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Project Director

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Lewes WWTF

Long Range Planning Study

Lewes BPW Board Meeting

November 30, 2022

Welcome

Agenda

1. Project Background and Scope
2. Concept Development
3. Concept Evaluation
4. Next Stages

1. Project Background and Scope

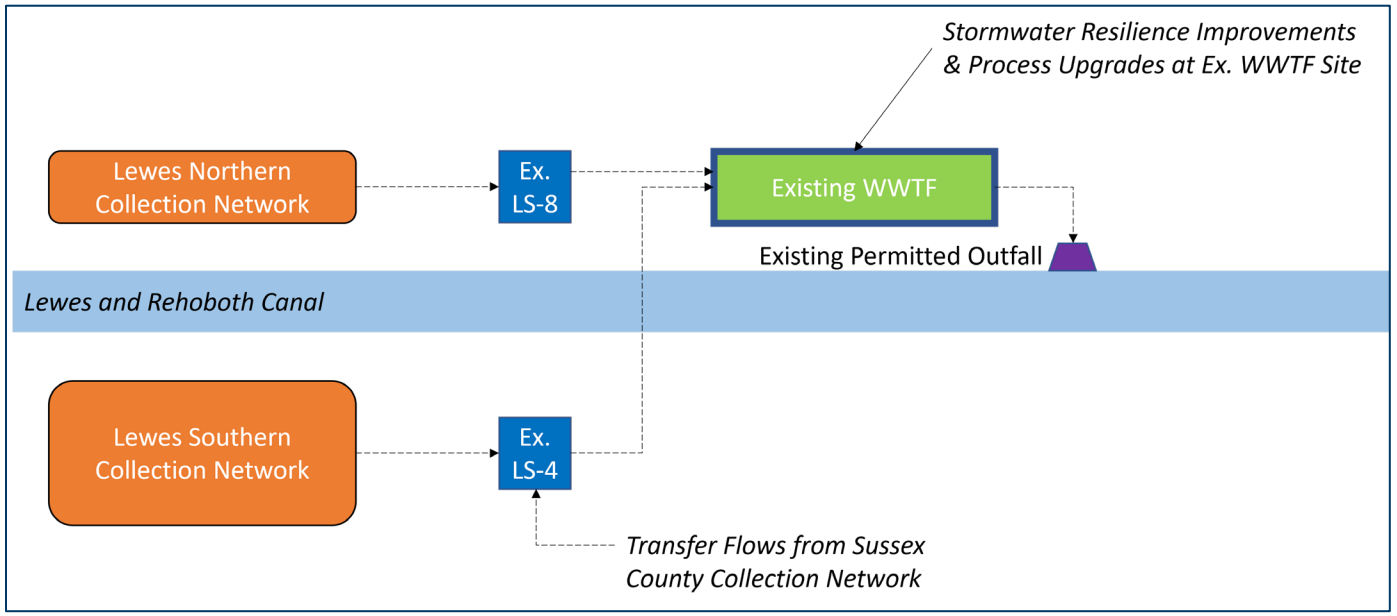
- The Lewes BPW Wastewater Treatment Facility (WWTF) is located at a low elevation site and is vulnerable to sea level rise and flood damage. The BPW would like to evaluate options to mitigate flood risk and/ or relocate the facility.
- Sussex County has an existing agreement in place with the BPW to transfer wastewater flows to the Lewes WWTF when demand is lower in Lewes during the winter months. The County has indicated that they may be interested in working with the BPW to establish additional shared facilities for wastewater treatment.
- GHD was appointed to develop and evaluate upgrade options that will provide increased resilience for wastewater treatment within the BPW's service area, including options for further collaboration with Sussex County.
- GHD's analysis has been summarized in the Lewes WWTF Long Range Planning Study Conceptual Evaluation Report, which has been provided to the BPW board for review.

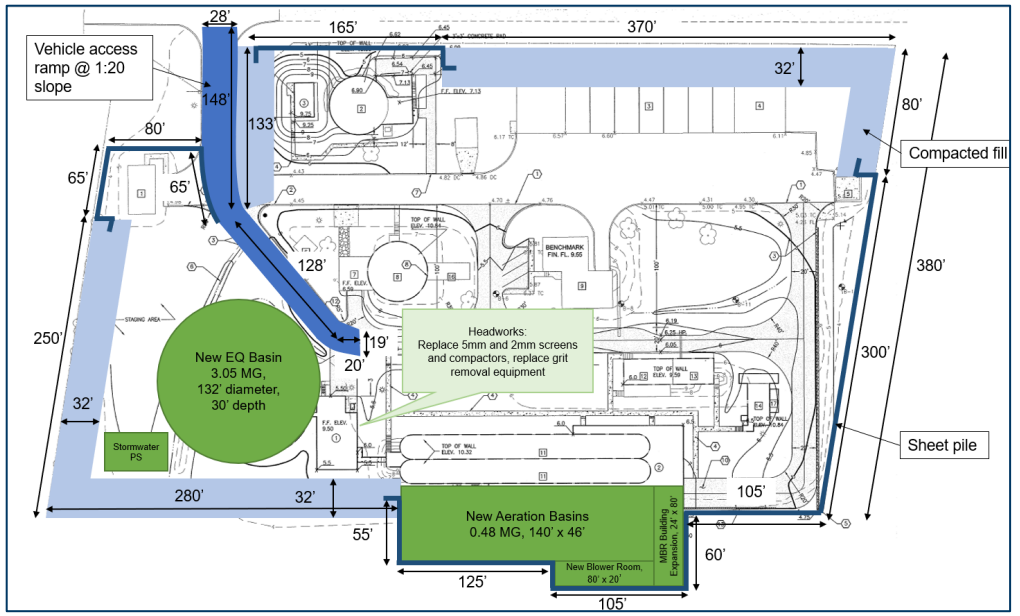
1. Project Background and Scope

- GHD evaluated a total of six (6) options to increase the resilience of BPW's wastewater treatment to storm events and sea level rise. The following options were evaluated:

Option Ref	Option Title	Notes
1	Existing WWTF Hardening	Determine existing site improvements necessary to mitigate treatment impacts from sea level rise, subsidence, storm events including flooding, power loss etc., including: – Perimeter Dike around facility with stormwater/dewatering pumping station. – Raising and or flood proofing the biosolids unit processes. – On-site fuel storage for extended storm events/emergencies.
2 – a	Relocation & Spray Irrigation and/or RIBS	Determine if a suitable site can be found to construct a new WWTF using Rapid Infiltration Beds (RIBS) or spray irrigation for effluent disposal, and decommission the existing WWTF.
2 – b	Relocation & Utilization of Existing WWTP Outfall	Construct a new WWTF but maintain the existing permitted outfall, new force main, and decommission the WWTF.
2 – c	Relocation & New Ocean Outfall	Construct a new WWTF with new ocean outfall and decommission the existing WWTF.
3 – a	Partnership with Sussex County & Utilization of Existing WWTP Outfall	Network upgrades to transfer wastewater from the Lewes collection network to a new WWTP in Sussex County, and transfer treated flows back to the existing permitted, outfall in Lewes.
3 – b	Partnership with Sussex County & Constructed Wetland	Given a suitable site, provide network upgrades required to transfer wastewater from the Lewes collection network to a new WWTF in Sussex County and decommission the existing WWTF.

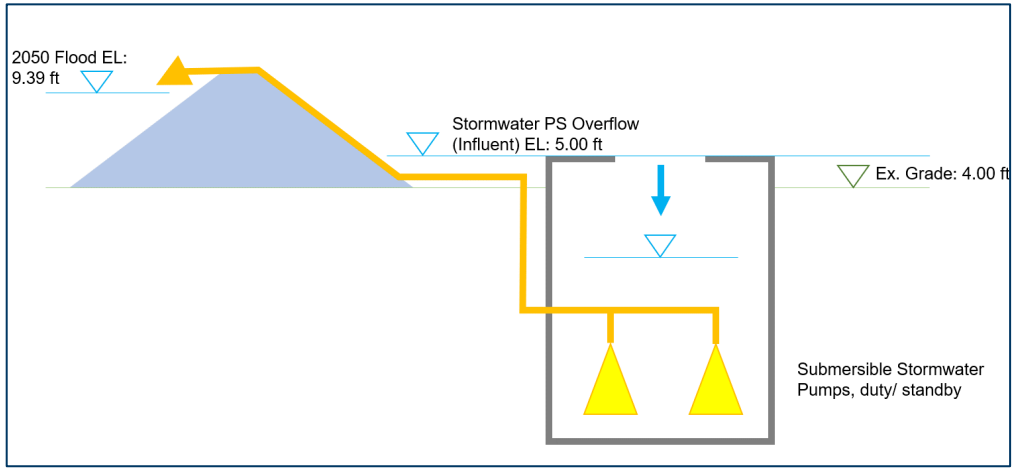
2. Concept Development: Option 1



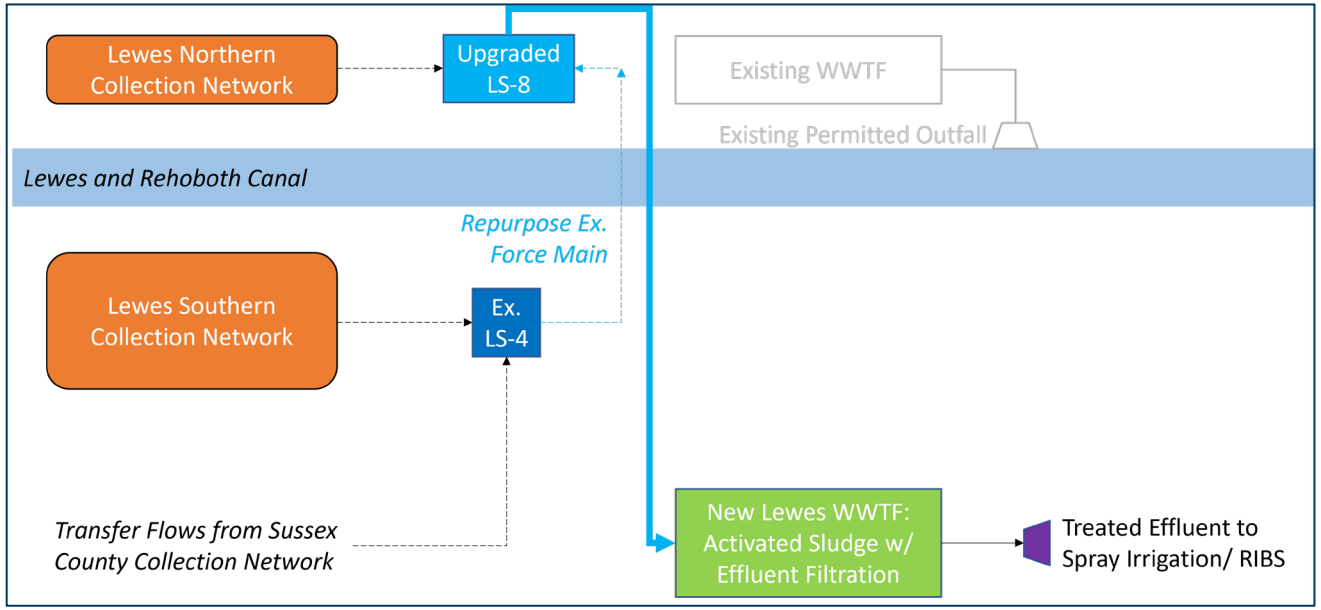


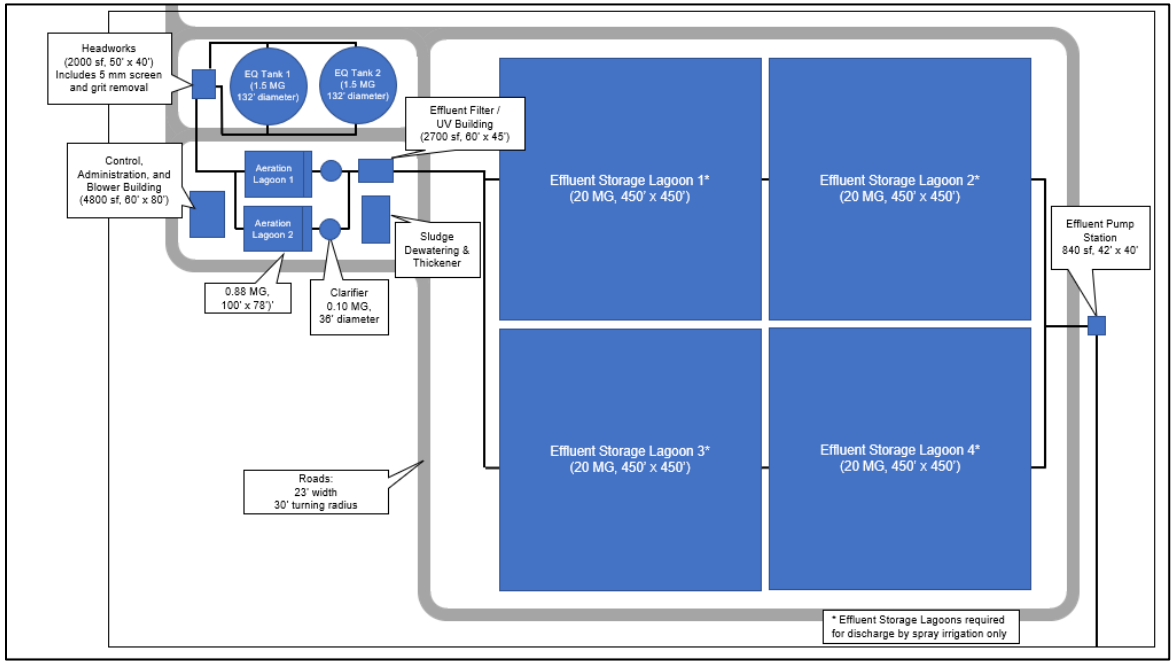
The following capital works are required as part of the Option 1 scope of work:

- Upgrades to the following treatment facilities to enable the existing Lewes WWTF to meet the Basis of Design Criteria up to 2050:
  - New Headworks facilities (screening and grit)
  - Demolish existing Flow EQ tank and install a new 3.03 MG tank.
  - Expand Aeration Basins to provide 12-hrs storage at average daily flow.
  - Install a fourth MBR cassette to increase the treatment capacity to 2.16 mgd.
  - Replace the existing UV reactors (2) like-for-like.
- Construction of a new Perimeter Flood Barrier and Vehicle Access Ramp.
- Construction of a Stormwater Discharge Pump Station.



2. Concept Development: Option 2a

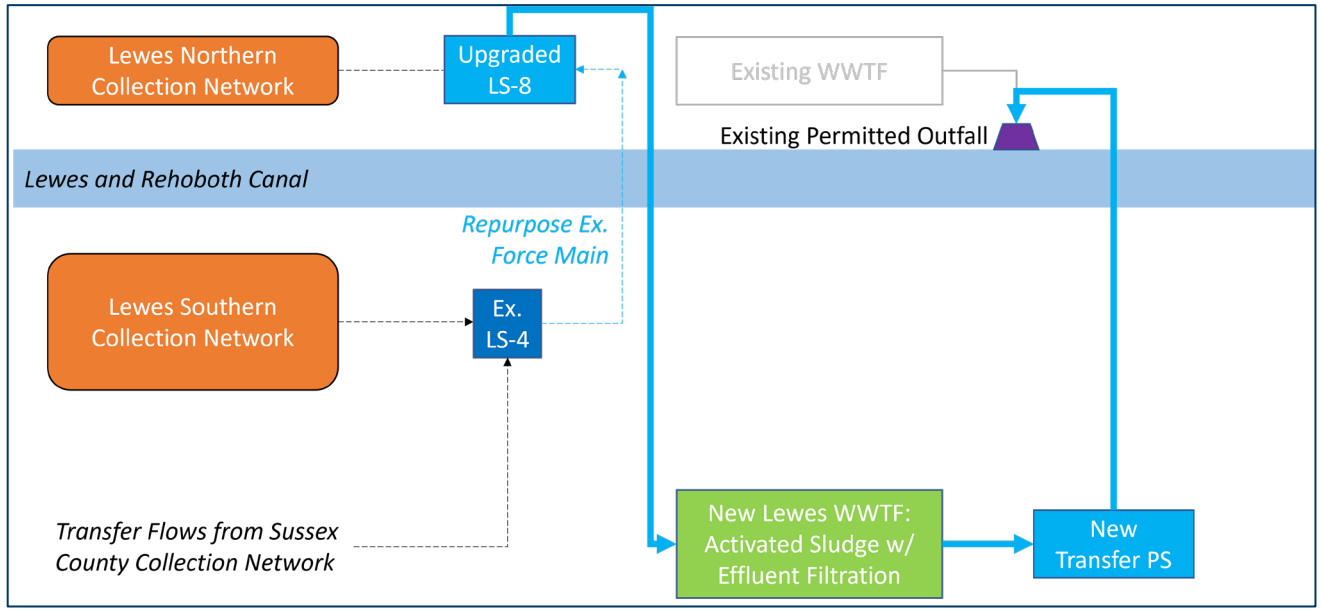


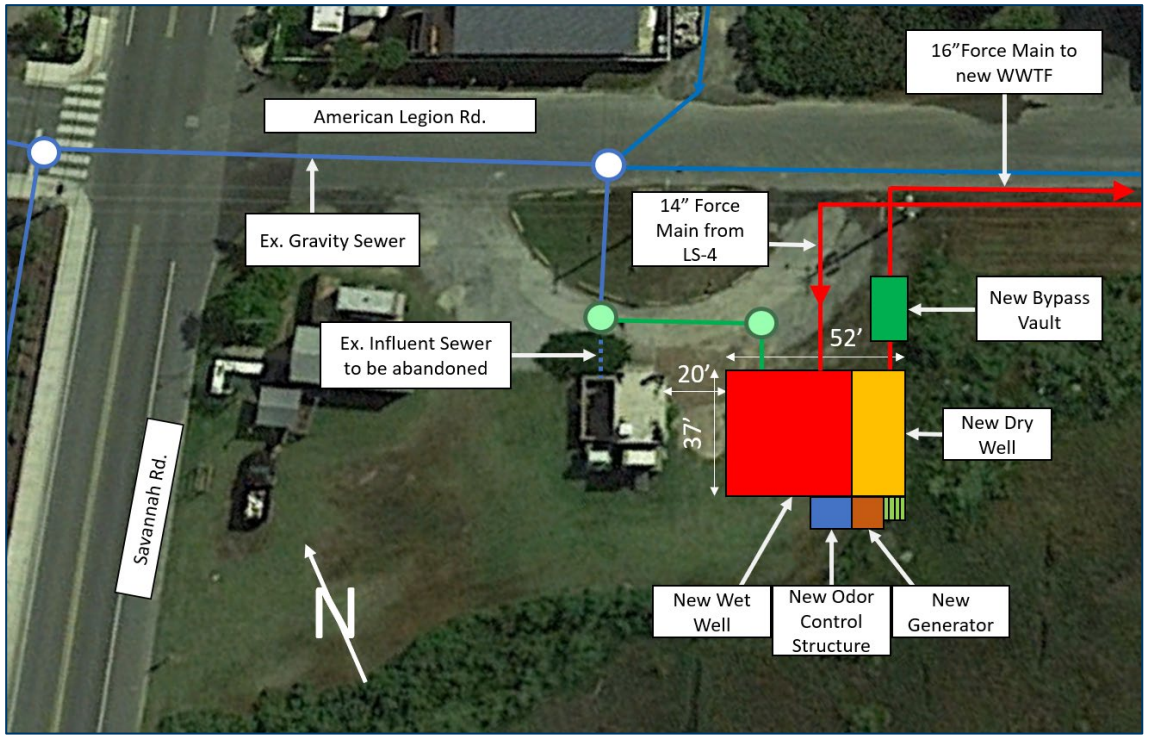


The following capital works are required as part of the Option 2a scope of works:

- Reconfiguration of LS-4 and LS-8 piping to consolidate all Lewes wastewater collection network flows at LS-8.
- LS-8 modifications to create new raw wastewater pump station.
- New Tertiary Treatment WWTF at high elevation, **discharging via spray irrigation.**

2. Concept Development: Option 2b





The following capital works are required as part of the Option 2a scope of works:

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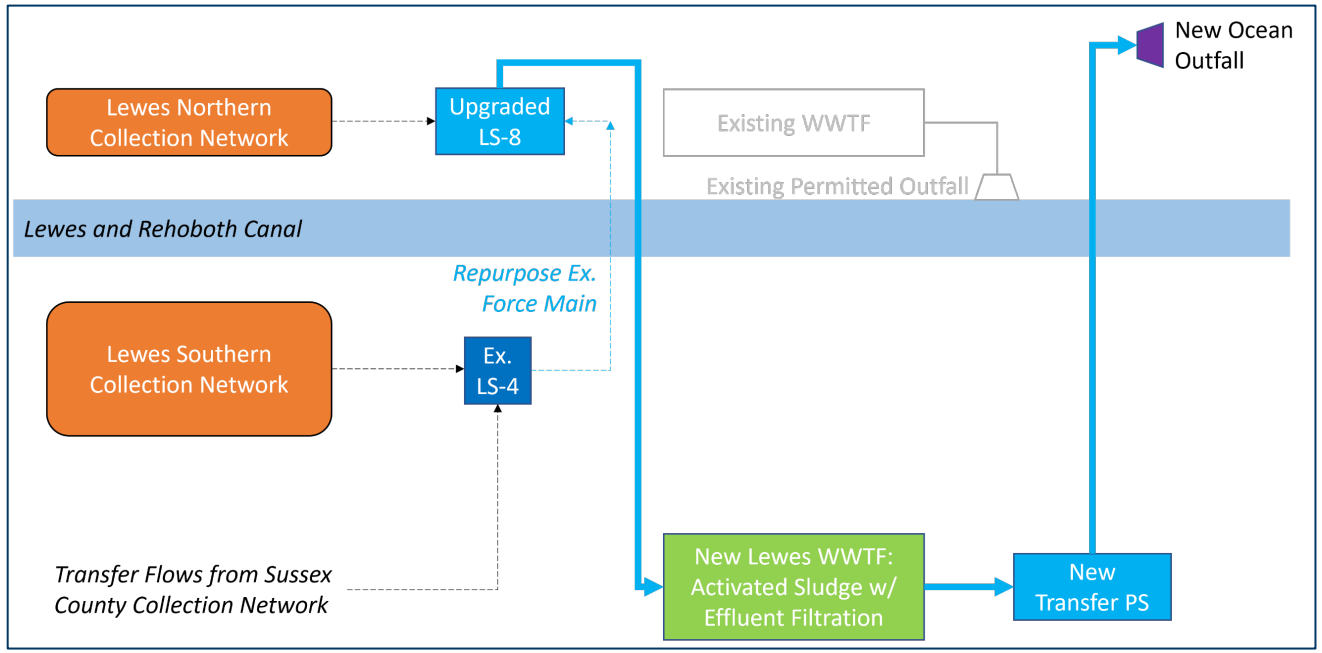
- LS-8 modifications to create new raw wastewater pump station.
- New Tertiary Treatment WWTF at high elevation, **discharging to existing (relocated outfall) at Lewes and Rehoboth Canal.**

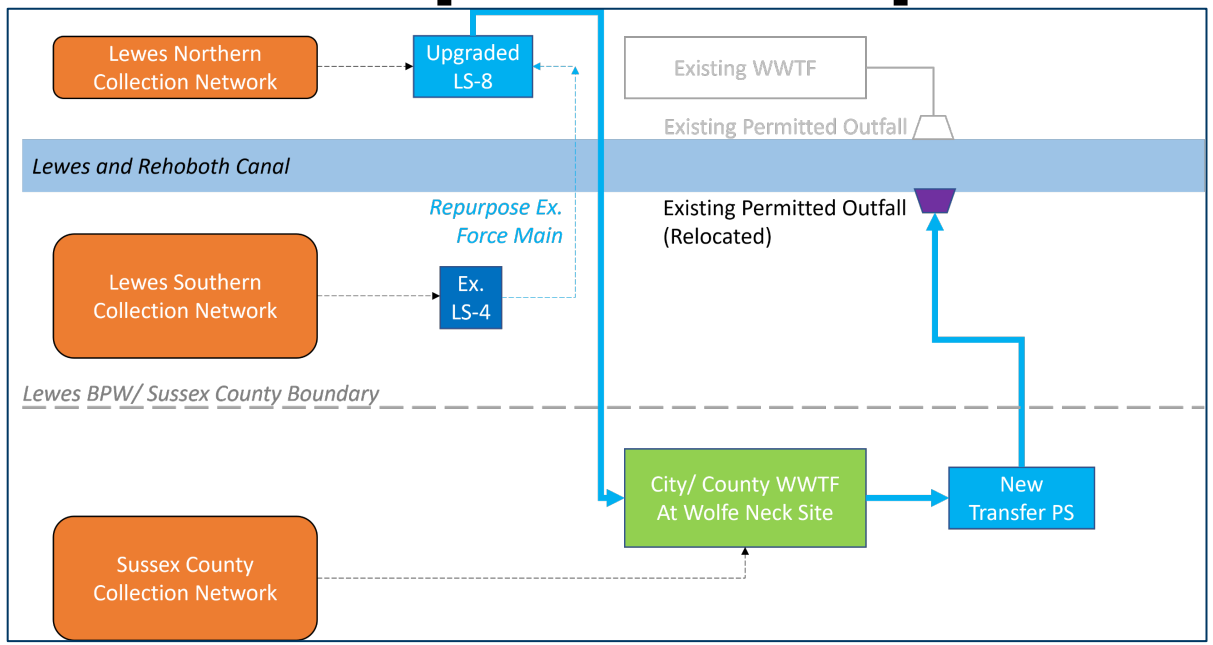
2. Concept Development: Option 2c

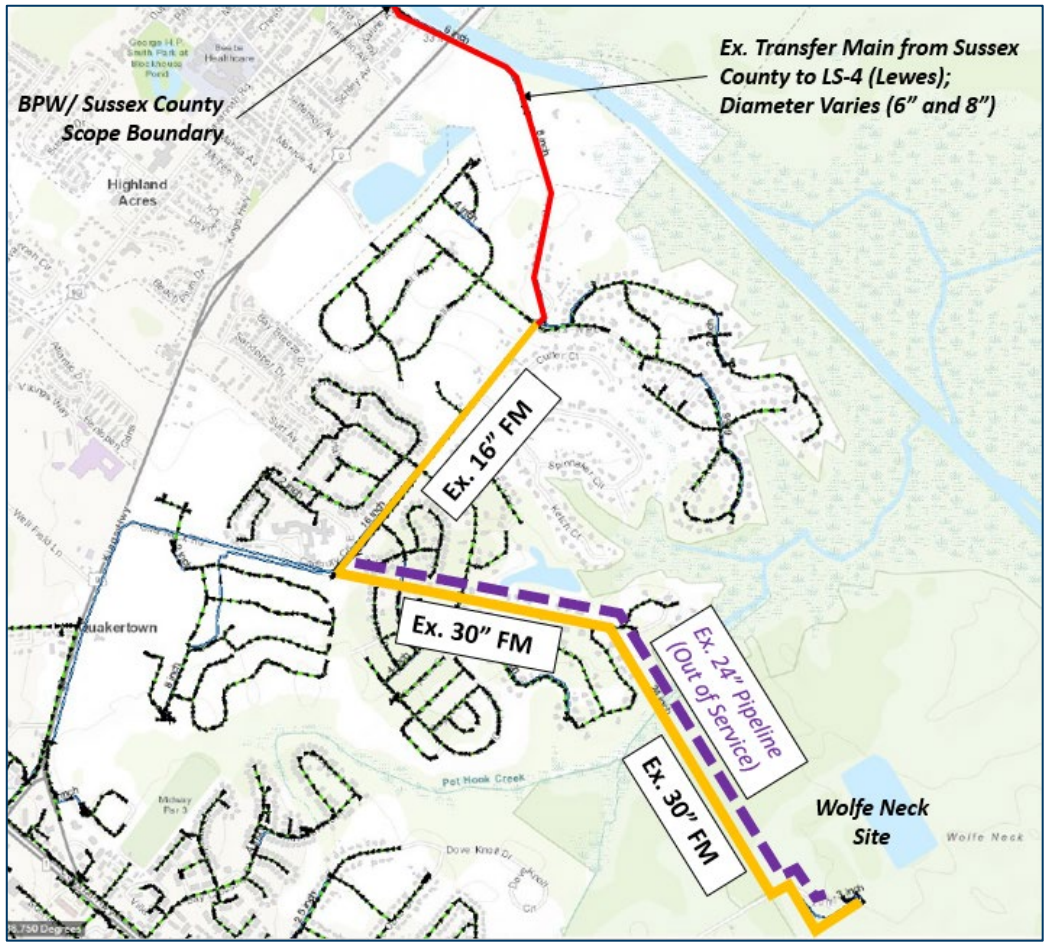


The following capital works are required as part of the Option 2c scope of works:

- Reconfiguration of LS-4 and LS-8 piping to consolidate all Lewes wastewater collection network flows at LS-8.
- LS-8 modifications to create new raw wastewater pump station.
- New Tertiary Treatment WWTF at high elevation, **discharging via new ocean outfall.**

2. Concept Development: Option 3a



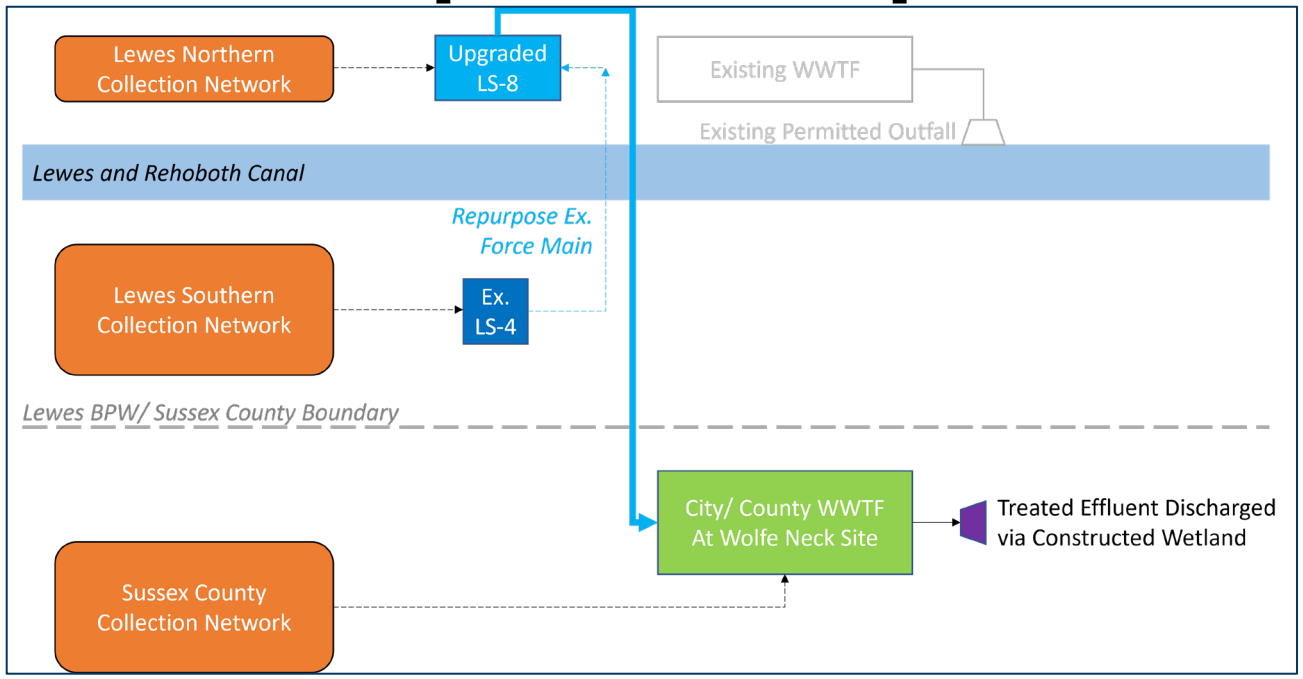


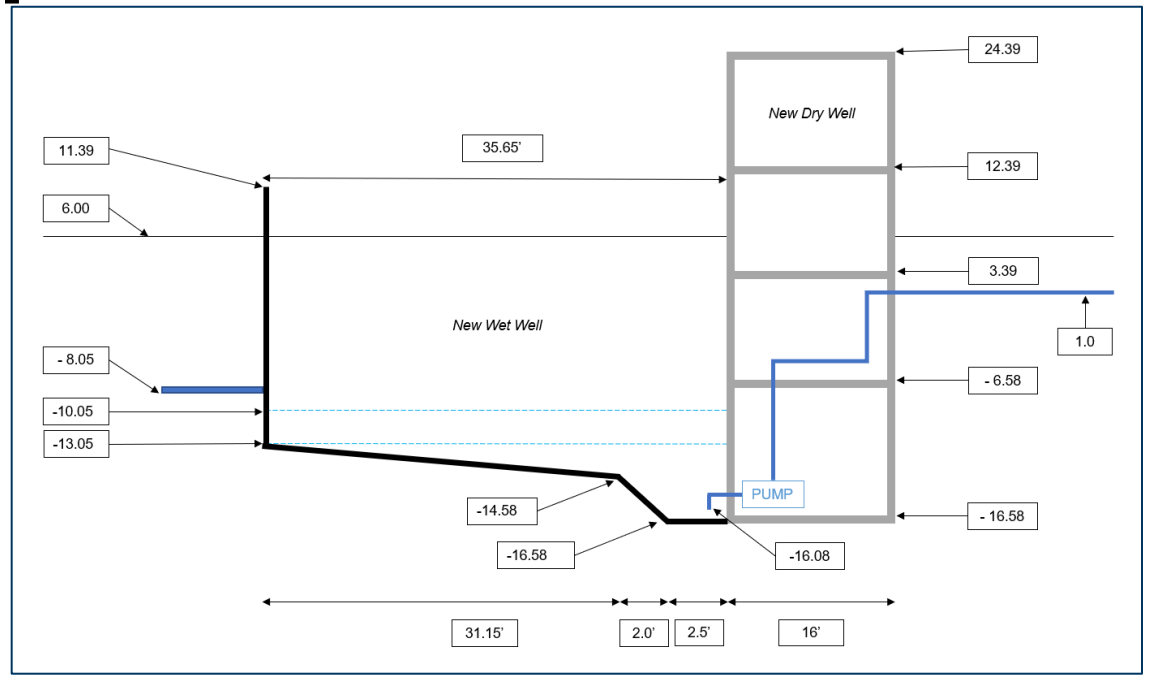
The following capital works are required as part of the Option 3a scope of work:

– Lewes BPW Responsibility:
  - Raw wastewater pump station.
  - Raw wastewater force main from the pumping station to the scope boundary.

– Sussex County Responsibility:
  - Raw wastewater force main from the scope boundary to the Wolfe Neck site.
  - New combined wastewater treatment facilities at the Wolfe Neck site.
  - Treated effluent pump station.
  - Treated effluent force main from Wolfe Neck to Relocated Outfall Location.
  - Relocated Outfall.

2. Concept Development: Option 3b





The following capital works are required as part of the Option 3b scope of works:

– Lewes BPW Responsibility:
  - Raw wastewater pump station.
  - Raw wastewater force main from the pumping station to the scope boundary.
– Sussex County Responsibility:
  - Raw wastewater force main from the scope boundary to the Wolfe Neck site,
  - New combined wastewater treatment facilities at the Wolfe Neck site, including a constructed wetland with vertical discharge

3. Concept Evaluation (MCA)

- A multi-criteria analysis (MCA) was performed to evaluate the concept options based on a series of non-cost criteria.
- Criteria were assigned a weighting to reflect the relative criticality of each item
    - Longer term impacts, water quality issues and treatment facility resilience were generally assigned a higher weighting
    - Shorter term impacts were assigned a lower weighting
- The evaluation criteria, performance measures, rating scale, and weighting factors used for the multi-criteria analysis are summarized below
    - **Category 1 of 3:**

Evaluation Category	Evaluation Criteria	Performance Measure	Weighting	Rating = 1 (Worst)	Rating = 3 (Average)	Rating = 5 (Best)
Permitting & Schedule	Permitting Complexity	The expected volume and complexity of permitting procedures	1	Greater than other options	Comparable to other options	Less than other options
	Delivery Schedule	The length of the overall project implementation schedule including design, permitting and construction stages	2	Greater than other options	Comparable to other options	Less than other options
	Property & Easement Acquisition	The complexity of obtaining required additional property and easement acquisition for treatment facilities and conveyance piping	2	Greater than other options	Comparable to other options	Less than other options
	Interagency & Regulatory Coordination	The schedule risk associated with coordination and approvals from other political bodies (such as Sussex County) or regulatory approvals which are outside of the control of the Lewes Board of Public Works	1	Greater than other options	Comparable to other options	Less than other options

3. Concept Evaluation (MCA)

- The evaluation criteria, performance measures, rating scale, and weighting factors used for the multi-criteria analysis are summarized below
  - **Category 2 of 3:**

Evaluation Category	Evaluation Criteria	Performance Measure	Weighting	Rating = 1 (Worst)	Rating = 3 (Average)	Rating = 5 (Best)
Community & Environmental Impacts	Stakeholder Impacts - Construction Stage	Temporary impacts to the community during the construction stage due to traffic volume, road closures, noise and other factors	1	Greater than other options	Comparable to other options	Less than other options
	Stakeholder Impacts - Long Term	Long term impacts to the community due to ongoing site traffic, odor, aesthetics and other factors	2	Greater than other options	Comparable to other options	Less than other options
	Water Quality Impacts for Inland Bays	The likelihood that the proposed treatment process will negatively impact the water quality of the Inland Bays	3	More Likely than other options	Comparable to other options	Less Likely than other options
	Overall Environmental Risk	Likelihood of environmental impacts due to failure/ flood damage at treatment facilities, force mains, pumping facilities or other components	3	More Likely than other options	Comparable to other options	Less Likely than other options
	Sustainability and Energy & Chemical Use	Energy, chemical usage and overall sustainability associated with the proposed treatment and conveyance facilities	1	Less Sustainable than other options	Comparable to other options	More Sustainable than other options
	Land Use within City of Lewes	Amount of land required within the City of Lewes for wastewater treatment infrastructure	1	Greater than other options	Comparable to other options	Less than other options

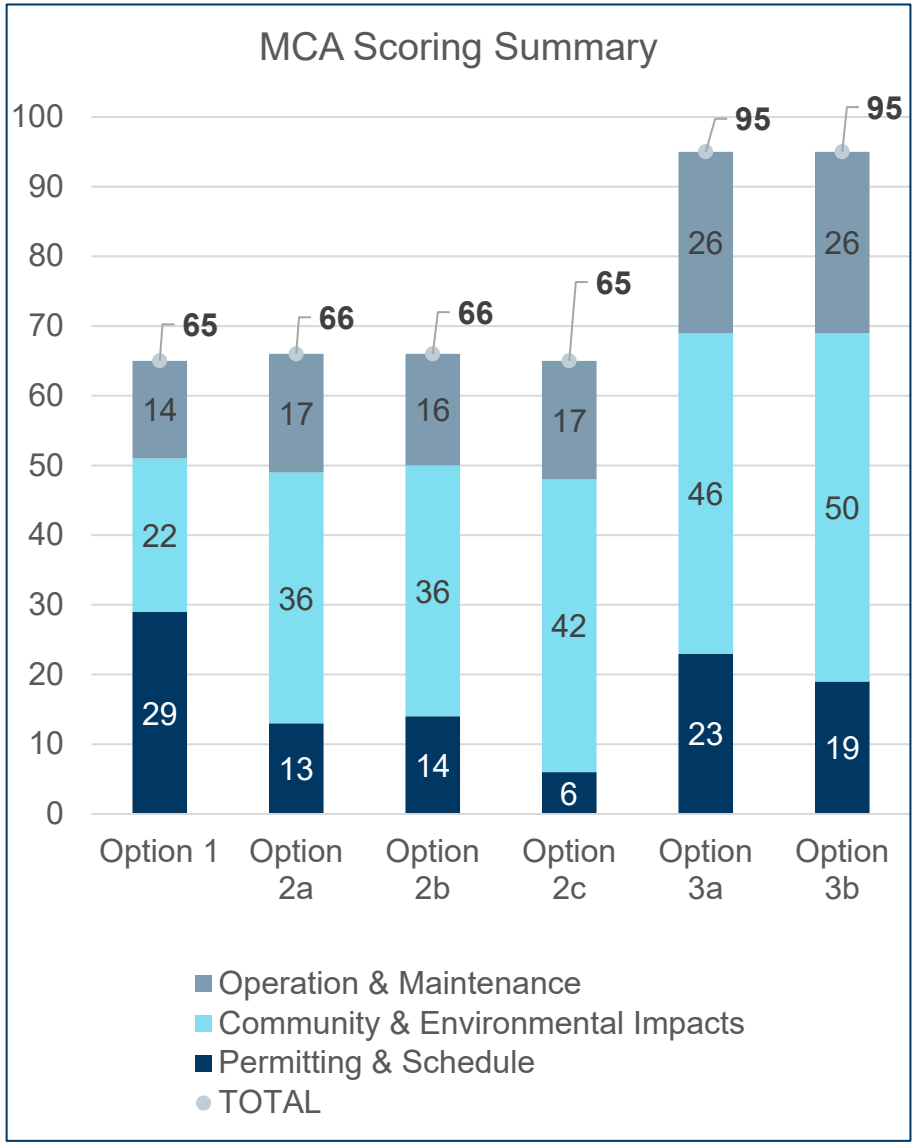
3. Concept Evaluation (MCA)

- The evaluation criteria, performance measures, rating scale, and weighting factors used for the multi-criteria analysis are summarized below:
  - **Category 3 of 3:**

Evaluation Category	Evaluation Criteria	Performance Measure	Weighting	Rating = 1 (Worst)	Rating = 3 (Average)	Rating = 5 (Best)
Operation & Maintenance	Impact to WWTF Operations During Construction	The extent to which the proposed upgrades will affect the operation and resilience of existing treatment and conveyance facilities	1	More Likely than other options	Comparable to other options	Less Likely than other options
	Operational Complexity	The level of operational effort required to maintain treatment performance and the difficulty in obtaining qualified staff	3	Greater than other options	Comparable to other options	Less than other options
	Future Flexibility	The extent to which the proposed treatment and conveyance facilities can be adapted to meet future environmental and compliance conditions	2	Less Likely than other options	Comparable to other options	More Likely than other options

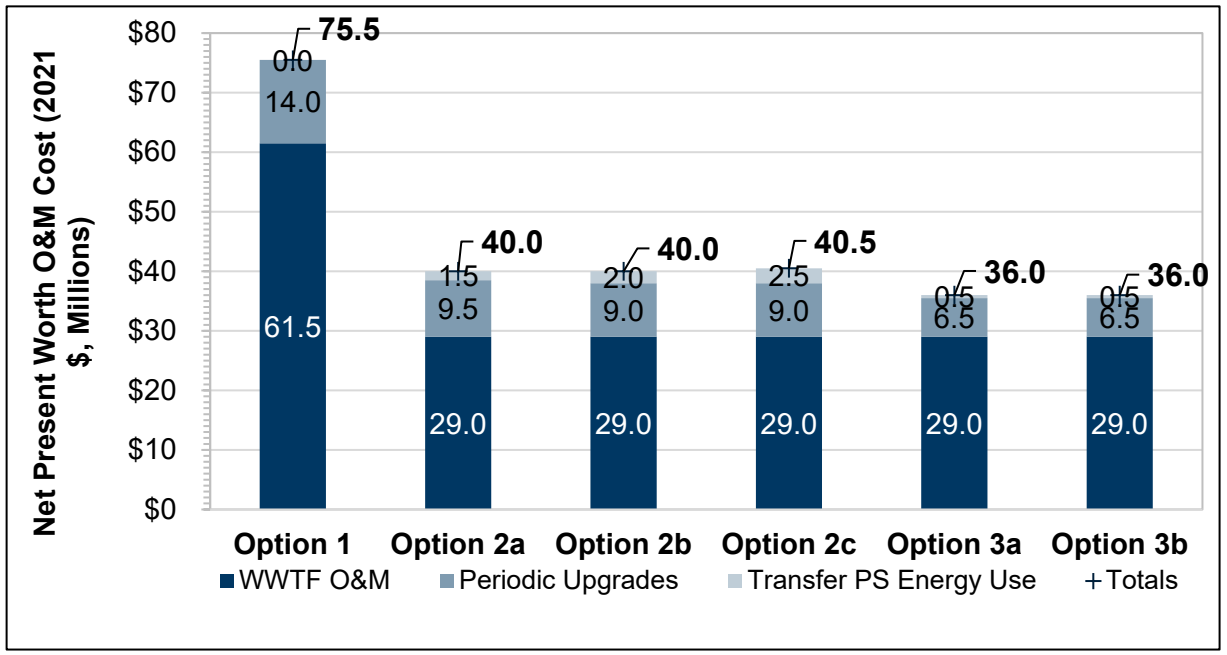
3. Concept Evaluation (MCA)

- The Key findings of the MCA are summarized below:
- Option 3a and Option 3b have the joint-highest MCA scores
- Option 3a scores higher for the Permitting & Schedule category,
    - Due to the relative uncertainty associated with the constructed wetland discharge arrangement under Option 3b
- Option 3b scores higher for the Community & Environmental Impacts
    - No requirement to pump treated effluent back to Lewes
- The Option 1 and Option 2 concepts have very similar overall MCA scores
    - Option 1 scores lower for Community & Environmental Impacts due to the residual flood risk at the existing site
    - Option 2 concepts score lower for Permitting & Schedule due to land acquisition and significant lengths of transfer force mains in public roads
    - Option 2c scores particularly low in this category due to the permitting complexities associated with constructing a new ocean outfall
    - Option 2c scores higher in the Community & Environmental Impacts category as treated effluent no longer discharged to the Canal

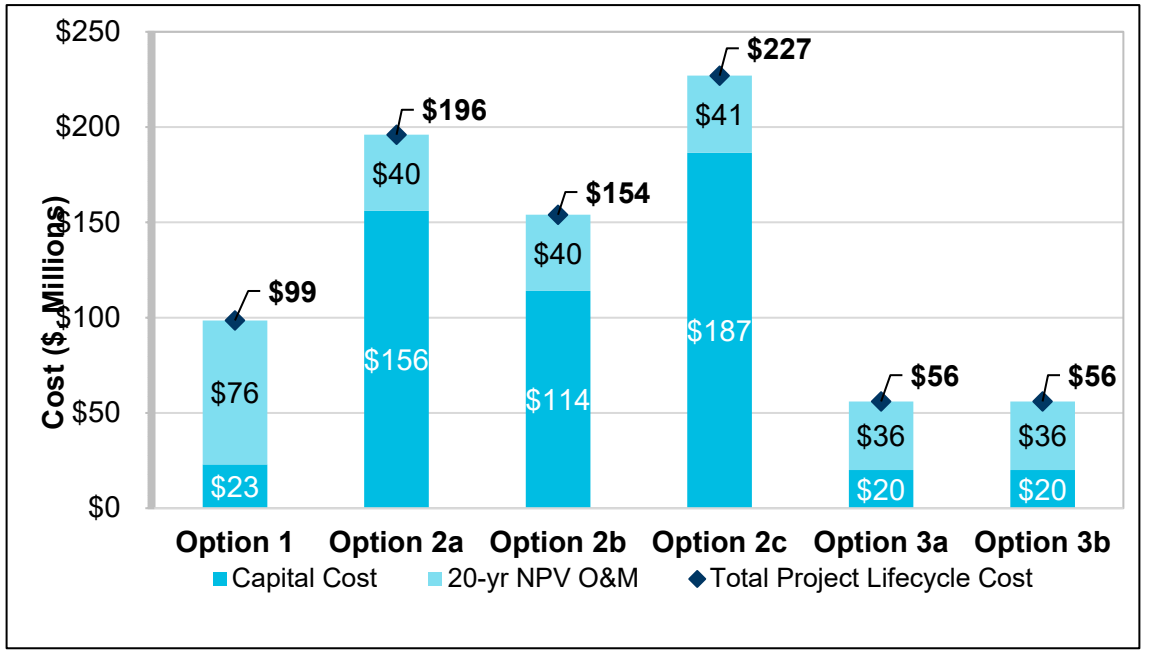


3. Concept Evaluation (Cost)

2050 Net Present Value (NPV) Operation & Maintenance (O&M) Cost:



Project Lifecycle Cost Estimates:



	Option 1	Option 2a	Option 2b	Option 2c	Option 3a	Option 3b
Preliminary Capital Cost Estimate	$23,000,000	$156,000,000	$114,000,000	$186,500,000	$20,000,000	$20,000,000
2050 NPV O&M Cost Estimate	$75,500,000	$40,000,000	$40,000,000	$40,500,000	$36,000,000	$36,000,000
Project Lifecycle Cost	**$98,500,000**	**$196,000,000**	**$154,000,000**	**$227,000,000**	**$56,000,000**	**$56,000,000**
MCA Score	65	66	66	65	95	95
Cost per MCA Scoring Point	$1,520,000.00	$2,970,000.00	$2,330,000.00	$3,490,000.00	$590,000.00	$590,000.00

4. Next Stages: Identify Preferred Option

The next steps to advance the Lewes WWTF Long Range Planning Study and address the underlying issues are as follows:

1. Sussex County will present the findings of the study to the County Council, December 6th 2022.
2. BPW will arrange a Special Meeting to present the findings to the public, engage with the community stakeholders and provide an opportunity for stakeholders to comment on the findings before a preferred option is identified by the BPW Board.
    - **Meeting date is still to be determined**
3. BPW will include the Long Range Planning Study on the agenda for a further Board meeting and at that time the Board will make its final decision on a preferred option for further design development.
4. The preferred option will advance for further development, including (but not limited to): field investigations, modeling, conceptual design and permitting design stages.

* Thank You

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