Summary of Cost Estimate

For Clark, Lincoln, and White Pine Counties

Groundwater Development Project

June 2011

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Table of Contents

List of Figures

List of Tables

Background

As part of its environmental analysis for SNWA's proposed Clark, Lincoln, and White Pine Counties Groundwater Development (GWD) Project, the Bureau of Land Management (BLM) asked SNWA to prepare a Conceptual Plan of Development (CPOD) for the facilities of the GWD Project. SNWA submitted a CPOD to the BLM in December 2008. SNWA subsequently submitted a conceptual level cost estimate for the GWD Project to the BLM for use in the environmental analysis. This cost estimate was prepared by SNWA Engineering staff based on the facilities generally identified in the CPOD.

For the purposes of evaluating potential funding requirements, SNWA Engineering staff also developed a cash flow projection based on certain assumptions for when various phases of the GWD Project might be designed and constructed.

This document summarizes the cost estimate and the cash flow projection for the GWD Project and describes the major assumptions applied in their preparation.

Cost Estimate Accuracy

The facilities of the proposed GWD Project as described in the CPOD have not been designed. There is substantial uncertainty about many aspects of the proposed project. For example, it is not yet known exactly how many groundwater wells will be needed or where they will be located. Until the final location of all wells is defined, the lengths of water pipelines needed to reach those well locations cannot be defined with certainty. Therefore, the construction cost estimate for these conceptual project facilities must also be very conceptual in nature.

The Association for Advancement of Cost Engineering (AACE) International offers widely accepted guidance for classifying cost estimates. AACE International publishes Recommended Practice (RP) No. 17R-97 and RP No.18R-97. In these publications, the AACE suggests five classifications for cost estimates. Class 1 estimates are generally applicable when a project is defined in great detail, thus allowing a high expectation of estimate accuracy. Class 5 estimates are generally applicable when a project is defined only very broadly for screening or feasibility purposes and thus have a very low expectation of estimate accuracy.

The estimate prepared by SNWA Engineering for the GWD Project based on the CPOD falls into the AACE Class 4 concept or feasibility study estimate category, where the current project definition is between 1% and 15% of full project definition. Actual costs for projects in the Class 4 estimate category can vary widely from the estimated cost. Under AACE guidelines, a reasonable expectation for a current estimate of the cost of construction for the GWD Project is that actual costs may range from as much as 50% above to as little as 30% below the estimate.

Cost Estimate Source Data and Related Components

The estimated construction costs for the GWD Project facilities were based on eight years of actual construction costs for various water facility projects constructed in the southwestern United States from 1995 to 2003. These estimated costs are embodied in SNWA Engineering's 2006 Cost Estimating Guide for Capital Projects. Engineering judgment was applied to account for possible project variables (e.g. pipeline pressure class, pipeline bedding

material, facility site issues, etc.). Costs were escalated to July 2007 dollars based on the 20-city Construction Cost Index produced by Engineering News Record, which contains the industry standard for construction cost indices.

A cost of 30% of the GWD Project construction cost was added to account for project administration. The majority of these administrative costs are typically for design and construction management but may also include project management, planning, right-of-way coordination, land acquisition, regulatory compliance, species monitoring, land restoration, etc.

Cost Estimate Assumptions

The CPOD characterizes a large number of assumptions relative to the potential scope and capacity of the proposed GWD Project. The CPOD assumes conveyance of a certain amount of water from each groundwater basin with estimated ranges for the number of possible wells, collector pipelines, and distribution power lines. However, until the total amount of SNWA's permitted water rights is finally determined and the actual location and capacity of groundwater wells are known, these assumptions are subject to change. The major assumptions applied in development of the conceptual cost estimate are listed below.

1. Project flow rates are based on previously permitted and/or potential future water rights to be conveyed for SNWA and Lincoln County.
2. Groundwater production wells each produce 1,000 gpm.
3. Groundwater production wells are sited 1 mile apart.
4. A specific diameter is assumed for collector pipelines in each basin based on the required number of production wells to meet the assumed flow rate from each basin.
5. An average distance is assumed for collector pipelines and associated distribution power lines (from production wells to main or lateral pipelines) in each basin.
6. Pipelines are designed in accordance with SNWA design criteria.
7. Grouping of project facilities and their associated costs are consistent with the construction phases described in the June 2011 BLM Draft Environmental Impact Statement (DEIS) for the GWD Project.

Cost Estimate

The cost estimate prepared by SNWA Engineering staff for the conceptual facilities described in the CPOD is based on a total conveyance capacity of 170,434 acre feet per year (afy), 134,434 afy for SNWA and 36,000 afy for Lincoln County. This conveyance capacity is consistent with the previously permitted water rights in Spring, Delamar, Dry Lake, and Cave Valleys, and SNWA's pending applications in Snake Valley, as described in the CPOD. This conveyance capacity would also be sufficient for the full application volumes for SNWA's water right applications in Spring, Delamar, Dry Lake, and Cave Valleys. Although precise permit quantities for each GWD Project basin will not be known until after the Nevada State Engineer issues new permits, SNWA believes that the total conveyance capacity of 170,434 afy represents the best basis for estimating GWD Project costs.

The GWD Project cost estimate, in 2007 dollars, is $3.2 billion.

Table 1 divides the cost estimate into sub-groups of facilities associated with accessing water rights within each groundwater basin or basin subareas consistent with the potential phased construction schedule presented in the DEIS for the GWD Project.

Table 1 –GWD Project Cost Estimate ($ Million)

	Facilities	Construction Cost	Program Administration (30%)		Capital Cost Constr + PA
			Design 10%	Constr. Mgmt 20%	
Proposed Facilities	**Main Pipeline (Las Vegas to Dry Lake)**				
	Main Pipeline	715	71.5	143.0	929.5
	Pressure Reducing Station	4	0.4	0.8	5.2
	Storage Reservoir + ROFC	27	2.7	5.4	35.1
	Water Treatment Facility	4	0.4	0.8	5.2
	Power Facilities	66	6.6	13.2	85.8
	Subtotal	**816**	**81.6**	**163.2**	**1,060.8**
	Main Pipeline (Dry Lake to Spring)				
	Main Pipeline	583	58.3	116.6	757.9
	Pumping Stations	48	4.8	9.6	62.4
	Pressure Reducing Stations	7	0.7	1.4	9.1
	Power Facilities	122	12.2	24.4	158.6
	Subtotal	**760**	**76.0**	**152.0**	**988.0**
	Cave Lateral				
	Lateral Pipeline	41	4.1	8.2	53.3
	Power Facilities	4	0.4	0.8	5.2
	Subtotal	**45**	**4.5**	**9.0**	**58.5**
	Spring Lateral				
	Lateral Pipeline	153	15.3	30.6	198.9
	Pumping Station	11	1.1	2.2	14.3
	Power Facilities	50	5.0	10.0	65.0
	Subtotal	**214**	**21.4**	**42.8**	**278.2**
	Snake Lateral				
	Lateral Pipeline	130	13.0	26.0	169.0
	Pumping Stations	24	2.4	4.8	31.2
	Power Facilities	22	2.2	4.4	28.6
	Subtotal	**176**	**17.6**	**35.2**	**228.8**
	Proposed Facilities Total	**2,011**	**201.1**	**402.2**	**2,614.3**
Future Facilities	**DDC Wells**				
	Groundwater Wells	25	2.5	5.0	32.5
	Collector Pipeline	47	4.7	9.4	61.1
	Pumping Stations	7	0.7	1.4	9.1
	Hydroturbine Generation	5	0.5	1.0	6.5
	Power Facilities	18	1.8	3.6	23.4
	Subtotal	**102**	**10.2**	**20.4**	**132.6**
	Spring South Wells				
	Groundwater Wells	48	4.8	9.6	62.4
	Collector Pipeline	68	6.8	13.6	88.4
	Hydroturbine Generation	2	0.2	0.4	2.6
	Power Facilities	5	0.5	1.0	6.5
	Subtotal	**123**	**12.3**	**24.6**	**159.9**
	Spring North Wells				
	Groundwater Wells	34	3.4	6.8	44.2
	Collector Pipeline	47	4.7	9.4	61.1
	Power Facilities	25	2.5	5.0	32.5
	Subtotal	**106**	**10.6**	**21.2**	**137.8**
	Snake Wells				
	Groundwater Wells	62	6.2	12.4	80.6
	Collector Pipeline	57	5.7	11.4	74.1
	Power Facilities	19	1.9	3.8	24.7
	Subtotal	**138**	**13.8**	**27.6**	**179.4**
	Future Facilities Total	**469**	**46.9**	**93.8**	**609.7**
	Total	**2,480**	**248.0**	**496.0**	**3,224.0**

To reflect the conceptual nature of the cost estimating, rounding was applied in the presentation of the amounts shown in this table.
Rounding effects in the application of percent and summation formulas may cause some totals to be slightly off. These effects are insignificant and may be ignored.

Cash Flow Projection

A cash flow of expenditures was developed by SNWA Engineering staff to aid in the evaluation of potential funding requirements for the GWD Project. This cash flow projection was based on one possible schedule for design and construction of the project, and the costs previously described in Table 1 for phased construction of the GWD Project. This construction schedule represents the earliest that construction of the primary conveyance facilities (main and lateral pipelines, facilities, and power lines) would likely occur and was developed for the BLM's use in the DEIS. Project construction could be accelerated or delayed from this schedule dependent upon drought conditions on the Colorado River. Since potential future drought conditions cannot be predicted with certainty, the schedule for facilities to deliver water from the project basins (groundwater production wells and collector pipelines) are based on projected water resource demand developed from the 2009 SNWA Water Resource Plan. This schedule for delivery of water is consistent with the DEIS. The schedule assumes normal Colorado River conditions, but groundwater development may be needed sooner if an extended severe drought in the Colorado River basin results in reduced availability of SNWA's other water supplies.

The schedule assumptions for phased construction of the GWD Project as shown in the DEIS are shown in Figure 1 and are described as follows:

1. Construction of the project begins in 2012.
2. Phase 1 – The main pipeline from the existing Southern Nevada Water System in the Las Vegas Valley to Dry Lake Valley is constructed by third quarter of 2016.
3. Phase 2 – The main pipeline from Dry Lake Valley to Spring Valley South Pumping Station is constructed by fourth quarter of 2018.
4. Phase 3 – The lateral pipeline for Cave Valley is constructed by second quarter of 2017.
5. Phase 4 – The lateral pipeline for Spring Valley is constructed by first quarter of 2020.
6. Phase 5 – The lateral pipeline for Snake Valley is constructed by fourth quarter of 2023.

Other major assumptions of the cash flow projection for the GWD Project are that the inflation rate is 4% per year and the project contingency is 15%. Contingency is a percentage of the estimated construction cost that is added to a project to account for uncertainties during construction (e.g. bidding climate for contractors, material availability, and unforeseen site conditions, etc.). Contingency is typically added to a project prior to SNWA Board approval of funding. The cash flow developed for the evaluation of funding requirements is shown in Table 2.

Figure 1 – GWD Project by Phase

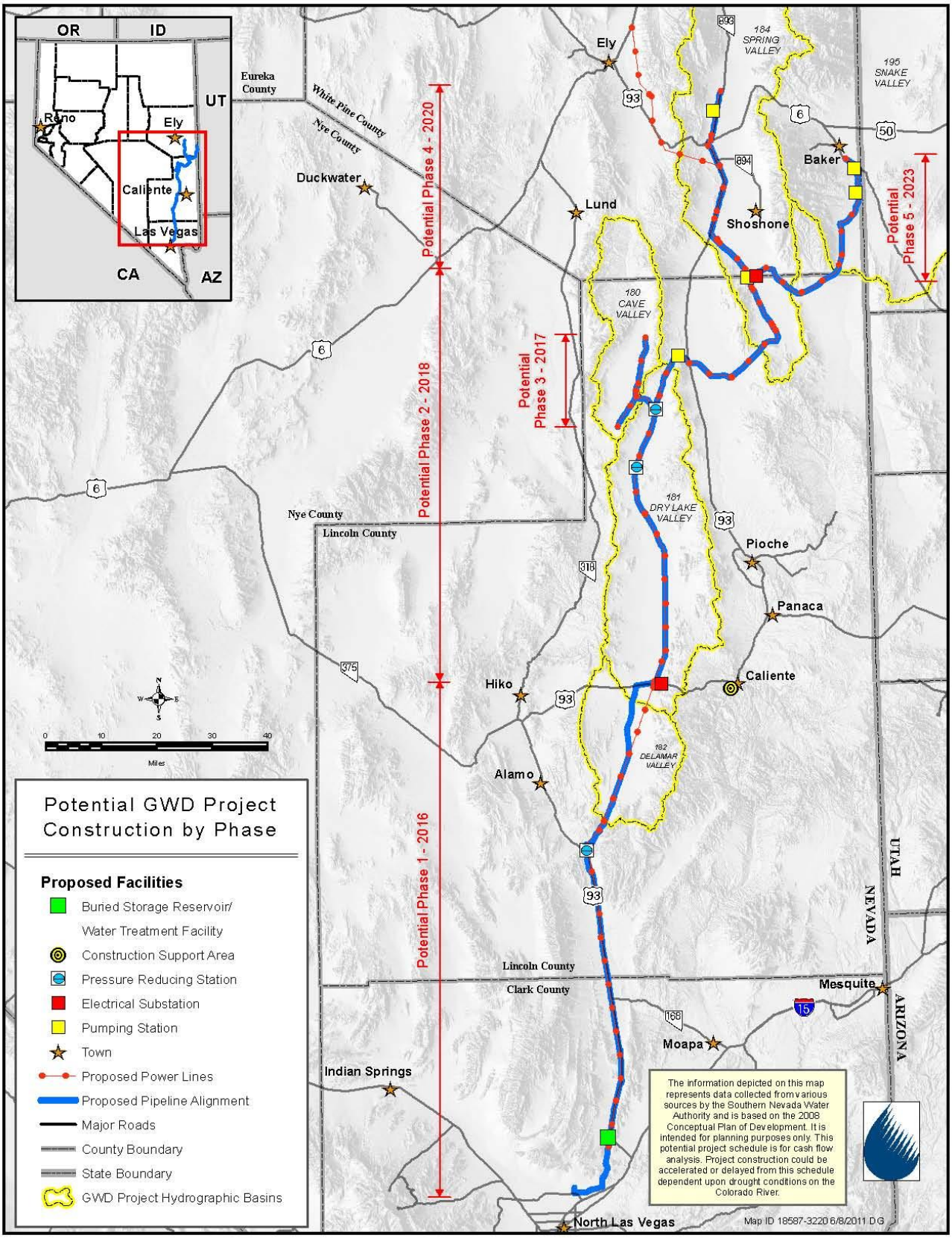

Table 2 –GWD Project Cash Flow ($ Million)

Fiscal Year	Proposed Facilities															Future Facilities												Capital ($)			Capital + Contingency ($)	Capital + Cont. + Infl. ($)
	Main Pipeline Las Vegas to Dry Lake Phase 1			Main Pipeline Dry Lake to Spring Phase 2			Cave Lateral Phase 3			Spring Lateral Phase 4			Snake Lateral Phase 5			DDC Wells			Spring South Wells			Spring North Wells			Snake Wells							
	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM	design	const	CM		
09/10																												0	0	0	**0**	**0**
10/11																												0	0	0	**0**	**0**
11/12	20,401,358																											20,401,358	0	0	**20,401,358**	**24,821,372**
12/13	20,401,358	163,210,865	32,642,173													2,572,286												22,973,644	163,210,865	32,642,173	**243,308,312**	**307,862,635**
13/14	20,401,358	163,210,865	32,642,173	19,008,401												2,572,286	14,698,777	2,939,755										41,982,045	177,909,642	35,581,928	**282,160,062**	**371,303,393**
14/15	20,401,358	163,210,865	32,642,173	19,008,401			2,224,229			5,339,705						2,572,286	14,698,777	2,939,755										49,545,979	177,909,642	35,581,928	**289,723,996**	**396,507,294**
15/16		163,210,865	32,642,173	19,008,401	190,084,012	38,016,802	2,224,229	22,242,285	4,448,457	5,339,705						2,572,286	14,698,777	2,939,755										29,144,621	390,235,939	78,047,188	**555,963,139**	**791,308,904**
16/17		163,210,865	32,642,173	19,008,401	190,084,012	38,016,802		22,242,285	4,448,457	5,339,705	53,397,054	10,679,411					14,698,777	2,939,755										24,348,107	443,632,994	88,726,599	**623,252,648**	**922,566,170**
17/18					190,084,012	38,016,802				5,339,705	53,397,054	10,679,411					14,698,777	2,939,755										5,339,705	258,179,843	51,635,969	**353,882,493**	**544,785,840**
18/19					190,084,012	38,016,802					53,397,054	10,679,411					14,698,777	2,939,755										0	258,179,843	51,635,969	**348,542,788**	**558,028,233**
19/20											53,397,054	10,679,411	5,883,478				14,698,777	2,939,755	2,451,527									8,335,004	68,095,831	13,619,166	**100,264,376**	**166,947,556**
20/21													5,883,478						2,451,527	15,322,041	3,064,408							8,335,004	15,322,041	3,064,408	**29,019,760**	**50,252,835**
21/22													5,883,478	58,834,778	11,766,956				2,451,527	15,322,041	3,064,408							8,335,004	74,156,819	14,831,364	**108,446,710**	**195,306,397**
22/23														58,834,778	11,766,956				2,451,527	15,322,041	3,064,408							2,451,527	74,156,819	14,831,364	**102,563,232**	**192,099,010**
23/24														58,834,778	11,766,956				2,451,527	15,322,041	3,064,408							2,451,527	74,156,819	14,831,364	**102,563,232**	**199,782,970**
24/25																				15,322,041	3,064,408							0	15,322,041	3,064,408	**20,684,756**	**41,903,519**
25/26																				15,322,041	3,064,408							0	15,322,041	3,064,408	**20,684,756**	**43,579,660**
26/27																				15,322,041	3,064,408							0	15,322,041	3,064,408	**20,684,756**	**45,322,847**
27/28																				15,322,041	3,064,408							0	15,322,041	3,064,408	**20,684,756**	**47,135,760**
28/29																												0	0	0	**0**	**0**
29/30																												0	0	0	**0**	**0**
30/31																												0	0	0	**0**	**0**
31/32																												0	0	0	**0**	**0**
32/33																												0	0	0	**0**	**0**
33/34																												0	0	0	**0**	**0**
34/35																												0	0	0	**0**	**0**
35/36																												0	0	0	**0**	**0**
36/37																						2,105,929						2,105,929	0	0	**2,105,929**	**6,830,366**
37/38																						2,105,929	13,162,059	2,632,412				2,105,929	13,162,059	2,632,412	**19,874,709**	**67,040,046**
38/39																						2,105,929	13,162,059	2,632,412				2,105,929	13,162,059	2,632,412	**19,874,709**	**69,721,647**
39/40																						2,105,929	13,162,059	2,632,412				2,105,929	13,162,059	2,632,412	**19,874,709**	**72,510,513**
40/41																						2,105,929	13,162,059	2,632,412				2,105,929	13,162,059	2,632,412	**19,874,709**	**75,410,934**
41/42																							13,162,059	2,632,412				0	13,162,059	2,632,412	**17,768,780**	**70,117,186**
42/43																							13,162,059	2,632,412	3,466,694			3,466,694	13,162,059	2,632,412	**21,235,474**	**87,148,953**
43/44																							13,162,059	2,632,412	3,466,694	19,809,682	3,961,936	3,466,694	32,971,741	6,594,348	**47,978,544**	**204,776,738**
44/45																							13,162,059	2,632,412	3,466,694	19,809,682	3,961,936	3,466,694	32,971,741	6,594,348	**47,978,544**	**212,967,807**
45/46																									3,466,694	19,809,682	3,961,936	3,466,694	19,809,682	3,961,936	**30,209,764**	**139,459,329**
46/47																										19,809,682	3,961,936	0	19,809,682	3,961,936	**26,743,070**	**128,394,031**
47/48																										19,809,682	3,961,936	0	19,809,682	3,961,936	**26,743,070**	**133,529,793**
48/49																										19,809,682	3,961,936	0	19,809,682	3,961,936	**26,743,070**	**138,870,984**
49/50																										19,809,682	3,961,936	0	19,809,682	3,961,936	**26,743,070**	**144,425,824**
50/51																												0	0	0	**0**	**0**
51/52																												0	0	0	**0**	**0**
52/53																												0	0	0	**0**	**0**
53/54																												0	0	0	**0**	**0**
54/55																												0	0	0	**0**	**0**
55/56																												0	0	0	**0**	**0**
56/57																												0	0	0	**0**	**0**
Total	**81,605,433**	**816,054,327**	**163,210,865**	**76,033,605**	**760,336,048**	**152,067,210**	**4,448,457**	**44,484,571**	**8,896,914**	**21,358,822**	**213,588,216**	**42,717,643**	**17,650,433**	**176,504,333**	**35,300,867**	**10,289,144**	**102,891,437**	**20,578,287**	**12,257,633**	**122,576,329**	**24,515,266**	**10,529,647**	**105,296,433**	**21,059,295**	**13,866,777**	**138,667,771**	**27,733,554**	**248,039,950**	**2,480,399,504**	**496,079,901**	**3,596,579,281**	**6,450,718,545**
			1,060,870,625			988,436,862			57,829,942			277,664,681			229,455,632			133,758,868			159,349,228			136,885,414			180,268,102			3,224,519,356		

1. Capital cost = **$3.2** billion in 2007 dollars (includes Program Admin.) based on Conceptual Plan of Development
2. Program Admin = **30%** of construction cost design **10%** Const. Mgmt. **20%**
3. Contingency = **15%** of construction cost
4. Inflation (i) = **4%** Capital+ Cont.+Infl. = (Capital+Cont.) x (1 + i) ^ (n - 2007)