



Evaluation of the Costs and Benefits of Implementing Ocean Water Desalination as a Local Drinking Water Supply

Chapter III - Appendix C Risk-Adjusted Cash Flow Model Outputs

West Basin Municipal Water District

Final Report
July 30, 2021

Submitted by



in association with
 RAFTELIS





Appendix C – Risk-Adjusted Cash Flow Model Outputs



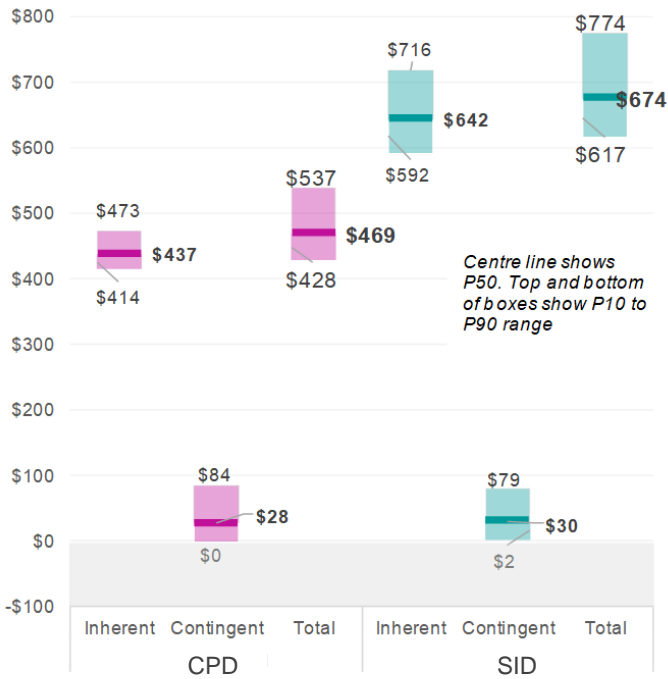
DBB Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

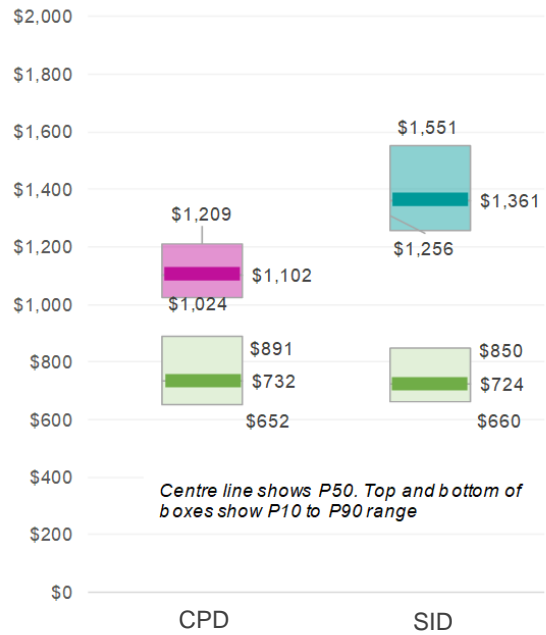
Delivery Model - DBB

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

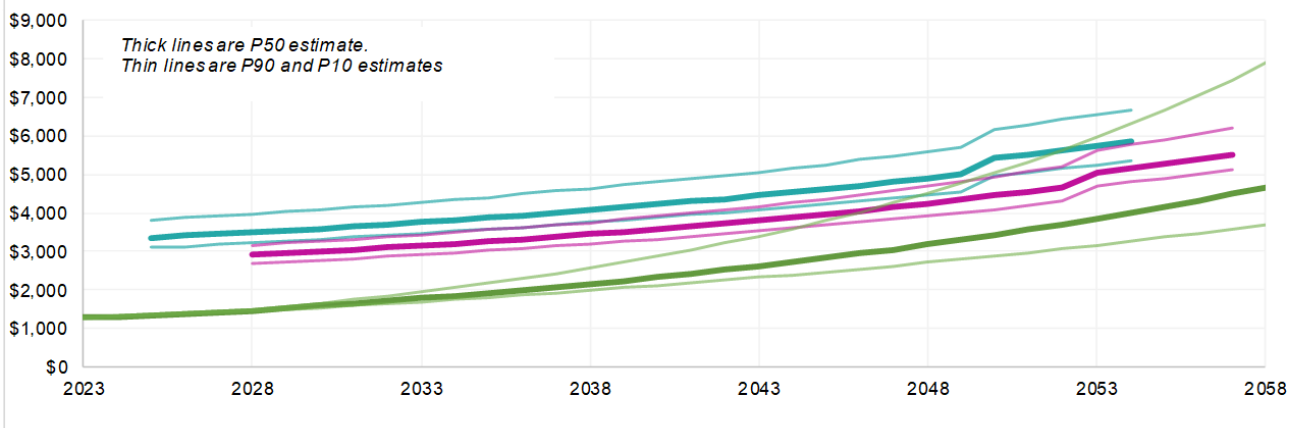
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$2,903	\$3,152	\$3,450	\$3,806	\$4,251	\$5,055	\$5,161	\$5,511
	P10 - P90	\$0 - 0	\$2682 - 3170	\$2926 - 3435	\$3199 - 3752	\$3524 - 4177	\$3924 - 4704	\$4701 - 5638	\$4797 - 5770	\$5116 - 6219
SID	P50	\$3,365	\$3,497	\$3,765	\$4,075	\$4,448	\$4,899	\$5,729	\$5,846	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$3096 - 3824	\$3222 - 3984	\$3472 - 4275	\$3758 - 4640	\$4082 - 5053	\$4465 - 5570	\$5253 - 6544	\$5346 - 6684	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



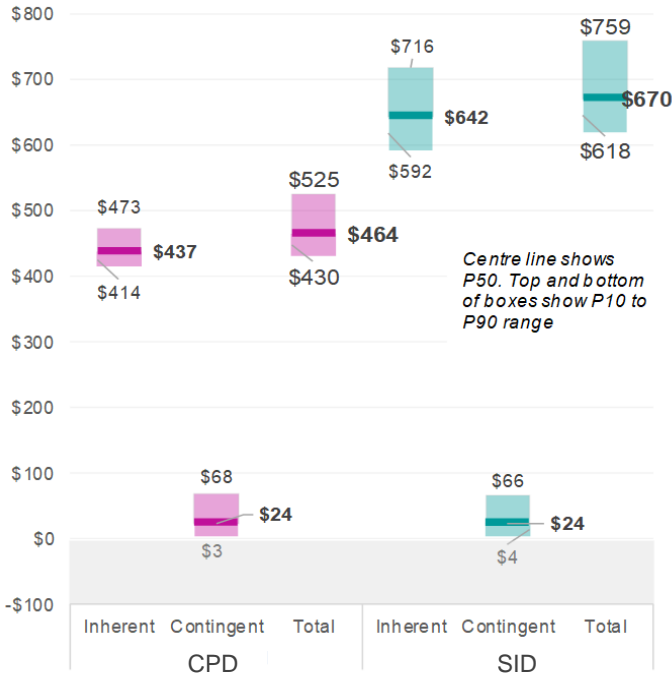
DBOM Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

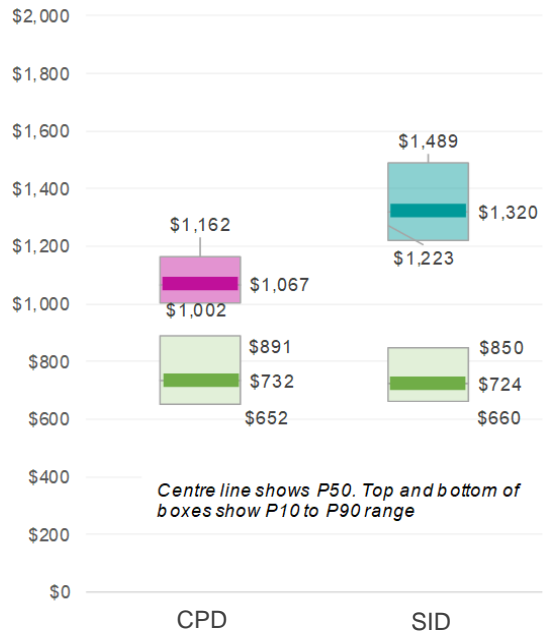
Delivery Model - DBOM

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

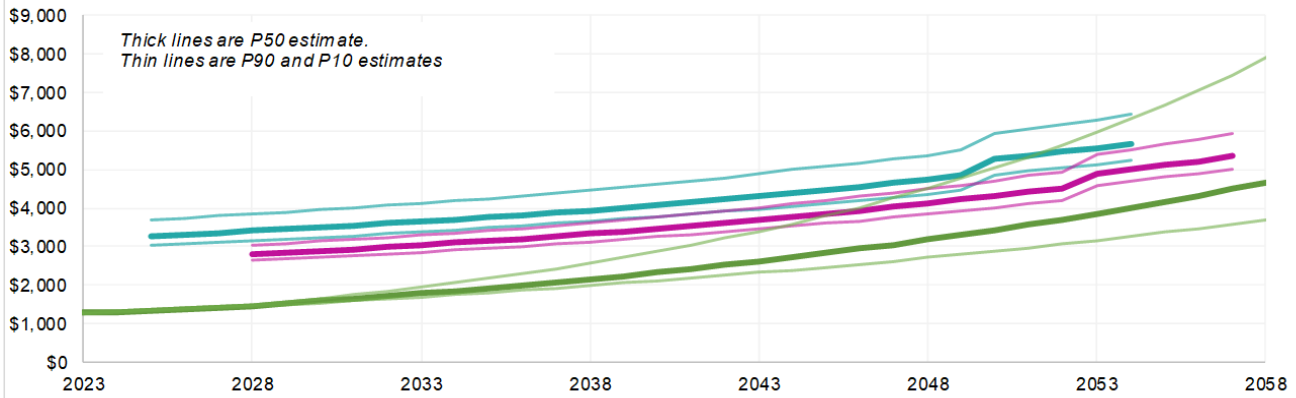
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$2,801	\$3,044	\$3,332	\$3,676	\$4,123	\$4,892	\$4,997	\$5,340
	P10 - P90	\$0 - 0	\$2636 - 3045	\$2860 - 3298	\$3133 - 3618	\$3454 - 4013	\$3835 - 4495	\$4601 - 5386	\$4696 - 5526	\$5008 - 5940
SID	P50	\$3,270	\$3,406	\$3,659	\$3,945	\$4,309	\$4,734	\$5,567	\$5,683	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$3035 - 3692	\$3155 - 3839	\$3388 - 4122	\$3659 - 4468	\$3976 - 4893	\$4361 - 5370	\$5142 - 6295	\$5243 - 6442	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



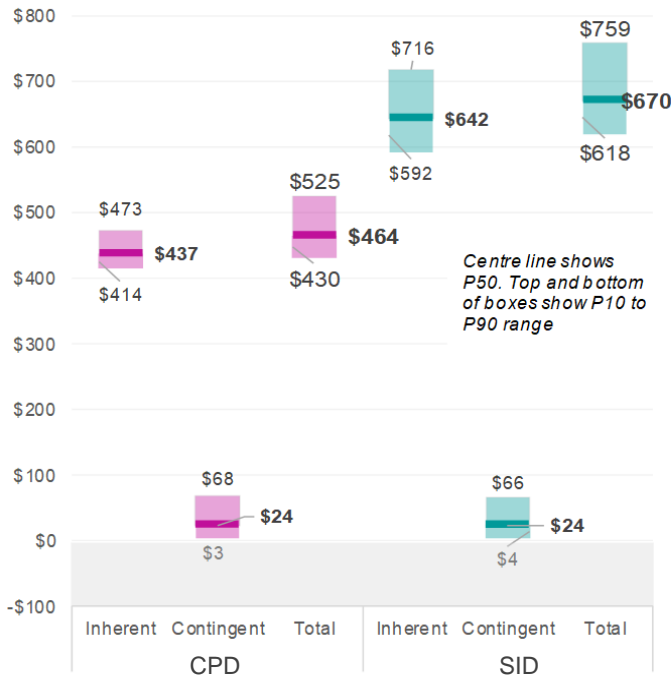
DBFOM-10% Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

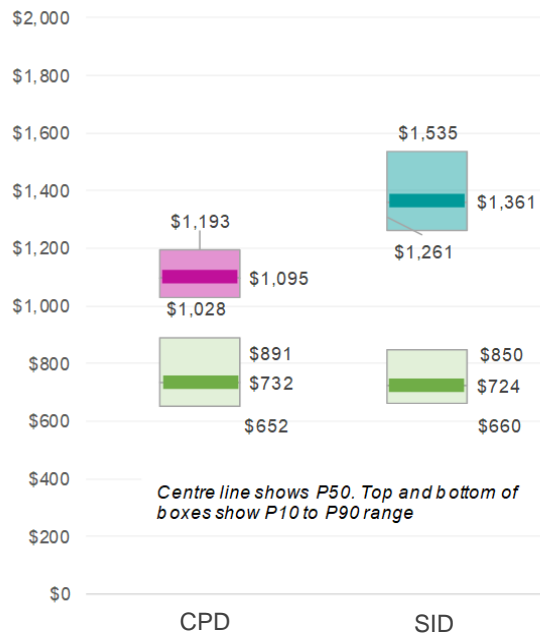
Delivery Model - DBFOM - 10%

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

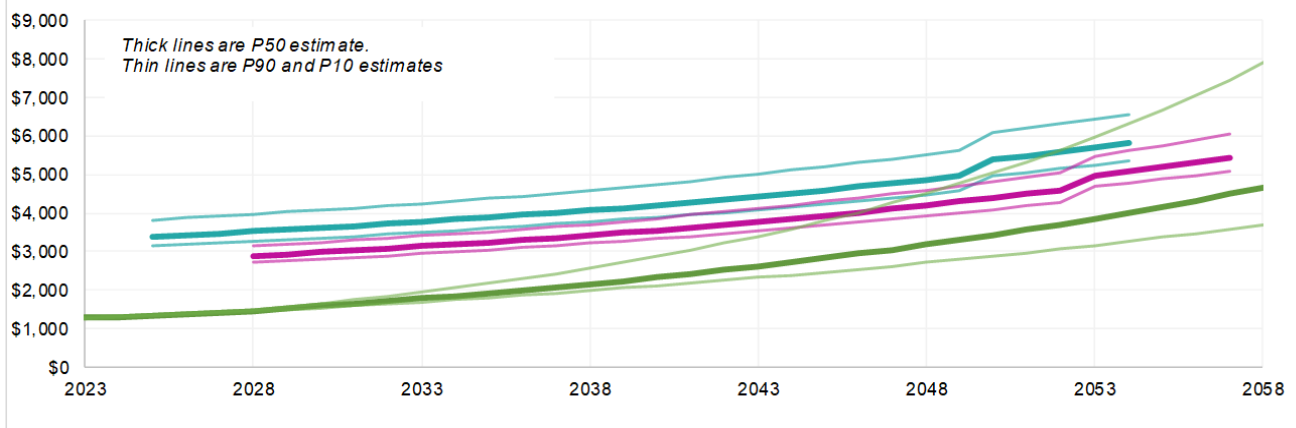
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$2,892	\$3,136	\$3,423	\$3,768	\$4,211	\$4,987	\$5,091	\$5,433
	P10 - P90	\$0 - 0	\$2,722 - 3152	\$2,948 - 3405	\$3,220 - 3710	\$3,539 - 4108	\$3,921 - 4592	\$4,690 - 5488	\$4,786 - 5614	\$5,096 - 6041
SID	P50	\$3,396	\$3,528	\$3,779	\$4,074	\$4,437	\$4,861	\$5,691	\$5,803	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$3147 - 3821	\$3269 - 3968	\$3504 - 4254	\$3771 - 4601	\$4089 - 5016	\$4474 - 5509	\$5258 - 6443	\$5359 - 6565	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



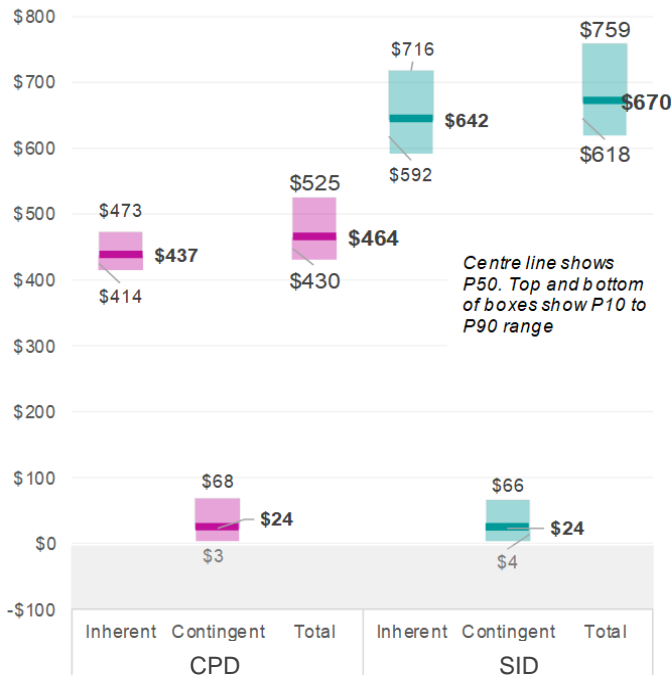
DBFOM-50% Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

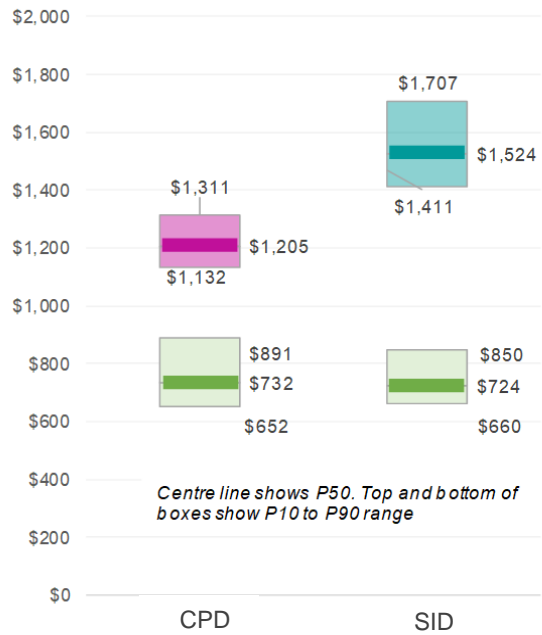
Delivery Model - DBFOM - 50%

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

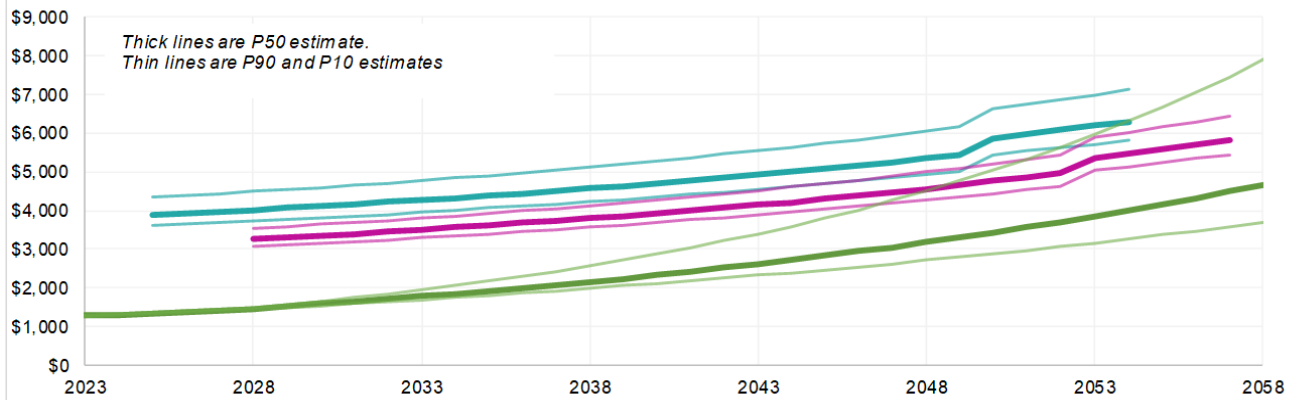
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$3,264	\$3,503	\$3,798	\$4,140	\$4,557	\$5,364	\$5,469	\$5,810
	P10 - P90	\$0 - 0	\$3064 - 3540	\$3296 - 3810	\$3565 - 4120	\$3887 - 4514	\$4267 - 4997	\$5042 - 5888	\$5141 - 6010	\$5448 - 6434
SID	P50	\$3,886	\$4,019	\$4,269	\$4,570	\$4,922	\$5,347	\$6,194	\$6,299	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$3605 - 4353	\$3720 - 4497	\$3952 - 4775	\$4232 - 5116	\$4549 - 5552	\$4936 - 6058	\$5714 - 6979	\$5825 - 7124	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



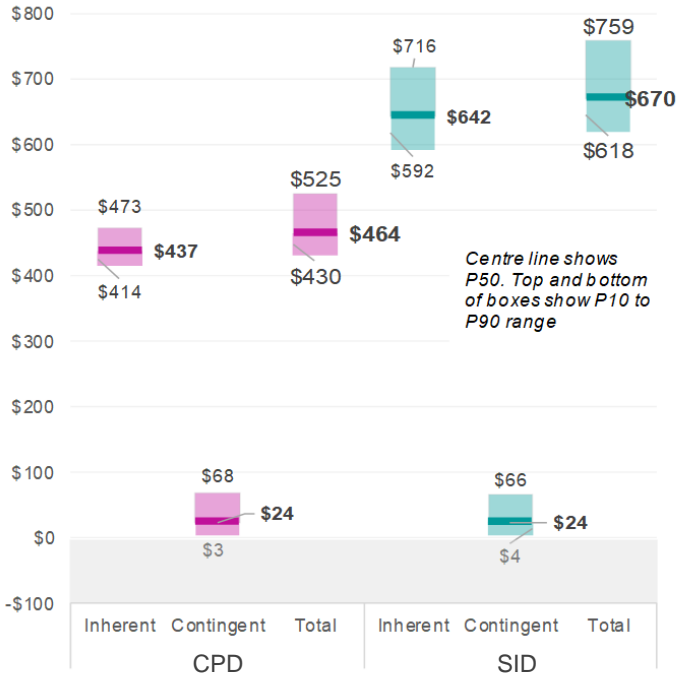
DBFOM-100% Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

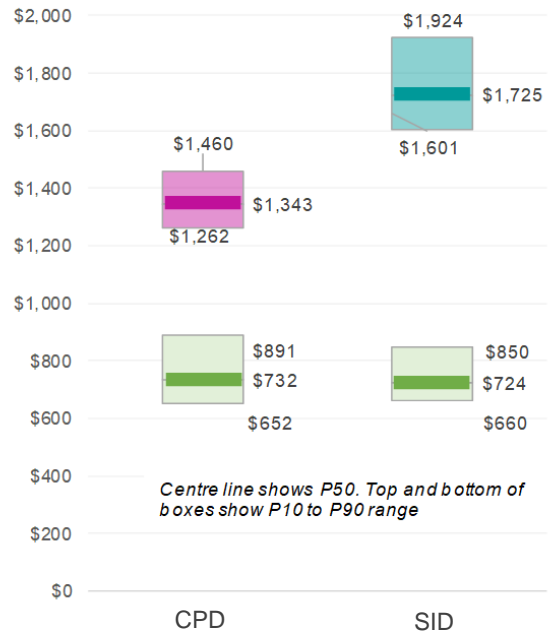
Delivery Model - DBFOM - 100%

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

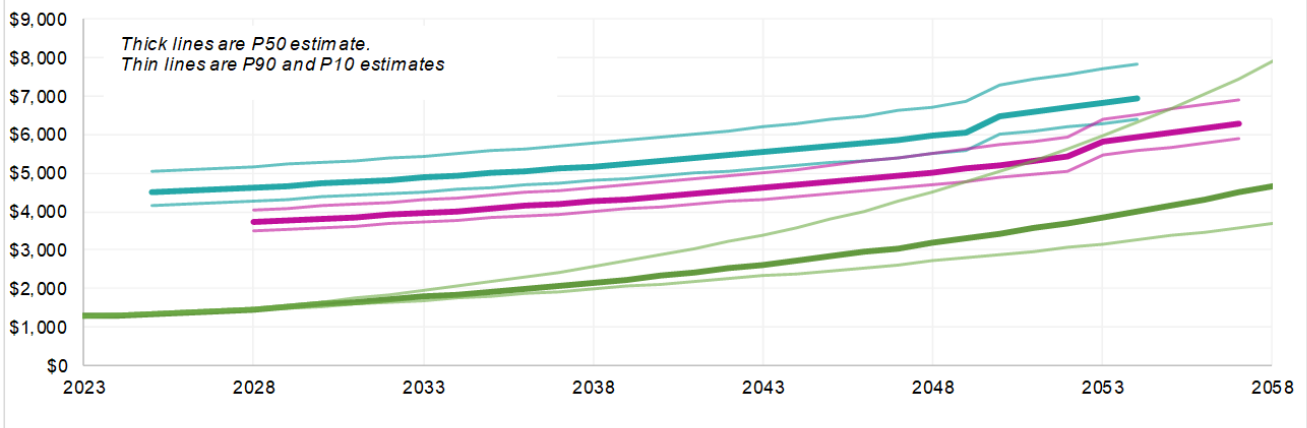
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$3,721	\$3,965	\$4,260	\$4,605	\$5,016	\$5,833	\$5,937	\$6,286
	P10 - P90	\$0 - 0	\$3495 - 4056	\$3727 - 4306	\$4002 - 4624	\$4329 - 4998	\$4697 - 5496	\$5479 - 6401	\$5578 - 6524	\$5892 - 6918
SID	P50	\$4,500	\$4,630	\$4,882	\$5,175	\$5,538	\$5,961	\$6,804	\$6,922	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$4173 - 5037	\$4289 - 5171	\$4517 - 5448	\$4810 - 5774	\$5126 - 6198	\$5497 - 6720	\$6292 - 7702	\$6392 - 7809	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



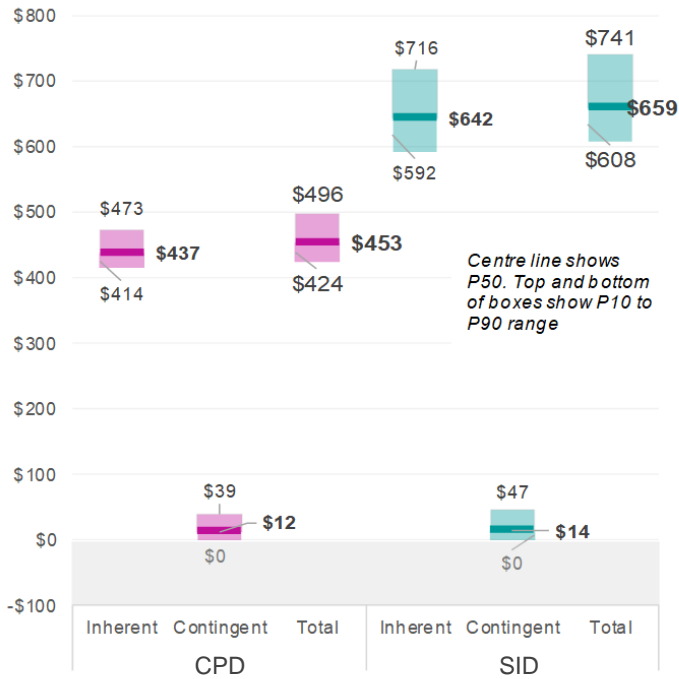
PPP Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

Delivery Model - PPP

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

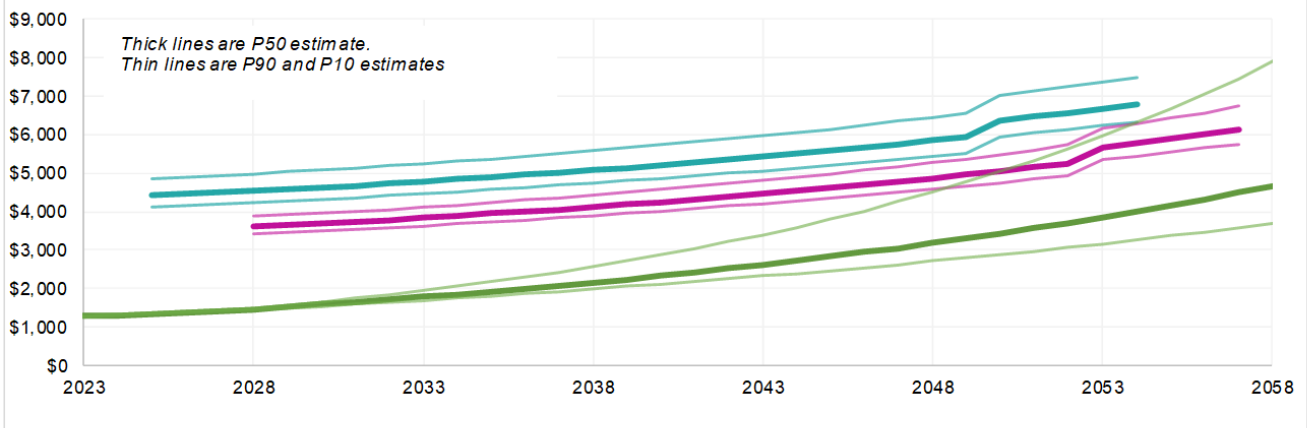
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$3,605	\$3,841	\$4,124	\$4,461	\$4,868	\$5,667	\$5,775	\$6,111
	P10 - P90	\$0 - 0	\$3409 - 3876	\$3635 - 4119	\$3903 - 4433	\$4213 - 4819	\$4576 - 5266	\$5350 - 6156	\$5445 - 6278	\$5760 - 6727
SID	P50	\$4,411	\$4,542	\$4,784	\$5,073	\$5,420	\$5,839	\$6,671	\$6,784	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$4115 - 4855	\$4235 - 4983	\$4469 - 5238	\$4738 - 5574	\$5062 - 5975	\$5445 - 6447	\$6232 - 7351	\$6335 - 7482	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517



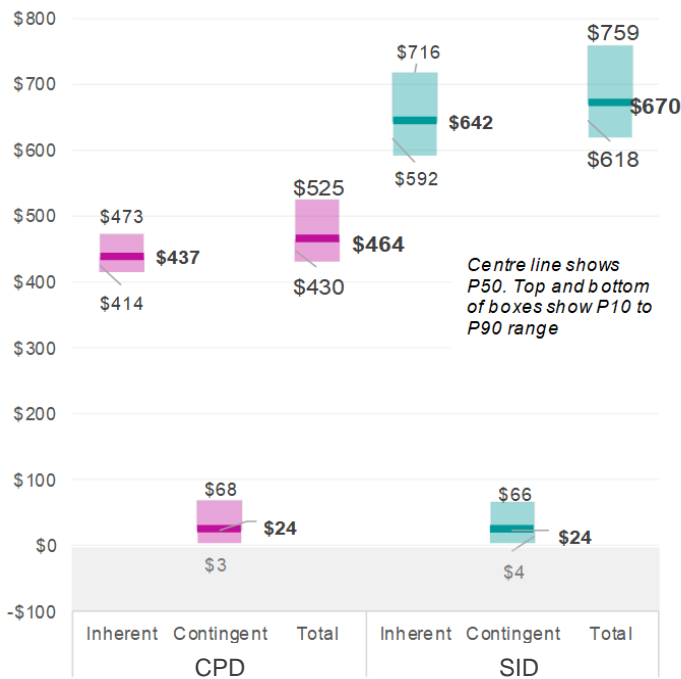
Sensitivity Scenario – DBOM with 50% SRF funding Delivery Model

RISK ADJUSTED CASH FLOW MODEL RESULTS

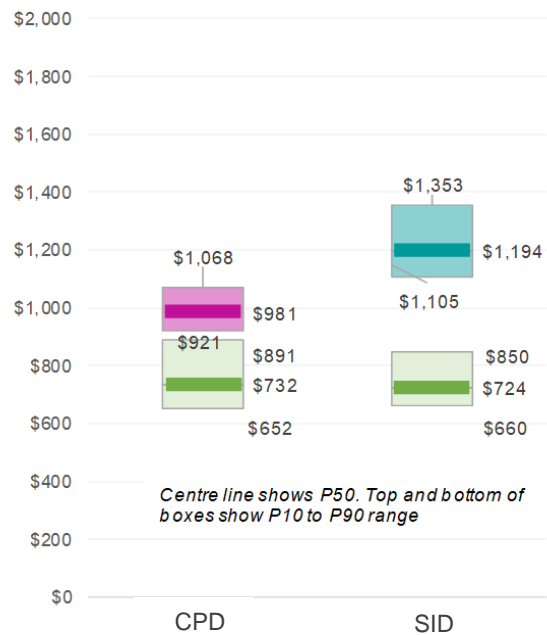
Delivery Model - DBOM w. 50% SRF funding

■ Current Project Design (CPD)
 ■ Subsurface Intake Design (SID)
 ■ Imported Water (No-Project)

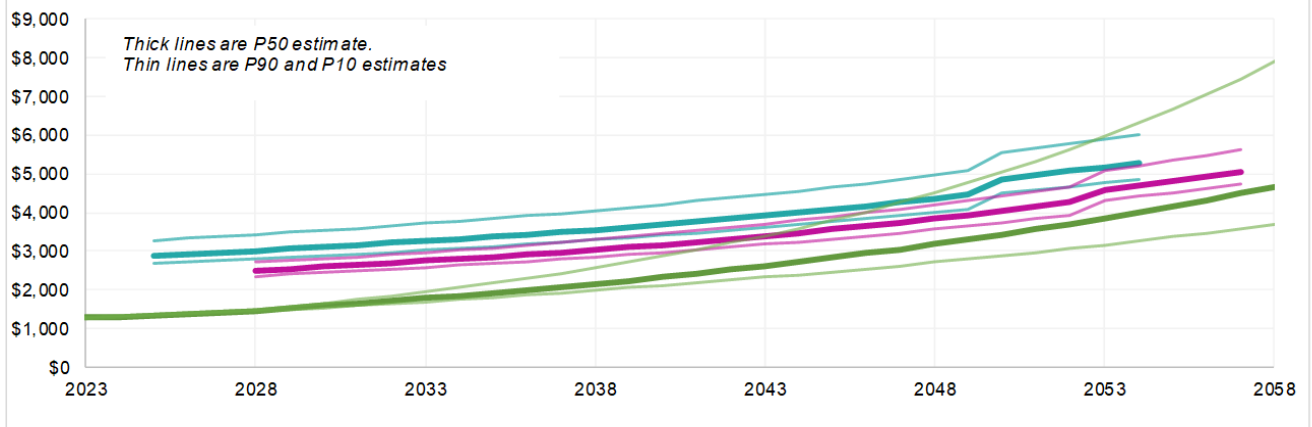
CAPEX (\$ millions, 2019 dollars)



Net Present Cost (\$ millions)



Cost of Water (\$/AF)



Year		2025	2028	2033	2038	2043	2048	2053	2054	2057
CPD	P50	\$0	\$2,503	\$2,749	\$3,037	\$3,394	\$3,840	\$4,593	\$4,696	\$5,038
	P10 - P90	\$0 - 0	\$2358 - 2719	\$2585 - 2971	\$2855 - 3293	\$3179 - 3699	\$3562 - 4202	\$4321 - 5081	\$4417 - 5205	\$4725 - 5631
SID	P50	\$2,883	\$3,017	\$3,265	\$3,557	\$3,919	\$4,368	\$5,181	\$5,293	\$0
	P10 - P90	\$1,355	\$1,472	\$1,786	\$2,160	\$2,623	\$3,178	\$3,852	\$4,002	\$4,494
No-project	P50	\$2671 - 3280	\$2795 - 3433	\$3024 - 3720	\$3295 - 4050	\$3614 - 4478	\$4017 - 4962	\$4769 - 5907	\$4870 - 6032	\$0 - 0
	P10 - P90	\$1336 - 1368	\$1442 - 1494	\$1702 - 1908	\$1991 - 2461	\$2327 - 3178	\$2713 - 4107	\$3167 - 5308	\$3265 - 5587	\$3585 - 6517





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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Final Draft	Nikhil Khurana	Mark Donovan		Mark Donovan		
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GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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