Wayland Drinking Water Long Term Supply

Board of Public Works January 4, 2023



Goals of the Meeting

- Provide Recommendation
- Summary of Analysis
- Answer questions
- Board Decision: To connect or not to connect?



Agenda

- 1. Summary of Problem
- 2. Summary of Recommendation What we recommend
- 3. Alternatives Ranking Process *How recommendation determined*
- 4. Conclusion
- 5. Next steps



Summary of Problem – Existing Source Constraints: Space, Yield, Economics, & Environmental Impact / Permitting



Highest capital outlay with questionable feasibility & high uncertainty



Summary of Problem – PFAS in Local Supplies



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Summary of Problem

Wayland's water supply has no redundancy and is in jeopardy of another crisis like the summer of 2021.

- Wells are running essentially 24/7.
- Unable to meet resiliency standard (meet MDD w/o largest source).
- Needs are many and expensive
- MA PFAS limit <5 ppt likely within 5 years (all wells would exceed)
- Not feasible to build new WTPs at most wells
- > Wayland needs flexibility now
- Wayland wants to invest where large investments will not be wasted when regulations or local conditions change.



Happy Hollow Temporary Pilot PFAS System

Overview of Recommendation: Hybrid Alternative

Connection to the MWRA to supplement the Happy Hollow wellfield

- Phase 1 Permanent Connection to MWRA
 - 24" Main ~(6,400 ft) from Elm Street via Hultman to Wallace Road/OCP
 - Pump Station (~2.5MGD) & 16" main upgrades (~2,300 ft)
- Phase 2 Happy Hollow 1.4MGD PFAS Permanent Water Treatment Plant

$\sqrt{}$ Lowest initial capital cost

- $\sqrt{}$ Lowest operational cost (of the feasible alternatives)
- $\sqrt{}$ Lowest 25-yr and 50-yr lifecycle cost (of the feasible alternatives)
- $\sqrt{}$ Happy Hollow is the best local source for investment due to its available land, location, and condition.
- $\sqrt{}$ Restore critical supply resiliency needed in the near term
- $\sqrt{}$ Flexibility & expandability to overcome future regulations and uncertainties



Summary of Recommendation (continued)

Phase 1

- MWRA Admission / Permitting & Design ~ 2 years
- 24" Pipeline via Hultman corridor, PS, 16" main Construction ~2 years
- Meanwhile:
 - Continue Rental of Happy Hollow Pilot PFAS System
 - Upgrade Baldwin Filters (2023)
 - Continue use of Chamberlain / Campbell if able (or pull from MWRA Emergency)
 - Monitor PFAS regulatory environment & sources
 - > Decision on if / when design of HH permanent PFAS WTP or expand MWRA use

Phase 2

Design & construction of Happy Hollow permanent / expanded PFAS WTP (OR expand MWRA usage: add pumps to PS & extend 16" main upgrades)



Alternatives Ranking Process:

Since October Meeting:

- 1. Review / update feasibility of options; site walk
- 2. Refine & Update 'nearterm' capital costs (0-10 yr)
- 3. Estimate Annual Operations costs
- 4. Screen out worst options
- 5. Scoring /ranking of top options





Alternatives Ranking Process:

Started with 16 different options looking at capital 0-10 yr, \$M/MGD, LCC

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	Alternative (MGD Supplied by MWRA under MDD)	MWRA Supply	_	Pump Station Size	Transm Main L	nission 16" Pipe ength Upgrades on	16" Pipe Ugrades on	Total Near Term Capital Cost	Million Dollars (Upfront) Per MGD	Local Supply	Total supply	Total Near Term Capital Cost (Local	\$M/MGD (Near Term)	Total 0-10 YR	\$ M/MGD (10-yr)	50-Year Cost
2 -		(MGD)	* % MWR *	(HP) 💌	(ft	t) OCP (ft)	WPS (ft 🝸	(MWRA Suppl	(MWRA Supply	(MGD)	ch 🝸	Supply)	(Local Supp	Capital Cost	(Total)	(Total NPV 🝸
	Wheeling water From Framingham (0.45)	0.45	18%	50		1,400 -	-	\$ 2,500,000	5.56	2.05	2.50	\$ 46,000,000	22.44	\$ 48,500,000	19.40	
+ 2	wheeling water From Framingham (0.9)	0.90	36%	100		1,400 3,600	-	\$ 5,300,000	5.89	1.60	2.50	\$ 33,000,000	20.63	\$ 38,300,000	15.32	
	Wheeling Water From Framingham (1.75)	1./5	/0%	200		1,400 -	5,600	\$ 8,700,000	4.97	0.75	2.50	\$ 15,000,000	20.00	\$ 23,700,000	9.48	
, 4	Wheeling Water From Framingham (2)	2.00	80%	230	- 1	1,400 10,000	-	\$ 11,600,000	5.80	0.50	2.50	\$ 8,000,000	16.00	\$ 19,600,000	7.84	\$ 670,000,000
2 6	MWPA Via Hultman to Hanny Hollow (1.2)	2.50	/8%	150	-										13.60	\$ 070,000,000
3 7	MWRA Via Hultman to Happy Hollow (2.5)	2.50	100%	300	-							Lar	a Torm Fe	acibility	7.52	
0 8	MWRA Via Hultman to OCP (0.2)	0.20	8%	40	-	Alternative (% Supplied by MWRA)							15.40	\$ 224 000 000		
1 9	MWRA Via Hultman to OCP (1.05)	Hultman to OCP (1.05) 1.05 42% 150 Screening							ng	12.96	\$ 228,000,000					
2 10	MWRA Via Hultman to OCP (2.5)	2.50	100%	300											6.44	\$ 220,000,000
3 11	MWRA Supply Via In-Road Transmission Main (0.45)	0.45	18%	50	-							-			1 21.16	\$ 224,000,000
4 12	MWRA Supply Via In-Road Transmission Main (0.9)	0.90	36%	100			1.		11 (4004)				A 14 14 14		17.04	\$ 224,000,000
5 13	MWRA Supply Via In-Road Transmission Main (1.75)	1.75	70%	200	6	WWRA Via H	ultman	to Happy H	ollow (48%)			Not cons	structable		8.56	\$ 224,000,000
6 14	MWRA Supply Via In-Road Transmission Main (2)	2.00	80%	230	7	MWRA Via H	ultman t	o Hanny Ho	llow (100%)			Not con	tructable		9.76	\$ 224,000,000
7 19	MWRA Supply Via In-Road Transmission Main (2.5)	2.50	100%	300	'		ununant	опаррупс	1000 (10070)			Not com	ridetable		8.56	\$ 225,000,000
8 16	Local Supply Only	0.00	0%	NA	16	Local Supply (Only					New WT	Ps not fea	sible	18.40	\$ 212,000,000
5 Wheeling Water From Framingham (100%) Long ter 3 Wheeling Water From Framingham (70%) Long ter								m cost too m cost too m cost too	high high high							
	Screened out 12 options for				1	MWRA Supply Via In-Road Transmission Main (80%)						Highest	On cost	111811		
	feasibility and cost reasons				8	MWRA Via Hultman to OCP (8%)					HH alone not sufficient					
				-						init alone not sufficient						
					11	MWRA Supply Via In-Road Transmission Main (18%)					HH alone not sufficient					
					12	MWRA Supply Via In-Road Transmission Main (36%)				HH alon	HH alone not sufficient					
					1	Wheeling Water From Framingham (18%) HH alone not sufficient										
					2	Wheeling Water From Framingham (36%) HH alone not sufficient										
					10	Full MWRA Via Hultman to OCP (100%)										
				9	MWRA Via Hultman to OCP - 2MGD PS (42%)											
					15	MWRA Supply Via In-Road Transmission Main (100%)										
						MWRA Supply Via In-Road Transmission Main (70%)										

Top 4 Alternatives Ranking:

	2.5				20%	20%	10%	10%	10%	10%	20%	100%
	Alternative (% Supplied by MWRA)	Total 0-10 YR	50-Year Cost	Operation Cost	0-10 Yr Capital	50-Year LCC	Ability to Meet LT Supply	Political Complexity	Traffic Disruption	O&M Complexity	Operations Cost	Weighted Average Score
Ŧ		Capital Cost 🔻	(Total NPV) 🔻	(Ś/MG) 🔻		-		-			•	+
9	MWRA Via Hultman to OCP - 2MGD PS (42%)	\$ 21,844,250	\$ 195,000,000	\$ 6,142	3	3	2	3	3	2	3	2.80
10	Full MWRA Via Hultman to OCP (100%)	\$ 20,461,750	\$ 225,000,000	\$ 7,627	3	2	3	3	3	3	1	2.40
15	MWRA Supply Via In-Road Transmission Main (100%)	\$ 26,415,250	\$ 225,000,000	\$ 7,627	1	2	3	1	1	3	1	1.60
13	MWRA Supply Via In-Road Transmission Main (70%)	\$ 25,482,500	\$ 224,000,000	\$ 7,257	1	2	2	1	1	2	1	1.40

Used 7 Ranking Metrics and Weighted Score

- 0-10 yr capital cost
- 50-yr LCC
- Long Term capacity
- Political complexity
- Traffic disruption
- Operational complexity / (regulatory)
- Operational cost

Full MWRA and Hybrid via Hultman are top 2 ranked options.



LEGEND:	Not Feasible	0
	Least Favorable	1
		2
	Most Favorable	3

Top 2 Alternatives – Detail

Alternative	Required Elements	0-5 Yr Capital	5-10 Yr Capital	Total 10- Yr Capital	Operational Cost \$M/Y \$/MG	Life Cycle Cost 25yr / 50 yr NPV
Hybrid MWRA (~40%) & Happy Hollow	 0-5 yr: Filters @ Baldwin; well cleaning 24" main from Elm to Wallace & 2MGD HH to Chloramines. 2,300 ft 16" main OCP to Maiden 5+ yr: Permanent PFAS Facility at HH 	~\$13M	~\$9M	~\$22M	\$3.5M/yr \$6,100/MG	\$112M \$195M
Full MWRA (via Hultman)	 0-5 yr: Filters @ Baldwin; well cleaning 24" Main along Hultman to Wallace Rd. 5MGD PS 8,000 x 16" main OCP to Main St 	~\$20M	\$	~\$20M	\$4.3M/yr \$7,630/MG	\$116M \$225M

Hybrid is the best combination of cost and flexibility

Note: Costs are order of magnitude for <u>planning and comparison purposes</u> and are subject to change during design.



Conclusion

- Preferred Alternative is a connection to MWRA at Elm St via Hultman Easement
- Hybrid Solution provides best combination flexibility, operation and capital cost
- Several details to be determined during preliminary design (costs not high enough to affect ranking):
 - Pump Station (location, configuration)
 - Timing and manner of chloramine conversion at Happy Hollow
 - Details of the extent and timing of 16" main upgrades



Next Steps

- Vote of BPW
- Vote of Select Board
- Town Meeting Vote 'Approval to Proceed' with MWRA Admission process
- 1. Preliminary Design
- 2. MWRA Admission Permitting and Approvals
 - a) MEPA Environmental Notification Form
 - b) MEPA Environmental Impact Report
 - c) Local Water Resources Management Plan
 - d) Conservation & Demand Management Plan
 - e) Interbasin Transfer Application
 - f) MWRA Admission Application & Contract



Questions & Discussion

