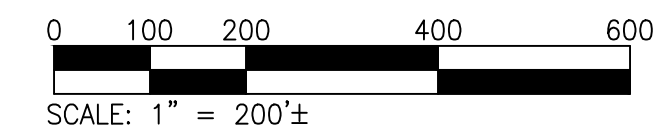
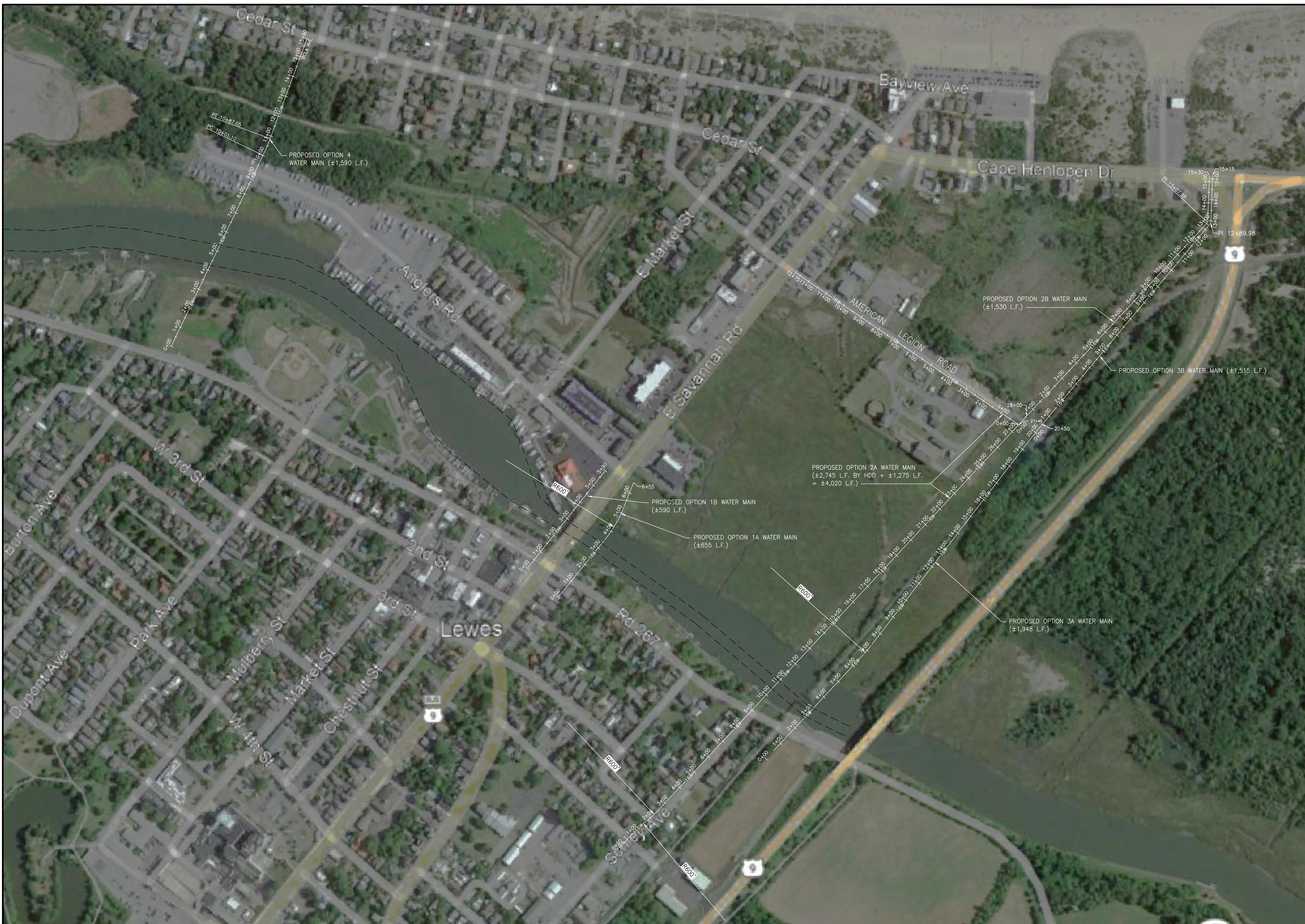


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 PLOT DATE
 PLOT TIME
 PLOT USER
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 PLOT SCALE
 PLOT SHEET NO.
 PLOT SHEET TOTAL



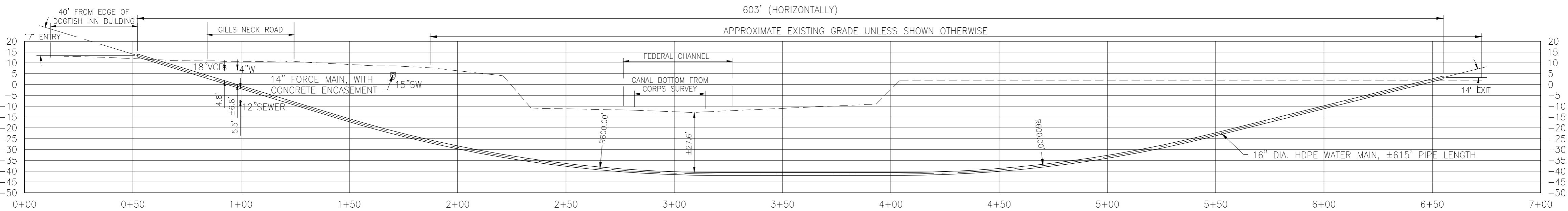
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DATE	
REVISIONS	
NO.	

GMB
 GEORGE, MILES & BUHR, LLC
 ARCHITECTS & ENGINEERS
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 SEAFORD, DELAWARE 19973
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 www.gmbnet.com

**PROPOSED WATER MAIN CROSSING
 OF THE LEWES & REHOBOTH CANAL**
 CITY OF LEWES
 SUSSEX COUNTY, DELAWARE

**CONCEPT
 OPTIONS**

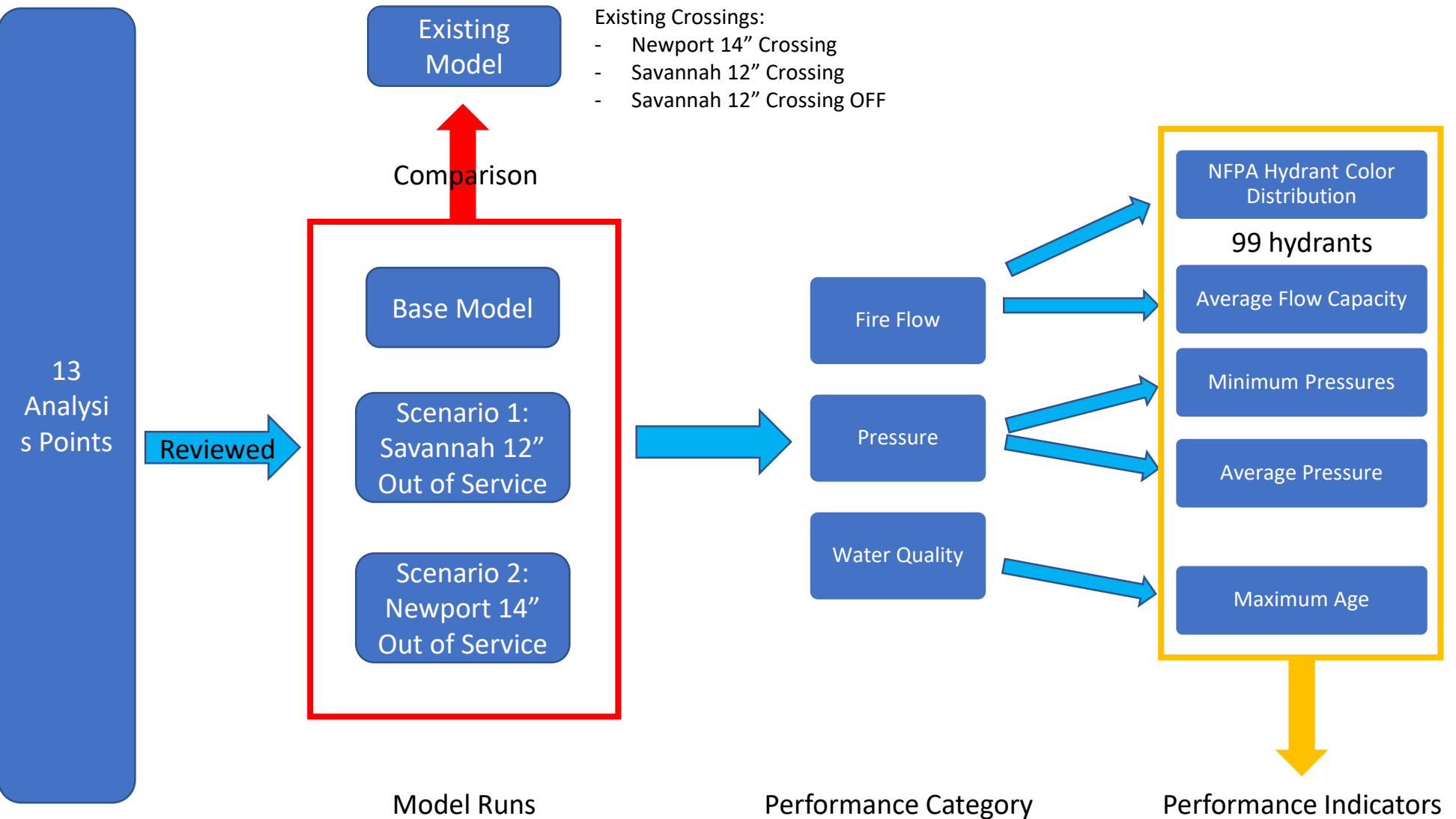
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DRAWN BY: JWK	
CHECKED BY: VAL_COD	
GMB FILE: 220183	
DATE: MARCH 2023	DRAWING 1 OF 1



OPTION 1A PROFILE

HORIZONTAL SCALE: 1"=30'
 VERTICAL SCALE: 1"= 30'

Hydraulic Modeling Summary



**Lewes Rehoboth Canal Watermain Crossing
Summary of Cost for By Option
March 2023**

Location Option	Cost
OPTION NO. 1-A - PS No. 3/Savannah Road Bridge Area: South side Drill	\$1,534,125
OPTION NO. 1-B - PS No. 3/Savannah Road Bridge Area: North side Drill	\$1,496,750
OPTION NO. 2-A – Schley Ave Area: Schley Ave to American Legion Road to Savannah Road	\$3,055,000
OPTION NO. 2-B – Schley Ave Area: Schley Ave to Cape Henlopen Drive	\$3,259,125
OPTION NO. 3-A – Kennedy Property: Kennedy Property to American Legion Road to Savannah Road	\$2,567,975
OPTION NO. 3-B – Kennedy Property: Kennedy Property to Cape Henlopen Drive	\$2,792,225
OPTION NO. 4 - Queen Anne: Queen Ann to Cedar Ave	\$1,502,500

Table 3: Evaluation Criteria

Evaluation Category	Category Weight	Evaluation Criteria	Performance Measure	Criteria Weight	Rating = 1 (Worst)	Rating = 3 (Average)	Rating = 5 (Best)
Permitting and Schedule	15%	Easement Acquisition	Expected need and complexity for easements to accomplish work	2	Greater than other Options	Comparable to other Options	Less than other Options
		Permitting	Expected complexity of permitting work	1	Greater than other Options	Comparable to other Options	Less than other Options
Community Impacts	20%	Stakeholder Impacts During Construction	Temporary impacts to the public during construction related to noise, road closures and other factors	3	Greater than other Options	Comparable to other Options	Less than other Options
		Constructability	Ease of construction process	2	Greater than other Options	Comparable to other Options	Less than other Options
		Duration of work	Estimated length of project equating to impact to public	1	Greater than other Options	Comparable to other Options	Less than other Options
Hydraulic Benefits	65%	Hydrant Fireflows	Impacts to Fire Hydrant Capacities of the 99 hydrants on the beach side	3	Worse Conditions than Existing Condition	Comparable to Existing Condition	Better Conditions than Existing Condition
		Pressure	Impacts to Minimum Pressures on the Beach Side	2	Worse Conditions than Existing Condition	Comparable to Existing Condition	Better Conditions than Existing Condition
		Water Quality	Impacts to aged water as an indicator of water quality	1	Worse Conditions than Existing Condition	Comparable to Existing Condition	Better Conditions than Existing Condition

Table 5: Hydraulic Analysis

Model Run	Criteria	Performance Measure	Weight of Category	Weight of Criteria	Location Option 1 - A: Savannah Crossing			Location Option 3 - A: Schley to American Legion Road			Location Option 3 - B: Schley to Cape Henlopen Drive			Location Option 4: Queen Anne (16" Crossing)			Location Option 4 - A: Queen Anne - Sub A (16" Crossing + 10" Cedar Upsize)			Location Option 4 - B: Queen Anne - Sub B (16" Crossing + 12" Cedar Upsize)				
					Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments		
					Base Model (12" Savannah & 14" Newport On)			50%																
	Hydrant Fireflows	Impacts to Fire Hydrant Capacities of the 99 hydrants on the beach side		3	4	12	6 hydrants improved	5	15	10 hydrants improved	5	15	14 hydrants improved	4	12	6 hydrants improved	Same benefits as Base Option. Suboptions are a replacement value for Option 2A only	Same benefits as Base Option. Suboptions are a replacement value for Option 2A only						
	Pressure	Impacts to Minimum Pressures on the Beach Side		2	3	6		4	8		4	8		3	6									
	Water Quality	Impacts to aged water as an indicator of water quality		1	2	2		2	2		1	1		3	3	Average age about								
					Subtotal =	20			Subtotal =	25			Subtotal =	24			Subtotal =	21			Subtotal =	21		
					Weighted Subtotal (Subtotal * Model Weight) =			10	12.5			12			10.5			10.5			10.5			
Savannah Road 12" Crossing Off			40%																					
	Hydrant Fireflows	Impacts to Fire Hydrant Capacities of the 99 hydrants on the beach side		3	4	12	6 increased, no increases to red topped	4	12	8 increased, no increases to red topped	4	12	11 increased, no increases to red topped	0	0	74 hydrants reduced, 61 are red topped vs 2 existing condition	0	0	29 hydrants reduced, 6 are red topped vs 2 existing condition	1		19 hydrants reduced (mostly blue topped), 3 are red topped vs 2 existing condition		
	Pressure	Impacts to Minimum Pressures on the Beach Side		2	4	8	Increased psi all locations (43 psi min) vs 41.9 psi in existing condition	4	8	Increased psi all locations (43.3 psi min) vs 41.9 psi in existing condition	4	8	Increased psi all locations (44.7 psi min) vs 41.9 psi in existing condition	1	2	Borderline unacceptable psi (35.6 psi min) in some locations vs 41.9 psi in existing condition	2	4	Reduced psi all locations (39.5 psi min) vs 41.9 psi in existing condition	2		Reduced psi all locations (40.5 psi min) vs 41.9 psi in existing condition		
	Water Quality	Impacts to aged water as an indicator of water quality		1	2	2		4	4		4	4		4	4		3	3		3		3		
					Subtotal =	22			Subtotal =	24			Subtotal =	24			Subtotal =	6			Subtotal =	7		
					Weighted Subtotal (Subtotal * Model Weight) =			8.8	9.6			9.6			2.4			2.8			4			
Newport 14" Crossing Off			10%																					
	Hydrant Fireflows	Impacts to Fire Hydrant Capacities of the 99 hydrants on the beach side		3	2	6	30 reduced (mostly blue topped), no increases to red topped	2	6	26 reduced (mostly blue topped), no increases to red topped	2	6	23 reduced (mostly blue topped), no increases to red topped	3	9	9 reduced, no increases to red topped	Same benefits as Base Option. Suboptions are a replacement value for Option 2A only	Same benefits as Base Option. Suboptions are a replacement value for Option 2A only						
	Pressure	Impacts to Minimum Pressures on the Beach Side		2	3	6	Increase minimums all but 2 nodes	4	8	Increase minimums for all locations	4	8	Increase minimums for all locations	3	6	Increase minimums all but 2 nodes								
	Water Quality	Impacts to aged water as an indicator of water quality		1	2	2		2	2		2	2		3	3									
					Subtotal =	14			Subtotal =	16			Subtotal =	16			Subtotal =	18			Subtotal =	18		
					Weighted Subtotal (Subtotal * Model Weight) =			1.4	1.6			1.6			1.8			1.8			1.8			
Sum of Weighted Scores:						20.2			23.7			23.2			14.7			15.1			16.3			

Table 4: MCA Evaluation

Category	Criteria	Performance Measure	Weight of Category	Weight of Criteria	Location Option 1 - A: Savannah Crossing (South of Drawbridge)			Location Option 1 - B: Savannah Crossing (North of Drawbridge)			Location Option 3 - A: Schley to American Legion Road			Location Option 3 - B: Schley to Cape Henlopen Drive			Location Option 4: Queen Anne (16" Crossing)			Location Option 4 - A: Queen Anne - Sub A (16" Crossing + 10" Cedar Upsize)			Location Option 4 - B: Queen Anne - Sub B (16" Crossing + 12" Cedar Upsize)					
					Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments	Rating	Score (Weight * Rating)	Comments			
					Permitting & Schedule					15%																		
	Easement Acquisition	Expected need and complexity for easements to accomplish work		2	2	4	Easement from both sides of Canal	2	4	Easements from Wheelhouse and Graves	3	6	Easement from Kennedy	3	6	Easement from Kennedy and DRBA	4	8	JB easement only	Option has same benefits/issues related to the crossing of the canal. Additional work is required and reflected as part of the Cost per Point review.			Option has same benefits/issues related to the crossing of the canal. Additional work is required and reflected as part of the Cost per Point review.					
	Permitting	Expected complexity of permitting work		1	2	2	DeIDOT MOT more impactful	2	2	DeIDOT MOT more impactful	3	3	Bike Path Permitting / RR Permitting	2	2	Bike Path Permitting / RR Permitting	4	4	Least DeIDOT Permitting Effort									
					Subtotal =			6			6			9			8			12			12					
					Weighted Subtotal (Subtotal * Model Weight) =			0.9			0.9			1.35			1.2			1.8			1.8					
Community Impacts					20%																							
	Stakeholder Impacts During Construction	Temporary impacts to the public during construction related to noise, road closures and other factors		3	1	3	Heart of downtown, more extensive road/lane closures	2	6	Heart of downtown, limited road closures	4	12	Limited impacts to traveling public, work in roads are lower capacity roads.	4	12	Limited impacts to traveling public, work in roads are lower capacity roads.	4	12	Limited impacts to traveling public	Option has same benefits/issues related to the crossing of the canal. Additional work is required and reflected as part of the Cost per Point review.			Option has same benefits/issues related to the crossing of the canal. Additional work is required and reflected as part of the Cost per Point review.					
	Constructability	Ease of construction process		2	1	2	Existing utilities & FM crossing prove difficult	2	4	Bore path is more open & less existing to work around	4	8	Relatively Open, long bores via marshland	3	6	Relatively Open, long bores via marshland	4	8	Relatively Open, existing electrical crossing may be issue.									
	Duration of work	Estimated length of project equating to impact to public		1	4	4	Shorter Duration than Queen Anne	4	4	Shorter Duration than Queen Anne	2	2	Longer Duration than Queen Anne	2	2	Longer Duration than Queen Anne	3	3	Middle Duration									
					Subtotal =			9			14			22			20			23			23					
					Weighted Subtotal (Subtotal * Model Weight) =			1.8			2.8			4.4			4			4.6			4.6					
Hydraulics					65%																							
	Hydraulic Analysis	Weighted total based on Hydraulic sub-table analysis (Table 3)		1		20.2			20.2			23.7			23.2			14.7			15.1			16.3				
					Subtotal =			20.2			20.2			23.7			23.2			14.7			15.1			16.3		
					Weighted Subtotal (Subtotal * Model Weight) =			13.13			13.13			15.41			15.08			9.56			9.82			10.60		
					Sum of Weighted Scores:			15.83			16.83			21.16			20.28			15.96			16.22			17.00		

Table 6: MCA Summary

Location	Sum of Weighted Scores	Cost Estimate	Cost per Point: (Cost / Sum of Weighted Scores)
Option 1-B: Savannah Crossing (North of Drawbridge)	16.83	\$ 1,496,750	\$ 88,900
Option 4: Queen Anne (16" Crossing)	15.96	\$ 1,502,500	\$ 94,200
Option 1-A: Savannah Crossing (South of Drawbridge)	15.83	\$ 1,534,125	\$ 96,900
Option 3-A: Schley to American Legion Road	21.16	\$ 2,567,975	\$ 121,400
Option 3-B: Schley to Cape Henlopen Drive	20.28	\$ 2,792,225	\$ 137,700
Option 4-B: Queen Anne (16" Crossing + 12" Cedar Upsize)	17.00	\$ 3,012,500	\$ 177,300
Option 4-A: Queen Anne (16" Crossing + 10" Cedar Upsize)	16.22	\$ 2,902,500	\$ 179,000