

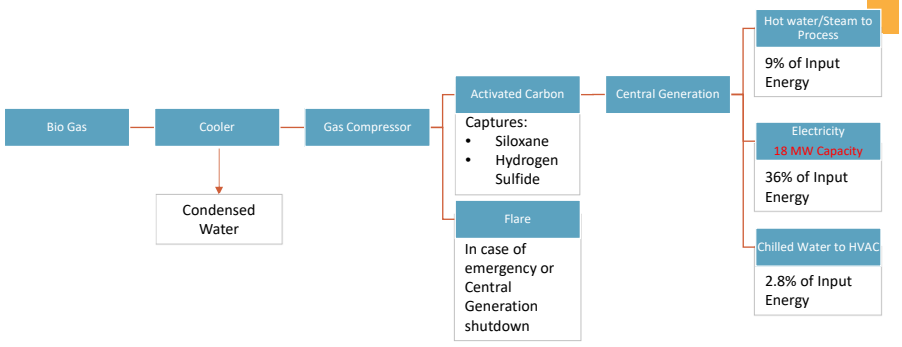


33

33

Energy Recovery

Bio Gas to Electricity and Heat



34

34

OC San Energy Picture

(Average month: July 2019 – June 2020)

Supply		Use	
• What we make			
• Bio Gas kWhr	24,086,000	• Electricity	12,568,500 kWhr
Electrical Gen. kWhr	8,092,000	• Thermal	3,752,700 kWhr
Thermal kWhr	2,195,000	• Process	3,090,100 kWhr
		• HVAC	662,600 kWhr
• What we import			
• Natural Gas kWhr	3,235,000		
• *SCE Electricity kWhr	4,653,600		
• Diesel	Emergency Power		

* OC San needs to produce 57% more bio gas to be energy independent.

35

35

Long Term Engine Viability Study

- OC San's eight Central Generation engines are 26 years old and are due for major rebuilds.
  - Significant investment in emissions and modern controls have been made.
  - Resilient operation
- Manufacturing of parts and service support is a concern over the long haul.
  - Engineering study to assure long term support for continued investment

36

36

Initiatives

- **Initiative:** Maximize the anaerobic digestion conversion of organics to methane through receipt of food waste and operational techniques.
- **Initiative:** Investigate and install energy storage and photovoltaic systems where practical to achieve energy independence/resilience.
- **Initiative:** Continue to support the conversion of biomethane into electricity and heat for process use. Improve systems as necessary to comply with air regulations.

37

37

Questions

38

38

Climate and Catastrophic Event Resiliency Policy

Presented by:

Kathy Millea,

Director of Engineering

39

Policy Statement

The Sanitation District aims to design, maintain and operate valuable wastewater assets that withstand or adapt to adverse conditions in a reasonable manner that is both cost-effective and sustainable for present and future generations.

These adverse conditions include heavy rains, flooding, sea level rise, earthquakes, tsunamis, extreme heat, wildfires, and electrical grid interruptions.

40

40

Policy Statement

The Sanitation District aims to design, maintain and operate valuable wastewater assets that **withstand or adapt to adverse conditions in a reasonable manner** that is both cost-effective and sustainable for present and future generations.

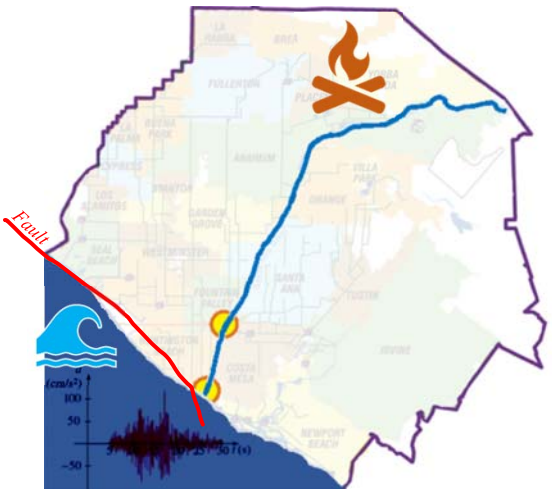
These adverse conditions include heavy rains, flooding, sea level rise, earthquakes, tsunamis, extreme heat, wildfires, and electrical grid interruptions.

41

41

OC San Risk Events

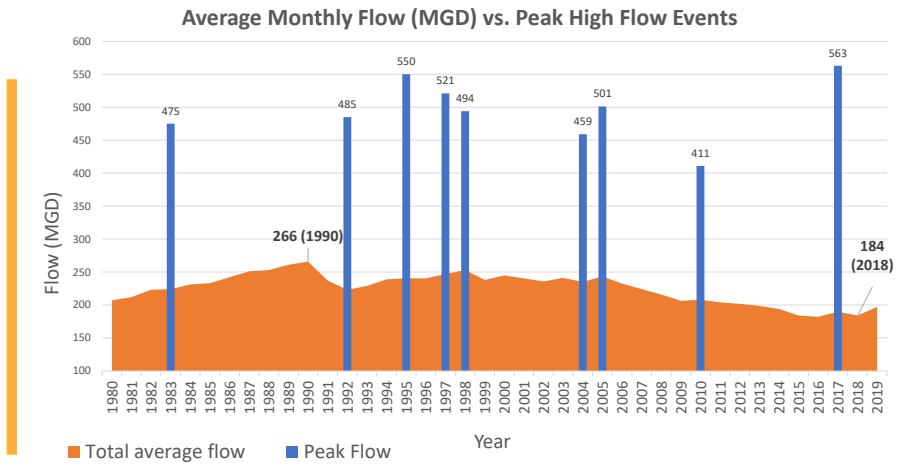
- Heavy Rains
- King Tides
- Floods
- Sea Level Rise
- Wildfires
- Earthquakes
- Tsunamis



42

42

Heavy Rains



43

43

King Tides

Huntington Beach, King Tide 2014

A Street Pump Station

8th Street, Newport Beach, King Tide 2012

Newport Beach Pump Stations

44

44

Floods

- **7 feet** of storm surge + high tide (January 2005)
- **8 feet** of storm surge + high tide (December 2012)

(Natural Hazards Mitigation, City of Newport Beach)

January 2010, Flooding at Plant No. 2

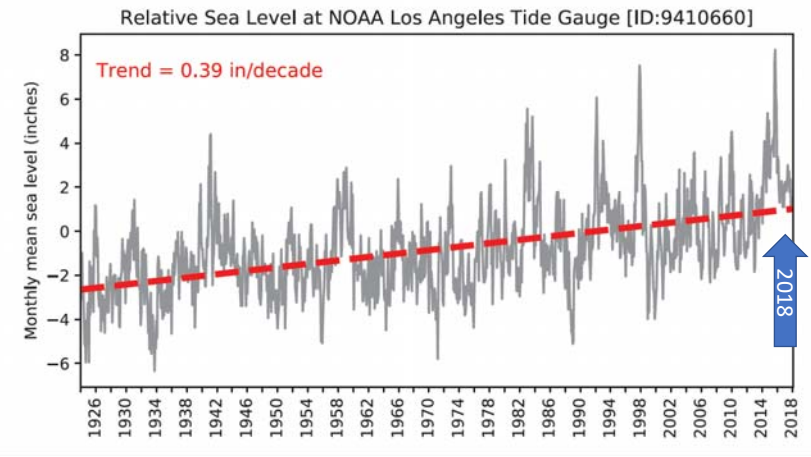
Dec 2010, Balboa Island

1983, Flooded streets in Newport Beach

45

45

Sea Level Rise



Observation: 1mm/year

Current projections for Newport Beach: 2.2 mm per year

(http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml)

46

46

Wildfire

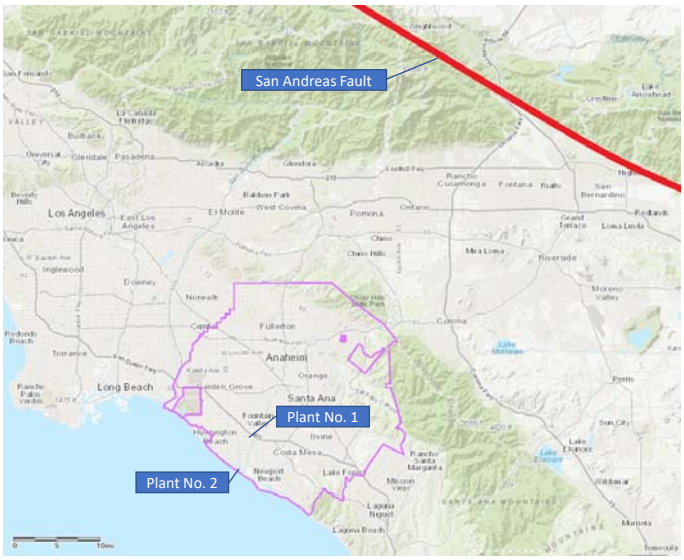
The Cocos Fire burns in San Marcos, California, in 2014. (theatlantic.com)

Ventura Fire, California, Dec 2017. (@aghakouchak)

47

47

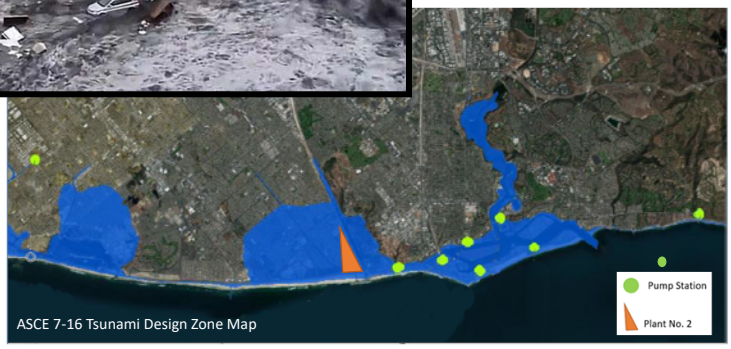
Seismic/Earthquakes



48

48

Tsunamis

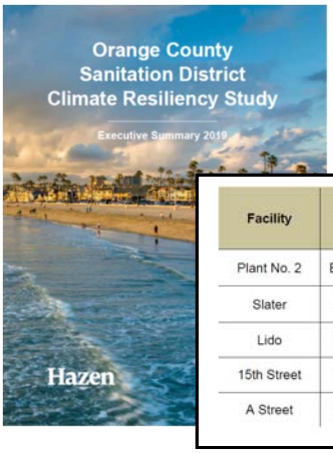


ASCE 7-16 Tsunami Design Zone Map

49

49

Climate Study Recommendations



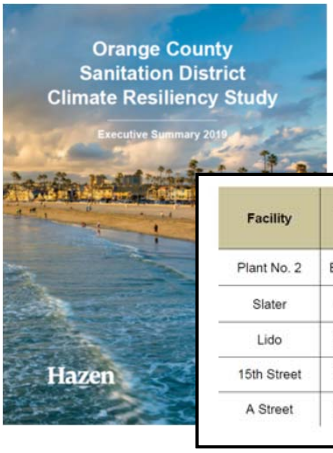
Facility	Adaptation Strategy	Construction Cost	Address with Planned Project	Project Start Date	Impacted Planning Horizon	Recommended Project Schedule
Plant No. 2	Boundary Level	$28 million	-	2025	2050, 2070	2025
Slater	Building Level	$0.5 million	11-34	2027	Current, 2050, 2070	2027
Lido	Building Level	$0.5 million	X-023	2028	Current, 2050, 2070	2028
15th Street	Building Level	$0.1 million	X-022	2033	2070	2033
A Street	Building Level	$0.4 million	X-041	2033	2070	2033

SP-152, Table 4-21 Recommended Adaptations with Associated Costs, Projects and Schedule

50

50

Climate Study Recommendations



Facility	Adaptation Strategy	Construction Cost	Address with Planned Project	Project Start Date	Impacted Planning Horizon	Recommended Project Schedule
Plant No. 2	Boundary Level	$28 million	-	2025	2050, 2070	2025
Slater	Building Level	$0.5 million	11-34	2027	Current, 2050, 2070	2027
Lido	Building Level	$0.5 million	X-023	2028	Current, 2050, 2070	2028
15th Street	Building Level	$0.1 million	X-022	2033	2070	2033
A Street	Building Level	$0.4 million	X-041	2033	2070	2033

SP-152, Table 4-21 Recommended Adaptations with Associated Costs, Projects and Schedule

51

51

Initiatives

- **Initiative:** Complete an engineering study of the seismic vulnerabilities of the treatment plants. Incorporate necessary upgrades into future capital improvement projects.
- **Initiative:** Complete the biannual high flow exercise to assure readiness for a high flow event. Maintain a higher level of readiness October 15 through March 15 and in advance of predicted significant rain events.

52

52

Questions

53

53

Water Reuse Policy

Presented by:

Rob Thompson, Assistant General Manager

54

Current Policy Statement

The Orange County Sanitation District will seek to beneficially reuse all reclaimable water for potable, industrial, irrigation and environmental uses.

Why do we add the word "reclaimable" rather than just say all water?

Page 55

55

OC San/OCWD 50-Year Partnership

Water Factory 21 Project (1970s)

- Seawater intrusion barrier

Green Acres Project (1991)

- Non-potable water for landscape irrigation (purple pipe)

Ground Water Replenishment System (2008/2015/2023)

- 2008 – 70 MGD potable water
- 2015 – 100 MGD potable water
- 2023 – 130 MGD potable water

Page 56

56

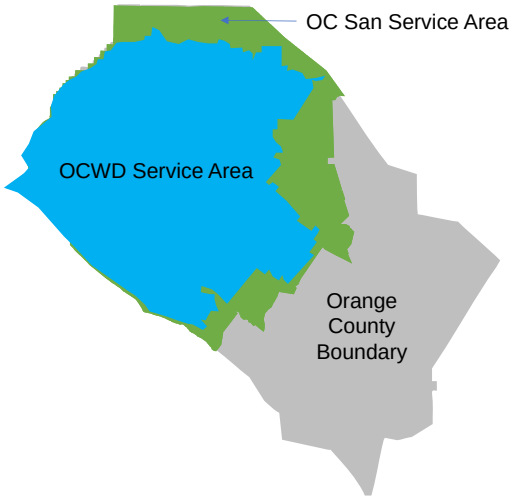
OC San and OCWD Joint Campus

Page 57

57

OC San and OCWD Service Areas

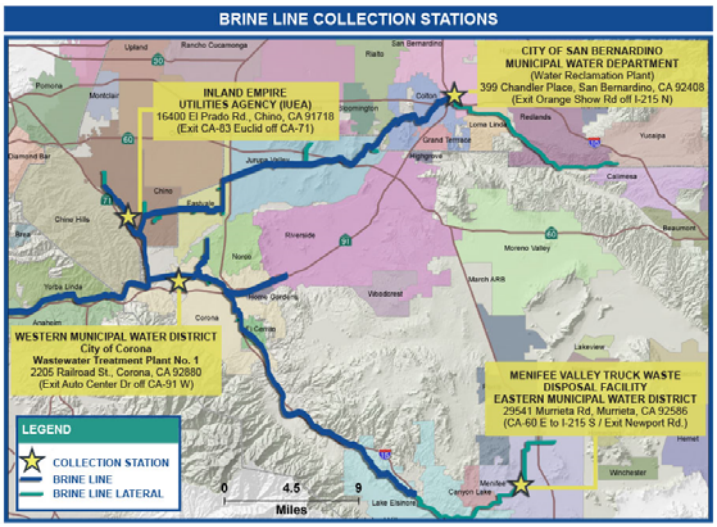
Both agencies serve roughly the same service area (~2.5 million residents)



Page 58

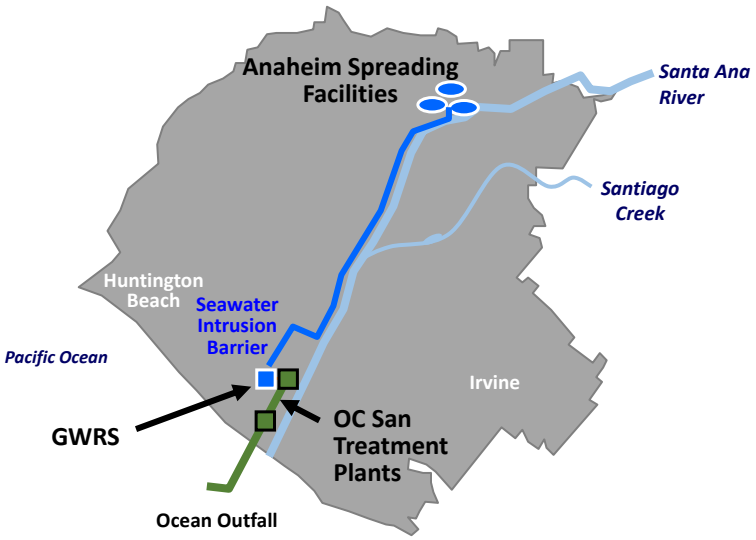
58

OC San Flow Management and SAWPA



59

GWRS System Components



60

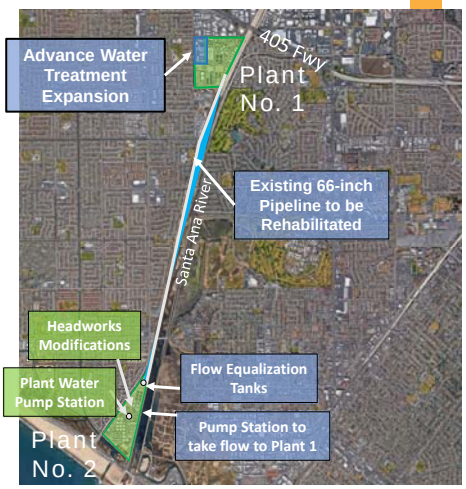
GWRS Final Expansion Projects

OC San Design/Construct/Operate (OCWD Fund)

- Headworks Modifications at Plant No. 2 (Project No. P2-122)
- Plant No. 2 Plant Water Pump Station Relocation (Project No. J-117B)

OCWD

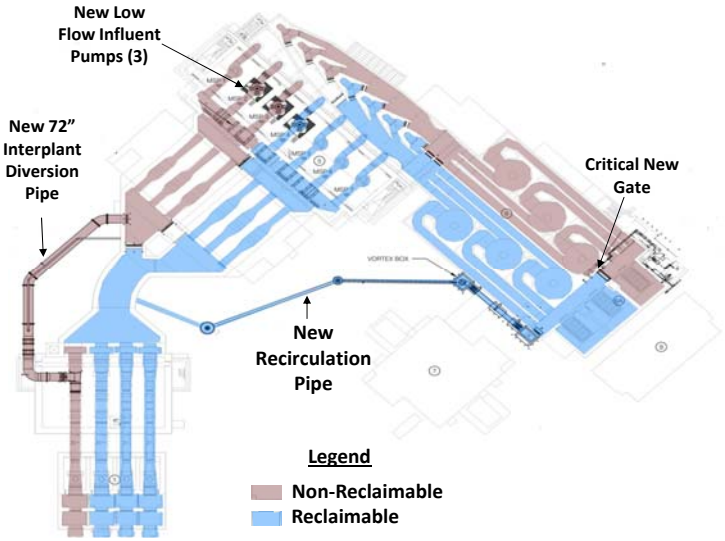
- New Flow Equalization Tanks at Plant No. 2
- New Effluent Pump Station at Plant No. 2
- 66-inch Pipeline Rehabilitation
- Advanced Water Treatment Facility Expansion to 130 mgd



Page 61

61

Plant No. 2 Water Segregation

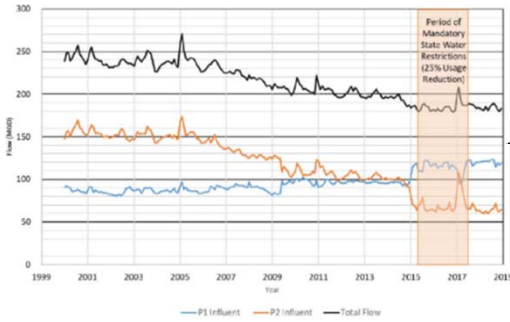


Page 62

62

Available Flow for GWRS Final Expansion

GWRS Final Expansion Production Goal:
134,000 acre-foot/year, or 11,167 acre-foot/month (AF/month)



OC San Total Influent	185 mgd
(Non-reclaimable flows)	-34 mgd
+ Microfiltration Backwash	+21 mgd
Total influent to GWRS	172 mgd
Total Product water	128 mgd
Total Water Produced in Month	11,855 AF

Page 63

63

Beyond GWRS

- GWRS will reach capacity to accept, transport, and inject additional treated effluent after final expansion.
- Technology and economic limits to further recovery of brine.
- Potable reuse of Santa Ana River Interceptor flow not permitted.

Page 64

64

Initiatives to Support Policy

Initiative: Support the completion of the final phase of the Groundwater Replenishment System and maximize water availability to the Orange County Water District.

Initiative: Support Green Acres project water production to provide reclaimed water for industrial and irrigation uses.

65

Questions

66

Chemical Sustainability

Presented by:

Lorenzo Tyner

Assistant General Manager

67

OC San has a need for Chemicals

OC San uses chemicals to speed up or inhibit natural processes to make facilities smaller or less energy intensive

- Coagulation of organic compounds
- Prevent formation of odorants
- Disinfection or biocide

OC San spends more than $18 million on chemicals

68

68

Coagulant Chemicals

Coagulant chemicals are designed to bind organic compounds together to form clumps or flocculant.

- In water treatment: Anionic Polymer and Ferric Chloride
- In solids treatment: Cationic Polymer

These chemicals are specialty chemicals for the water/wastewater industry and are most subject to pricing and availability volatility.

69

69

Polymers

- Polymers are necessary for proper operations of Centrifuges, Belt Presses and Dissolved Air Floatation Thickeners.
- Many proprietary choices in the market. Decisions are based on best cost performance in trials and $/pound bidding.
- Alternatives – Only effective at very high dosages, more expensive

70

70

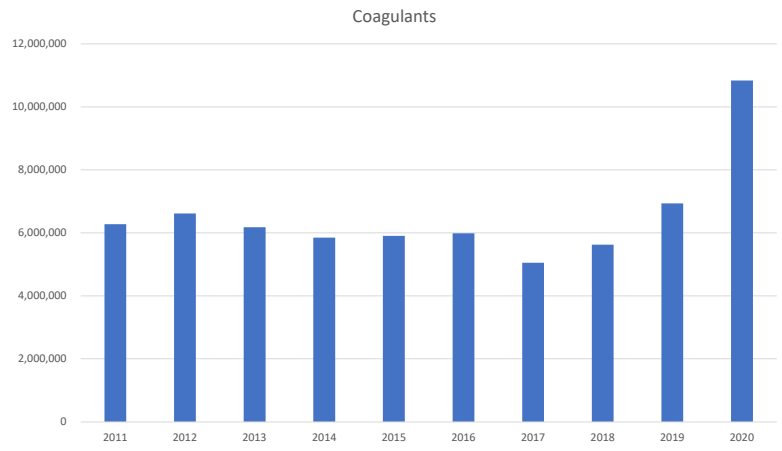
Ferric Chloride

- Ferric is a specialty chemical with a limited number of suppliers
- Vendors require a significant supply chain/infrastructure to make/purchase and transport the product.
- This is also why the OC San does not make the product in-house.

71

71

OC San has held Coagulants costs steady



72

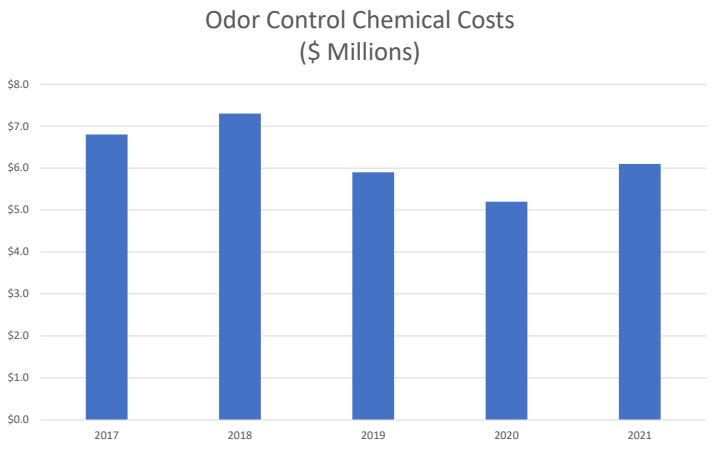
72

Regional Odor Control

73

73

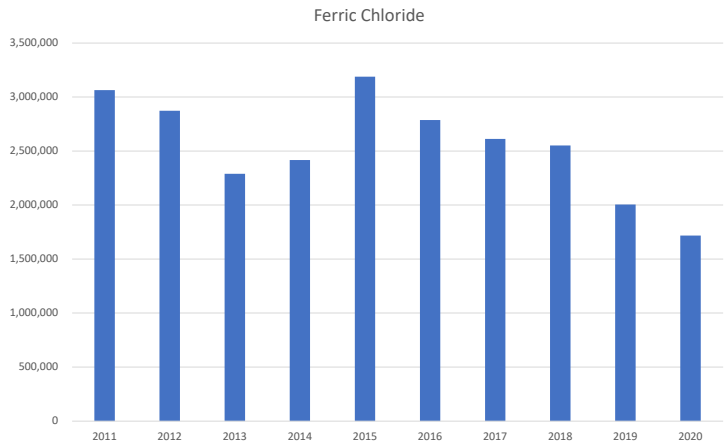
Odor Control Chemical Costs have been going down



74

74

OC San has worked to reduce Ferric Chloride Costs



75

75

Disinfection

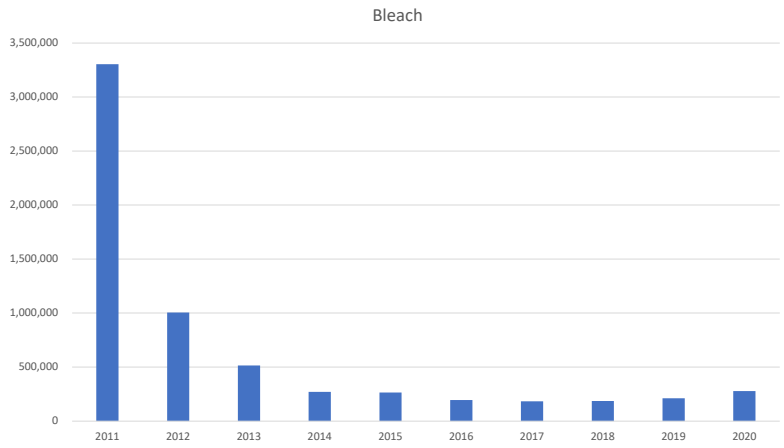
- Bleach – Less than 10% of historical usage because we no longer disinfect ocean discharge
- Water disinfection: Ozone and UV light can be utilized for disinfection process.

  However, require expensive capital expenditures, more energy and are subject to re-growth of bacteria.

76

76

Process changes have allowed for the reduction in disinfection costs, primarily Bleach.



77

77

Policy Statement

OC San has a need to use chemicals in its treatment process to improve plant performance, reduce odor and corrosion potential, and meet its regulatory requirements.

These commodity chemicals are provided by outside vendors through the purchasing process.

OC San will identify chemicals key to its operation, investigate the market risks for those chemicals and devise strategies to mitigate identified risks to availability and pricing.

78

78

Initiatives

- OC San has adopted a policy to support multiple vendors to maintain competition in the market.

  This is the basis for recommending multiple contracts to supply the same chemical.

  Short-term vs. Long-term Costs

  This strategy may be more costly in the short-term but provides long-term savings and source reliability.

- **Initiative**: Reduce reliance on particular chemicals and Individual vendors and establish flexibility to utilize other chemicals/processes to accomplish the same operational objectives.

79

79

Questions

80

80

Workshop #3 – April 21

Policy Topics:

1. Constituents of Emerging Concern
2. Biosolids Management
3. Environmental Water Quality, Stormwater Management and Urban Runoff
4. Food Waste Treatment

81

81

Questions

John Withers
Board Vice Chairman
(949) 861-1250
jwithers@calstrat.com

Rob Thompson
Assistant General Manager
714.593.7310
rthompson@ocsd.com

82

82