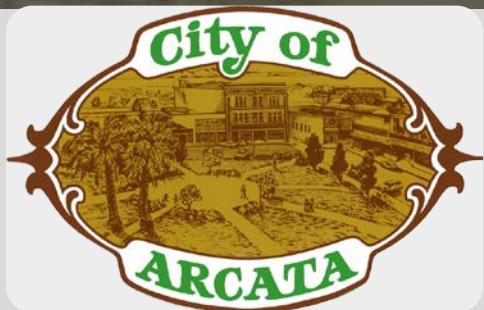




CALIFORNIA  
COASTAL  
COMMISSION



# Arcata Wastewater Treatment Facility Feasibility Study



# Arcata Wastewater Treatment Facility Feasibility Study Project Purpose, Goals, and Funding

## Purpose

- Investigate and evaluate strategies for protecting, relocating, or otherwise adapting the City's wastewater facilities to maintain safety and regulatory compliance considering long-term climate change effects from flooding and other coastal hazards

## Goals

- Inform the City on how to move forward on the levee resilience improvements
- Identify multiple top-ranking alternatives to support future decisions

## Funding

- City Feasibility Study funded through a State Water Regional Control Board (SWRCB) Clean Water State Revolving Fund (CWSRF) grant administered through Rural Community Assistance Corporation with cooperation from the Coastal Commission and Regional Water Quality Control Board
- ©2024. "Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation of use."

# Arcata Wastewater Treatment Facility Feasibility Study Scope

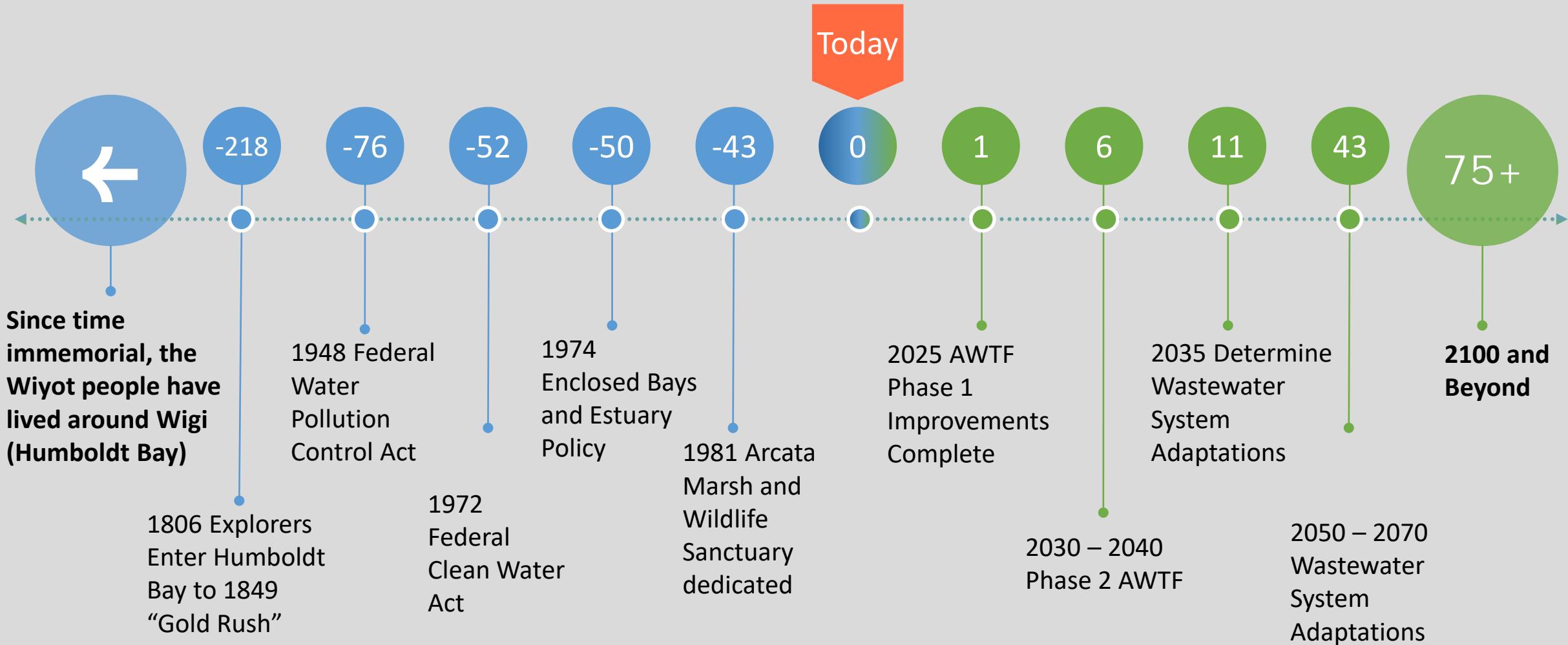
## Feasibility Study Report:

- Background Information Review
- Sea Level Rise Risk Vulnerability Assessment
- Adaptation Alternatives Development
- Alternatives Analysis
- Cost Analysis and Funding Plan
- Final Feasibility Study Findings

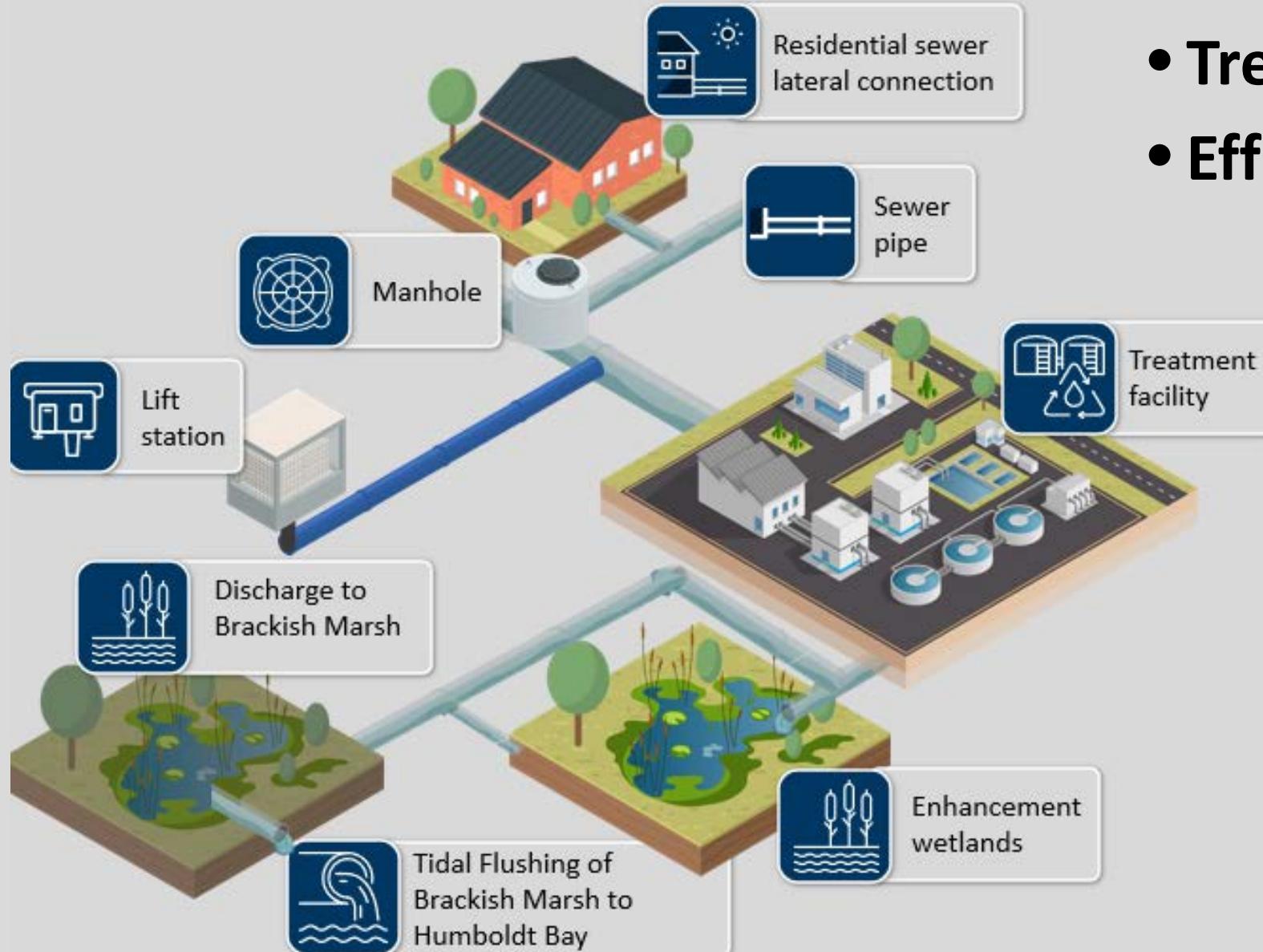
(Final Alternative Selection not included in the Feasibility Study)

# Timeline

## Humboldt Bay Region History & Wastewater Regulation and Treatment Timeline

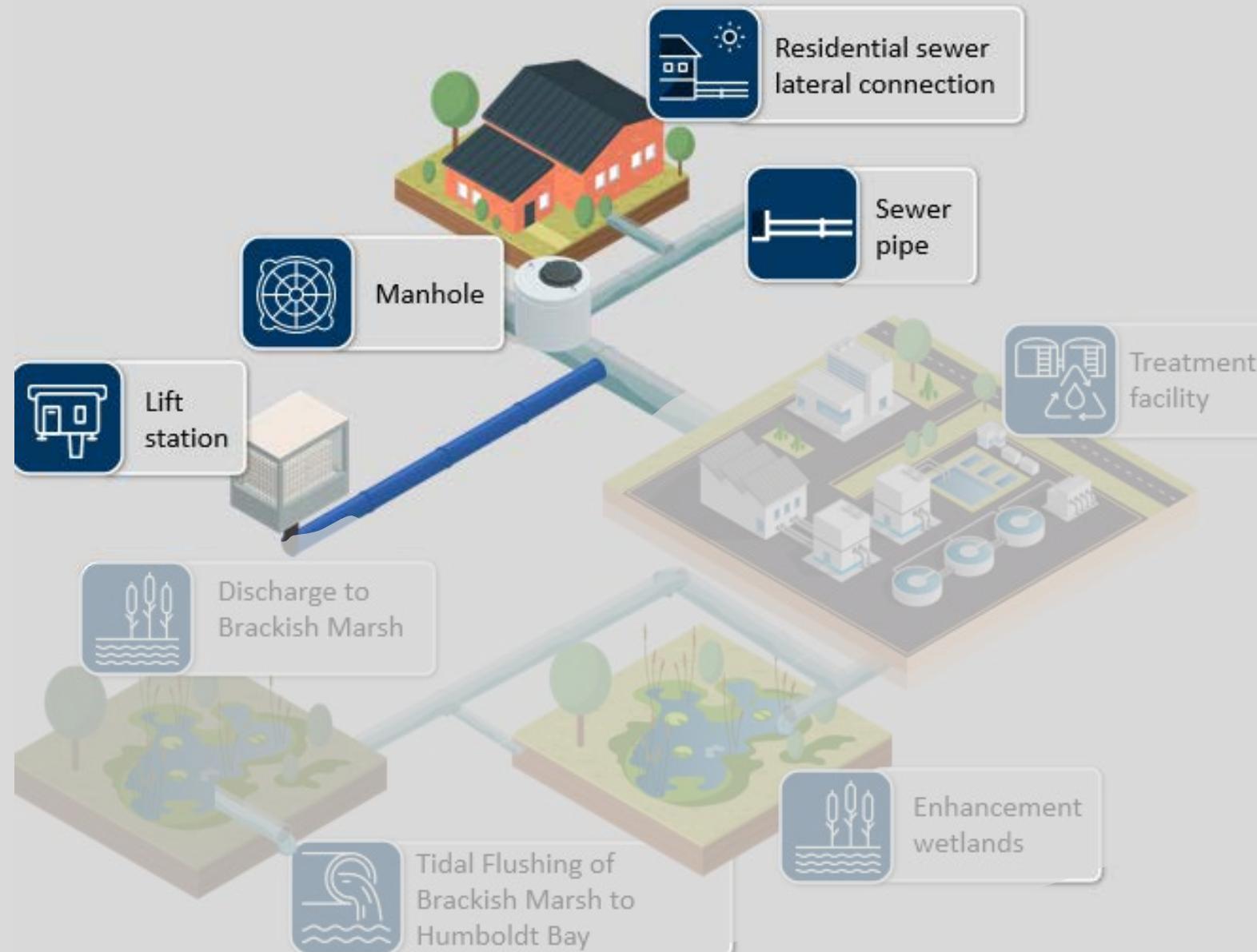


# Existing treatment system



- Collection System
- Treatment Facility
- Effluent Disposal System

# Collection System

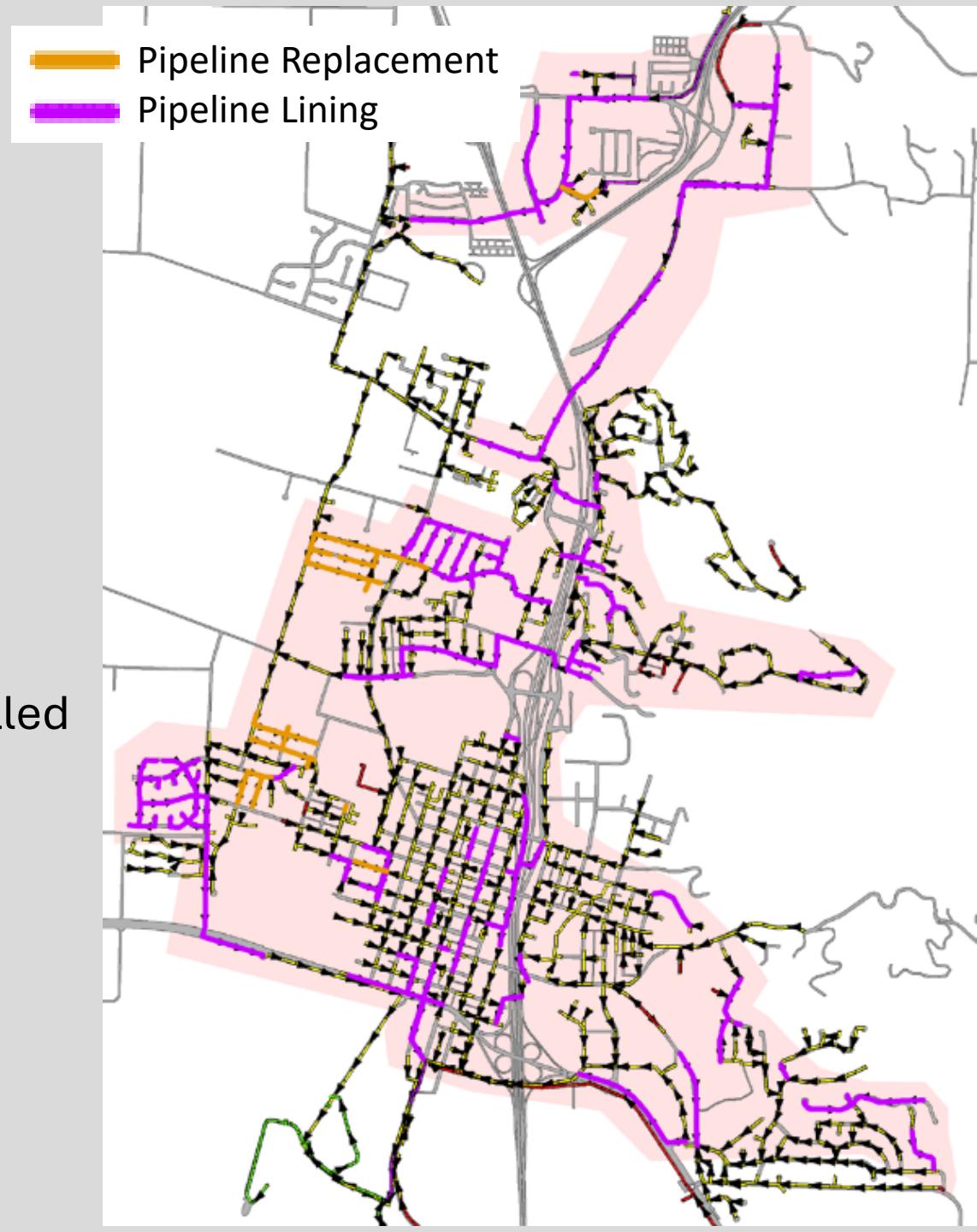


# Collection System Improvements

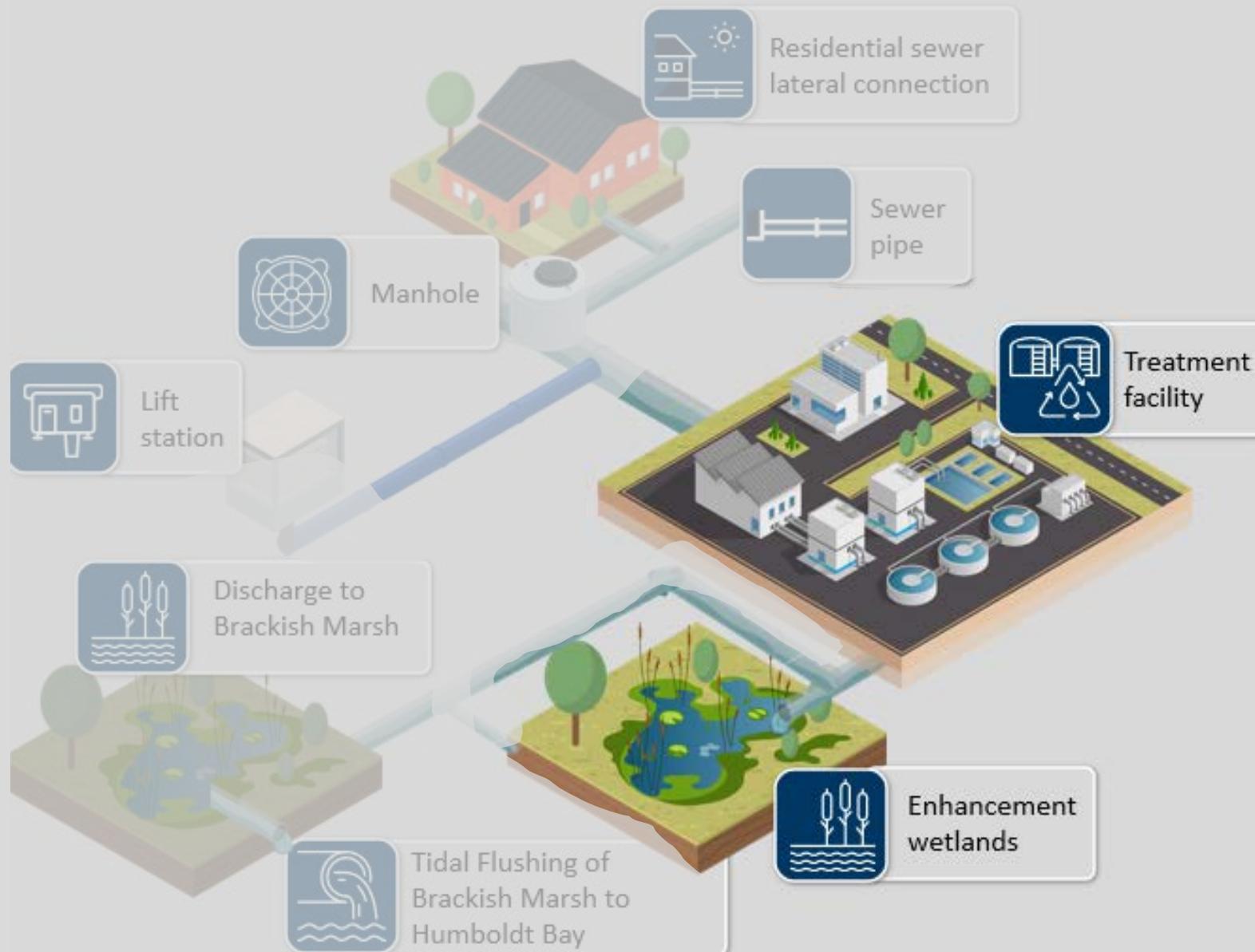
City is implementing projects to reduce Inflow and Infiltration into the collection system and reduce sewer flows going to the Treatment Plant

2018 Inflow and Infiltration Project major components included:

- 41,325 linear feet of cured in place pipelining installed
- 29 manholes replaced, newly installed, or rehabilitated
- 1,200 linear feet of sewer main replaced
- 7,500 linear feet of sewer lateral pipe replaced
- 500 lateral cleanouts installed
- 620 service lateral connections,



# Treatment Facility



# Wastewater Treatment Facility Planned Improvements

## Phase 1 Improvements (in Progress)

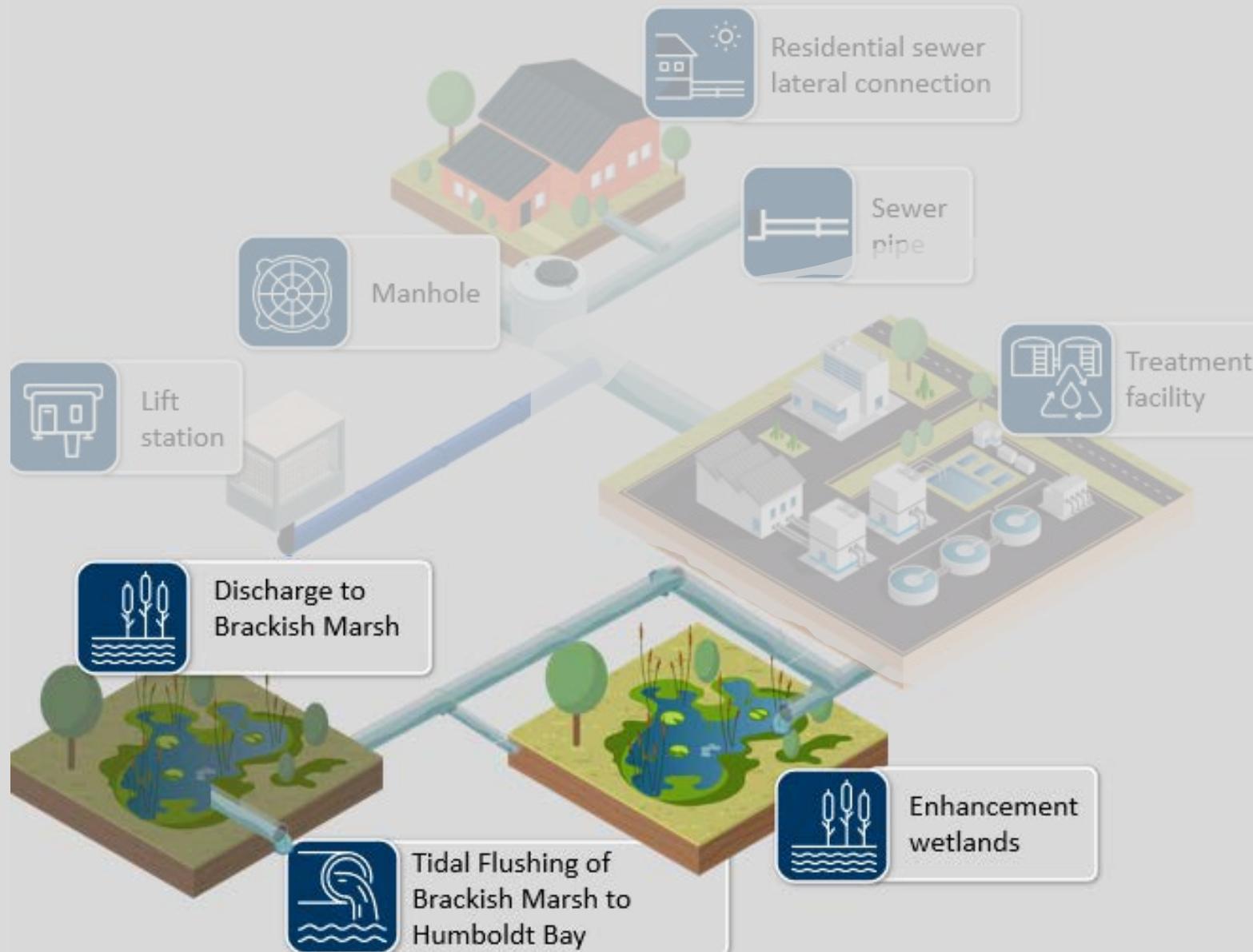
- Flow Reconfiguration
- Plant Rehabilitation
  - Headworks and Primary Clarifier Improvements
  - Pond and Treatment Wetland Improvements
  - UV Disinfection
  - Electrical Upgrades

## Phase 2 (to be completed in the near term)

- Treatment Process Upgrades to Improve the Quality of Effluent Discharge to the Bay



# Effluent Disposal System

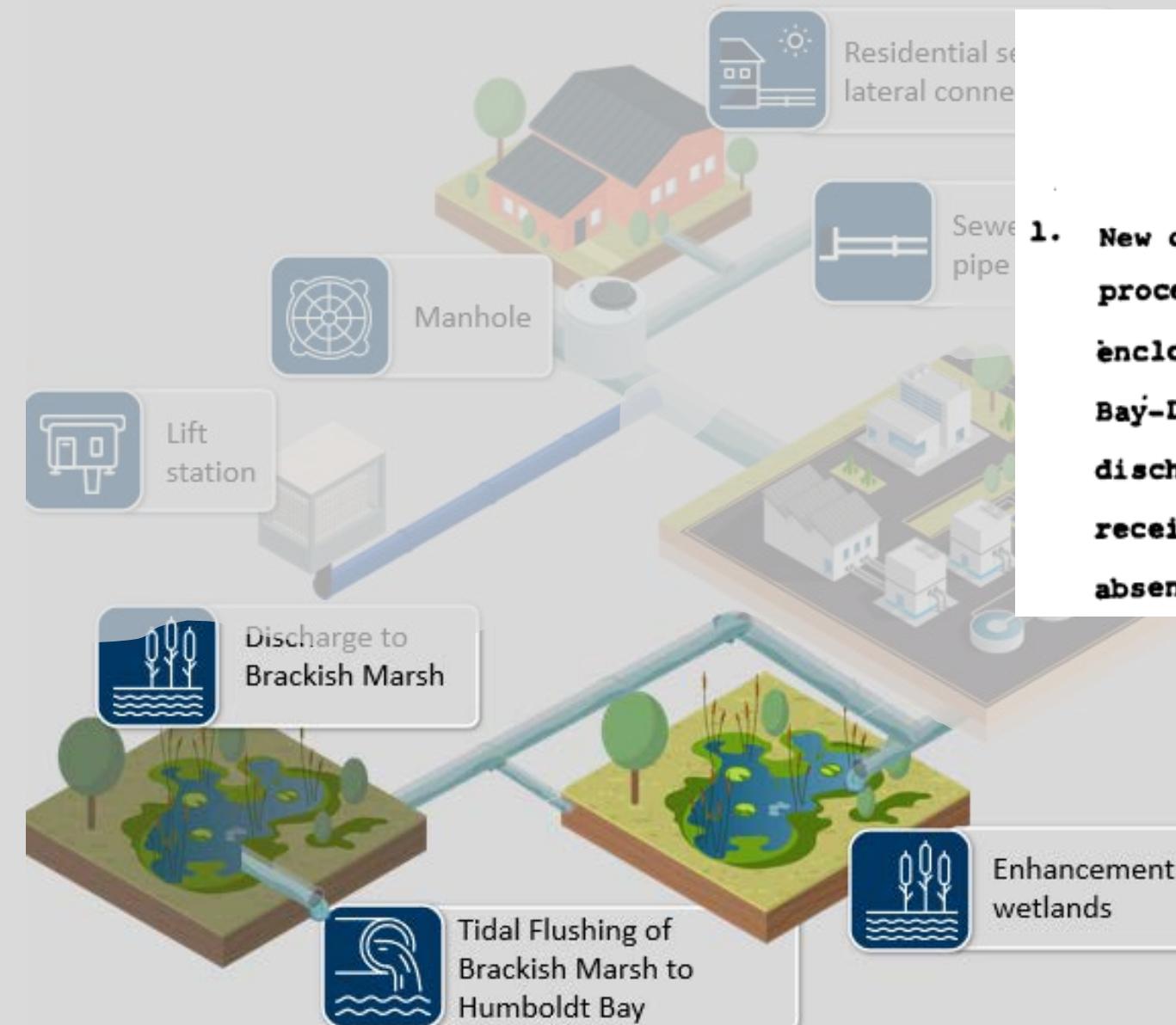


# Effluent Disposal System

1974 Water Quality Control Policy for the  
Enclosed Bays and Estuaries of California

## CHAPTER III DISCHARGE PROHIBITIONS

1. New discharges<sup>5/</sup> of municipal wastewaters and industrial process waters<sup>2/</sup> (exclusive of cooling water discharges) to enclosed bays and estuaries, other than the San Francisco Bay-Delta system, which are not consistently treated and discharged in a manner that would enhance the quality of receiving waters above that which would occur in the absence of the discharge, shall be prohibited.





# Wastewater Treatment System Sea Level Rise Risk Summary

- Arcata Sea Level Rise Vulnerability Assessment and Capital Improvement Project Adaptation Plan identified the following for the Wastewater Treatment System:
  - Asset vulnerability
  - Asset adaptive capacity
  - Consequences if asset is flooded
  - Likelihood that asset will be flooded
  - Risk of asset damage/ failure based on a combination of likelihood of flooding and consequences of flooding

# Summary of Risk Matrix

Risk Assessment includes consideration of the likelihood and consequence of a flooding event

Risk Matrix Evaluation						
Likelihood	Consequence					
	Insignificant	Minor	Moderate	Major	Severe	Catastrophic
	Almost Certain					
	Very Likely					
	Likely					
	Unlikely					
	Very Unlikely					
Almost Unprecedented	Very Low	Low				

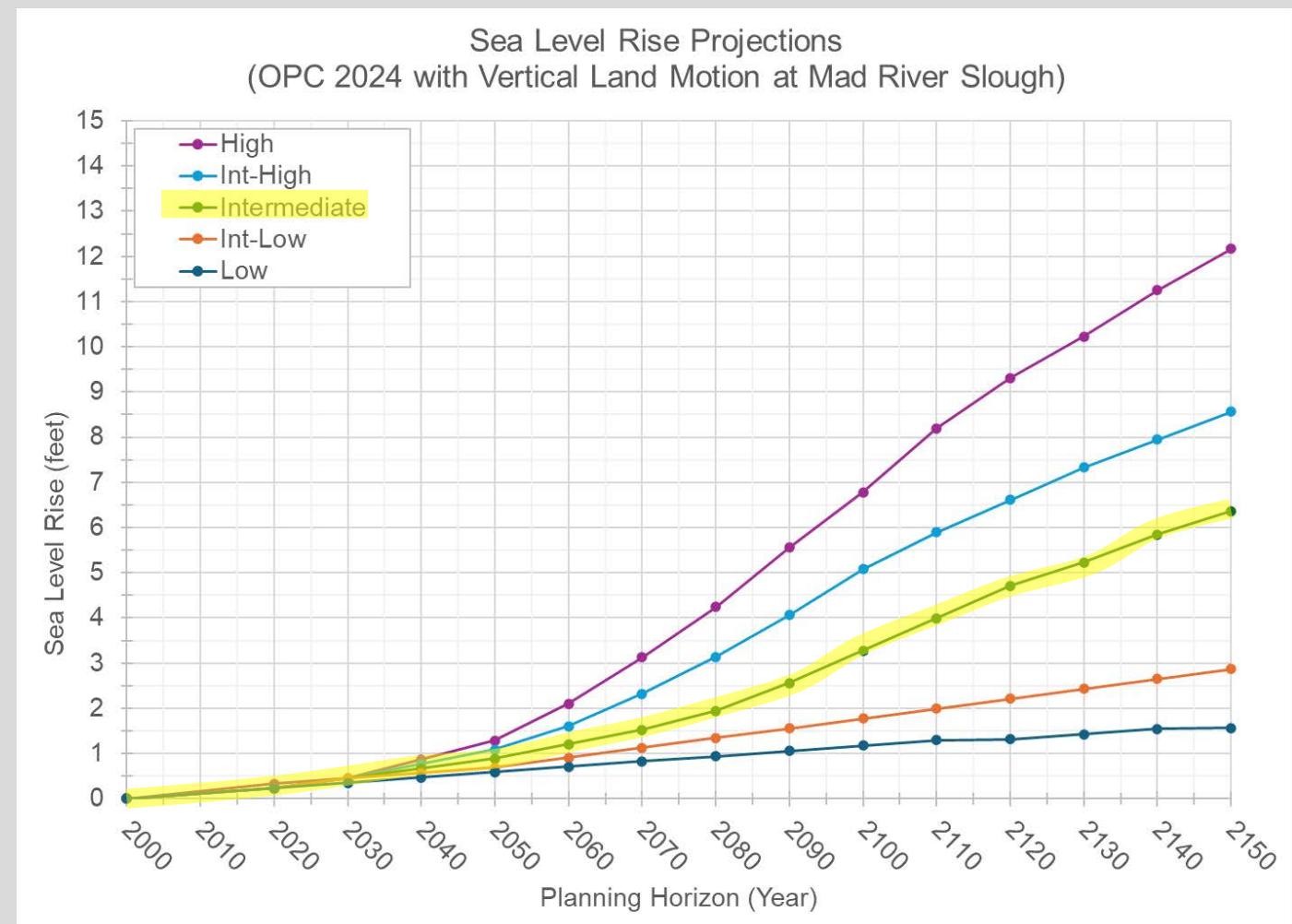
Sea Level Rise Projections  
(OPC 2024 with Vertical Land Motion at Mad River Slough)

The graph displays projected sea level rise in feet over a 150-year planning horizon. The Y-axis represents Sea Level Rise (feet) from 0 to 15, and the X-axis represents the Planning Horizon (Year) from 2000 to 2150. The 'High' scenario shows the steepest rise, reaching approximately 12 feet by 2150. The 'Low' scenario shows the slowest rise, reaching approximately 2 feet by 2150. The 'Intermediate' scenario is in the middle, reaching about 6.5 feet by 2150. The 'Int-High' and 'Int-Low' scenarios fall between the intermediate and low scenarios, reaching approximately 8.5 and 2.5 feet respectively by 2150.

Planning Horizon (Year)	High (feet)	Int-High (feet)	Intermediate (feet)	Int-Low (feet)	Low (feet)
2000	0.0	0.0	0.0	0.0	0.0
2010	0.2	0.1	0.1	0.1	0.1
2020	0.4	0.2	0.2	0.2	0.2
2030	0.6	0.3	0.3	0.3	0.3
2040	0.8	0.4	0.4	0.4	0.4
2050	1.2	0.6	0.6	0.6	0.6
2060	1.8	0.9	0.9	0.9	0.9
2070	2.5	1.2	1.2	1.2	1.2
2080	3.5	1.6	1.6	1.6	1.6
2090	5.0	2.2	2.2	2.2	2.2
2100	7.0	3.0	3.0	3.0	3.0
2110	9.0	4.0	4.0	4.0	4.0
2120	11.0	5.0	5.0	5.0	5.0
2130	12.5	6.0	6.0	6.0	6.0
2140	13.5	7.0	7.0	7.0	7.0
2150	14.5	8.0	8.0	8.0	8.0

# Sea Level Rise Planning Scenario

- Sea Level Rise scenarios along the west coast of California are provided in the latest 2024 Draft State of California Sea Level Rise Guidance document developed by the Ocean Protection Council
- For the wastewater system risk analysis, the Intermediate projection was used
- Intermediate: Based on sea level observations and current estimates of future warming, a reasonable estimate of the upper bound of most likely sea level rise in 2100.



# Collection System Risk

Risk Rating

Very High

High

Medium

Low

Very Low

	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
First Street Lift Station and Support infrastructure	10.7 ft – 13.3 ft	Low	Low	Medium	High
Meadowbrook, Wetlands, and Samoa Lift Stations	11.7 ft - 13.3 ft	Low	Low	Low	Low
Collection System Piping	Below ground surface	Low	Low	Low	Low

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

# Treatment Facility Risk without the Levee Project



	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
Site and Facility Access	11.2 ft	Low	Medium	Medium	Medium
Essential Treatment Facilities	10.7 ft – 16.7 ft	Low	Medium	High	High
Enhancement Marshes	11.7 ft - 13.3 ft	Low	Medium	High	High

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

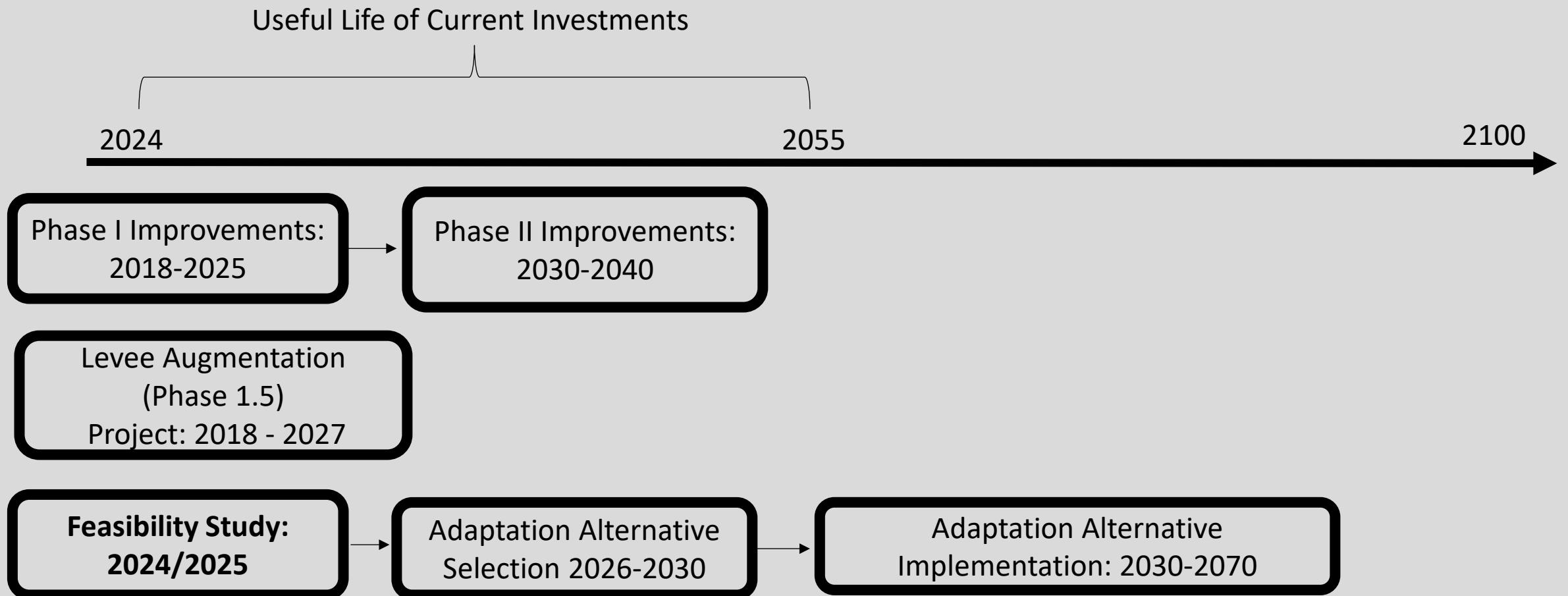
# Treatment Facility Risk with the Future Levee Project



	Threshold for impacts (Tidal Elevation)	Year/ Risk Rating			
		2024	2055	2075	2105
Site and Facility Access	11.2 ft				
Essential Treatment Facilities	Protected to 15 ft				
Enhancement Marshes	11.7 ft - 13.3 ft				

(Analysis based on Ocean Protection Council – Intermediate Sea Level Rise Scenario)

# Arcata Wastewater Treatment Facility Improvement Timeline



# Adaption strategies

Protect/defend where significant investment exists



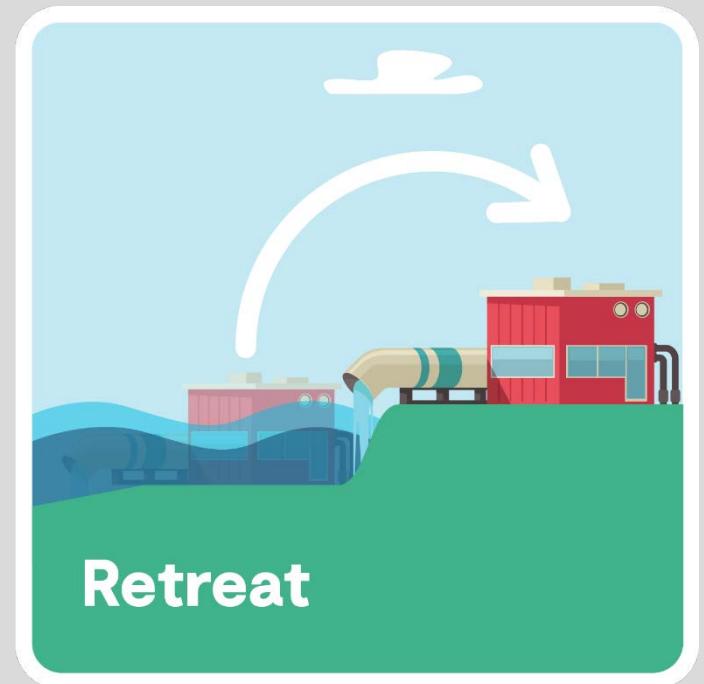
Protect

Accommodate where infeasible to defend or relocate



Accommodate

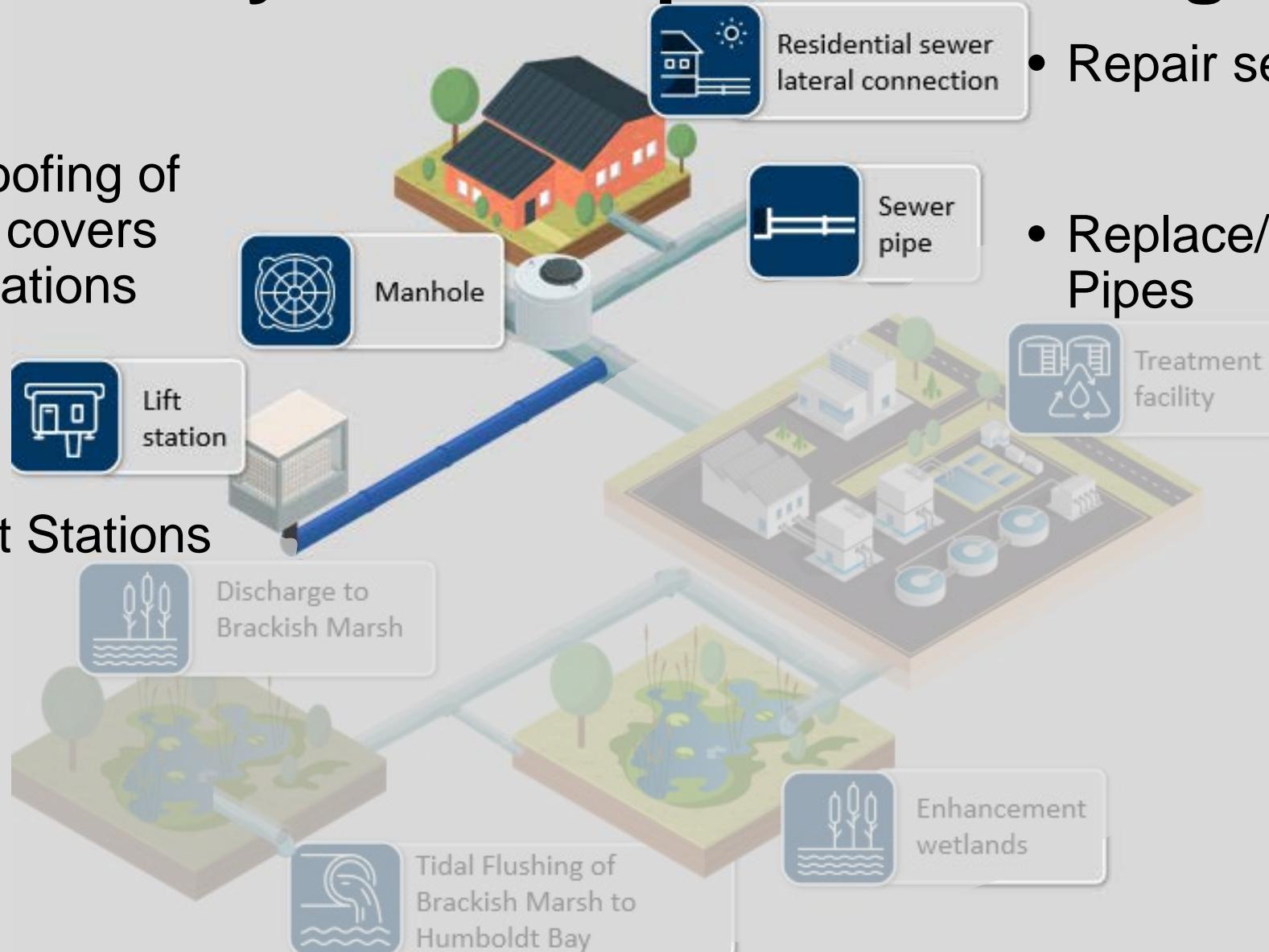
Retreat where/when no longer feasible to defend



Retreat

# Protect/ Accommodate Collection System Adaptation Strategies

- Flood proofing of manhole covers and lift stations

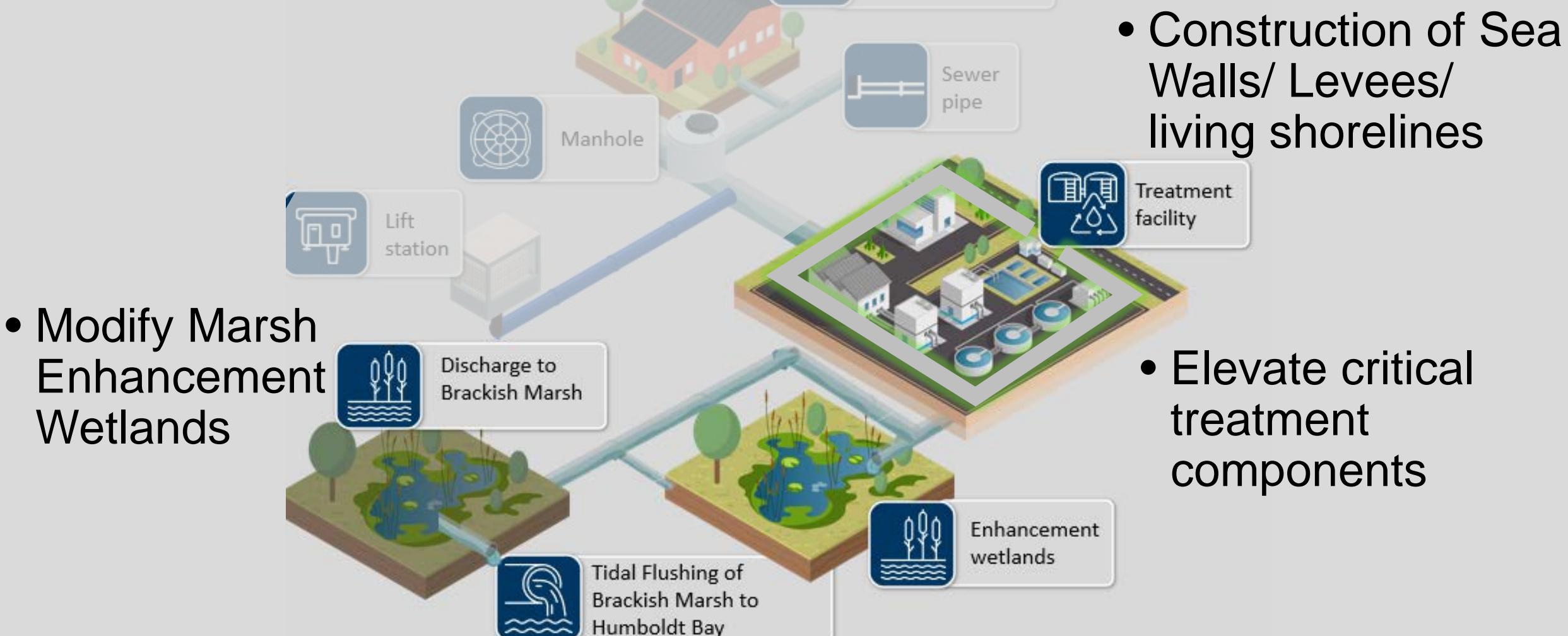


- Repair service laterals
- Replace/ Repair Sewer Pipes

- Elevate Lift Stations

# Protect / Accommodate Treatment / Discharge Adaptation Strategies

- Modify Marsh Enhancement Wetlands
  - Discharge to Brackish Marsh
  - Tidal Flushing of Brackish Marsh to Humboldt Bay
  - Enhancement wetlands
- Construction of Sea Walls/ Levees/ living shorelines
- Elevate critical treatment components



# Retreat Adaptation Strategies

## Collection System

- Reconfigure lift stations to pump to different areas of the City

## Treatment

- New Wastewater Plant (Full/ Partial)

## Effluent Disposal

- Ocean Discharge
- Land application/ Reuse
- New surface water discharge
- Groundwater injection

## Collection/ Treatment/ Disposal

- Decentralized Treatment coupled with land application/ reuse

# Retreat Effluent Disposal: Ocean Outfall (Year Round)



## Regional Examples of Ocean Outfalls

- Redwood Marine Terminal serving the Peninsula Community Services District, which includes Samoa and Fairhaven
- Mendocino City Community Services District
- Monterey One Regional Wastewater Treatment Plant

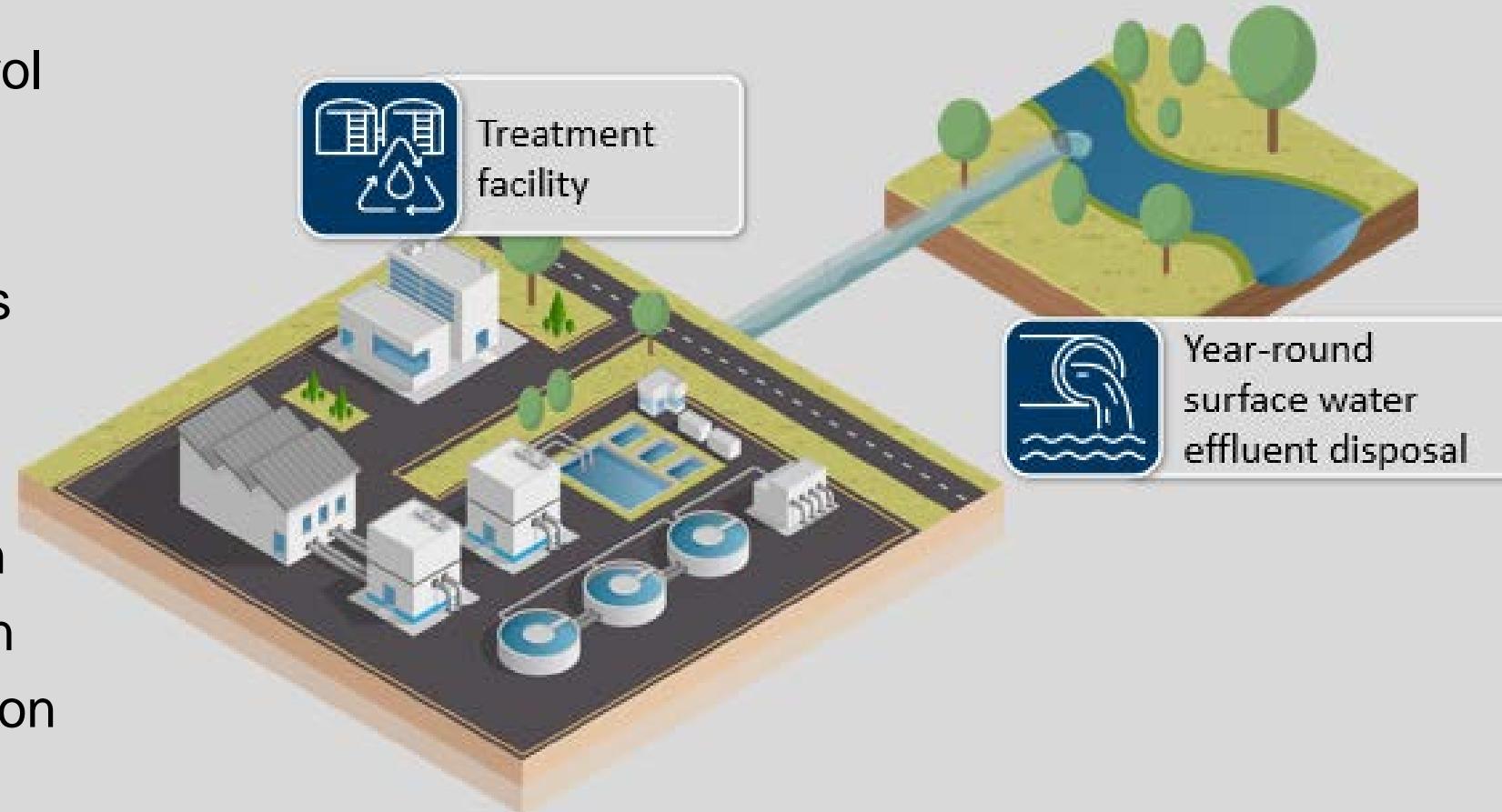
# Ocean Discharge

- Examples: Monterey Regional Wastewater Treatment Plant. Serves Castroville, Del Rey Oaks, Marina, Monterey, Pacific Grove, Salinas, Sand City and Seaside
- Mendocino Community Services District



# Retreat Effluent Disposal: Surface Water (Year Round)

- Summertime Discharge  
Prohibition: North Coast  
Regional Water Quality Control  
Board Basin Plan prohibits  
discharge of effluent to the  
Mad, Eel, and Russian Rivers  
during the low flow period of  
May 15<sup>th</sup> – September 30<sup>th</sup>
- City of Fortuna is pursuing an  
Amendment to the Basin Plan  
for a Lower Eel River Exception  
to Seasonal Discharge  
Prohibition



# Retreat Effluent Disposal: Land Application (Year Round)

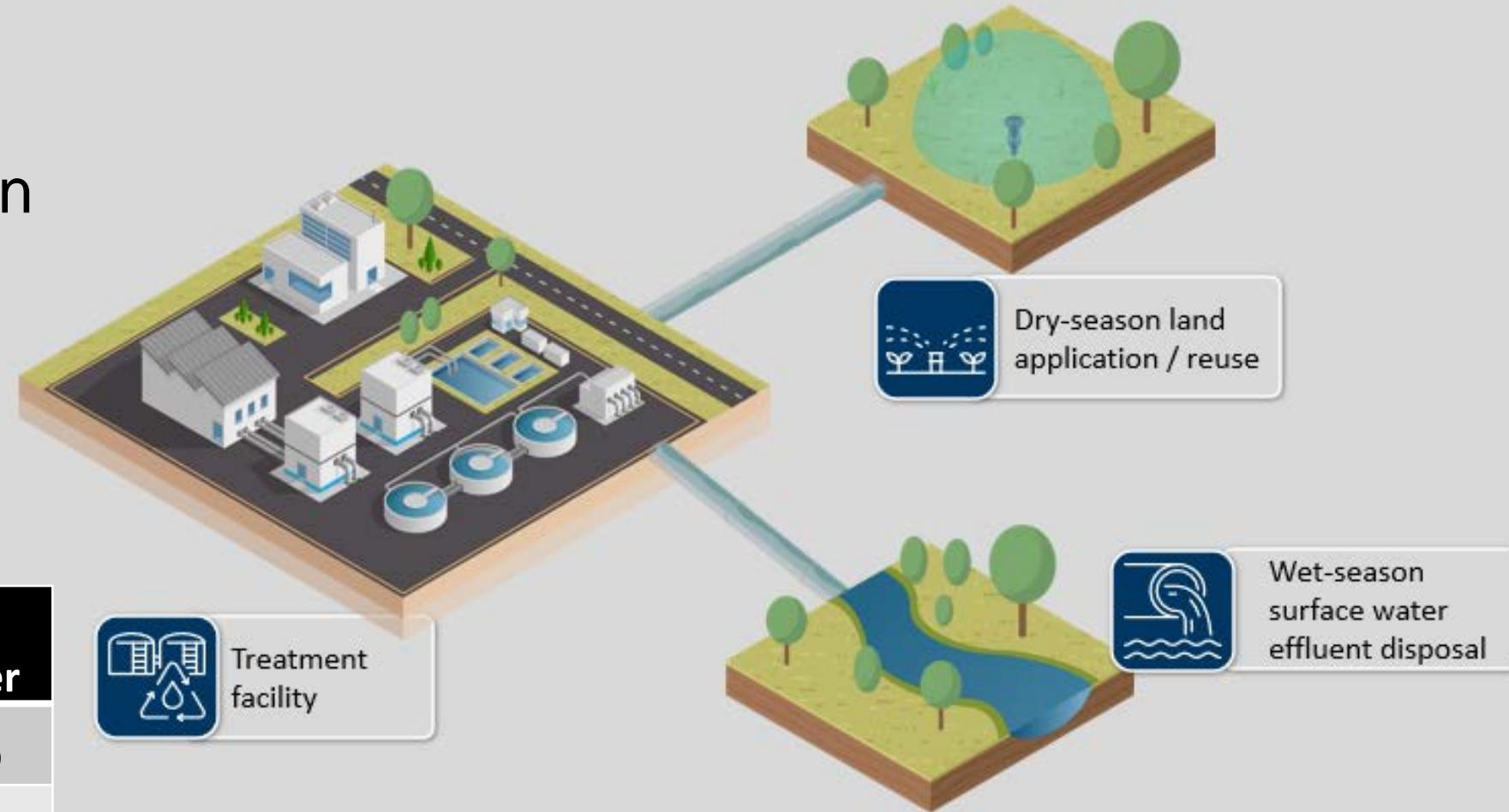


- No local municipalities rely solely on irrigation year-round
- Estimated area needed for full irrigation ~2,000 acres

# Retreat Effluent Disposal: Surface Discharge/ Land Application

- Estimated area needed for dry-season irrigation ~600 acres
- Similar systems used in McKinleyville and Rio Dell

Permitted flows	Dry Weather	Wet Weather
Arcata	2.3 MGD	5 MGD
Rio Dell	0.4 MGD	1.25 MGD
McK	1.37 MGD	3.1 MGD



\*MGD = Million Gallons per Day

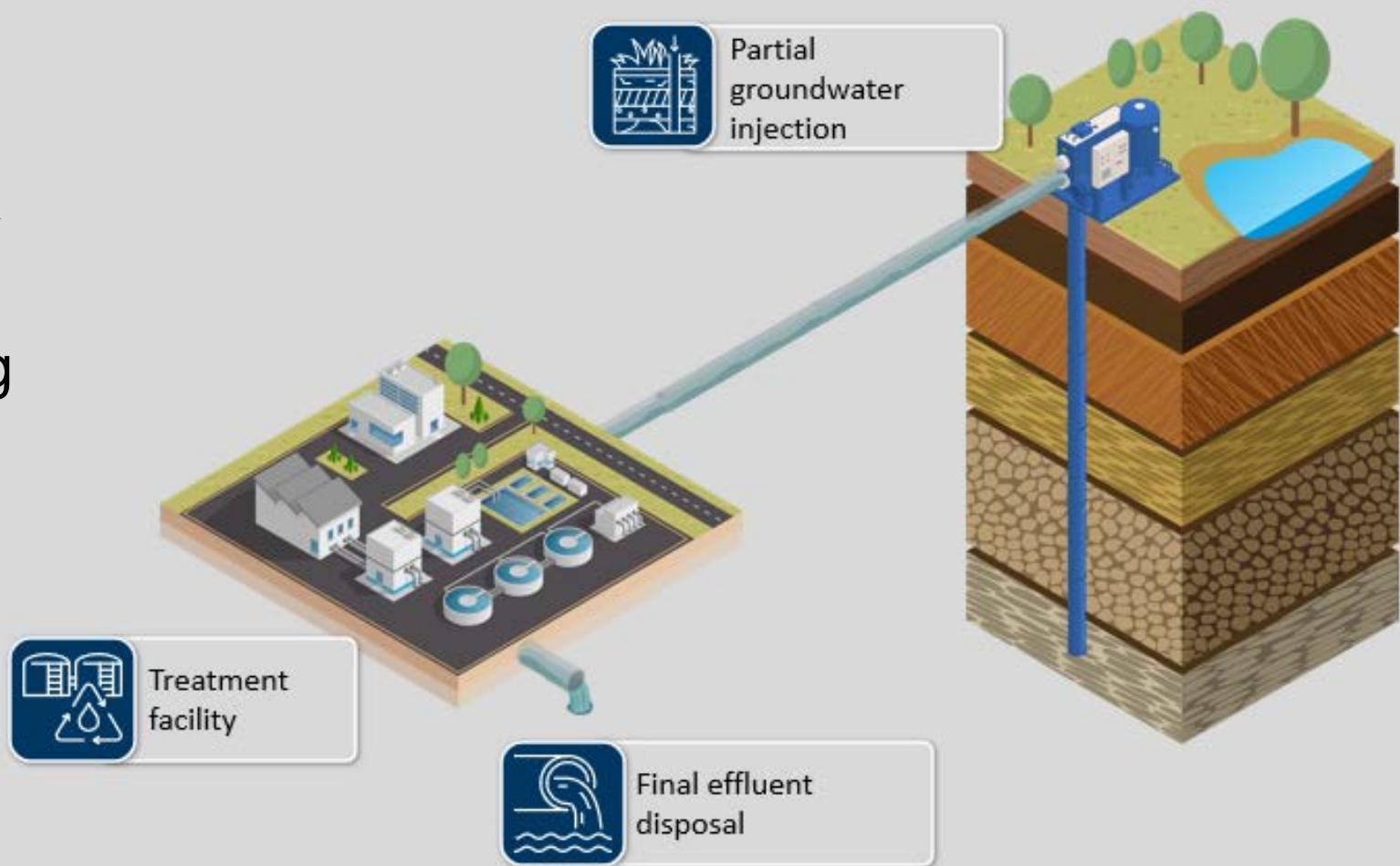
# Discharge Options: Land Application

- Local Examples: McKinleyville and Rio Dell



# Retreat Effluent Disposal: Groundwater Injection Discharge

- Groundwater injection is used for:
  - Preventing saltwater intrusion into drinking water aquifers
  - Indirect recharge of drinking water aquifers
- Dept of Toxic Substance Control only allows injection if wastes cannot be disposed of in an alternative way



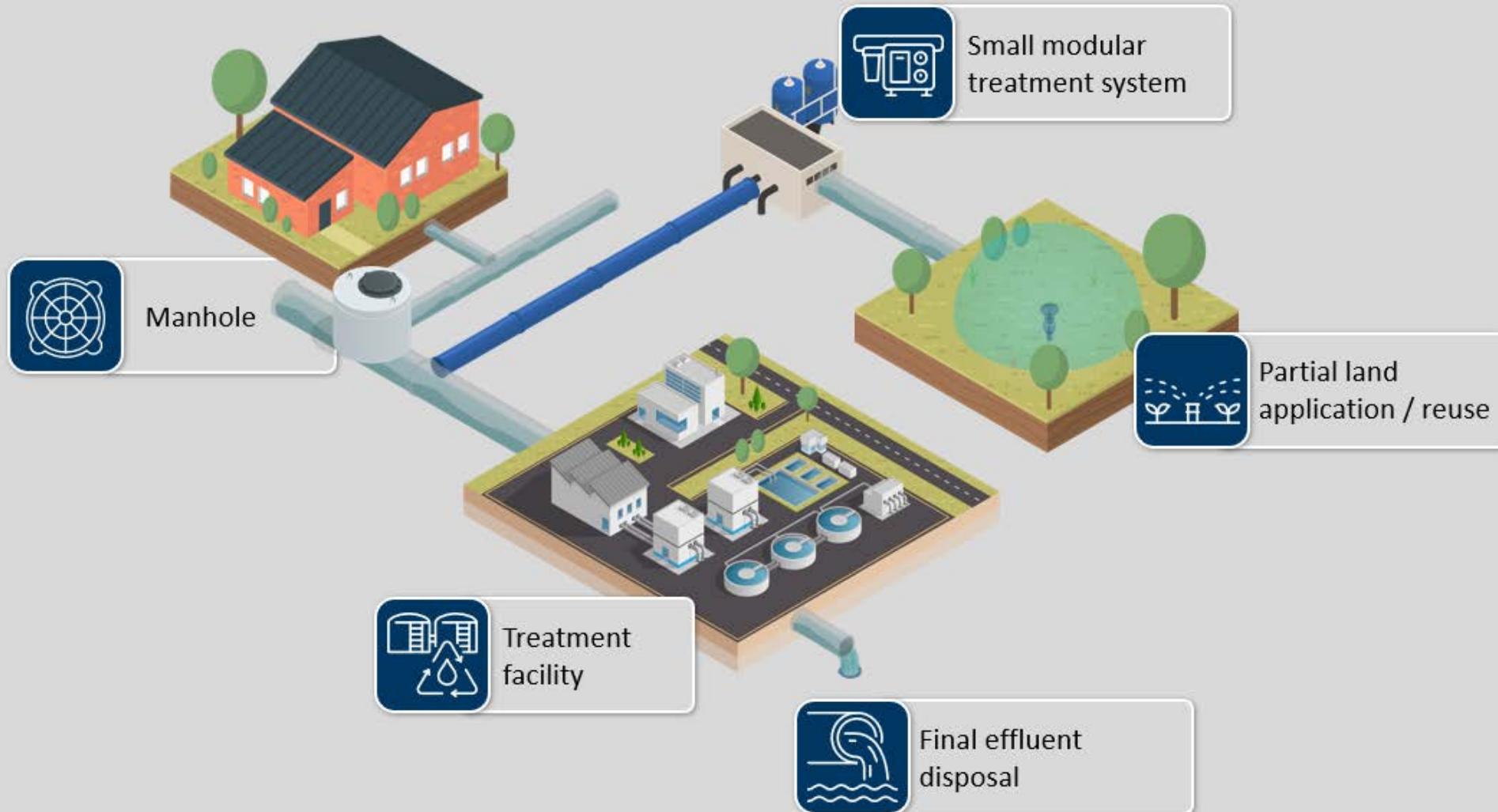
# Indirect Potable Reuse



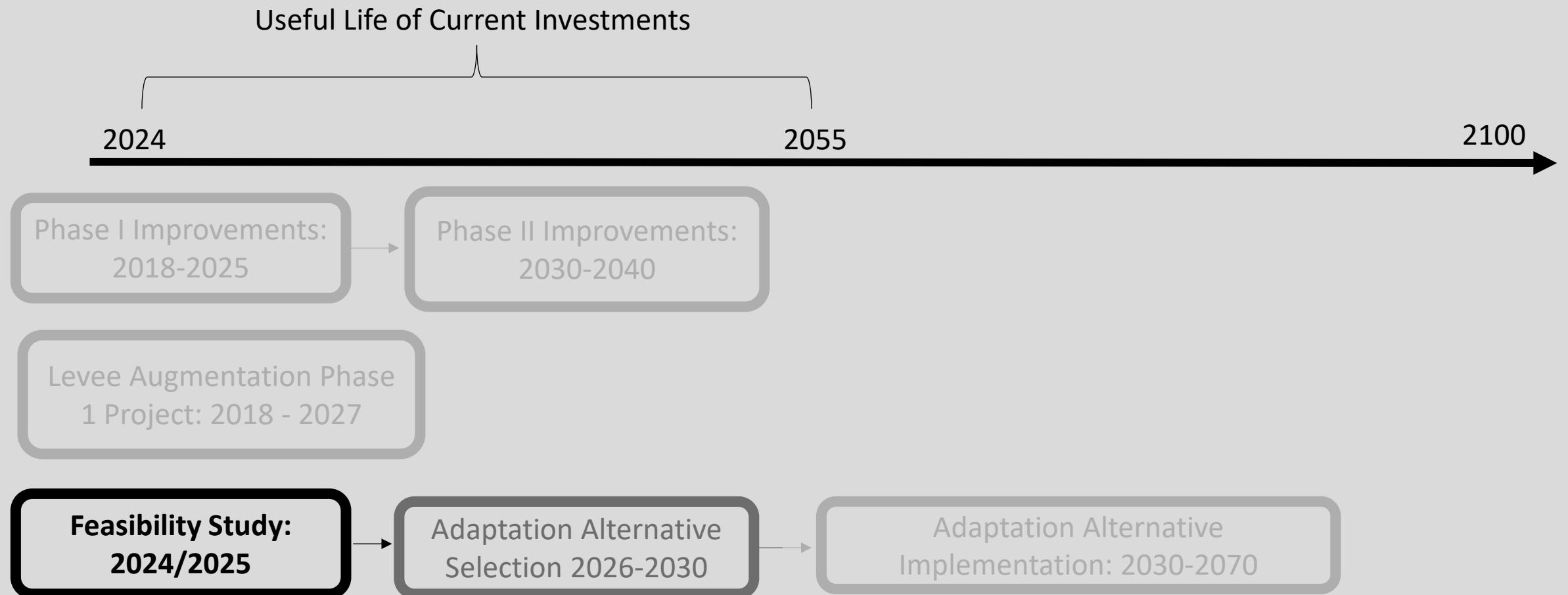
# Direct Potable Reuse



# Retreat Effluent Disposal: Decentralized Treatment



# Arcata Wastewater Treatment Facility Improvement Timeline



# Next: Community Input

## Breakout Groups

- 3 stations (~10 minutes per station), all attendees invited to visit each station
  - Wastewater Discharge Options
  - Decision Making Criteria
  - Beneficial Reuse and Ancillary Benefits
- Goals: review information, ask questions, share your thoughts