

CITY OF SANTA BARBARA

Enhanced Urban Water Management Plan

Task 2.8 – SWP Exchange and Storage Options

The following memorandum is a summary of the consulting work completed by Sierra Water Group, Inc. (“Sierra Water”) for the City of Santa Barbara (“City”). Sierra Water conducted a review of water bank and supplemental water options for the City. The review is part of the 2020 Enhanced Urban Water Management Plan (“Plan”) being developed by Water Systems Consulting, Inc. (“WSC”).

Scope of Work

Sierra Water was hired to complete Task 2.8 of the Scope of Work (“Scope”) by WSC. The task includes an analysis of the following: 1) existing State Water Project (“SWP”) supplies; 2) exchange and storage options; and, 3) supplemental SWP/non-project supplies. The Scope also included a discussion of criteria used to manage the Scope items.

1) Existing SWP Supplies

The City has a contract with the Central Coast Water Authority (“CCWA”) for the annual delivery of 3,300 acre-feet (“AF”) of SWP Table A water. The costs include the fixed and variable costs charged by both the California Department of Water Resources (“DWR”) and CCWA. For Fiscal Year (“FY”) 2019-20, the estimated budget for the City’s SWP contract is \$6,524,101. The budget is broken down in CCWA’s Annual Budget as follows:

- CCWA Bond Payments - \$1.5 million/year (payments end in FY21/22);
- CCWA Fixed Costs - \$700,000/year with 3% annual escalation;
- DWR Fixed Costs - Roughly \$3.3 million/year with 3% annual escalation; and,
- CCWA and DWR Variables Costs – Projected at \$286.00/AF with 5% annual escalation.

Based on estimated deliveries of 2,705 AF (CCWA 2019-20 Budget), this equates to \$2,412 per AF for SWP water. The SWP contract is approximately 9.1% of the City’s water department budget of \$71,562,277 (City FY 2020 Budget).

According to the City, the primary objective with the SWP contract is to regulate the delivery of water in dry and wet years. As a result, the City has done the following: 1) acquire dry-year supplemental water; 2) enter into water exchanges; and, 3) evaluate participation in San Joaquin Valley water banks.

Challenges. This section deals with the current challenges with the City’s SWP water supplies.

- **Water Supply Reliability.** Based on DWR’s “Draft State Water Project Delivery Capability Report of 2019” issued in December 2019, the long-term reliability of the SWP is 58.8% of the SWP Table A. For the City, this is an average of 1,940 AF of SWP water on an annual basis. The Report provides a range of 6.5% (minimum) to 98.2% (maximum) for annual delivery of SWP water. This equates to a 215 AF to 3,241 AF (a large range for long-term planning).
- **Dry-Year Water Supply.** On average, when the SWP allocation is below 30.0%, the City has to consider supplemental water options. This also applies when local surface water supplies are below normal. In a dry-year, the City can purchase supplemental water or recover stored water from a banking program. A summary of City supplemental water purchases during the recent drought is summarized in the tables below. In addition, the City can impose voluntary or mandatory water conservation. All the dry-year options have additional costs for the City. This is due to the requirement that the City pay its SWP fixed costs and incur supplemental water costs.

Table 1 - Supplemental Water Purchases
(AF Purchased by Fiscal Year)

Seller Agency	FY14	FY15	FY16	FY17	FY18	Total	Debt(1)
Antelope Valley-East Kern WA	-	4,219(2)	4,000(3)	-	-	8,219	6,219
Mojave Water Agency - 2014	535(4)	-	-	-	-	535	869
Mojave Water Agency - 2018	-	-	-	-	1,500	1,500	375
SWC Dry-Year Program	-	85	-	-	-	85	-
Biggs-West Gridley WD	-	1,600	-	-	-	1,600	-
Vandenberg Air Force Base	-	1,148	-	-	-	1,148	-
City of Santa Maria	-	-	-	2,000	-	2,000	-
Total	535	7,052	4,000	2,000	1,500	15,087	7,463

Notes:

- 1) Some water debt has been repaid.
- 2) 1:1 exchange.
- 3) 2:1 exchange.
- 4) 1:1 exchange for 268 AF at \$400.00/AF or 1:2.25 exchange for 268 (no fee); no initial cost/pay variable costs upon return (unless returned when SWP Table A allocation is less than 30.0% - then no return cost).

Table 2 - Supplemental Water Purchases
(Unit Cost in \$ by Fiscal Year)

Seller Agency	FY14	FY15	FY16	FY17	FY18	Total
Antelope Valley-East Kern WA	-	\$750.00	\$378.00	-	-	\$909.00(1)
Mojave Water Agency - 2014	\$450.00(2)	-	-	-	-	\$606.00(1)
Mojave Water Agency - 2018	-	-	-	-	\$320.00	\$383.00(1)
SWC Dry-Year Program	-	\$700.00	-	-	-	\$700.00
Biggs-West Gridley WD	-	\$828.00	-	-	-	\$828.00
Vandenberg Air Force Base	-	\$1,070.00	-	-	-	\$1,070.00
City of Santa Maria	-	-	-	\$225.00	-	\$225.00
Weighted Based on Yield	-	-	-	-	-	\$758.00

Notes:

1) Includes \$250.00/AF to be paid in future for transportation costs for water debt.

2) 1:1 exchange for 268 AF at \$400.00/AF or 1:2.25 exchange for 268 (no fee); no initial cost/pay variable costs upon return (unless returned when SWP Table A allocation is less than 30.0% - then no return costs).

- Groundwater Storage.** The City does not have a groundwater storage program for its SWP water. The City can create an account within or outside of the CCWA service area. If the City wants to use the surplus water on an operational basis, then the water should be stored along Central Coast SWP facilities for ease of access. For long-term storage, the surplus water should be stored in the San Joaquin Valley for later recovery and transfer (to minimize carrying costs since it does not include power to transport over coastal mountains). It is assumed that the power and land costs to store water will be lower in the San Joaquin Valley. Groundwater storage typically can add \$350.00 to \$400.00 per AF to the delivered cost of stored water (does not include the cost of the water).
- SWP Allocation.** The cost to acquire additional SWP Table A water in dry and critical years may be prohibitive. As the SWP allocation goes down, the cost per AF goes up. The City could acquire a non-project water supply in dry and critical water years with a high level of reliability/deliverability to complement its SWP contract and convey the non-project water with the City's SWP conveyance capacity (SWP Contract Article 55(a)).
- High Fixed Costs.** CCWA has the highest fixed costs in the SWP system. For FY 2019-20, the CCWA fixed costs are approximately 87.5% of the City's annual payments (CCWA 2019-20 Budget). This equates to \$5.7 million in fixed costs (to CCWA and DWR). The City has to pay these costs regardless of the delivery of any SWP water. The City will not be able to fully recover these costs in the current water market through remarketing efforts.

2) Storage Options

Groundwater storage is an option for the City to regulate its surplus SWP Table A. Storing the water in the San Joaquin Valley has the lowest long-term storage costs in the SWP system. The City will not be able to recover the storage costs until the water is recovered and sold to its customers. This may be an extended period of time (5 to 10 years). This is the primary challenge to overcome in identifying water bank options for the City.

Water Bank Criteria. Given the “Challenges” above, the water bank criteria provide target objectives for the City. To pursue water banking as a management option, the City will have to evaluate the following criteria prior to implementing a program.

- **Structure.** It is important to determine the purpose of the water bank. Many irrigation districts operate a water bank to better utilize surface and groundwater within their service areas. The local groundwater banks were started with funding from the banking partners that stored water at the bank. This model was designed for long-term storage of surplus water at low cost. These water banks are integrated into existing farming operations.

The current approach is to develop a public-private model for the banking host to “make money” from water banking. This includes the sale of shares to banking partners and annual banking fees to generate investment returns. These water banks are typically stand-alone operations.

- **Capital Investment.** Every water bank requires a capital investment. The capital investment can include land, retention basins, wells, pipes and interconnections. This is the majority of the water bank costs for banking partners. Most irrigation districts will issue some form of taxable municipal financing to extend repayment of the capital over a long period (i.e. 30-year term) to reduce annual principal and interest payments.
- **Banking Fees.** The banking fees are designed to reimburse the water bank for actual costs and a “profit.” It includes recharge, storage, management, maintenance, recovery and power costs. In addition, the water banks typically have to dedicate a portion of the delivered water (e.g., 10.0%) to the groundwater basin to alleviate impacts.
- **Exchange Capacity.** This category deals with the mechanism to recover and return stored water. The operators of a water bank have supplemental water from a state or federal water supply contract. Instead of physically recovering the stored water, the water bank leaves its surface water in the system (i.e. California Aqueduct) and delivers the water to the banking partner by exchange. This reduces the cost to recover and deliver the stored water.
- **Pump-Back Capacity.** Some water banks are built on the basis of physical recovery of stored water. This requires pump-back capacity that is connected to a conveyance system (i.e. California Aqueduct). DWR allows SWP Contractors to store water outside of their service area. DWR refers to these agreements as “pump-in” since they include putting SWP water back into the California Aqueduct. In 2016 (last year reported by DWR), there were 31 agreements between DWR and SWP Contractors for recovery of stored water.

- **Cycling Ratio.** The cycling ratio refers to the period of time that elapses between the delivery date and the recovery date of the stored water. If the cycling ratio is 3 to 5 years, then the stored water is utilized for operational storage and ongoing water demand. If the cycling ratio is greater than 7 years, then the stored water is considered long-term storage. Since the cost of stored water increases over time, a lower cycling ratio produces lower cost water when delivered.

Existing Banking Programs. There are multiple water banking programs in the San Joaquin Valley. Most of the programs are limited to landowners within a specified region or irrigation district. The most popular banking partner for SWP Contractors is the Semitropic Water Storage District (“SWSD”). Between the original banking program and the Stored Water Recovery Unit (“SWRU”), SWSD has substantial operating experience with operating a water bank.

The City can participate in a water banking program in the San Joaquin Valley that allows the City to store its own surplus SWP water. Sierra Water prepared a financial summary of the SWSD SWRU program in Appendix A. It requires that the City acquire shares upfront in the SWRU program and pay banking fees to use the water bank. Assuming that the water bank has sufficient exchange or pump-back capacity, the City can recover the SWP water when it is needed. If not, the City may have to incur additional costs (“wheeling fee”) or delay delivery of the SWP water.

Appendix A presents the projected allocation of the SWP and resulting “put” and “take” of water for a possible SWRU banking program. The model assumes the City will deposit all surplus SWP Table A in allocations over 40% and recover the maximum quantity of stored water when allocations are under 40%. Over a 30-year period, the City recovers 27,112 AF from the SWRU but still has to acquire approximately 6,300 AF of supplemental water to avoid extraordinary conservation in an extended drought.

It is projected that the SWRU program will add \$367 per AF in banking costs to enable delivery of stored SWP Table A water in dry years. The projection is based on the upfront investment of \$5.6 million by the City and the total costs \$9.9 million based on a 30-year program with a discount rate of 4.5%.

3) Supplemental SWP/Non-Project Supplies

Without long-term storage of SWP supplies, the City must acquire water during drought periods. It is difficult and costly to acquire supplement SWP Table A in dry or critical water years because, as the SWP allocation and resulting supply are reduced, the demand and costs are increased. In dry or critical water years, acquiring SWP Table A supplies can be uneconomical so the City could acquire non-SWP supplemental water supplies instead.

Supplemental Water Criteria. The City knows that its SWP Table A contract is not sufficient to meet its water demands in all years. The following criteria can guide the City in pursuing a supplemental water program.

- ***Avoid Dry-Year Water Purchases (for the Long-Term)***. Dry-year water purchases from the spot market can be costly and difficult to complete. Dry-year water purchases are typically the result of a lack of long-term planning. Given the management tools available in the water industry, a water department can acquire supplemental water in the long-term water market and/or storage assets to avoid dry-year water purchases. On the other hand, dry-year water purchases (on a short-term basis) can be an important tool while developing a long-term water marketing program.
- ***Conveyance Capacity***. The City has access to the California Aqueduct through its SWP contract with CCWA. This provides an opportunity to transfer non-project water supplies. Article 55(a) of the SWP Contract allows access to the SWP to convey non-project water. In addition, Article 55(b) allows CCWA (by assignment from the Santa Barbara Flood Control and Water Conservation District) to transfer the non-project water at project costs (primarily power costs).
- ***Limit Extraordinary Conservation***. During water shortages, the City sometimes has to raise water rates to cover revenue shortfalls from extraordinary conservation measures because of the City's fixed water costs. Supplemental water purchases can reduce the need for extraordinary conservation. The City is only limited by their capacity in CCWA conveyance infrastructure of roughly 3,300 AFY.

4) Supplemental Water Management Options

The City has multiple options to regulate its SWP contract and associated water demand. The management options include the sale, lease, acquisition, banking, and exchange of supplemental water supplies. The City has already participated in a number of these management options on a short-term basis.

Acquire Water Rights/Long-Term Leases. The goal is to diversify the City's water supply. This category includes consideration of water rights and/or long-term water leases. To complement the SWP Table A, the City could acquire and/or lease highly reliable water rights. Most of the senior water rights available in the Sacramento Valley pre-date the SWP. Even in years in which SWP allocation are low, senior water rights can provide a full contract water supply. This water could be transported in SWP infrastructure.

Sale of SWP Table A (Permanent). In 1994, the Monterey Agreement between DWR and the SWP Contractors allowed Kern County Water Agency ("KCWA") to permanently sell a portion of its SWP Table A contract. KCWA and its subcontractors sold 170,670 AF of SWP Table A over a fifteen-year period from 1995 through 2010. In general, the sellers within KCWA were required to revert to a "pre-project" level of service. Although this does not apply to the City, it is a good operating guideline.

A sale of SWP Table A by the City would result in a similar outcome. The City could retire a portion or all of its SWP Table A. This will reduce the availability of future SWP Table A deliveries and the capacity to deliver supplemental water (project and non-project water supplies). Since the City's SWP contract is expensive relative to other SWP service areas, the likely buyer

will be in Santa Barbara County. This will provide the best opportunity for full cost recovery of the City's SWP investment. Unless the City can find a reliable replacement for the 3,300 AF of SWP Table A, Sierra Water does not recommend the permanent sale of SWP Table A.

Sale of SWP Table A (Lease). The leasing of SWP Table A has developed over the last ten years as a viable alternative to DWR's Turnback Pool. It includes short-term and long-term leasing of SWP Table A or SWP water yield (quantity adjusted for actual SWP allocation) depending upon needs of the buyer. Also, the prices are set by negotiation between sellers and buyers, not DWR. The City can consider selling its surplus SWP Table A or buying supplemental water in one of the following three markets:

- **Dry-Year Program.** The SWP Contractors have a well-developed water transfer program referred to as the "Dry-Year Program" (operating in years with SWP allocation is below 30.0%). The City can buy and sell into the Dry-Year Program with its SWP Table A. The City has experience with the program through CCWA participation.
- **Irrigation Season Program.** There are new buyers in the San Joaquin Valley market looking for water for direct use and water banking in years with SWP allocation of 30.0% to 55.0%. The buyers are still active when the Dry-Year Program is inactive. The Sustainable Groundwater Management Act of 2014 is driving most of the demand for replacement water. San Joaquin Valley groundwater banks are capturing most of the water from this program.
- **Fall Banking Program.** There is demand for water banking in fall months (October and November). The City can consider selling its surplus water into this developing water market. To qualify for the fall banking program, the water has to be retained in surface water reservoirs (Oroville or San Luis) and released on call. Typically, the transfer water is surplus to summer peak irrigation demands. There is substantial Delta conveyance capacity in both the federal and state pumping plants during this period.

The short-term leases can be priced off of the spot market index (described below). For long-term leases, it can be difficult to price the transaction. Typically, an index has to be developed to price the long-term lease. The index is agreed upon at the beginning of the lease and resets the water price each year during the term.

Pricing of SWP Table A (Spot Market). Sierra Water has indexed the short-term water transfer market for transactions that include the Sacramento-San Joaquin Delta. The typical water transfer originates in the Sacramento Valley from a seller that fallows rice acreage. The federal and state water agencies want to acquire dry-year water when SWP allocation is less than 30.0%. In recent years, irrigation districts in the San Joaquin Valley were seeking short-term water for groundwater banking (SWP allocation of 30.0% to 55.0%).

The following table shows the current spot market index for short-term water prices:

Table 3 – Spot Market Prices

SWP Allocation	"SR" Index	"NOD" \$/AF	Carriage Losses	"SOD" \$/AF	CCWA & DWR Variable \$/AF	Delivered to Cachuma \$/AF
Above 70.0%	Wet	\$150.00	25.0%	\$200.00	\$286.00	\$486.00
46.0% - 70.0%	Above Normal	\$250.00	28.0%	\$347.22	\$286.00	\$633.22
31.0% - 45.0%	Below Normal	\$375.00	30.0%	\$535.71	\$286.00	\$821.71
16.0% - 30.0%	Dry	\$525.00	35.0%	\$807.69	\$286.00	\$1,093.69
0.0% - 15.0%	Critical	\$700.00	38.0%	\$1,129.03	\$286.00	\$1,415.03

Notes:

- 1) "SR" refers to Sacramento River;
- 2) "NOD" refers to North of Delta (Sacramento Valley);
- 3) Carriage Losses refer to a percentage of transfer water dedicated to Delta water quality (reduces yield to buyer);
- 4) "SOD" refers to adjusted cost of NOD water delivered to South of Delta (San Joaquin Valley); and,
- 5) the \$286.00/AF is the FY 2019-20 DWR/CCWA estimate for power costs to deliver SWP water to the City.

Supplemental Water. Broadly defined, supplemental water can include SWP water and non-SWP water. Non-SWP water can include senior water rights, contract water supplies and federal contract water. The City needs supplemental water in dry years. Historically, the City has acquired dry and critical year water through CCWA (participating in the Dry-Year Program). The City can access the water market to acquire short-term, long-term, and permanent supplemental water supplies.

Appendix B shows the potential water marketing revenues and costs for the City assuming that the City buys supplemental water to maximize deliveries to 3,300 AF in years with Table A allocations below 40% and sells all surplus SWP water in years above 40% allocation. The analysis estimates 33,415 AF purchased over 30 years at an NPV of \$18.8 million (or \$563/AF) and 30,197 AF sold over 30 years at an NPV of \$8.3 million (or \$274/AF). The net NPV of \$10.5 million is equivalent to \$315 per AF of water purchased.

Water Exchanges. The City has participated in "unbalanced" water exchanges with two SWP Contractors. The water exchanges were completed with Antelope Valley-East Kern Water Agency ("AVEK") and Mojave Water Agency ("PWD"). Both AVEK and PWD have access to groundwater storage and surplus SWP water. This provides the basis for a good exchange partner.

The water exchanges allowed the City to acquire supplemental water from another SWP Contractor. The City will pay back the SWP Contractor with surplus SWP Table A or purchase substitute water supplies for delivery. As discussed above, the City can pursue management options that provide similar benefits without a water exchange.

Water exchanges require that the receiving party have sufficient SWP Table A to "pay" back the water debt in dry or critical water years. This is typically accomplished with a combination of additional water and cash from the City. The City still has an outstanding balance (water due) to

AVEK and PWD. Sierra Water projects that these types of water exchanges will “dry up” as the market for leasing SWP Table A fully develops.

Options Summary. Of the different options described above, Sierra Water recommends combining the sale of SWP Table A during wet years (lease) with the acquisition of supplemental water in dry years (spot market/long-term leases). Water Exchanges are not expected to be as prevalent in the future but, even if they are, purchase of spot market and supplemental water is preferred to avoid complication and costs of payback component of exchanges. Also, sale of SWP Table A (permanent) is not recommended.

5) Conclusions

This memo is an initial look at potential options to increase the reliability of SWP deliveries in dry years while potentially providing revenue to the City in wet years. No recommendations are made now because CCWA is currently conducting a broader study that will better define the City’s options. The City should work with CCWA to identify the preferred method for increasing certainty of SWP or supplemental water availability during extended drought conditions – whether via groundwater banking or long-term purchase agreements. This effort could also identify the potential to sell SWP supplies on an annual basis when they are not needed for City use in that year or for providing drought year supplies.

Appendix A

SEMITROPIC WATER STORAGE DISTRICT
Stored Water Recovery Unit (SWRU) - "Area B" Shares (2014 Prices)
40% Allocation Setting

Assumptions (per Share):

Projected

Recharge (AF):	3.30	3,300	Upfront Payment:	\$5,577,000	Recharge Fee:	\$20.55
Storage (AF):	9.90	9,900	Discount Rate:	4.5%	Recovery Fee:	\$123.30
Recovery (AF):	3.30	3,300	Purchased Water Price/AF:	-	Production Costs:	\$50.00
Priority 1 Price (Upfront):	\$1,690		Management Fee:	\$6.17	Annual Escalator:	3.0%
Total Shares:	3,300		Maintenance Fee:	\$8.00	Recharge Loss to Basin:	10.0%

	CY		Manage. Fees	Maint. Fees	Annual Put	Recharge Fees	Annual Take	Recovery Fees	Production Costs	Storage Losses	Storage Account	Total Cost
0	2020		-	-	-	-	-	-	-	-	-	\$5,577,000
1	2021	49%	\$20,361	\$26,400	1,620	\$33,281	-	-	-	(162)	1,458	80,042
2	2022	22%	20,972	27,192	-	-	(2,561)	325,202	128,033.24	-	(1,103)	501,399
3	2023	54%	21,601	28,008	1,792	39,077	-	-	-	(179)	510	88,685
4	2024	58%	22,249	28,848	1,911	42,921	-	-	-	(191)	2,230	94,018
5	2025	65%	22,916	29,713	2,155	49,855	-	-	-	(216)	4,170	102,485
6	2026	65%	23,604	30,605	2,143	51,052	-	-	-	(214)	6,099	105,261
7	2027	58%	24,312	31,523	1,928	47,313	-	-	-	(193)	7,834	103,148
8	2028	56%	25,041	32,469	1,834	46,349	-	-	-	(183)	9,485	103,859
9	2029	25%	25,793	33,443	-	-	(2,462)	384,585	123,112	-	7,023	566,933
10	2030	28%	26,566	34,446	-	-	(2,383)	383,432	119,168	-	4,639	563,613
11	2031	52%	27,363	35,479	1,701	\$46,973	-	-	-	(170)	6,170	109,816
12	2032	49%	28,184	36,544	1,624	46,186	-	-	-	(162)	7,631	110,914
13	2033	68%	29,030	37,640	2,248	65,868	-	-	-	(225)	9,654	132,538
14	2034	76%	29,901	38,769	2,498	75,382	-	-	-	(250)	11,903	144,052
15	2035	45%	30,798	39,932	1,499	46,586	-	-	-	(150)	13,251	117,316
16	2036	26%	31,722	41,130	-	-	(2,426)	465,978	121,287	-	10,826	660,117
17	2037	30%	32,673	42,364	-	-	(2,301)	455,246	115,042	-	8,525	645,326
18	2038	38%	33,654	43,635	-	-	(2,051)	417,997	102,553	-	6,474	597,839
19	2039	61%	34,663	44,944	1,998	69,911	-	-	-	(200)	8,272	149,518
20	2040	49%	35,703	46,293	1,624	58,507	-	-	-	(162)	9,734	140,502
21	2041	26%	36,774	47,681	-	\$0	(2,426)	540,196	121,287	-	7,308	745,939
22	2042	4%	37,877	49,112	-	-	(3,175)	728,288	158,755	-	4,133	974,032
23	2043	15%	39,014	50,585	-	-	(2,800)	661,615	140,021	-	1,332	891,235
24	2044	45%	40,184	52,103	1,499	60,784	-	-	-	(150)	2,681	153,071
25	2045	64%	41,390	53,666	2,123	88,695	-	-	-	(212)	4,592	183,750
26	2046	26%	42,631	55,276	-	-	(2,426)	626,236	121,287	-	2,166	845,430
27	2047	36%	43,910	56,934	-	-	(2,101)	558,676	105,051	-	65	764,571
28	2048	36%	45,228	58,642	-	-	-	-	-	-	65	103,870
29	2049	36%	46,584	60,401	-	-	-	-	-	-	65	106,986
30	2050	36%	47,982	62,213	-	-	-	-	-	-	65	110,195
Total			\$968,683	\$1,255,991	30,197	\$868,739	(27,112)	\$5,547,451	\$1,355,597	(3,020)	-	\$15,573,461
NPV/Ave.			\$457,127	\$592,709	-	\$489,925	-	\$2,430,117	\$638,827	-	-	\$9,945,546
NPV/AF			\$17	\$22	\$0	\$18	\$0	\$90	\$24	\$0	\$0	\$367

Appendix B

**Water Marketing (SWP Table A & Supplemental Water)
30-Year Projection (40.0% SWP Allocation Setting)**

SWP Allocation	\$/AF
70.0-100.0%:	\$200
46.0-69.0%:	\$350
31.0-45.0%:	\$535
16.0-30.0%:	\$810
0.0-15.0%:	\$1,130

Inflation	3%
Discount	5%
Sell / Buy Trigger	40%

	WY	%	Table A AF	AF Buy	AF Sell	Unit Cost	\$ Buy	\$ Sell	
0	2020		-					\$0	
1	2021	49%	1,620	-	1,620	\$361	\$0	\$584,010	
2	2022	22%	739	2,561	-	\$859	\$2,200,742	\$0	
3	2023	54%	1,792	-	1,792	\$382	\$0	\$685,358	
4	2024	58%	1,911	-	1,911	\$394	\$0	\$752,797	
5	2025	65%	2,155	-	2,155	\$406	\$0	\$874,382	
6	2026	65%	2,143	-	2,143	\$418	\$0	\$895,599	
7	2027	58%	1,928	-	1,928	\$430	\$0	\$829,919	
8	2028	56%	1,834	-	1,834	\$443	\$0	\$813,140	
9	2029	25%	838	2,462	-	\$1,057	\$2,602,005	\$0	
10	2030	28%	917	2,383	-	\$1,089	\$2,594,068	\$0	
11	2031	52%	1,701	-	1,701	\$484	\$0	\$824,104	
12	2032	49%	1,624	-	1,624	\$499	\$0	\$810,402	
13	2033	68%	2,248	-	2,248	\$514	\$0	\$1,155,442	
14	2034	76%	2,498	-	2,498	\$303	\$0	\$755,690	
15	2035	45%	1,499	-	1,499	\$545	\$0	\$817,388	
16	2036	26%	874	2,426	-	\$1,300	\$3,153,344	\$0	
17	2037	30%	999	2,301	-	\$884	\$2,034,713	\$0	
18	2038	38%	1,249	2,051	-	\$911	\$1,868,054	\$0	
19	2039	61%	1,998	-	1,998	\$614	\$0	\$1,226,227	
20	2040	49%	1,624	-	1,624	\$632	\$0	\$1,026,594	
21	2041	26%	874	2,426	-	\$1,507	\$3,655,590	\$0	
22	2042	4%	125	3,175	-	\$2,165	\$6,874,500	\$0	
23	2043	15%	500	2,800	-	\$1,599	\$4,476,094	\$0	
24	2044	45%	1,499	-	1,499	\$711	\$0	\$1,066,505	
25	2045	64%	2,123	-	2,123	\$733	\$0	\$1,555,782	
26	2046	26%	874	2,426	-	\$1,747	\$4,237,831	\$0	
27	2047	36%	1,199	2,101	-	\$1,188	\$2,496,807	\$0	
28	2048	36%	1,199	2,101	-	\$1,224	\$2,571,711	\$0	
29	2049	36%	1,199	2,101	-	\$1,261	\$2,648,862	\$0	
30	2050	36%	1,199	2,101	-	\$1,299	\$2,728,328	\$0	
Total			42,982	33,415	30,197		\$44,142,649	\$14,673,338	
							NPV	\$18,819,042	\$8,301,693
							NPV, Net (Buy - Sell)		\$10,517,349
							NPV/AF Bought	\$563	\$315