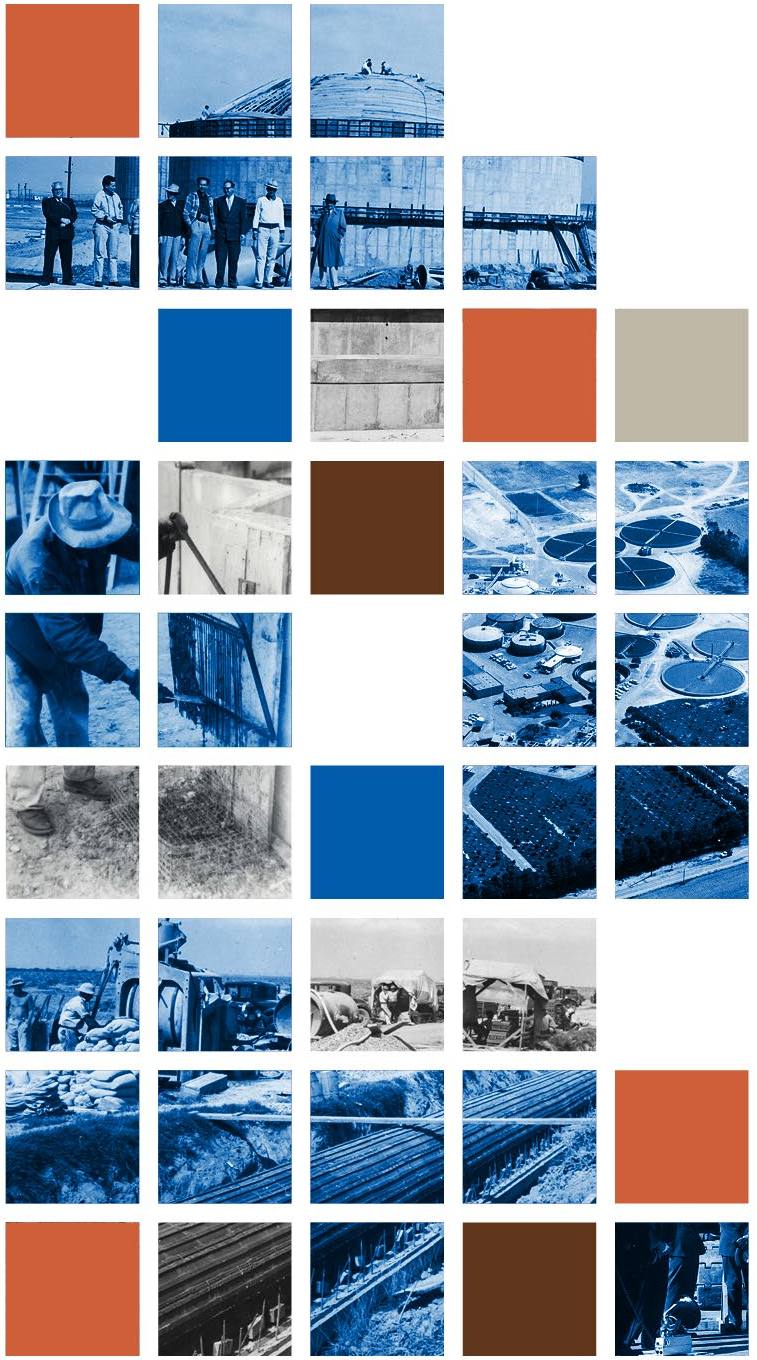


Temperature Phased Anaerobic Digestion (TPAD) Digester Facility at Plant No. 2

Project No. P2-128

Kathy Millea, Director of Engineering
Operations Committee
July 1, 2020

Many Years of Planning



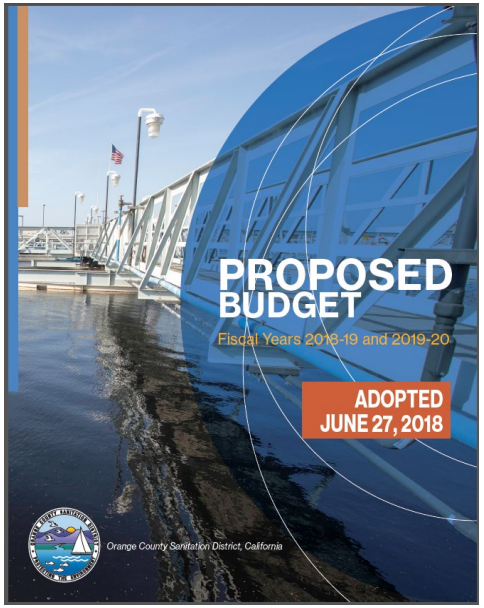
2015 — 2017 — 2018 — 2019



Seismic Evaluation, Condition Assessment, Asset Management

Biosolids Management Plan



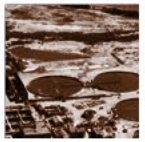


CIP Budget

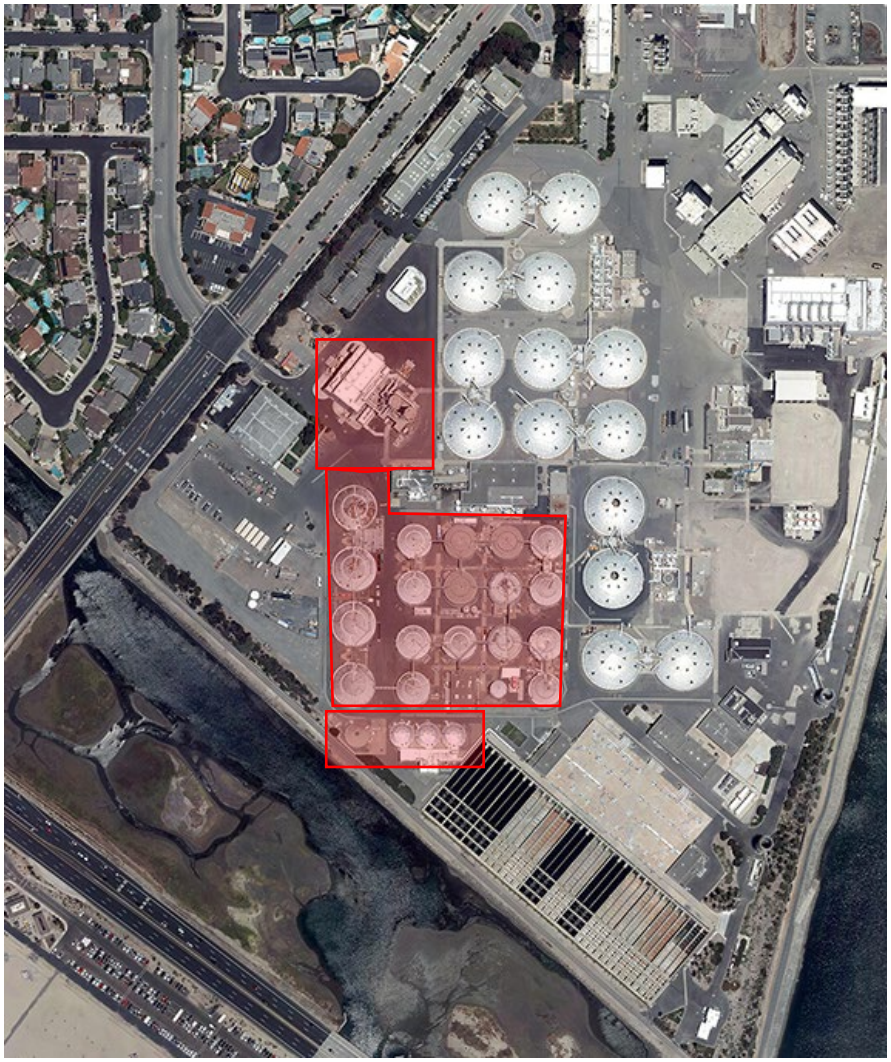
Start Project



What Makes Up Solids Treatment?



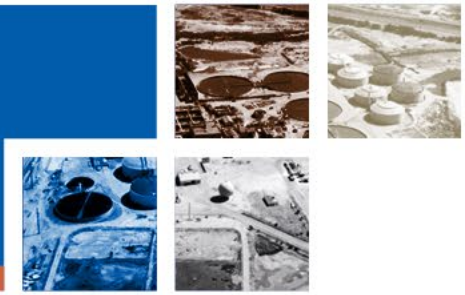


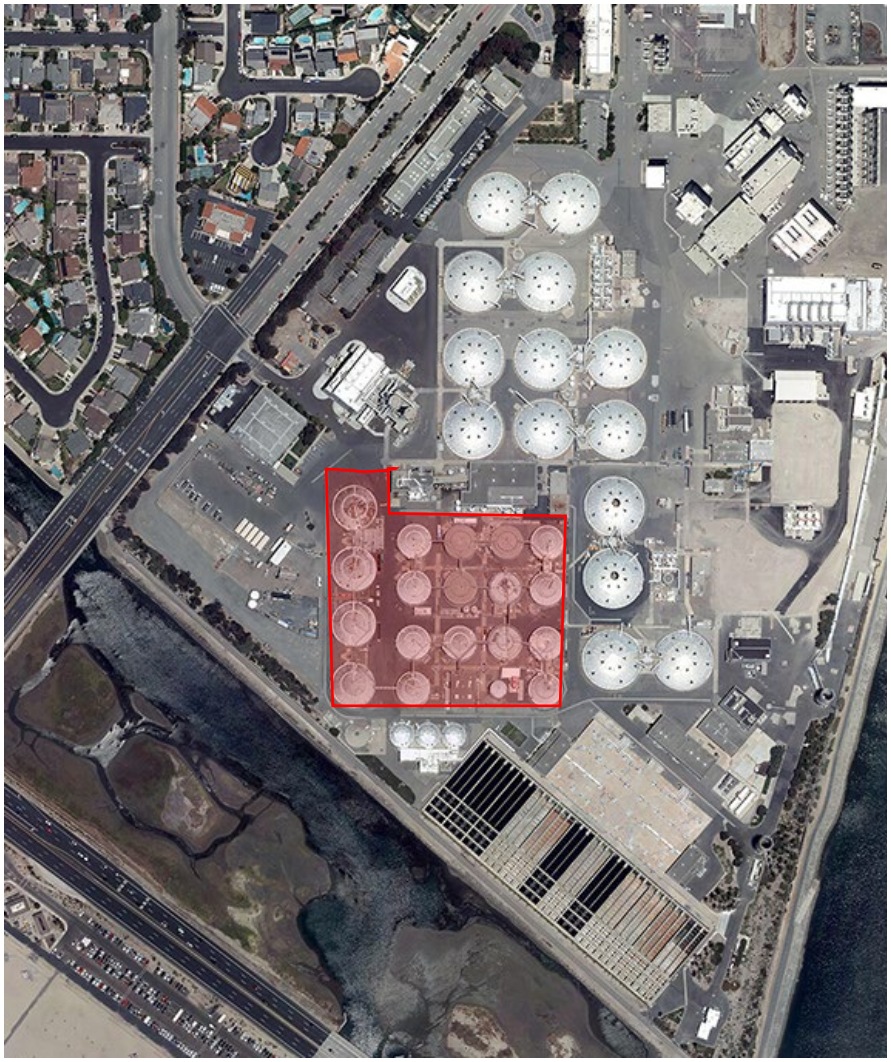



- Digesters
- Dewatering ✔
- Solids Storage ✔
- Truck Loading ✔
- Dissolved Air Flotation Thickeners (DAFTs) ✔



Status of Digesters

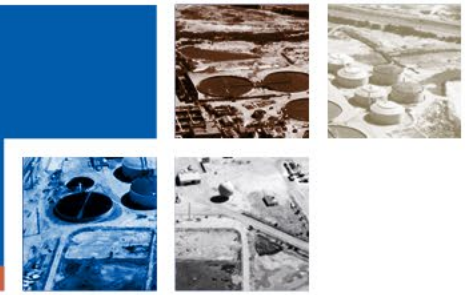




- 18 Digesters
- 40-60 years old
- Generally poor condition
- Seismic deficiencies can not be cost effectively addressed



Anaerobic Digestion is the Core of Solids Treatment



Raw Sewage



Raw Sludge



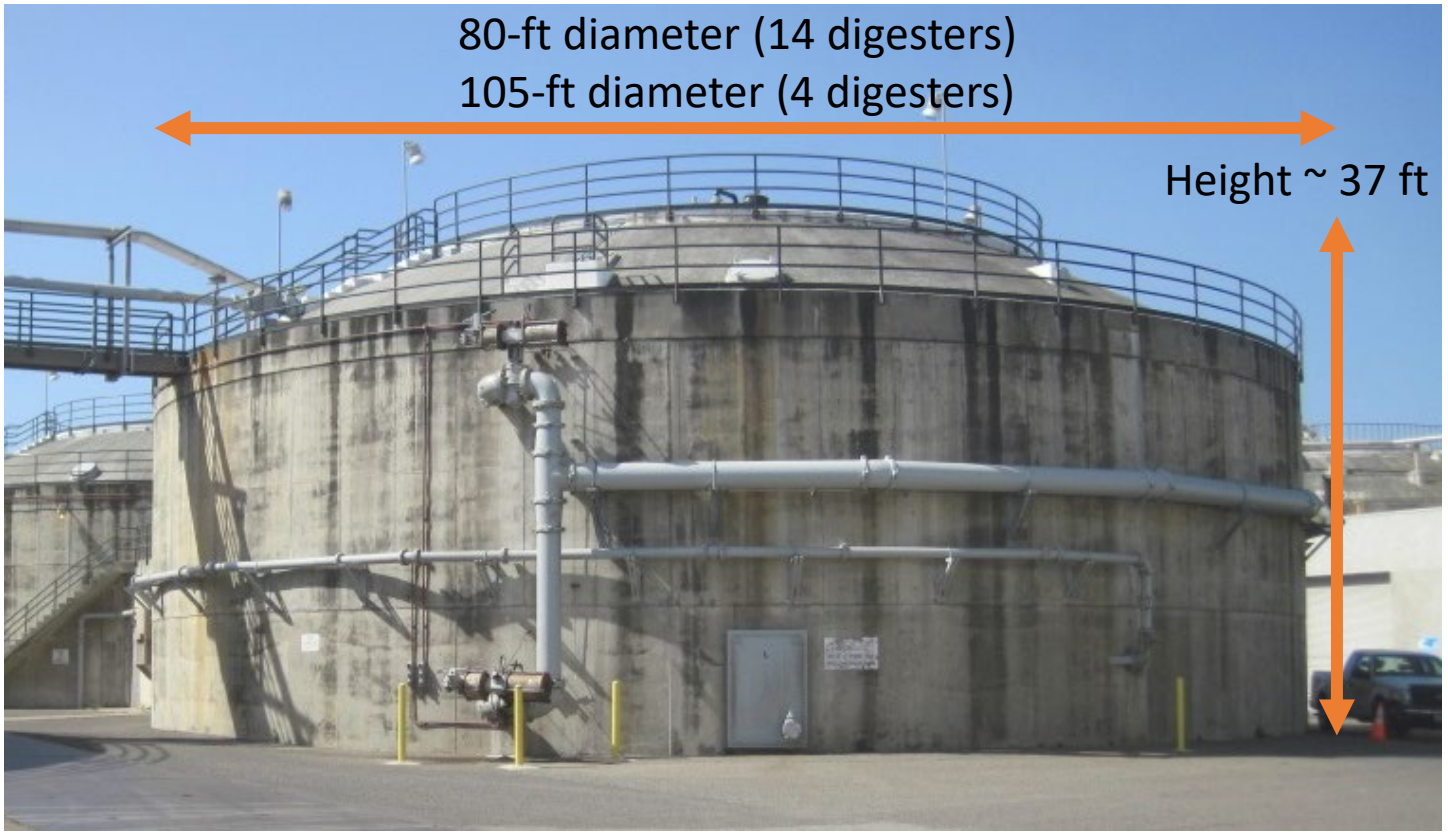
Digesters



Digested Sludge (=Biosolids)

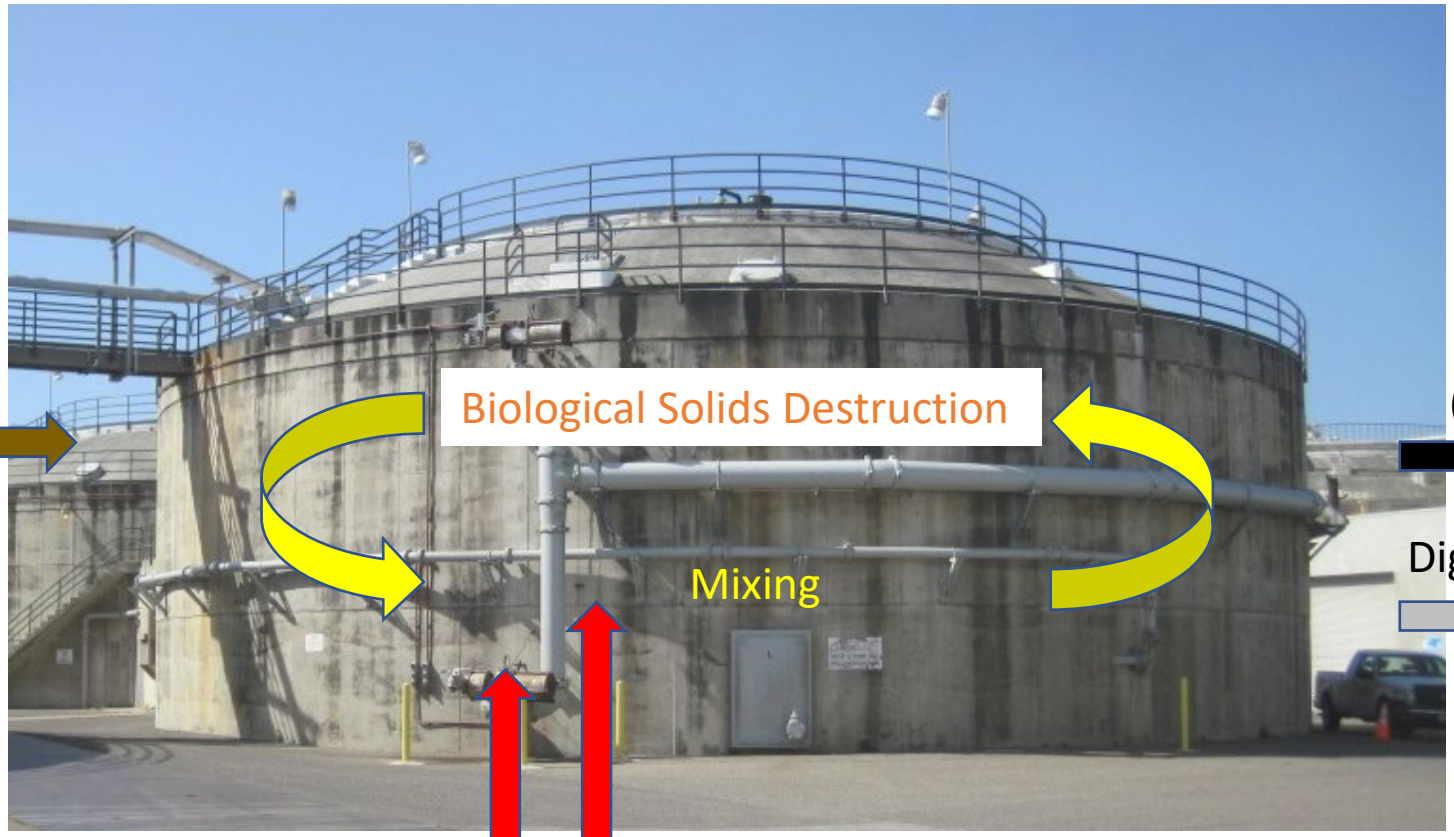


Anaerobic Digestion



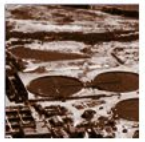
Anaerobic Digestion



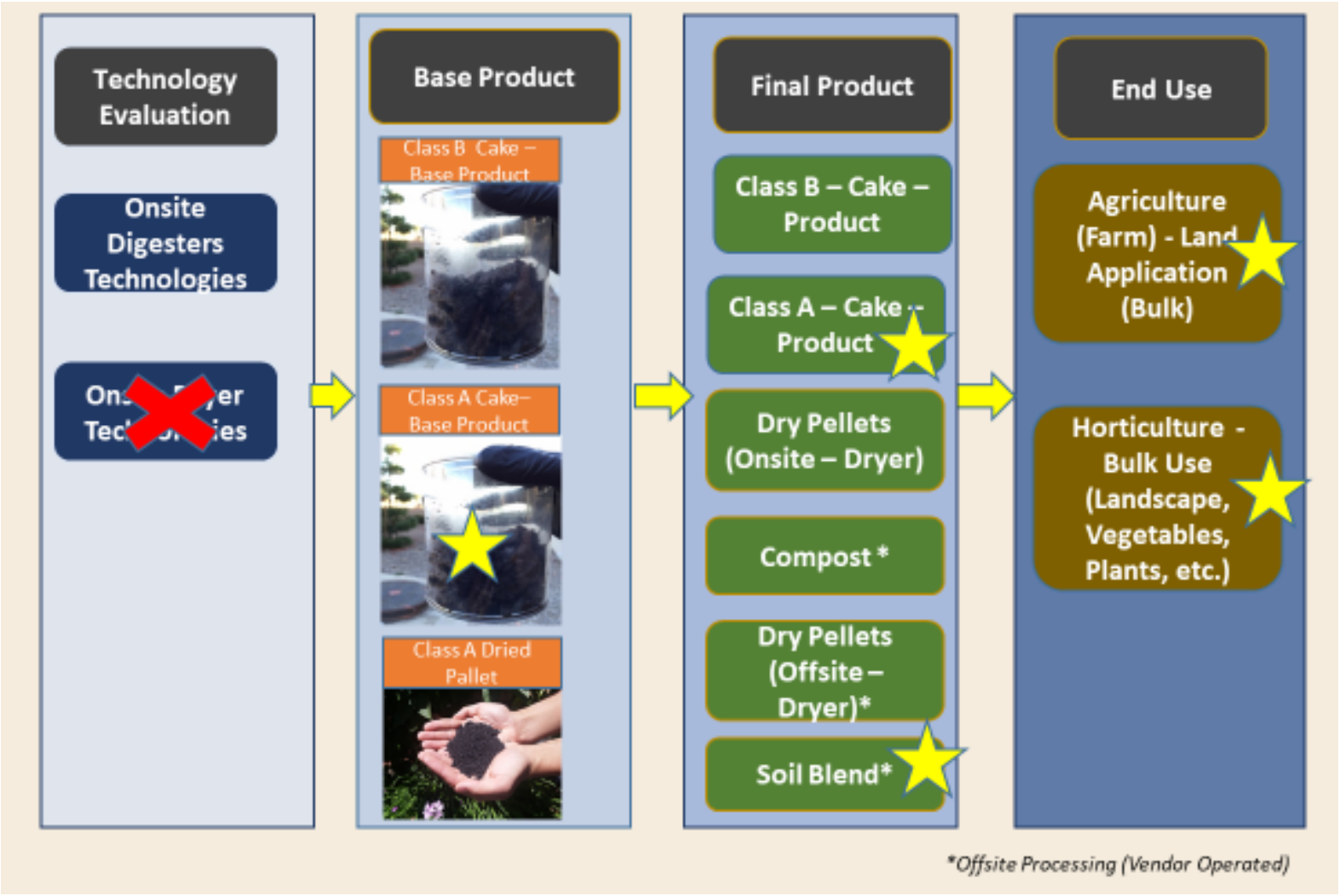




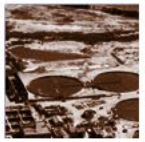
Market + Technology Alternative Combinations Evaluated





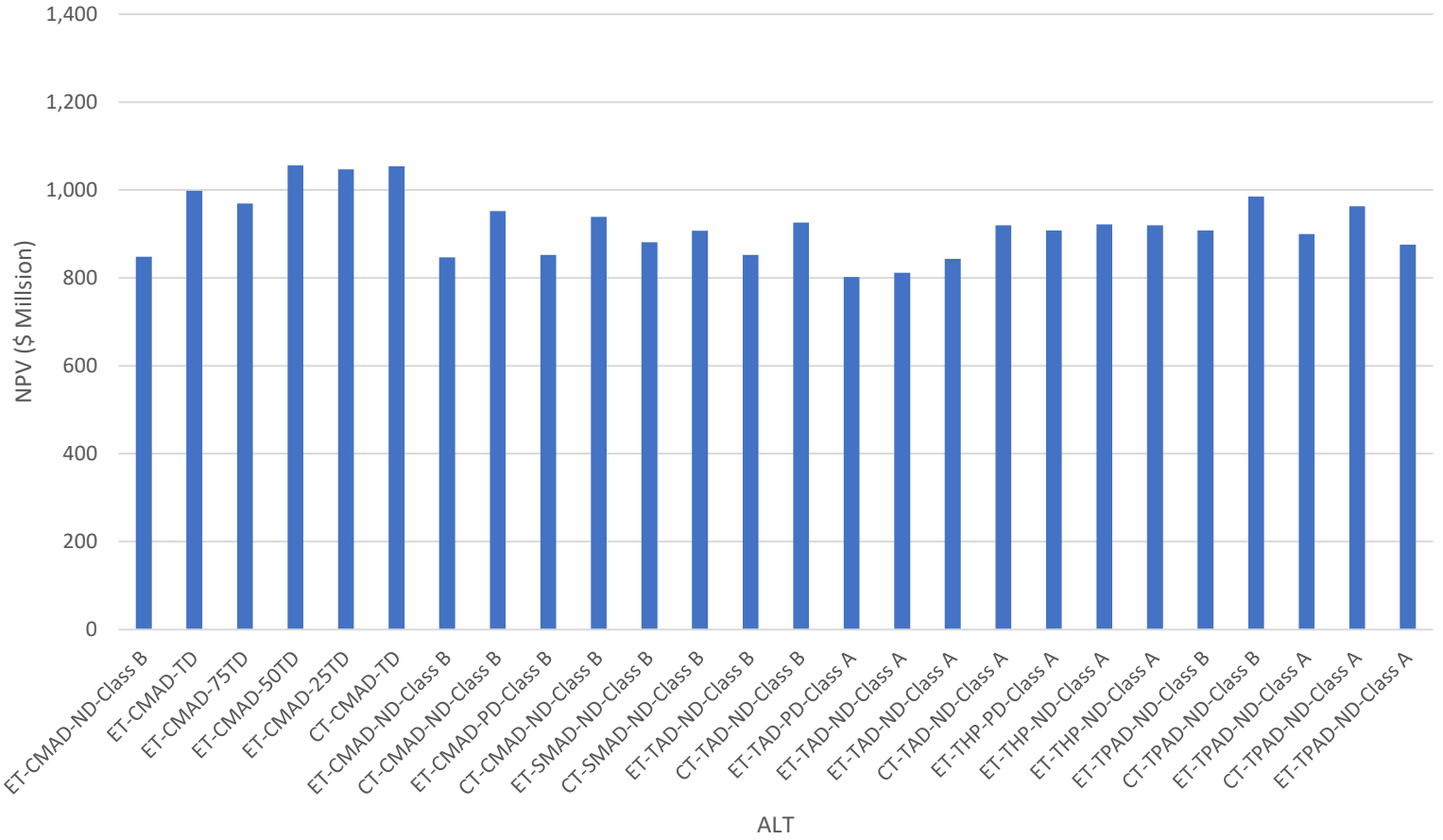



Market + Technology Alternative Combinations Evaluated



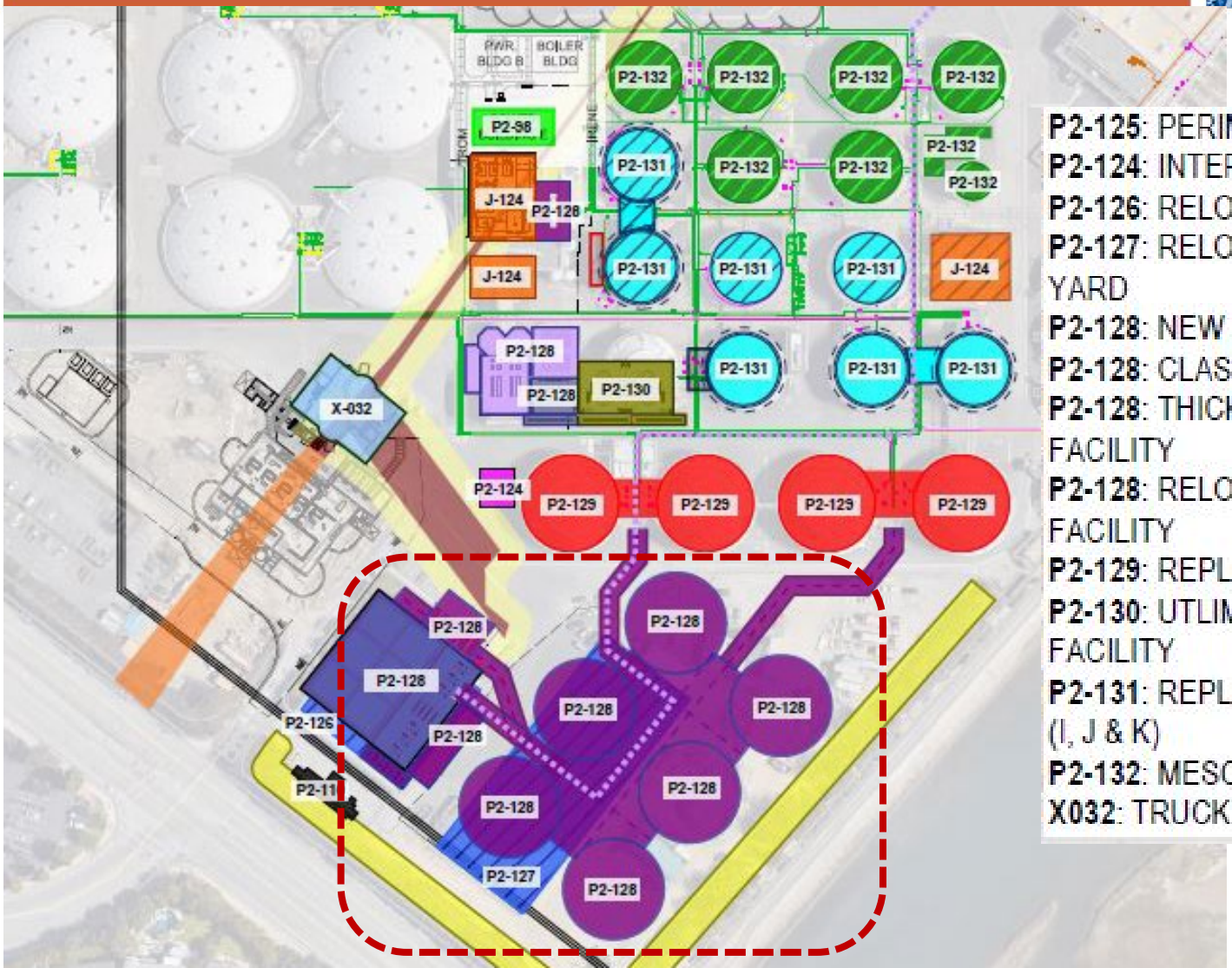



26 combinations of processing and products with end use



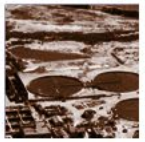
Class A Digester Complex 20-yr CIP Plan



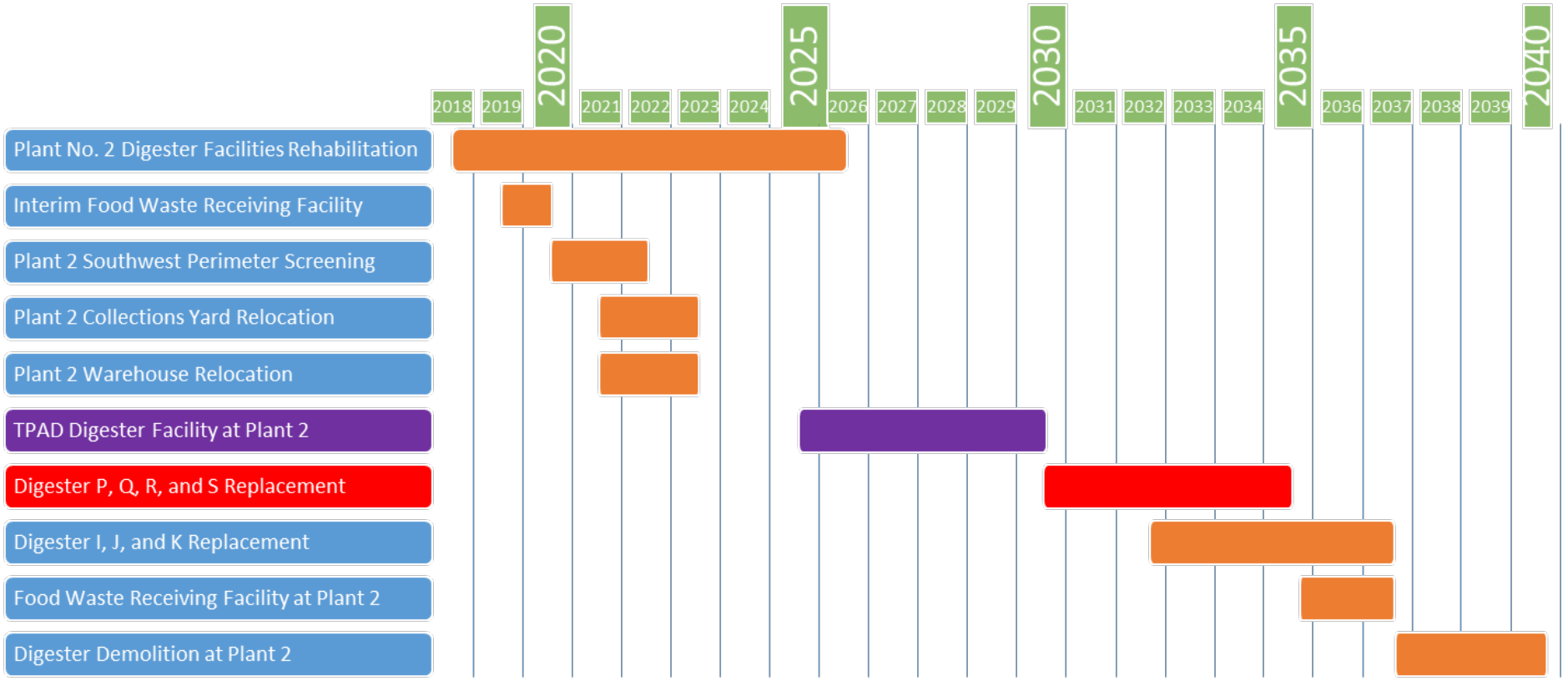


P2-125: PERIMETER SCREENING
P2-124: INTERIM FOOD WASTE FACILITY
P2-126: RELOCATION OF WAREHOUSE
P2-127: RELOCATION OF COLLECTIONS YARD
P2-128: NEW TPAD DIGESTERS
P2-128: CLASS A BATCH TANKS
P2-128: THICKENED SLUDGE FEED FACILITY
P2-128: RELOCATE FERRIC CHLORIDE FACILITY
P2-129: REPLACE DIGESTERS P, Q, R, S
P2-130: UTLIMATE FOOD WASTE FACILITY
P2-131: REPLACE DIGESTER HOLDERS (I, J & K)
P2-132: MESO DIGESTER DEMOLITION
X032: TRUCK LOADING REHABILITATION

2017 Biosolids Master Plan





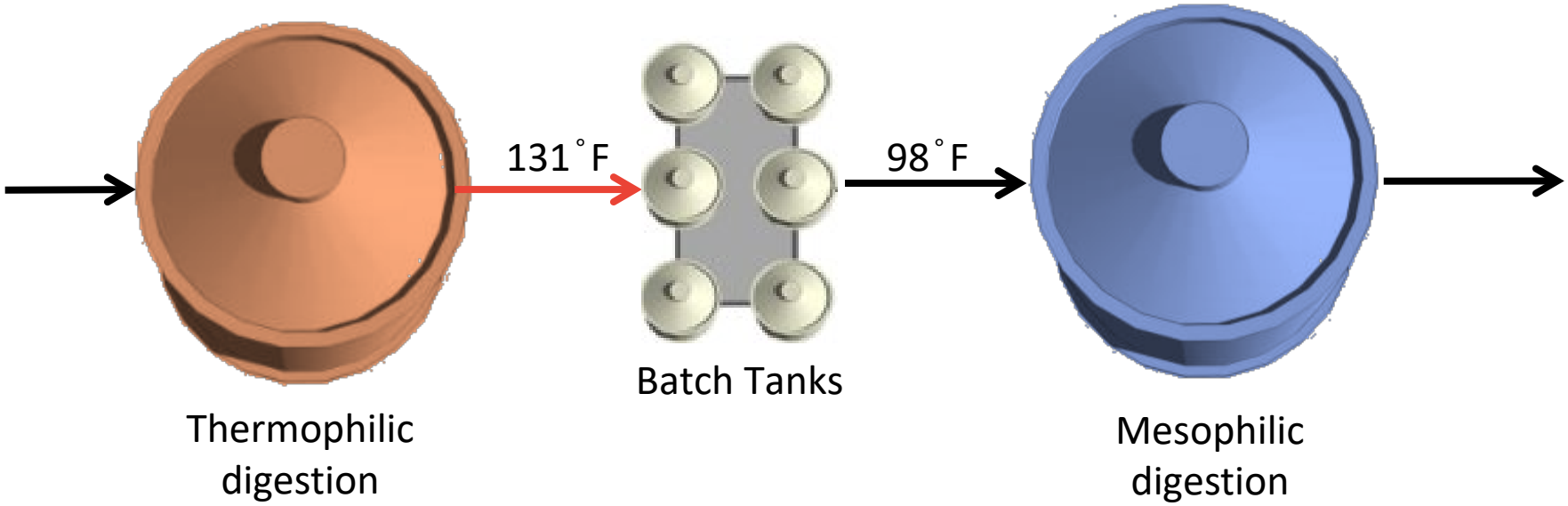



Graphic from: Biosolids Master Plan, Project SP15-01 Information Update to Operations Committee, April 5, 2017

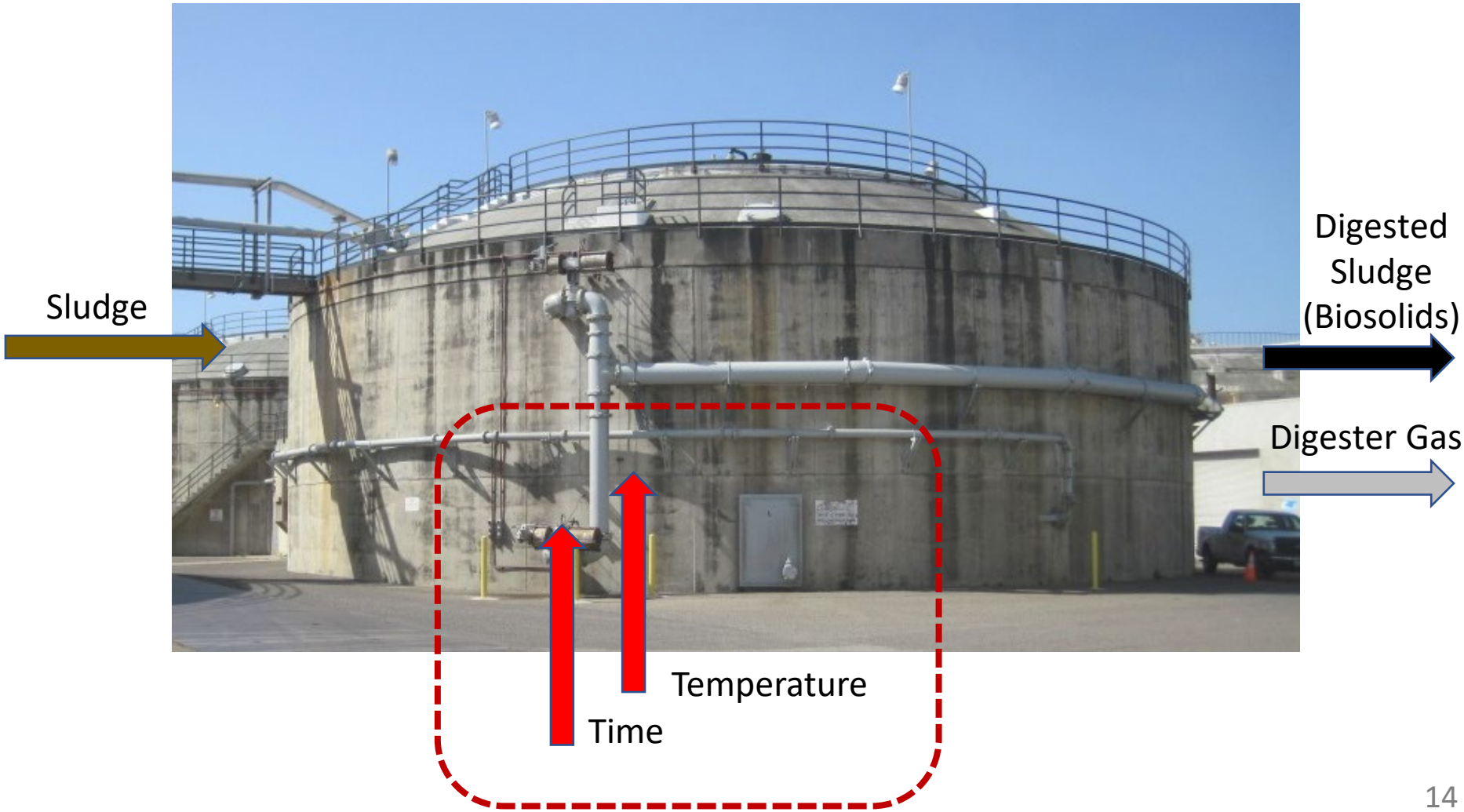
Temperature Phased Anaerobic Digestion (TPAD)



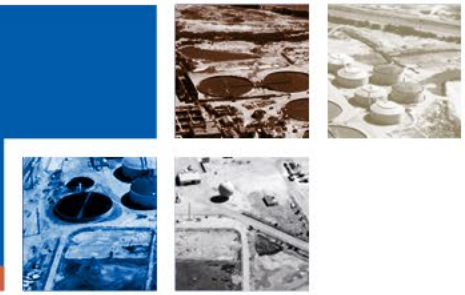
- High pathogen kill / Class A capable
- Increased solids destruction and gas production
- Increased process complexity



Class A vs Class B



Class A vs Class B

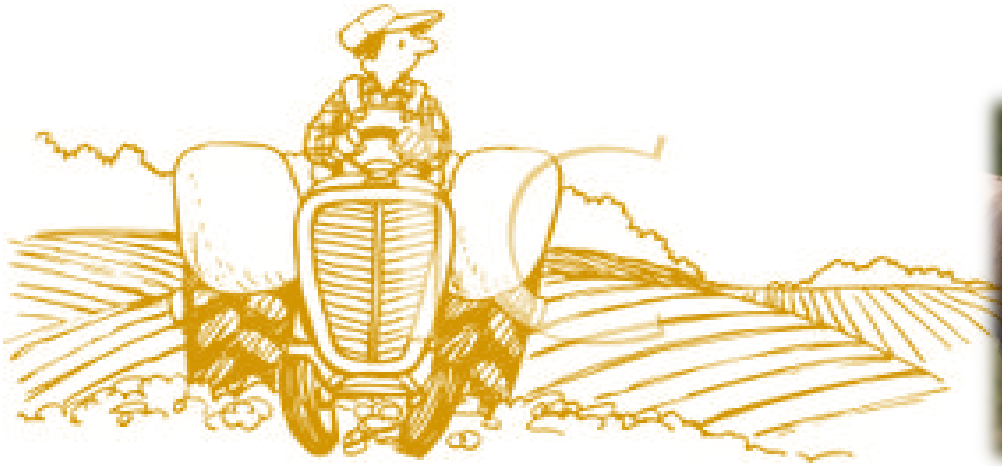


Class B Biosolids (Existing)

- Mesophilic Digestion (98 deg)
- 15 days
- Key Reuse Options
  - Non-Food Crop Application (Arizona, not California)
  - Feed to compost

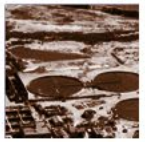
Class A Biosolids (Proposed)

- Thermophilic Digestion (131 deg)
- 24-hour hold time in batch tanks
- Key Reuse Options
  - Food Crop Application (California, Arizona)
  - Landscaping amendments
  - Feed to compost





Food Crops are New Market for OCSD





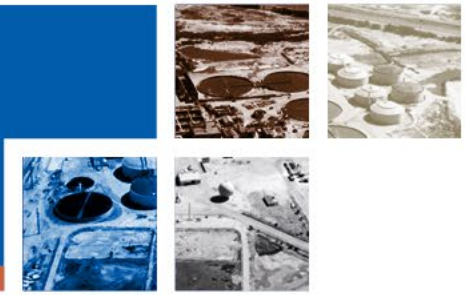




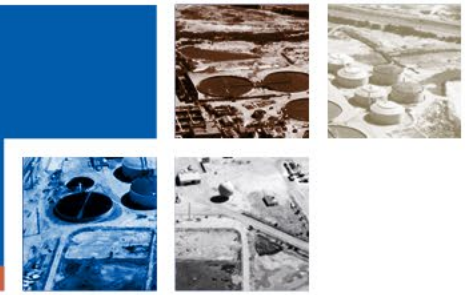




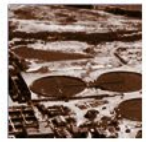
Class A TPAD Digester Complex



Class A TPAD Digester Complex



Class A TPAD Digester Complex

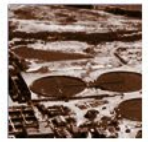








Class A TPAD Digester Complex

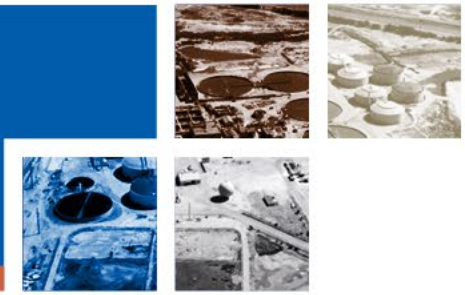







1. Perimeter Screening
2. Digester Feed Facility
3. DFF Odor Control
4. Thermophilic Digesters
5. Boiler Facility
6. Emergency Overflow System
7. Class A Batch Tanks
8. Sludge Cooling
9. Power Building

Selection Process



- **Jan 2017 –**

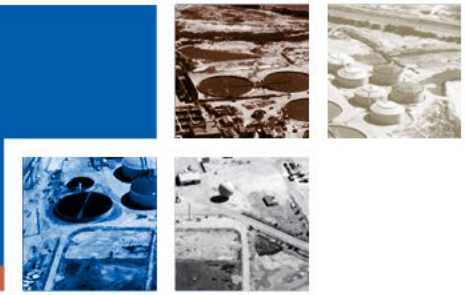
Start of Consultant outreach effort

- **Jan 2020 –** Advertisement

Design Services Request For Proposal Activity - January 24, 2017

Project Name	Mail PSA RFP	Project Manager	Scope	Construction Estimate
P2-123 Return Activated Sludge Piping Replacement at Plant 2	Mar-2017	Rich Leon	This project will replace return activated sludge piping at the Plant 2 Oxygen Activated Sludge Plant from the Secondary Clarifiers to the RAS Pumps.	$5,000,000
P2-122 Headworks Modifications at Plant 2 for GWRS Final Expansion	Jan-2017	Shahrzad Namini	Modify Plant 2 as needed to provide separate treatment for flow streams that are not currently suitable as source water for GWRS.	$25,300,000
J-124 Digester Gas Facilities Rehabilitation	Mar-2017	Victoria Pilko	The project will modify, rehabilitate, and repair digester gas handling facilities at both Plant 1 and Plant 2. Facilities affected include low pressure gas vents on all digesters, new gas compressors and dryers, and a low pressure gas flare system to replace the existing high pressure system with a low pressure system. Sections of the gas piping need modification to manage condensation and corrosion. The work may include replacement of the existing gas compressor buildings at both plants, but at Plant 1, a temporary gas compressor facility may be needed to allow reuse of the existing gas compressor building.	$53,400,000
5-67 Bay Bridge Pump Station and Forcemain Replacement	May-2017	Adam Nazaroff	This project will replace and potentially relocate the existing Bay Bridge Pump Station. The Bay Bridge force mains from the pump station to the west side of Upper Newport Bay will also be replaced and the size increased.	$26,500,000
7-65 Gisler - Red Hill Interceptor Rehabilitation	Jan-2018	Wendy Smith	This project will rehabilitate the Gisler Redhill Interceptor from a diversion manhole near the Main Street Pump Station to the College Avenue Pump Station. The project is expected to line or repair 38 manholes and approximately 15,000 feet of VCP sewer in Costa Mesa.	$9,600,000
1-101 Raitt and Bristol Street Sewer Extension	Jan-2018	Wendy Smith	This project will replace 2,360 linear feet of 21-inch City of Santa Ana sewer with a 24-inch Sanitation District's sewer line and a parallel 8-inch City of Santa Ana sewer line to allow for redirecting all house lateral connections. The sewer line is located along Myrtle Street, between Raitt and Bristol Streets in the City of Santa Ana. The project also includes rehabilitating 910 feet of 18-inch VCP, 7,075 feet of 21-inch VCP, and 2,570 feet of 24-inch VCP pipe and associated manholes in Bristol Street and Raitt Street.	$7,800,000
P2-128 Digester Process Upgrades at Plant 2	Aug-2017	Jeff Mohr	This project is the largest of a set of related projects to replace the mesophilic anaerobic digesters at Plant 2 with new digesters in a temperature-phased anaerobic digester (TPAD) configuration. This project will include six new thermophilic digesters, batch tanks, cooling facilities, and associated sludge pumping, digester mixing, power distribution, and controls. Replacement and demolition of existing digesters will be included in a separate project.	$260,000,000
7-63 MacArthur Pump Station Rehabilitation	Jan-2018	Wendy Smith	This project will rehabilitate the existing MacArthur Pump Station, force main and upstream gravity system pipeline and manholes (approximately 2,000 linear feet of 8-inch pipe and eight manholes). The existing station is located in the vicinity of John Wayne Airport in the City of Newport Beach. The work includes bringing the pump station into compliance with the latest applicable electrical and safety codes and replacing maintenance-intensive pumps. 700 feet of the nearby Von Karman Trunk Sewer (located in Campus Drive north of the pump station) will also be upsized as part of this project. The sewer, which is a 12-inch vitrified clay pipe (VCP), will be upsized to 15-inch in diameter.	$4,700,000
2-73 Yorba Linda Pump Station Abandonment	Feb-2018	Wendy Smith	This project will abandon the Yorba Linda Pump Station and downstream force main. Gravity sewers located in Yorba Linda Boulevard will also be reconfigured to improve access to the facilities for maintenance. Flows which are currently being pumped by the Yorba Linda Pump Station east will be conveyed by gravity through the newly upsized Newhope-Placentia Trunk located in State College Boulevard to the west.	$3,800,000

Selection Process



- **February 2020 –**

  Preproposal Survey

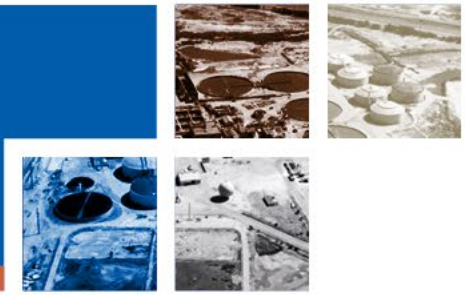
  - Two major firms teamed
  - One team dropped last minute
  - Other firms had insufficient resources

- **March 2020 –**

  One Proposal Received



Brown and Caldwell's Proposal

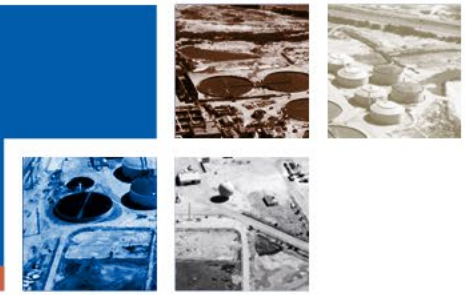


- Exceptionally strong team
- Very clear understanding
- Effective plan to execute the project
- Directly related experience
- Team includes 13 Subconsultants (49% of Fee)



BLACK & VEATCH
ALTA ENVIRONMENTAL AN NV5 COMPANY
BGB | DESIGN GROUP Landscape Architecture Planning Urban Design
CORROSION PROBE, INC. THE COMPLETE ENGINEERING APPROACH – FROM DETECTION TO CORRECTION
KDM MERIDIAN Surveying, Mapping, and Land Services
moffatt & nichol
SHANNON & WILSON GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
KLEINFELDER Bright People. Right Solutions.
JENSEN HUGHES Advancing the Science of Safety
ESA
T2 utility engineers

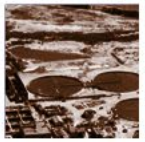
Negotiations



	Original Proposal	Negotiated
Total Hours	**191,567**	**185,663**
Total Fee	**$39,810,783**	**$39,300,000**

- Over 20 meetings held with Consultant with over 50 hours to conclude negotiations
- Clarified project elements and design assumptions
- Ensured scope and level of effort are appropriate
- Adjusted some tasks to improve design and reduce construction risks

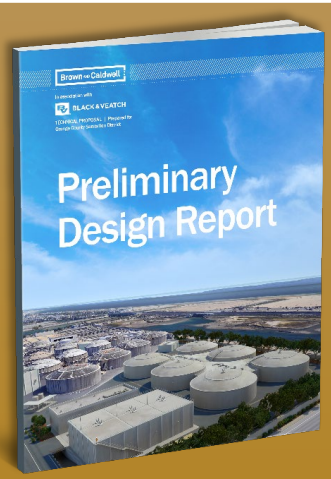
Project Schedule






Board Award

Jul 2020



Preliminary Design Complete

May 2022



Advertisement for Bids

Nov 2024



Construction Start

Jun 2025



Construction Completion

Nov 2030

$39.3M **$317M**

Recommendation



- Approve a Professional Design Services Agreement with Brown and Caldwell to provide engineering services for Temperature Phased Anaerobic Digestion (TPAD) Digester Facility at Plant No. 2, Project No. P2-128, for an amount not to exceed $39,300,000; and
- Approve a contingency of $3,930,000 (10%).