



## TECHNICAL MEMORANDUM

DATE: April 17, 2012 Project No.: 376-00-11-06

TO: Dennis Diemer, Woodland-Davis Clean Water Agency

CC: Doug Baxter, City of Woodland  
Diane Phillips, City of Davis

FROM: Andy Smith, R.C.E. #74673

REVIEWED BY: Jim Yost, R.C.E. #24137

SUBJECT: Comparison of Costs for Recent California Surface Water Projects

### **INTRODUCTION**

At the suggestion of Davis Woodland Water Supply Project (DWWSP) team members, West Yost Associates (West Yost) conducted a cursory investigation of costs for surface water supply projects recently constructed in California and developed a comparison to the estimated benchmark DWWSP costs. This technical memorandum (TM) presents a summary of this work.

### **INVESTIGATION METHODOLOGY**

Based on DWWSP project team and West Yost knowledge, a list of surface water supply projects recently constructed in California was developed. Included projects are primarily confined to Central and Northern California, particularly in the Central Valley. Definition of "recent" for the purposes of this evaluation is any project constructed since the early 2000's. Table 1 lists the comparison projects identified and researched for this evaluation. To varying degrees, the constructed projects feature elements similar to the DWWSP (e.g., raw water intake, raw water pipelines), although certain DWWSP project elements are missing from some of the comparison projects. All comparison projects feature a surface water treatment plant.

<b>Table 1. DWWSP Surface Water Comparison Projects</b>	
<b>Project Owner / Location</b>	<b>Project Status / Completion Date</b>
Department of Water Resources (DWR)	Early planning phase
Freeport Regional Water Authority (FRWA)	Nearing completion
City of Lodi	Nearing completion
City of Stockton	Nearing completion
Modesto Irrigation District (MID)	(a)
Cities of Tracy, Lathrop, Manteca and Escalon	2005
City of Tracy	2006
Turlock Irrigation District (TID)	(a)
City of Fresno	2004
City of Clovis	2004
City of Bakersfield / Cal Water	2003
City of San Diego	2006
Notes: (a) Information not readily available.	

Investigation of project details and cost information was limited to internet research and telephone inquiries with appropriate personnel associated with the projects in question. For many of the projects, readily available information was limited and/or incomplete. For example, very little information was found regarding treated water pipelines, where applicable, from water treatment plants to their respective distribution systems. Additionally, the nature and magnitude of indirect costs (e.g., design, permitting, legal, and so on) for the projects in question was not readily available in most cases.

## **PROJECT COST COMPARISON**

Table 2 presents all of the capacity and cost information that was obtained through West Yost's cursory investigation. Null entries reflect incomplete or unavailable information.

Figures 1 through 3 illustrate how the costs of the raw water intake, raw water pipeline and surface water treatment plant for the DWWSP compare to a subset of the comparison projects. Note that for projects omitted from these charts, cost information was not readily available for the project elements in question.

## **CONCLUSIONS**

The range of costs among comparison projects is relatively wide, owing to site-specific differences (e.g., presence and location of raw water intakes, presence and alignments of raw water pipelines, treatment processes, presence and alignments of treated water pipelines, permitting issues, and so forth) among the various projects. It does not appear that the DWWSP costs are out of line with the comparison projects.

Table 2. Capacity and Cost Information for Selected Recent California Surface Water Projects

Project Element	DWWSP	DWR	FRWA	Lodi	Stockton	MID	Tracy / Lathrop / Manteca / Escalon	Tracy	TID	Fresno	Clovis	Bakersfield / Cal Water	San Diego (Twin Oaks)
<b>Project Status</b>	Pre-Design	Early Planning	Nearing Completion	Nearing Completion	Nearing Completion	(a)	Completed	Completed	(a)	Completed	Completed	Completed	Completed
<b>Procurement Process</b>	DBO	TBD	DBB	DBB	DB	(a)	(a)	(a)	(a)	(a)	(a)	DB	DBO
<b>Construction Year</b>						(a)	2005	2006	(a)	2004	2004	2003	2006
<b>Intake</b>													
Location	On Sacramento River, near Woodland, CA	On Sacramento River Alternative 1: Near Clarksburg, CA Alternative 2: Near Courtland, CA	On Sacramento River, near Freepport, CA	At head of Woodbridge Irrigation District canal, at Mokelumne River, in Lodi, CA, near Lodi Lake	San Joaquin River at Eight Mile Rd	Modesto Reservoir	(a)	(a)	(a)	Friant-Kern Canal / Enterprise Canal	(a)	(a)	(a)
Style	Flat plate Parallel to river	TBD	Flat plate Parallel to river	Flat plate "V" shaped	Flat plate Parallel to river	Turnout	(a)	(a)	(a)	Turnout	(a)	(a)	(a)
Capacity, cfs	80	240	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Capacity, MGD	53	155	(a)	11.5	30.0	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction Cost \$	12,200,000	(a)	\$ 85,000,000	(a)	\$ 25,900,165	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/MGD	236,000	(a)	460,000	(a)	864,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
<b>Raw Water Pipeline</b>													
No. Pipes	2	1	1	1	1	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Diameter, in	36	84	84	30	54	(a)	(a)	(a)	(a)	N/A	(a)	(a)	(a)
Length, mi	4.5	32.0	13.0	(a)	18.0	(a)	(a)	(a)	(a)	4.5	(a)	(a)	(a)
Length, LF	47,520	168,960	68,640	1,200	95,040	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction Cost \$	35,700,000	(a)	\$ 185,000,000	(a)	\$ 54,000,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/ID-LF	10.4	(a)	32.1	(a)	10.5	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/MGD	691,000	(a)	1,000,000	(a)	1,800,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
<b>Water Treatment Plant</b>													
Location	Woodland, CA	N/A	Sacramento, CA	Lodi, CA	North of Stockton, CA	Near Modesto Reservoir	(a)	(a)	(a)	Fresno, CA	Clovis, CA	(a)	San Diego, CA
Initial Capacity, MGD	40		50	8	30	30	40	15	29	27.5	15	20	100
Ultimate Capacity, MGD	52		100	20	160	60	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Treatment Type	Conventional Ozonation		Conventional	Membrane	Membrane	Membrane	Membrane	Conventional		Conventional Ballasted flocculation Ozonation	Ballasted flocculation Membrane filtration	Membrane	Membrane
Construction Cost \$	130,100,000		\$ 207,249,000	\$ 27,500,000	\$ 102,000,000	(a)	\$ 136,600,000	\$ 40,839,930	\$ 74,240,000	\$ 32,000,000	\$ 26,000,000	\$ 42,570,000	\$ 157,000,000
\$/MGD	3,253,000		4,145,000	3,438,000	3,400,000	(a)	3,415,000	2,723,000	2,560,000	1,164,000	1,734,000	2,129,000	1,570,000
<b>Treated Water Pipeline(s)</b>													
Pipe No. 1		N/A	N/A				East-West						
Diameter, in	36			36	54	24	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, mi	7			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, LF	36,960			3,200	(a)	17,200	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction Cost \$	25,900,000			(a)	\$ 6,400,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/ID-LF	19.4			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Pipe No. 2		N/A	N/A				North-South						
Diameter, in	36			(a)	42	24	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, mi	7			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, LF	36,960			(a)	(a)	23,900	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction Cost \$	25,820,000			(a)	\$ 5,100,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/ID-LF	19.4			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Pipe No. 3		N/A	N/A				Southern						
Diameter, in	30			(a)	36	24	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, mi	3.25			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Length, LF	17,160			(a)	(a)	14,600	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Construction Cost \$	10,130,000			(a)	\$ 4,100,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/ID-LF	19.7			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Total Cost per Total TW MGD	\$ 1,189,423	\$	\$	\$	\$ 520,000								
<b>Other</b>													
Indirect Costs \$	97,150,000	(a)	(a)	(a)	\$ 19,902,565	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
\$/MGD	2,429,000	(a)	(a)	(a)	664,000	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
<b>Summary</b>													
Total Project Cost	\$ 337,000,000	\$ 436,000,000	\$ 477,249,000	\$ 48,900,000 (b)	\$ 217,402,733	\$ 57,308,855	\$ 136,600,000	\$ 40,839,930	\$ 183,000,000 (b)	\$ 32,000,000	\$ 26,000,000	\$ 42,570,000	\$ 157,000,000
Limiting Project Capacity, MGD	40	155	50	8	30	30	40	15	29	27.5	15	20	100
\$/MGD	8,425,000	2,811,000	9,545,000	6,113,000	7,247,000	1,911,000	3,415,000	2,723,000	6,311,000	1,164,000	1,734,000	2,129,000	1,570,000
FOOTNOTES:													
(a) Not applicable or information not readily available													
(b) Total provided by project contact (not calculated from above costs)													

Figure 1.

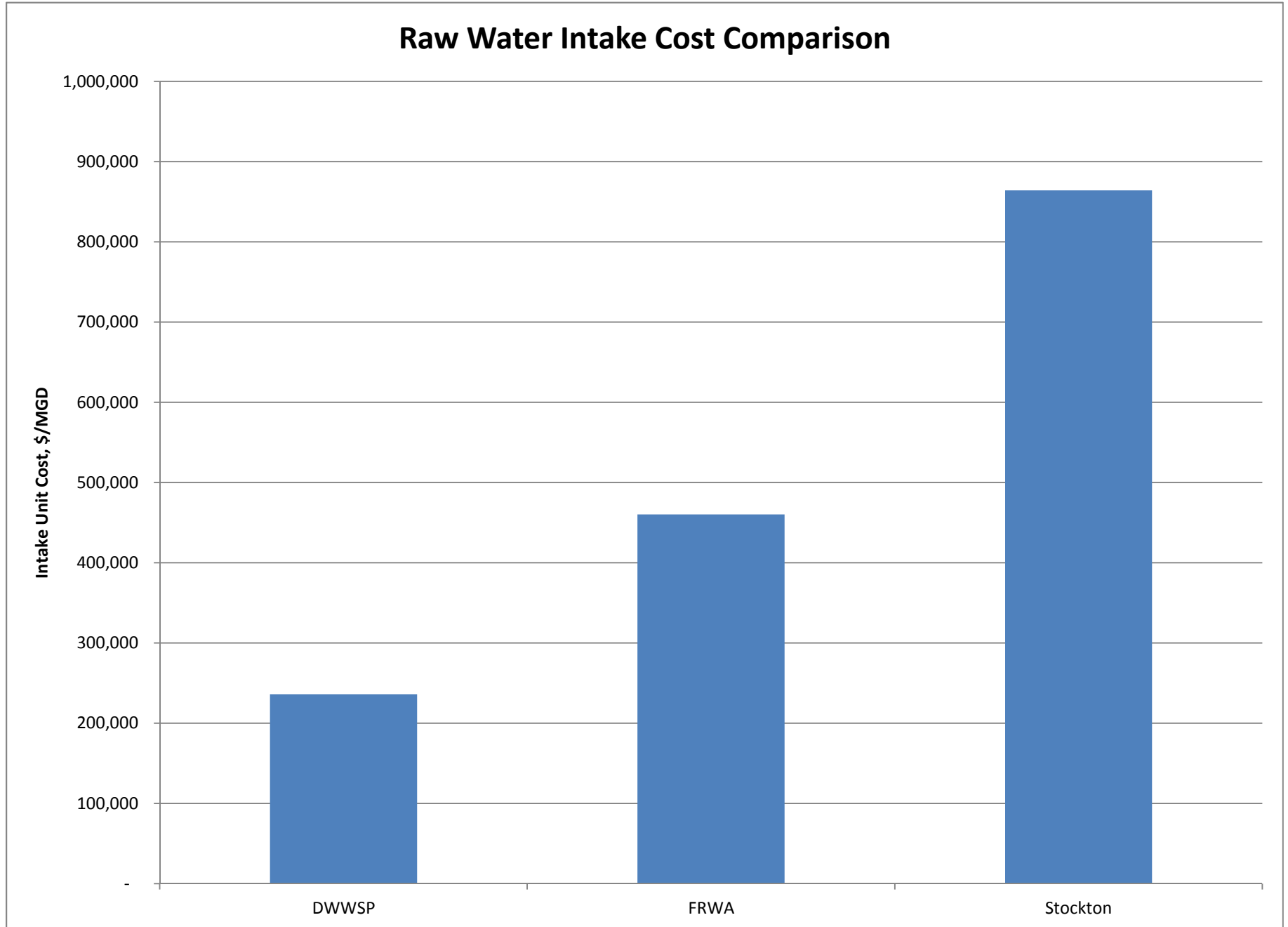


Figure 2.

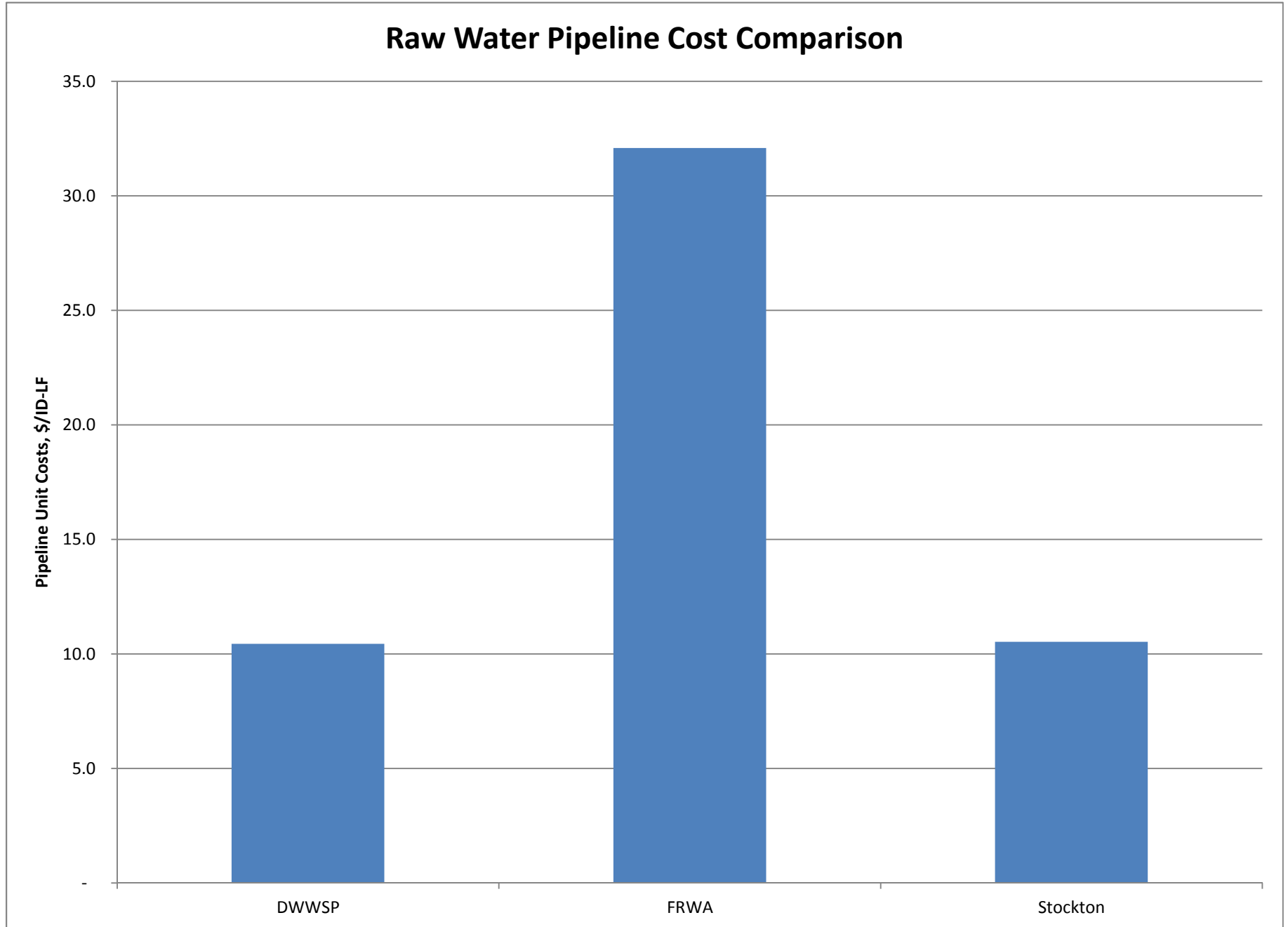


Figure 3.

