

SITE 1

CLEAN WATER DIVERSION TRENCHES

Site No.	Channel Base Width (m)	Channel Height (m)	Channel Top Width (m)	Channel Length (m)	Channel Excavate Vol (m)	Concrete Liner (m)	Volume Concrete Liner (m ³)	Mesh Ref 500 (m ²)
1	1	0.5	2.5	450	394	3.40	153	1 531
1	1	0.26	1.8	623	227	2.54	158	1 581
1	1	0.3	1.9	295	128	2.68	79	791
1	1	0.3	1.9	306	133	2.68	82	821
1	1	0.48	2.4	590	481	3.33	197	1 965
Totals					1 363		669	6 689

SOLUTION (DIRTY WATER) TRENCHES

Channel No.	Channel Base Width (m)	Channel Height (m)	Channel Top Width (m)	Channel Length (m)	Channel Excavate Vol (m)	Concrete Liner (m)	Volume Concrete Liner (m ³)	Mesh Ref 500 (m ²)
A	1	1.8	6.4	450	2 997	8.09	364	3 640
B	1	1.5	5.5	590	2 876	7.01	413	4 135
C	1	1.9	6.7	1 021	7 469	8.45	863	8 628
D	1	1.6	5.8	623	3 389	7.37	459	4 591
E	1	1.8	6.4	295	1 965	8.09	239	2 387
F	1	1.8	6.4	306	2 038	8.09	248	2 476
G	1	1.6	5.8	753	4 096	7.37	555	5 549
G	1	2.3	7.9	450	4 606	9.89	445	4 452
Totals					29 436		3 586	35 857

SITE CLEARANCE

9 645 011.00

	Area m ²	RATE	AMOUNT
ADF Footprint	1 000 000	5.00	5 000 000.00
Clean Water Channels	4 804	5.00	24 021.50
Dirty Water Channels	24 793	5.00	123 964.50
Pipeline routes	49 000	5.00	245 000.00
Return Water Dam	770 000	5.00	3 850 000.00
Roads	80 405	5.00	402 025.00
Totals	1 929 002		

EARTHWORKS

291 047 820.58

	Area m ²	Depth/Length (m)	Volume m ³		
Excavation for ADF Liner	1 000 000	1.4	1 400 000	55.00	77 000 000.00
Extra over for Hard Rock (assume 10%)	2 559 682	10%	255 968	305.00	78 070 304.42
Importation of material	430 000	20%	86 000	290.00	24 940 000.00
Construction of ADF starter wall			364 000	65.00	23 660 000.00
Stockpile topsoil			297 000	65.00	19 305 000.00
Excavation for New AWRD Liner	770 000	1.4	1 078 000	55.00	59 290 000.00
Construction of new AWRD wall			66 000	65.00	4 290 000.00
Clean water channels (from above)			1 363	55.00	74 986.84
Dirty water channels (from above)			29 436	55.00	1 618 964.33
Excavation for penstock outlet pipe	1.8	1 500	2 640	55.00	145 200.00
Box-cut for roads	80 405	0.6	48 243	55.00	2 653 365.00
Totals			3 628 650		

LINER SYSTEM

897 564 000.00

	Area m ²	Volume m ³	Length m	Totals	
HDPE for ADF	1 000 000		2	2 000 000	60.00
HDPE for New AWRD	770 000		2	1 540 000	60.00
Clay for ADF	1 000 000	900 000		900 000	250.00
Clay for New AWRD	770 000	693 000		693 000	250.00
River Sand for ADF	1 000 000	200 000		200 000	130.00
River Sand for New AWRD	770 000	154 000		154 000	130.00
Bidim for ADF	2 000 000			2 000 000	45.00
Bidim for New AWRD	1 540 000			1 540 000	45.00
Geopipes for Leachate (ADF)			16 200	16 200	120.00
Leak detection stone 19mm (ADF)	1 000 000	150 000		150 000	300.00
Leak detection stone 19mm (New AWRD)	770 000	115 500		115 500	300.00

Liner rate R/m² 507.10

STRUCTURAL CONCRETE

21 960 673.29

	Area m ²	Volume t or m ³	Length m	Totals	
New AWRD Silt Trap Concrete		300		300	1 400.00
New AWRD Silt Trap Rebar		45		45	11 000.00
Pipe plinths Concrete		3 500		3 500	1 400.00
Pipe plinths Rebar		350		350	11 000.00
Clean Water Channels Concrete		669		669	1 400.00
Clean Water Channels Mesh	6 689			6 689	40.00

Dirty Water Channels Concrete		3 586	3 586	1 400.00	5 019 956.33
Dirty Water Channels Mesh	35 857		35 857	40.00	1 434 273.24
Penstock Outlet Encasing Concrete	1.01	1 520	1 520	1 400.00	2 128 665.96
Penstock Outlet Encasing Rebar		228	228	11 000.00	2 508 784.89

PENSTOCKS AND PIPES 4 762 500.00

Area m ²	Volume t or m ³	Length m	No
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Precast concrete penstock rings 750mm dia			4050	250.00	1 012 500.00
Outlet pipe 450 mm diameter		1 500		2 500.00	3 750 000.00

PUMP STATION AND PIPEWORK 20 925 000.00
(same for all three options)

Area or Number m ² / Number

Return Water Pump Station	100			20 000.00	2 000 000.00
Return Water Pumps	7			750 000.00	5 250 000.00
Return water pump valves	21			75 000.00	1 575 000.00
Return water pump pipes	100			5 000.00	500 000.00
Other valves	20			75 000.00	1 500 000.00
Booster pump station	100			20 000.00	2 000 000.00
Booster pumps	8			750 000.00	6 000 000.00
Booster pumps valves	24			75 000.00	1 800 000.00
Booster pumps pipes	100			3 000.00	300 000.00

ROADS 14 070 875.00

Area m ²	Depth/ Length (m)	Volume m ³	Totals
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Rip and recompact in-situ	80 405		80 405	10.00	804 050.00
G9 lower sub-grade	80 405	0.15	12060.75	200.00	2 412 150.00
G7 upper sub-grade	80 405	0.15	12060.75	250.00	3 015 187.50
C4 sub-base	80 405	0.15	12060.75	300.00	3 618 225.00
G2 base	80 405	0.15	12060.75	350.00	4 221 262.50

TOTAL #####

TOTAL 861 725 879.86 97 350 000.00 959 075 879.86

PIPELINES 150 511 360.00

Slurry pipelines (350NB steel)	37816			1 800.00	68 068 800.00
Return water (600NB Steel))	19444			4 240.00	82 442 560.00

FENCING 17 726 920.00

Around New ADF and New AWRD	5719			1 800.00	10 294 200.00
Around Topsoil Stockpile	1753			4 240.00	7 432 720.00

CULVERTS 22 563 000.00

At pipe crossings, 4000 x 3000 x 1220mm Portal Culverts	120			25 000.00	3 000 000.00
At Transmission Line crossings, 4000 x 3000 x 1220mm Portal Culverts	534			25 000.00	13 350 000.00
Culvert Bases	654			9 500.00	6 213 000.00

ELECTRICAL 13 440 000.00

Number	Length (m)	Totals
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Overhead powerlines to Contractor's Camp and Pump Stations	4000	4 000	360.00	1 440 000.00
Mini Substations	3	3	1 000 000.00	3 000 000.00
MCCs	3	3	3 000 000.00	9 000 000.00

SUMMARY

1.1	SITE CLEARANCE	9 645 011.00
1.2	EARTHWORKS	291 047 820.58
1.3	LINER SYSTEM	897 564 000.00
1.4	STRUCTURAL CONCRETE	21 960 673.29
1.5	PENSTOCKS AND PIPES	4 762 500.00
1.6	PUMP STATION AND PIPEWORK	171 436 360.00
1.7	ROADS	14 070 875.00
1.8	FENCING	17 726 920.00
1.9	CULVERTS	22 563 000.00
2	ELECTRICAL	13 440 000.00

SUB-TOTAL 1 464 217 159.86

1.8	ALLOW FOR PRELIMINARY AND GENERAL ITEMS AT 25%	366 054 289.97
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SUB-TOTAL 1 830 271 449.83

1.9	ALLOW FOR 10% CONTINGENCIES	183 027 144.98
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TOTAL ESTIMATED CAPITAL COST 2 013 298 594.81