8. Cost Estimate

Updated: 3/23/2004

Independent Government Estimate Code A
Hatchery Water Supply Study
Chief Joseph Dam Bridgeport, WA

Item No.	Description	Estimated Quantity	Unit	Unit Price		Estimated Amount
1	Mob & Demob	1	LS	52,759.56	$	52,760
2	Relief Tunnel Revisions	1	LS	848,875.84	$	848,876
3	Intake Diversion Revisions	1	LS	155,371.75	$	155,372
4	Pipeline, Dam to Hatchery	1	LS	2,016,381.25	$	2,016,381
				Project Cost Total	$	3,073,388
				PROJECT COST TOTAL (rounded up) =	$	3,074,000

The rounded total includes all contractor & owner markups.

Contractor markups include	Small Tools	**3.00%**	**(of Labor)**
	JOOH	**5.00%**	
	HOOH	**10.00%**	
	Profit	**10.25%**	
	Bond/Ins	**2.00%**	
	B&O Tax	**0.56%**	
Owner markers include:	Escalation	**0.67%**	
	Contingency	**30.00%**	
	S & A	**7.00%**	

Independent Government Estimate Code A
Hatchery Water Supply Study Chief Joseph Dam
Bridgeport, WA

Code A_Hatchery Water Supply Study.xls SUMMARY

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Title Page

Hatchery Water Supply Project

A 25% contingency is used for this initial budgetary estimate.

Estimated by	Cost Engineering Unit, CENWS-EC-CO-CA
Designed by	U.S. Army Corps of Engineers, Seattle District
Prepared by	Timothy F. Sullivan, P.E.
Preparation Date	3/23/2004
Effective Date of Pricing	9/30/2005
Estimated Construction Time	120 Days

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Library Properties

Designed by
U.S. Army Corps of Engineers, Seattle District
Estimated by
Cost Engineering Unit, CENWS-EC-CO-CA
Prepared by
Timothy F. Sullivan, P.E.

Design Document	Sketches of proposed project/As-Builts of existing
Document Date	3/9/2004
District	Seattle
Contact	Tim Sullivan (206) 764-6759
Budget Year	2005
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
UserCost1

Timeline/Currency

Preparation Date	3/23/2004
Escalation Date	6/1/2005
Eff. Pricing Date	9/30/2005
Estimated Duration	120 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Labor LB01Nat: MII National Labor 2001

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP01R08: MII Equipment Region 8 2001

08 NORTHWEST

Sales Tax	5.20
Working Hours per Year	1,540
Labor Adjustment Factor	1.09
Cost of Money	6.38
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.047
Gas	1.690
Diesel Off-Road	1.600
Diesel On-Road	1.850

Shipping Rates

Over 0 CWT	8.65
Over 240 CWT	7.81
Over 300 CWT	6.97
Over 400 CWT	6.30
Over 500 CWT	5.62
Over 700 CWT	5.48
Over 800 CWT	4.98

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Project Markups

Direct Cost Markups	Category	Method
Productivity	Productivity	Productivity
Overtime	Overtime	Overtime

	Days/Week	Hours/Shift	Shifts/Day	1st Shift	2nd Shift	3rd Shift
Standard	5.00	8.00	1.00	8.00	0.00	0.00
Actual	5.00	8.00	1.00	8.00	0.00	0.00

Day	*OT Factor*	*Working*	*OT Percent*	*FCCM Percent*
			0.00	0.00
Monday	1.50	Yes		
Tuesday	1.50	Yes		
Wednesday	1.50	Yes		
Thursday	1.50	Yes		
Friday	1.50	Yes		
Saturday	1.50	No		
Sunday	2.00	No		

Sales Tax	TaxAdj	TaxAdj
Direct Costs		
MatlCost		

Contractor Markups	Category	Method
Small Tools	Allowance	% of Labor
JOOH	JOOH	Running %
HOOH	HOOH	Running %
Profit	Profit	Profit Weighted Guidelines

Guideline	*Value*	*Weight*	*Percentage*
Risk	0.10	20	2.00
Difficulty	0.10	15	1.50
Size	0.12	15	1.80
Period	0.10	15	1.50
Invest (Contractor's)	0.10	5	0.50
Assist (Assistance by)	0.09	5	0.45
SubContracting	0.10	25	2.50
Total		100	10.25

Bond	Bond	Running %
Excise Tax	Excise	Running %

Owner Markups	Category	Method
Escalation	Escalation	Escalation

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Project Markups

StartDate	*StartIndex*	*EndDate*	*EndIndex*	*Escalation*
6/1/2005	*561.79*	*9/30/2005*	*565.56*	*0.67*

Contingency	Contingency	Running %
SIOH	SIOH	Running %

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Description	Page
Project Cost Summary	1
04 Dams -- Chief Joseph Dam	1
Indirect Cost Summary	2
04 Dams -- Chief Joseph Dam	2
0401 Main Dam	2
040101 Mob & Demob	2
Relief Tunnel Structure Revisions	2
Flap Gate	2
New Sump Room	2
Demo Work	2
New Concrete Work	2
Forming	2
Concrete	2
Metal Floor Gratings	2
Pump	2
Shaft	2
Dam Intake Diversion Structure Revisions	2
Demo work	2
Trashrack	3
Stoplogs	3
Fish Screen	3
30" Pipe	3
Pipe Supports	3
Straps	3
Saddles	3
Pipeline	3
Monolith 2 Room Improvements	3
Gate Valve	3
Metal Floor Grating	3
Metal Stairway	3
Concrete	3
Pipeline from Dam to Hatchery	3
Trench Excavation	3
Dewatering	4
Excavation	4
Haul & Dispose Excess Matl	4
Shoring	4

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Table of Contents

Table of Contents

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Project Cost Summary Page 1

Description	CostToPrime	ContractMarkup	CostToOwner	OwnerMarkup	ProjectCost
Project Cost Summary	1,664,834	617,922	2,282,181	790,820	3,073,754
	1,664,833.58		*2,282,181.48*		*3,073,753.98*
04 Dams -- Chief Joseph Dam	1,664,834	617,922	2,282,181	790,820	3,073,754

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Indirect Cost Summary Page 2

Description	CostToPrime	JOOH	HOOH	Profit	Bond	CostToOwner
Indirect Cost Summary	1,664,834	87,379	183,501	206,894	44,507	2,282,181
	1,664,833.58					*2,282,181.48*
04 Dams -- Chief Joseph Dam	1,664,834	87,379	183,501	206,894	44,507	2,282,181
	1,664,833.58					*2,282,181.48*
0401 Main Dam	1,664,834	87,379	183,501	206,894	44,507	2,282,181
	30,000.00					*39,183.87*
040101 Mob & Demob	30,000	1,500	3,150	3,552	764	39,184
	482,289.41					*630,447.71*
Relief Tunnel Structure Revisions	482,289	24,135	50,682	57,144	12,292	630,448
	4,079.76					*5,455.16*
Flap Gate	4,080	209	439	494	106	5,455
	478,209.65					*624,992.55*
New Sump Room	478,210	23,926	50,243	56,650	12,186	624,993
	939.40					*1,476.20*
Demo Work	939	57	119	134	29	1,476
	608.25					*837.15*
New Concrete Work	608	32	67	76	16	837
	139.40					*203.60*
Forming	139	8	16	18	4	204
	468.85					*633.55*
Concrete	469	24	51	58	12	634
	1,662.00					*2,268.00*
Metal Floor Gratings	1,662	87	182	206	44	2,268
	75,000.00					*97,959.66*
Pump	75,000	3,750	7,875	8,879	1,910	97,960
	400,000.00					*522,451.54*
Shaft	400,000	20,000	42,000	47,355	10,187	522,452
	84,462.57					*115,392.18*
Dam Intake Diversion Structure Revisions	84,463	4,417	9,277	10,462	2,251	115,392
	18.48					*29.04*
Demo work	18	1	2	3	1	29

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Description	CostToPrime	JOOH	HOOH	Profit	Bond	CostToOwner
Trashrack	*10,000.00* 10,000	500	1,050	1,184	255	*13,061.29* 13,061
Stoplogs	*10,000.00* 10,000	500	1,050	1,184	255	*13,061.29* 13,061
Fish Screen	*4,437.90* 4,438	225	472	533	115	*5,875.80* 5,876
30" Pipe	*33,939.68* 33,940	1,864	3,914	4,414	950	*48,685.96* 48,686
Pipe Supports	*9,321.68* 9,322	528	1,108	1,250	269	*13,781.96* 13,782
Straps	*2,138.00* 2,138	121	254	287	62	*3,161.00* 3,161
Saddles	*7,183.68* 7,184	407	854	963	207	*10,620.96* 10,621
Pipeline	*24,618.00* 24,618	1,336	2,806	3,164	681	*34,904.00* 34,904
Monolith 2 Room Improvements	*26,066.51* 26,067	1,327	2,789	3,144	675	*34,678.80* 34,679
Gate Valve	*22,950.19* 22,950	1,164	2,445	2,757	593	*30,411.87* 30,412
Metal Floor Grating	*1,108.00* 1,108	58	122	137	29	*1,512.00* 1,512
Metal Stairway	*1,859.78* 1,860	97	204	230	49	*2,532.79* 2,533
Concrete	*148.54* 149	8	18	20	4	*222.14* 222
Pipeline from Dam to Hatchery	*1,068,081.60* 1,068,082	57,327	120,392	135,736	29,200	*1,497,157.72* 1,497,158
Trench Excavation	*305,155.72* 305,156	16,120	33,855	38,169	8,211	*420,675.08* 420,675

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Indirect Cost Summary Page 4

Description	CostToPrime	JOOH	HOOH	Profit	Bond	CostToOwner
	25,624.00					*37,627.00*
Dewatering	25,624	1,440	3,025	3,411	734	37,627
	6,874.68					*9,904.20*
Excavation	6,875	377	793	894	192	9,904
	17,702.00					*24,871.31*
Haul & Dispose Excess Matl	17,702	951	1,997	2,252	484	24,871
	6,000.00					*7,836.80*
Shoring	6,000	300	630	710	153	7,837
	69,308.50					*92,670.90*
Liner	69,309	3,563	7,484	8,437	1,815	92,671
	4,876.00					*6,458.40*
Organic Erosion Control mat	4,876	247	520	586	126	6,458
	179,646.54					*247,764.87*
Backfill/Compaction	179,647	9,489	19,926	22,465	4,833	247,765
	165,697.56					*225,833.04*
Select Fill	165,698	8,649	18,161	20,476	4,405	225,833
	13,948.98					*21,931.83*
On-site Material	13,949	840	1,765	1,989	428	21,932
	665,510.44					*946,868.24*
Pipelines	665,510	36,247	76,119	85,823	18,463	946,868
	338,497.50					*479,930.00*
30"	338,498	18,372	38,581	43,500	9,358	479,930
	275,440.00					*391,655.00*
20" outlet pipe	275,440	14,993	31,486	35,500	7,637	391,655
	51,572.94					*75,283.24*
Thrust blocks/Anchors	51,573	2,882	6,052	6,823	1,468	75,283
	35,539.56					*53,845.56*
Forming	35,540	2,061	4,328	4,880	1,050	53,846
	16,033.38					*21,437.68*
Concrete	16,033	821	1,724	1,943	418	21,438

Labor ID: LB01Nat EQ ID: EP01R08

Currency in US dollars

TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Indirect Cost Summary Page 5

Description	CostToPrime	JOOH	HOOH	Profit	Bond	CostToOwner
New Road	*97,415.44* 97,415	4,960	10,418	11,744	2,526	*129,614.40* 129,614
Subgrade	*36,888.88* 36,889	1,878	3,944	4,446	956	*49,092.72* 49,093
Surface Paving	*60,526.56* 60,527	3,082	6,474	7,298	1,570	*80,521.68* 80,522

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 6

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
Direct Cost Summary				381,810	195,021	0	525,000	1,664,834
04 Dams -- Chief Joseph Dam	EA	1.0	Prime	*381,809.80* 381,810	*195,020.51* 195,021	0	525,000	*1,664,833.58* 1,664,834
0401 Main Dam	EA	1.0	Prime	*381,809.80* 381,810	*195,020.51* 195,021	0	525,000	*1,664,833.58* 1,664,834
040101 Mob & Demob (Note: Assume a $30,000 mob & demob lump sum cost.)	EA	1.0	Prime	*0.00* 0	*0.00* 0	0	30,000	*30,000.00* 30,000
USR Mob & Demob lump sum	EA	1.0	Prime	*0.00* 0	*0.00* 0	*0.00* 0	*30,000.00* 30,000	*30,000.00* 30,000
Relief Tunnel Structure Revisions	EA	1.0	Prime	*1,836.05* 1,836	*130.85* 131	0	475,000	*482,289.41* 482,289
Flap Gate	EA	1.0	Prime	*447.00* 447	*0.00* 0	0	0	*4,079.76* 4,080
CIV 027180800 Valves, iron body, mud valve, 36" size, flanged	EA	1.0	Prime	*447.00* 447	*0.00* 0	*0.00* 0	*0.00* 0	*4,079.76* 4,080
New Sump Room	EA	1.0	Prime	*1,389.05* 1,389	*130.85* 131	0	475,000	*478,209.65* 478,210
Demo Work	EA	1.0	Prime	*860.10* 860	*79.30* 79	0	0	*939.40* 939
AF 020462345 Site dml, conc, air eqpt, to 6" thick, rod reinf (Note: proximate volume difference between new & existing sump room = 756 cf - 202.5 cf = 553.5 cf. Assume approx 10% more in overexcavation to = 610 cf. If a 1-ft thickness is used, then this equates to 610 sf.)	SF	610.0	Prime	*1.41* 860	*0.13* 79	*0.00* 0	*0.00* 0	*1.54* 939
New Concrete Work (Note: Assume a total of 5 cy iof new concrete is needed.)	EA	1.0	Prime	*147.95* 148	*33.55* 34	0	0	*608.25* 608
Forming (Note: Assume 20 sf total.)	EA	1.0	Prime	*74.40* 74	*0.00* 0	0	0	*139.40* 139

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 7

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				3.72	*0.00*	*0.00*	*0.00*	*6.97*
CIV 031820700 Forms in place, walls, buttress forms, to 8' high 1 use	SF	20.0	Prime	74	0	0	0	139
				73.55	*33.55*			*468.85*
Concrete	EA	1.0	Prime	**74**	**34**	**0**	**0**	**469**
				0.00	*0.00*	*0.00*	*0.00*	*72.36*
RSM 033260300 Concrete ready mix, regular weight, 4000 psi	CY	5.0	Prime	0	0	0	0	362
				14.71	*6.71*	*0.00*	*0.00*	*21.41*
MIL 033724950 Placing conc, walls, 8" thick, pumped	CY	5.0	Prime	74	34	0	0	107
				381.00	*18.00*			*1,662.00*
Metal Floor Gratings	EA	1.0	Prime	**381**	**18**	**0**	**0**	**1,662**
				1.27	*0.06*	*0.00*	*0.00*	*5.54*
MIL 055420691 Floor grating,galv stl,4.1 PSF, brg bars @ 15/16"OC,3/4"x1/8" (Note: Approximate metal grating floor area is estimated at 300 sf.)	SF	300.0	Prime	381	18	0	0	1,662
				0.00	*0.00*			*75,000.00*
Pump	EA	1.0	Prime	**0**	**0**	**0**	**75,000**	**75,000**
				0.00	*0.00*	*0.00*	*75,000.00*	*75,000.00*
USR 450 hp pump (Note: $75k lump sum cost provided by Jack Graham of Granich Engineering (425.888.8744) in North Bend, WA. The price includes the pump, shipping to site and installation. Also, the price includes testing of the pump. Pump is assumed to be a Fairbanks-Morse model 5800-HSC-750 with a cast-iron casing & stainless steel impeller.)	EA	1.0	Prime	0	0	0	75,000	75,000
				0.00	*0.00*			*400,000.00*
Shaft (Note: The proposed method to construct this shaft is predicated on a shaft drilling rig is able to set up on top of the right bank in order to drill an 8-ft diameter access shaft. Per Karl Anderson of NWS Civil Design, the cost to drill +100 vertical feet through impervious fill is approximately $400k.)	EA	1.0	Prime	**0**	**0**	**0**	**400,000**	**400,000**
				0.00	*0.00*	*0.00*	*400,000.00*	*400,000.00*
USR Shaft Lump Sum Cost	EA	1.0	Prime	0	0	0	400,000	400,000
				18,588.38	*6,771.97*			*84,462.57*
Dam Intake Diversion Structure Revisions	EA	1.0	Prime	**18,588**	**6,772**	**0**	**20,000**	**84,463**

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 8

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				16.92	*1.56*			*18.48*
Demo work (Note: The upstream intake is blocked by 1-ft thick concrete wall and the downstream passage is closed with an 8 -in thick concrete blockwall. A 30-in diameter pipe needs to be run through these walls. X-sect area of pipe = 4.91 sf. Say, 6 sf to be removed from each upstream/downstream walls, 12 sf in all.)	EA	1.0	Prime	17	2	0	0	18
				1.41	*0.13*	*0.00*	*0.00*	*1.54*
AF 020462345 Site dml, conc, air eqpt, to 6" thick, rod reinf (Note: 12 sf.)	SF	12.0	Prime	17	2	0	0	18
				0.00	*0.00*			*10,000.00*
Trashrack	EA	1.0	Prime	0	0	0	10,000	10,000
				0.00	*0.00*	*0.00*	*10,000.00*	*10,000.00*
USR Design & Install (Note: Assume $10,000 lump sum cost.)	EA	1.0	Prime	0	0	0	10,000	10,000
				0.00	*0.00*			*10,000.00*
Stoplogs	EA	1.0	Prime	0	0	0	10,000	10,000
				0.00	*0.00*	*0.00*	*10,000.00*	*10,000.00*
USR Design & Install (Note: Assume $10,000 lump sum cost.)	EA	1.0	Prime	0	0	0	10,000	10,000
				276.20	*420.40*			*4,437.90*
Fish Screen	EA	1.0	Prime	276	420	0	0	4,438
				27.62	*42.04*	*0.00*	*0.00*	*443.79*
CIV 026748240 Well, domestic water, screen assembly, sst, 26" dia (Note: Assume 10 lf is needed.)	LF	10.0	Prime	276	420	0	0	4,438
				15,926.64	*6,305.92*			*33,939.68*
30" Pipe	EA	1.0	Prime	15,927	6,306	0	0	33,940
				6,208.64	*531.92*			*9,321.68*
Pipe Supports	EA	1.0	Prime	6,209	532	0	0	9,322
				1,424.00	*122.00*			*2,138.00*
Straps	EA	1.0	Prime	1,424	122	0	0	2,138
				14.24	*1.22*	*0.00*	*0.00*	*21.38*

Labor ID: LB01Nat EQ ID: EP01R08

Currency in US dollars

TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 9

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
MIL 051300748 Lightweight framing, junior beam, field fabed, 7" (Note: Assume these sized beams are used to support the pipeline along the dam. An angled support made up of this material would total 10 lf each. Assume supports needed every 10 lf of pipeline (appproximately 100 lf.) 10 x 10 lf = 100 lf.)	LF	100.0	Prime	1,424	122	0	0	2,138
				4,784.64	*409.92*			*7,183.68*
Saddles	EA	1.0	Prime	**4,785**	**410**	0	0	**7,184**
				14.24	*1.22*	*0.00*	*0.00*	*21.38*
MIL 051300748 Lightweight framing, junior beam, field fabed, 7" (Note: Assume these sized beams are used to support the pipeline as saddles. A saddle support made up of this material would total about 12 lf each. Assume supports needed every 100 lf of pipeline (appproximately 2750 lf.) 12 x 28 lf = 336 lf.)	LF	336.0	Prime	4,785	410	0	0	7,184
				9,718.00	*5,774.00*			*24,618.00*
Pipeline	EA	1.0	Prime	**9,718**	**5,774**	0	0	**24,618**
				48.59	*28.87*	*0.00*	*0.00*	*123.09*
CIV 026611090 Piping, water dist, 30" dia, blk stl, pl end, welded 3/8" wall (Note: Assume 200 lf total.)	LF	200.0	Prime	9,718	5,774	0	0	24,618
				2,368.62	*44.09*			*26,066.51*
Monolith 2 Room Improvements	EA	1.0	Prime	**2,369**	**44**	0	0	**26,067**
				1,616.17	*0.00*			*22,950.19*
Gate Valve	EA	1.0	Prime	**1,616**	**0**	0	0	**22,950**
				1,616.17	*0.00*	*0.00*	*0.00*	*22,950.19*
CIV 151943832 Valves, iron body, gate, 125 lb, OS&Y, flanged, 30"	EA	1.0	Prime	1,616	0	0	0	22,950
				254.00	*12.00*			*1,108.00*
Metal Floor Grating	EA	1.0	Prime	**254**	**12**	0	0	**1,108**
				1.27	*0.06*	*0.00*	*0.00*	*5.54*
MIL 055420691 Floor grating,galv stl,4.1 PSF, brg bars @ 15/16"OC,3/4"x1/8" (Note: Two platforms are needed. Approximate total area = 200 sf.)	SF	200.0	Prime	254	12	0	0	1,108
				401.31	*19.89*			*1,859.78*
Metal Stairway	EA	1.0	Prime	**401**	**20**	0	0	**1,860**

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 10

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				30.87	*1.53*	*0.00*	*0.00*	*143.06*
MIL 055110020 Stair, stl,grating trd & pipe r, 3'-6" W, saf nosing, stl strg	EA	13.0	Prime	401	20	0	0	1,860
				97.14	*12.20*			*148.54*
Concrete (Note: Assume)	**EA**	**1.0**	**Prime**	**97**	**12**	**0**	**0**	**149**
				13.37	*6.10*	*0.00*	*0.00*	*19.47*
MIL 033725100 Placing conc, walls, 12" thick, pumped (Note: Assume 2 cy.)	CY	2.0	Prime	27	12	0	0	39
				0.00	*0.00*	*0.00*	*0.00*	*0.00*
RSM 033260300 Concrete ready mix, regular weight, 4000 psi (Note: Assume 2 cy.)	CY	0.0	Prime	0	0	0	0	0
				3.52	*0.00*	*0.00*	*0.00*	*5.48*
MIL 031822008 Forms in place, walls, int, to 8' high, 1 use, job built plywood (Note: 10 sf for each section -- 20 sf total.)	SF	20.0	Prime	70	0	0	0	110
				361,385.37	*188,117.69*			*1,068,081.60*
Pipeline from Dam to Hatchery	**EA**	**1.0**	**Prime**	**361,385**	**188,118**	**0**	**0**	**1,068,082**
				79,280.66	*33,150.84*			*305,155.72*
Trench Excavation (Note: Approximate total length of excavation = 2750 lf. Approximate length in rip rap slope = 300 lf. Typical trench x-sect area = 8' x 11' = 88 sf. Total x-sect pipe area = [(2.5/2)*2 + (1.83/2)*2]x3.141= 7.54 sf. On-site material backfill x-sect = 27.5 sf. Width of 40-mil LLDPE liner = [2x(8+3)]+11= 33 lf)	**EA**	**1.0**	**Prime**	**79,281**	**33,151**	**0**	**0**	**305,156**
				14,875.00	*0.00*			*25,624.00*
Dewatering (Note: Assume additional dewatering trench built parallel to pipeline trench.)	**EA**	**1.0**	**Prime**	**14,875**	**0**	**0**	**0**	**25,624**
				148.75	*0.00*	*0.00*	*0.00*	*256.24*
RSM 021441000 Wellpoints, compl instl, first month, 200' L header, 8" dia	LF	100.0	Prime	14,875	0	0	0	25,624
				3,379.08	*3,379.08*			*6,874.68*
Excavation (Note: Approximate total length of excavation = 2750 lf. Approximate length in rip rap slope = 300 lf. Typical trench x-sect area = 8' x 11' = 88 sf. Assume 30% expansion of soil material for excavation; volume of excavated soil = (1.3) x (2750') x (88sf)/27 = 11,652 cy.)	**EA**	**1.0**	**Prime**	**3,379**	**3,379**	**0**	**0**	**6,875**

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 11

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				0.29	*0.29*	*0.00*	*0.00*	*0.59*
MIL 022280344 Excavate trench, hvy soil, 6'-10' D, 1.5 CY excavator (Note: 11,652 cy.)	CY	11,652.0	Prime	3,379	3,379	0	0	6,875
				6,284.21	*11,417.79*			*17,702.00*
Haul & Dispose Excess Matl (Note: Excavated native material volume = 11,652 cy. Re-use native material volume = (2.5 x 11 x 2750)/27= 2801 cy. Haul & dispose volume = 11,652 cy - 2801 cy = 8851 cy.)	EA	1.0	Prime	6,284	11,418	0	0	17,702
				0.71	*1.29*	*0.00*	*0.00*	*2.00*
AF 022344100 Hauling, w/loading, 12 CY truck, 5 mile haul, sand (Note: 8851 cy.)	CY	8,851.0	Prime	6,284	11,418	0	0	17,702
				0.00	*0.00*			*6,000.00*
Shoring (Note: Number of days for renting shoring boxes = number of days spent excavating. Assume two shoring boxes used in series: one for excavation & one for pipe laying. Assume excavator can produce 600 cy/day. 11,652 cy/600 cy/day = 19.42 days. Say 20 days per trench box. Two boxes x 20 days = 40 days.)	EA	1.0	Prime	0	0	0	0	6,000
				0.00	*0.00*	*0.00*	*0.00*	*150.00*
CIV 022283110 Excavate trench, trench box, 8' x 16', rent per day	EA	40.0	Prime	0	0	0	0	6,000
				8,480.30	*907.50*			*69,308.50*
Liner (Note: Width of 40-mil LLDPE liner = [2x(8+3)]+11= 33 lf Trench length = 2750 lf Area of liner = 33 x 2750 = 90750 sf = 10,084 sy.)	EA	1.0	Prime	8,480	908	0	0	69,309
				0.09	*0.01*	*0.00*	*0.00*	*0.71*
CIV 022670200 Membrane lining, HDPE, 100,000 SF or more, 60 mil thick	SF	90,750.0	Prime	8,168	908	0	0	64,433
				312.80	*0.00*			*4,876.00*
Organic Erosion Control mat	EA	1.0	Prime	313	0	0	0	4,876
				0.34	*0.00*	*0.00*	*0.00*	*5.30*
MIL 022660120 Erosion control, revegetation mat, webbed (Note: Area = (3-ft width x 2750 lf)/9sf/sy = 917 sy. Say 920 sy.)	SY	920.0	Prime	313	0	0	0	4,876
				46,262.07	*17,446.47*			*179,646.54*

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18
Direct Cost Summary Page 12

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
Backfill/Compaction (Note: Approximate total length of excavation = 2750 lf. Typical trench x-sect area = 8' x 11' = 88 sf. Total x-sect pipe area = [(2.5/2)*2 + (1.83/2)*2]x3.141= 7.54 sf. On-site material backfill x-sect = 27.5 sf. Select Fill x-sect = 88 - (27.5 + 7.54 sf) = 53 sf. Vol of select fill = (2750 lf x 53 sf)/27 = 5399 cy. Say 5400 cy. Vol of On-site matl = (2750 lf x 27.5 sf)/27 = 2801 cy.)	EA	1.0	Prime	46,262	17,446	0	0	179,647
				33,405.48	*16,354.08*			*165,697.56*
Select Fill (Note: Volume of select fill = 5400 cy. Height of backfill averages 5.5-ft high. Number of 6-in layers = 5.5/0.5 = 11. Average width = 11 ft. (11 layers x 11 ft x 2750 lf)/9sf/sy = 36,973 sy.)	EA	1.0	Prime	33,405	16,354	0	0	165,698
				0.09	*0.14*	*0.00*	*0.00*	*0.23*
MIL 022152360 Backfill, spread dumped gravel/fill, dozer, 6" layers, no compaction (Note: 5400 cy, in eleven 6-in layers over 2750 lf of an 11-ft wide trench = 36,973 sy.)	SY	36,972.0	Prime	3,327	5,176	0	0	8,504
				4.30	*0.22*	*0.00*	*0.00*	*4.52*
MIL 022207260 Compaction, around structures & trenches, vibrating plate (Note: 5400 cy.)	CY	5,400.0	Prime	23,220	1,188	0	0	24,408
				1.27	*1.85*	*0.00*	*0.00*	*24.59*
AF 022441505 Base course, sand, washed & graded, compacted, 6"D, large areas (Note: 5400 cy.)	CY	5,400.0	Prime	6,858	9,990	0	0	132,786
				12,856.59	*1,092.39*			*13,948.98*
On-site Material (Note: On-site material backfill x-sect = 27.5 sf. Vol of On-site matl = (2750 lf x 27.5 sf)/27 = 2801 cy.)	EA	1.0	Prime	12,857	1,092	0	0	13,949
				0.29	*0.17*	*0.00*	*0.00*	*0.46*
RSM 022162000 Backfill, strl, sand & gravel, no cmpct, 75 HP dozer, 50' haul (Note: 2801 cy.)	CY	2,801.0	Prime	812	476	0	0	1,288
				4.30	*0.22*	*0.00*	*0.00*	*4.52*
MIL 022207260 Compaction, around structures & trenches, vibrating plate (Note: 2801 cy.)	CY	2,801.0	Prime	12,044	616	0	0	12,661
				273,924.47	*147,221.03*			*665,510.44*

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 13

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
Pipelines (Note: Approximate length of pipeline = 2750 lf. Assume 3/8" thick A53 steel, welded joints. Pipelines require anchoring every 100 lf and at three bends & three elevation changes.)	EA	1.0	Prime	273,924	147,221	0	0	665,510
				133,622.50	*79,392.50*			*338,497.50*
30"	EA	1.0	Prime	133,623	79,393	0	0	338,498
				48.59	*28.87*	*0.00*	*0.00*	*123.09*
CIV 026611090 Piping, water dist, 30" dia, blk stl, pl end, welded 3/8" wall	LF	2,750.0	Prime	133,623	79,393	0	0	338,498
				112,860.00	*67,045.00*			*275,440.00*
20" outlet pipe (Note: Design considerations selected a 20"diameter outlet pipe. This estimate used a 24" diameter pipe due to the Unit Cost database had either an 18" or 24" diameter pipe from which to choose.)	EA	1.0	Prime	112,860	67,045	0	0	275,440
				41.04	*24.38*	*0.00*	*0.00*	*100.16*
CIV 026611080 Piping, water dist, 24" dia, blk stl, pl end, welded 3/8" wall	LF	2,750.0	Prime	112,860	67,045	0	0	275,440
				27,441.97	*783.53*			*51,572.94*
Thrust blocks/Anchors (Note: Thrust block/anchorss are designed to be 8-ft wide x 6-ft high (long) x 3-ft highthick concrete. Number of thrust blocks/anchors needed = pipeline length/100 + 3 for bends + 3 for elev changes = 2750/100 +3 + 3 = 34.)	EA	1.0	Prime	27,442	784	0	0	51,573
				25,723.44	*0.00*			*35,539.56*
Forming (Note: Forming the anchors requires two buttress forms of 6ft x 8ft = 48sf each or 96 sf per anchor, and two end walls of 3ft x 6ft = 18sf each or 36 sf per anchor.)	EA	1.0	Prime	25,723	0	0	0	35,540
				54.28	*0.00*	*0.00*	*0.00*	*78.75*
CIV 031820100 Forms in place, wall, to 10 SF, box out for opening, to 16" thk (Note: 54 anchors with 2 blockout per anchor = 108 blockouts.)	EA	108.0	Prime	5,862	0	0	0	8,505
				2.71	*0.00*	*0.00*	*0.00*	*3.79*
CIV 031820850 Forms in place, walls, buttress forms, to 8' high 4 use (Note: 54 anchors x 96 sf per anchor = 5184 sf.)	SF	5,184.0	Prime	14,049	0	0	0	19,647

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Print Date Tue 23 March 2004
Eff. Date 9/30/2005

U.S. Army Corps of Engineers
Project : Hatchery Water Supply Project
Baseline Cost Estimate

Time 12:16:18

Direct Cost Summary Page 14

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				2.99	*0.00*	*0.00*	*0.00*	*3.80*
MIL 031822150 Forms in place, walls, below gr, to 8' high, 4 use job built plywood (Note: 36 sf per anchor x 54 anchors = 1944 sf.)	SF	1,944.0	Prime	5,813	0	0	0	7,387
				1,718.53	*783.53*			*16,033.38*
Concrete (Note: Concrete volume of typical thrust block/anchor = (3 x 6 x 8) - [(30/2)*2 + (22/2)*2]x 3.141/144 = 136.5 sf = 5 cy. Add 10% for wastage, volume of one thrust block/anchor = 5.5 cy. Volume of concrete needed = 34 x 5.5 cy = 187 cy.)	EA	1.0	Prime	1,719	784	0	0	16,033
				0.00	*0.00*	*0.00*	*0.00*	*72.36*
RSM 033260300 Concrete ready mix, regular weight, 4000 psi (Note: 187 cy.)	CY	187.0	Prime	0	0	0	0	13,531
				9.19	*4.19*	*0.00*	*0.00*	*13.38*
MIL 033722150 Placing conc, footings, deep continuous, pumped (Note: 187 cy)	CY	187.0	Prime	1,719	784	0	0	2,502
				8,180.24	*7,745.82*			*97,415.44*
New Road (Note: Total length of new road = 2400 lf. Assume 6-in = 0.5-ft of gravel subgrade. Typical road width = 26-ft. X -sect area of subgrade = 26 x 0.5 = 13 sf.)	EA	1.0	Prime	8,180	7,746	0	0	97,415
				3,050.96	*4,368.42*			*36,888.88*
Subgrade	EA	1.0	Prime	3,051	4,368	0	0	36,889
				0.21	*0.31*	*0.00*	*0.00*	*4.77*
MIL 022440100 Base course, crushed 3/4" stone, compacted, 6"D, large areas (Note: Area = (2400 lf x 26 ft)/9 sf/sy = 6934 sy.)	SY	6,934.0	Prime	1,456	2,150	0	0	33,075
				0.23	*0.32*	*0.00*	*0.00*	*0.55*
MIL 022430100 Base, prepare & roll sub-base, large areas over 2500 SY	SY	6,934.0	Prime	1,595	2,219	0	0	3,814
				5,129.28	*3,377.40*			*60,526.56*
Surface Paving	EA	1.0	Prime	5,129	3,377	0	0	60,527
				3.99	*2.95*	*0.00*	*0.00*	*36.98*
RSM 025050850 Asphaltic conc pavement, highway, wearing course, 1" thick (Note: Assume 143 pcf. Volume of asphalt = 2400' x 1/12 x 26 = 5200 cf. Weight = (5200 cf x 143 pcf) /2000 = 372 tons.)	TON	372.0	Prime	1,484	1,097	0	0	13,757

Labor ID: LB01Nat EQ ID: EP01R08 Currency in US dollars TRACES MII Version 1.0

Description	UOM	Quantity	Contractor	LaborCost	EQCost	Productivity	UserCost1	DirectCost
				2.43	*1.52*	*0.00*	*0.00*	*31.18*
MIL 025050813 Asphaltic conc pavement, highway, binder course, 4" thick (Note: Assume 143 pcf. Volume of asphalt = 2400' x 4/12 x 26 = 20,800 cf. Weight = (20,800 cf x 143 pcf) /2000 = 1487.2 tons. Say 1500 tons.)	TON	1,500.0	Prime	3,645	2,280	0	0	46,770

9. CONCLUSIONS

9.1. The water supply study determined the potential to modify the existing relief tunnel sump to provide 20 cfs. This will require excavating through the random and impervious fill and constructing a permanent shaft, demolishing a portion of the existing relief tunnel and sump, constructing a new larger sump 18-feet long by 6-feet wide by 7-feet deep and a 7-feet high overflow weir, and installing a 450 HP pump. The construction cost estimate for the relief tunnel work is $849,000 plus mobilization and demobilization.

9.2. The study determined the potential to supply 45 cfs from the reservoir. This will require opening the irrigation inlet and outlet on the upstream and downstream faces of the dam, installing a 30-inch diameter metal pipe with an emergency gate valve, trash rack, fish screen, and stoplogs.

9.3. The construction cost estimate for the dam intake diversion structure is $155,000 plus mobilization and demobilization.

9.4. Conveyance of the relief tunnel water to the hatchery site will require a 20-inch diameter metal pipe and conveyance of the reservoir water will require a 30-inch diameter metal pipe. The pipes must be buried for seismic and security considerations and would run approximately 300 feet through the riprap on the embankment and 2,400 feet under the existing road. This will require demolition and repaving the road and excavating a pipe trench 8-feet deep by 11-feet wide.

9.5. The pipes will be anchored in concrete thrust blocks every 100 feet and at bends or grade changes. The construction cost estimate for the water conveyance pipelines is $2,016,000 plus mobilization and demobilization.

9.6. The total mobilization and demobilization cost is estimated at $53,000 for a total water supply project cost of $3,074,000. These costs are not related to the operation of Chief Joseph Dam for hydropower and so would have to be borne by the Fish Hatchery Project along with operation and maintenance costs of these hatchery features.

9.7. A potential well field site is identified in the study upstream of the dam seepage blanket in the vicinity of the state park or golf course approximately 2 miles from the dam. From available information potential well field sites at the hatchery do not look promising and a well field in the vicinity of the relief tunnel is precluded by dam safety considerations. Additional investigation in the next phase of design, including test wells, is needed to determine the location, potential yield, and the number and size of the wells needed to make up the balance of well water required beyond the 20 cfs from the relief tunnel.

9.8. Water quality samples were taken on 3 February 2004 from the relief tunnel and the reservoir forebay at the elevation of the irrigation inlet. In general, water quality at the relief tunnel and forebay locations were good with no exceedances of either WDFW recommended

criteria for aquaculture or the WDOE chronic criteria, and the parameters monitored show little difference between the relief tunnel sample and the forebay sample. Water quality samples will be collected at the relief tunnel, forebay, and hatchery well site in the spring and summer to determine if any seasonal variations in water quality exist for these source waters. The test results will be added to this study as supplements.

9.9. Although this study determined the feasibility of supplying 20 cfs to the hatchery from the relief tunnel and 45 cfs from the reservoir, and identified a potential location for a well field to supply the balance of well water required beyond the relief tunnel supply, further and more detailed investigation will be needed in the next phase of design to confirm the assumptions and cost estimates in this study and to address dam safety issues. In view of the more certain potential to supply additional water from the reservoir and the uncertainty on the location and yield from a well field in the area, it is recommended that the next phase of design also investigate mechanical heating and cooling of additional water from the reservoir to achieve the desired temperatures for rearing fish.