



Beach Environmental, LLC  
0133 Prospector, Suite 4210  
Aspen, Colorado 81611

Tel: (970) 925-3475  
Fax: (970) 925-4754

December 11, 2006

Mr. James Willey  
Dallas Creek Water Company, Inc.  
P.O. Box 1287  
Montrose, CO 81402

Dear Jim:

At your request, the present and future water delivery requirements of the Fairway Pines Development (including the golf course irrigation requirements), the Loghill Village Development and other previously approved subdivisions were compared to the water rights available to serve those developments at full build-out. Although a similar study was completed previously to determine Dallas Creek Water Company's "capacity to serve," including irrigation demands of the Fairway Pines Golf Course, this study evaluated both municipal and irrigation delivery requirements, an analysis of the Hyde-Sneva Priority 100 water right, and the additional municipal water right amounts made absolute, which produced an increase in the earlier conclusions regarding Dallas Creek Water Company's overall ability to serve..


As in previous studies, average daily water delivery requirements for residential and commercial uses were calculated in terms of gallons per day and translated into equivalent single family units (SFEs) using standard methods and practices of the water industry. Records of metered water use confirming annual deliveries to existing residential and commercial properties were escalated by standard loss rates to generate realistic rates of demand per SFE. Since these demand rates were found to be lower than the industry standard of 350 gallons per day (gpd) per SFE, the higher industry rate of 350 gpd was used to determine future municipal water delivery requirements. It is also understood that the higher rate is used by the Planning Department of Ouray County and therefore represents an acceptable method for determining total water demands and for establishing the total number of SFE's that can be reliably supplied by Dallas Creek Water Company's existing water rights.

The study recognized that the water rights used to serve the irrigation demands of Fairway Pines Estates Golf Course are not owned by Dallas Creek Water Company and do not have a direct affect on DCWC's ability to reliably serve the subdivisions to which it has previously committed a municipal water supply. Nevertheless, a physical and legal capacity to provide irrigation supplies to the Fairway Pines Estates Golf Course currently exists and could be placed into service when required.

The findings and conclusions of the revised study are summarized on the following page and a detailed description of the methodology and data analyzed begins on page 4. Should you need any further information please contact me at your convenience.

Sincerely,

By   
Gary L. Beach, MSEE

By   
William W. Hansen, PhD, PE





Beach Environmental, LLC  
0133 Prospector, Suite 4210  
Aspen, Colorado 81611

## **SUMMARY OF FINDINGS AND CONCLUSIONS DALLAS CREEK WATER COMPANY WATER RIGHTS**

The results of this revised "capacity to serve" study support a finding that the senior Mike Cuddigan and Hyde-Sneva water rights in combination with the Loghill Pumping Plant, are now physically capable of providing a reliable water supply for up to 1,393 single family equivalent units (SFEs). With the increase in physical capacity of the water system since our prior water rights report, the DCWC system can now take advantage of the full decreed capacity of these senior water rights (0.75 cfs). In addition, the McLaughlin Water Engineers, dated January 2005, entitled "Water Supply Facilities Plan, Phase II", states that the facilities now under construction will yield 1.39 cfs upon completion and an additional water rights filing is anticipated for near future to make 1.39 cfs absolute and 0.48 cfs conditional. When this is accomplished, the total system yield increases to 2,554 SFEs.

Secondly, the Division 4 Water Court found that the Fairway Pines Plan for Augmentation for the Fairway Pines Golf Course and Country Club provided adequate water supplies for both the irrigation of the golf course and storage of water in several ponds, without causing material injury to any vested water right or decreed conditional water right. The augmentation plan and its companion water rights provide for the withdrawal of up to 168.00 acre feet per year from ground water underlying the Fairway Pines property. A comprehensive hydrologic report was submitted to the Court which provided evidence to support the awarding of water rights and approval by the Water Court of the Plan for Augmentation. The diversion of up to 168.0 acre feet for the full irrigation of the golf course and maintenance of the golf course ponds is therefore a legally secure water supply.

Results of the capacity study also indicate that whenever the Golf Course well field is incapable of meeting dry year or peak period demands, other water rights are available to Fairway Pines which are capable of supplying the golf course's irrigation and pond water requirements. Water rights available for these purposes include the Hyde-Sneva priority 100, the Golf Course Ditch and that excess capacity in the senior Mike Cuddigan and Hyde-Sneva priorities not presently required by municipal demand. Such irrigation diversions under priorities 39 and 42 could be made through the Loghill Pumping Plant without interrupting or diminishing required deliveries to the municipal system.

Therefore, the findings and conclusions reached by the various analyses completed for this study indicate that the water rights of Dallas Creek Water Company are legally and physically capable of supplying all units previously approved by the County. Dallas Creek Water Company has the

present physical capacity to serve a total of 1,393 SFEs through its senior priorities and will soon have the completed capacity to serve 2,554 SFEs.

In addition, the Hyde-Sneva priority 100 water right, although not included in the above capacity determinations, is decreed for both irrigation and municipal use. As such, it can be used to supplement overall deliveries by Dallas Creek Water Company, increasing its capacity to provide future water service of 2,554 Single Family Equivalents. During our recent study to quantify the amount of additional water that may be provided by the Hyde-Sneva Priority 100, we reviewed water diversion records, precipitation and stream flow records, and we spoke with the Division Engineer for Division 4 and reviewed prior work completed on Dallas Creek water right priorities. We concluded that:

1. The Hyde-Sneva Ditch has diverted an average of 2,131 acre feet per year during the 34 years of study.
2. Although the State advises that Priority 100 was subject to administrative curtailment in 2002, the driest year of record, hydro graphs for the stream gage on Dallas Creek indicate there are other years in which precipitation or stream flow was lower than in 2002, yet no calls against Priority 100 appear to have been made and perhaps did not need to be made in 2002.
3. Diversions through the Hyde-Sneva in 2002 remained well above other years at an estimated 989 acre feet. Similarly, the prior dry year of 1977 records indicate that 2,206 acre feet was diverted during that year and there is no record of a call being made against priority 100 in that year.
4. We also find that re-use water available from the wastewater plant, estimated to be 0.195 cfs, can be used to satisfy a portion of the golf course irrigation demands that would otherwise be satisfied by the Hyde-Sneva water rights.

## **CAPACITY TO SERVE**

Dallas Creek Water Company has committed to provide a reliable water supply for several subdivisions previously approved by the County through its P.U.D. process. In order to determine Dallas Creek Water Company's capacity to serve these previous municipal commitments while simultaneously addressing the need to ensure adequate water supplies to the Fairway Pines and Loghill Mesa developments, all anticipated future water delivery requirements for all entities were calculated and compared to the decreed water rights and physical supplies available to Dallas Creek Water Company.

Present capacity of the Loghill Pump and Pipeline is being increased to carry 1.39 cfs and an application to make absolute this additional water is proposed to be filed in December 2006. See attached McLaughlin Rincon Report for details.

This capacity to serve must also recognize that return flows through the wastewater treatment plant, serving up to 400 units, will generate up to 141 af/yr of additional flow that can be used to extinction for golf course irrigation purposes. Dallas Creek Water Company has committed, through contract, to provide Strategic Real Estate Group, of 325 Lake Dillon Drive, Suite 102, Dillon, Colorado, 100 acre feet per year of water for irrigation of the golf course through direct diversions from Dallas Creek or through waste water return flows. From a practical perspective, until residential lots are developed, water commitments to those lots, expressed in SFEs are more than adequate to allow water to be diverted from Dallas Creek for golf course irrigation. Once lots have been built out, water released from the waste water treatment facility (up to 141 af/yr) becomes available to supplement diversions from Dallas Creek.

### **DECREED WATER RIGHTS AVAILABLE FOR USE**

The water rights available for use by the previously approved subdivisions and the Fairway Pines Golf Course were awarded by the Division 4 Water Court in Case Numbers W-1357, W-1358, W-1365, 81CW110, 81CW183, 85CW188, 86CW143, 92CW177, 92CW178, and 92CW179. Cases W-1357 and W-1358 included a change in use for portions of the Mike Cuddigan Ditch, priority no. 39 and the Hyde-Sneva Ditch priorities 42 and 100. The original water rights were changed from irrigation only to irrigation and municipal uses including industrial, residential, commercial, storage, recreational and piscatorial. These two cases simultaneously transferred 0.625 cfs of the Mike Cuddigan priority no. 39, 0.125 cfs of the Hyde-Sneva priority no. 42, and 0.625 cfs of the Hyde-Sneva priority no. 100 to the Loghill Pumping Plant as an alternate point of diversion.

Similarly, Case No. W-1365 conditionally awarded municipal, industrial, commercial, residential, recreational and piscatorial rights in the amount of 10.0 cfs to the Log Hill Pumping Plant. A portion of those rights have been perfected and presently, the Loghill Pumping Plant water rights include 0.75 cfs of absolute rights and by stipulation and decree, the conditional rights have been reduced to 1.12 cfs for the above described municipal purposes.

In the later cases, Loghill Village Investors received Water Court approval to operate a plan for augmentation which provides a legal source of supply for; 1) the irrigation of an eighteen hole golf course, consisting of approximately 60 acres; and 2) the storage of water in several golf course ponds. The decrees awarded in 92CW177 and 178 include the right to divert up to 168.0 acre feet annually for direct irrigation and for storage of water in the golf course ponds.

To provide added capacity to the golf course irrigation system, the Water Court awarded 3.5 cfs for irrigation through the Golf Course Ditch in 85CW188. This water right, when constructed and fully operational, will provide Fairway Pines with a third source of irrigation water.

Therefore, as shown in Table I below, the water rights associated with Dallas Creek Water Company's commitment to serve presently total 2.125 cfs of absolute irrigation and municipal rights and 1.12 cfs of conditional municipal rights. Of the amounts decreed absolute for both irrigation

and municipal purposes, 1.375 cfs was determined by the Water Court to represent the amount historically diverted and depleted from Dallas Creek that could be transferred to the Loghill Pumping Plant without material injury to other water rights. Due to an enlargement of the pumping plant and facilities, capacity of the Loghill Pump and Pipeline will soon be capable of diverting 1.39 cfs for municipal and irrigation purposes.

Table I  
 Water Rights of DCWC

Water Right	Absolute Amount (cfs)	Conditional Amount (cfs)	Decreed Uses
Mike Cuddigan, Priority 39	0.625	0.0	I & M <sup>1</sup>
Hyde-Sneva, Priority 42	0.125	0.0	I & M
Hyde-Sneva, Priority 100	0.625	0.0	I & M
Loghill Pumping Plant	0.75	1.12	I & M
Total	2.125	1.12	I & M

1. Municipal includes all uses described previously

The cumulative total of the water rights and their physical annual yields were compared to the proposed future demands for water delivery by all users and uses, including irrigation. For purposes of this study it was assumed that a delivery of 350 gpd for each single family unit was required and this daily demand factor was used to determine the total number of units that could be reliably supplied by each of the Mike Cuddigan and Hyde-Sneva priorities through the Loghill Pumping Plant. Annual irrigation requirements for the golf course were based on demands developed by the golf course's irrigation and water consultants and compared to the supplies that are physically and legally available to Dallas Creek Water Company.

### FUTURE MUNICIPAL DEMANDS FOR WATER SERVICE

It is a generally accepted Colorado water utility standard that for planning and design of municipal water systems, a single family home (1 SFE) is assumed to require an average daily delivery of 350 gallons. This design factor includes water for water system maintenance, main line flushing, routine system losses, hydrant uses and a typical amount for lawn, garden and open space irrigation. Even though this amount of demand exceeds what is currently being experienced by actual

deliveries within Dallas Creek Water Company's service area, it serves to establish a conservative number of units that can be reliably supplied by the existing water rights.

Therefore, for design purposes, one single family home, based on a delivery rate of 350 gallons per day, will require the delivery of 127,750 gallons per year which is approximately 0.39 acre feet. Present Dallas Creek Water Company water rights are capable of producing the following volumes of water on an annual basis in support of the various Loghill Mesa developments:

Mike Cuddigan priority 39:	0.625 cfs =	208.40 acre feet <sup>1</sup>
Hyde-Sneva priority 42:	0.125 cfs =	41.60 acre feet
Hyde-Sneva priority 100:	0.625 cfs =	<u>208.40</u> acre feet
Subtotal:		458.40 acre feet
The Log Hill Pumping Plant:	0.750 cfs =	293.28 acre feet <sup>2</sup>

Consequently, the total deliverable amounts available from these water rights is currently 751.68 acre feet per year. However, since previous concerns were expressed over the utility of the Hyde-Sneva priority 100 water right, our capacity study only included the water supplies available through priorities 39 and 42 and the non-irrigation season municipal rights of the Loghill Pumping Plant. Further, since the present physical capacity of the Log Hill Pumping Plant is 0.75 cfs and available water right entitlements exceed that amount, "capacity to serve" calculations were completed for both present and future conditions.

When the Loghill Pumping Plant is diverting at its present maximum physical capacity of 0.75 cfs, a total of 543.39 acre feet<sup>3</sup> can be delivered annually. Based on a single family equivalent delivery demand of 0.39 acre feet per year, the present water rights and physical system of Dallas Creek Water Company can deliver a reliable municipal water supply for up to 1,393 single family equivalent units.

In the future, when the Loghill Pumping Plant capacity increase is completed to 1.39 cfs, water deliveries within Dallas Creek Water Company's service area will provide a reliable water supply for up to 2,582.28 SFEs. Because the Hyde-Sneva priority 100 does not appear to be subject to call in historic dry years, and can be protected from an Uncompahgre River call if necessary, further increases to the pumping capacity could provide a reliable water supply for an additional 534.36

---

<sup>1</sup> Based on total deliveries during a 168 day period as provided by the Decree.

<sup>2</sup> Based on deliveries during the 197 day non-irrigation season only.

<sup>3</sup> 0.75 cfs diverted over a 365 day period will yield 543.39 acre feet.

SFEs or could make water available for any combination of municipal or other beneficial uses for which these water rights have been decreed.

## SUMMARY

Therefore, work completed for this capacity study confirms earlier findings that the water rights available to Dallas Creek Water Company will provide a reliable municipal water supply for more than the existing single family equivalent units for which water service has previously been committed. Further, Dallas Creek Water Company has sufficient existing physical capacity to serve a total of 1,393 single family units or to meet other needs such as irrigation within Fairway Pines Estates without diminishing the reliability of deliveries to existing municipal commitments. Dallas Creek Water Company's legal "capacity to serve" extends to 2,554 single family equivalent units and additional capacity will be deliverable upon completion of additional water system improvements in December 2006.



**Dallas Creek Water Company, Inc.**

**Water Tap Single Family Equivalents Status at 10/2006**

<i>Developments Final Platted / Committed</i>	SFE's Committed	SFE's Accumulated
<b>SFE Equivalents</b>		
Alpenview Meadows	7	7
Bennett Subdivision Tract 2	6	13
Calbeck Subdivision LHNP #6	2	15
Colburn Estate Lot 11	1	16
Danny Thompson, 4839 County Road 1	1	17
Fred Jossi, Cty Road 1	1	18
Deerfield Subdivision	5	23
Enclave at the Edge Subdivision (finaled/no will serve issued)	6	29
Enclave at the Edge Subdivision (Issued Taps)	3	32
Fairway Pines Estates PUD	311	343
Fire Authority (outlot A & B)	2	345
Fisher Canyon Estates East	8	353
Fisher Canyon North	12	365
Fisher Canyon South	35	400
Fisher Creek Estates	36	436
Flying K Subdivision Tract 8	7	443
Gleason Subdivision	1	444
Keller Hills Subdivision Tracts 3 & 33	16	460
Loughill Village, Unit 1	184	644
Loughill Village, Unit 2	36	680
Loughill Village, Unit 4	71	751
Lot 1, Pinyon Peak (Janssen) Subdivision	1	752
Marshall Subdivision LHNP #1	4	756
Meadow Estates Subdivision Tract 9	5	761
Mesa Luna Subdivision Tract 7	3	764
NE1/4 NW1/4 Section 29 LHNP #14	1	765
NE1/4 SE1/4 Section 29 LHNP #8	1	766
NW1/4 NE1/4 Section 29 LHNP #15	1	767
NW1/4 NW1/4 Section 29 LHNP #13	1	768
NW1/4 SE1/4 Section 29 LHNP #7	1	769
NW1/4 SW1/4 Section 29 LHNP #5	1	770
Pinyon Peak (Cervanka) Subdivision	5	775
Pinions at Log Hill (Tract 1)	6	781
Ponderosa Crest Subdivision Tract 6	4	785
SE1/4 NE1/4 Section 29 LHNP #12	1	786
SE1/4 NW1/4 Section 29 LHNP #10	1	787
SE1/4 SE1/4 Section 29	1	788
Stapleton Limited Subdivision - LV Tract 5 Replat	1	789
Sunridge Subdivision LHNP #2	4	793
SW1/4 NE 1/4 Section 29 LHNP #11	1	794
SW1/4 NW1/4 Section 29 LHNP #9	1	795
SW1/4 SW1/4 Section 29	0	795
Tract 1, Loughill Crest	1	796
Tract 10, Loughill Crest	1	797
Tract 11, Loughill Crest	1	798
Tract 16, Loughill Crest	1	799
Tract 18, Loughill Crest	1	800
Tract 20, Loughill Crest	1	801
Tract 21, Loughill Crest	1	802
Tract 22, Loughill Crest	1	803
Tract 23, Loughill Crest	1	804
Tract 25, Loughill Crest	1	805
Tract 29, Loughill Crest	1	806
Tract 31, Loughill Crest	1	807
Tract 5, Loughill Crest	1	808
Tract 7, Loughill Crest	1	809
Waterview Cove	6	815
Waterview Subdivision (inc. WV Knolls - 5 units)	22	837
<b>Total Contracted Commitments</b>	<b>837</b>	<b>837</b>

**Will Serve Letters Issued:**

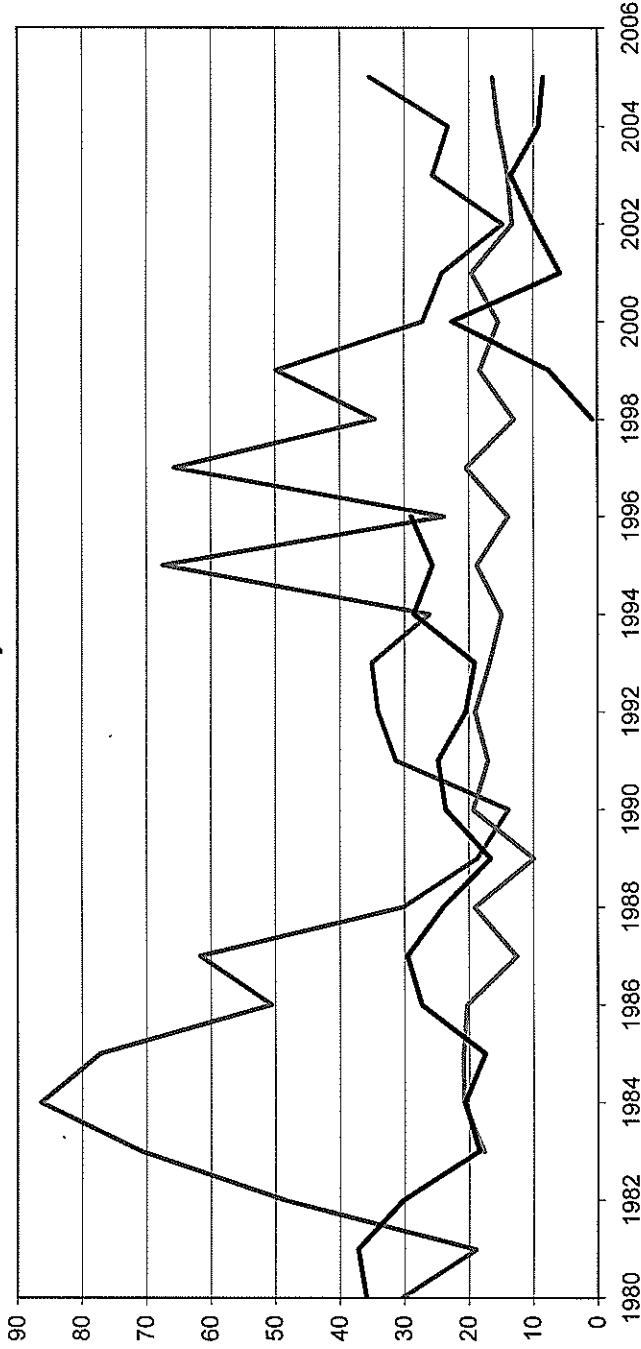
Fairway Pines Estates PUD	300	1,137
The Estates At Fairway Pines Subdivision	20	1,157
Calbeck Subdivision	2	1,159
Snowshoe Subdivision (Tract #24)	2	1,161
<b>Totals including Will Serve Commitments</b>	<b>1,161</b>	<b>1,161</b>

**Figure 1: Comparison of Hydrologic Records near Loghill Pumping Plant**

(NOTES: No diversion record available for 1997; precipitation record begins in 1983)

year	precipitation, inches	streamflow, cfs	diversion, AF/100
1980		30.5	35.9
1981		18.9	37.1
1982		48.5	30.1
1983	17.70	70.8	18.4
1984	20.84	86.4	20.6
1985	20.86	77.2	17.5
1986	20.33	50.6	27.3
1987	12.56	61.7	29.5
1988	19.08	30.2	23.9
1989	9.88	18.7	16.6
1990	19.29	13.8	23.5
1991	16.99	31.3	24.7
1992	18.99	34.0	20.5
1993	16.76	35.0	19.0
1994	14.92	26.1	28.5
1995	18.80	67.5	25.6
1996	13.87	23.8	28.9
1997	20.38	65.7	
1998	12.94	34.5	0.7
1999	18.26	49.8	7.4
2000	15.34	27.1	22.5
2001	19.56	24.1	5.8
2002	13.22	14.7	9.9
2003	13.93	25.6	13.5
2004	15.39	23.2	9.2
2005	16.30	35.4	8.5

Total Precipitation at Ridgway  
Average Streamflow Dallas Creek near Ridgway  
Total Diversion to Hyde Sneva Ditch



lowest 10% lowest 10% lowest 10%

ATTACHMENT 2 - 25 August '06

HYDE SNEVA DITCH				DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE															
YEAR	FDU	LDU	DWC	MAXQ	DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL	
1	1910	17-May	31-Oct	168	7.00	17-May						208	417	430	430	417	430	2332	
2	1911 thru																		
3	1949 No diversion record or comment available																		
4	1950	12-May	18-Sep	130	4.50	12-May						179	268	255	246	143		1091	
5	1951 thru																		
6	1969 No diversion record or comment available																		
7	1970	17-May	29-Jul	74	15.00	1-Jun						208	893	780				1881	
8	1971 thru																		
9	1973 No diversion record or comment available																		
10	1974	1-Jan	31-Oct	304	17.00	15-Jul		30.7	27.8	15.7	5.95	712	747	611	376	254	92.2	2872	
11	1975	1-Nov	8-Oct	250	15.00	28-May	59.5	4.96	27.8	18.3	2.97	161	893	819	500	208	47.6	2760	
12	1976	24-May	30-Oct	160	16.60	20-Jul						214	810	680	443	342	214	2703	
13	1977	1-Nov	31-Oct	314	17.00	9-Jun	59.5	61.5	55.5	61.5	5.95	365	677	452	344	54.2	8.43	2206	
14	1978	30-May	2-Oct	126	21.00	10-Jun						67.4	1135	948	495	288	16.9	2950	
15	1979	10-Jan	31-Oct	191	17.90	6-Jul		10.9	2.97			9.92	805	1097	769	327	123	3145	
16	1980	1-Nov	31-Oct	186	21.20	11-Jun	119						1147	1110	855	281	61.5	3585	
17	1981	30-Apr	22-Oct	176	19.00	12-Jun					8.93	455	939	974	927	212	196	3712	
18	1982	12-May	18-Oct	160	18.00	6-Aug						221	859	1088	743	65.5	35.7	3012	
19	1983	6-Jun	31-Aug	87	18.00	27-Jun							641	1070	130			1841	
20	1984	1-Nov	3-Sep	129	17.90	11-Jul	29.8	10.9				29.8	723	955	304	5.95		2058	
21	1985	10-Jun	17-Sep	68	19.00	10-Jun							764	620	3.97	360		1748	
22	1986	27-May	31-Oct	157	17.50	5-Jul						133	953	912	616	87.3	30.7	2732	
23	1987	1-Jun	31-Oct	153	17.50	23-Jun							1006	980	827	95.2	61.5	2950	
24	1988	6-May	14-Sep	132	17.30	21-Jun						247	928	643	408	167		2393	
25	1989	23-May	5-Sep	106	17.40	19-Jun						35.7	687	485	380	59.5		1657	
26	1990	16-May	29-Oct	167	17.00	16-Jul						200	660	865	462	108	57.5	2353	
27	1991	25-May	25-Aug	93	17.40	10-Jun						186	995	874	416			2471	
28	1992	8-May	31-Oct	177	15.40	14-Jun						169	611	815	284	105	61.5	2046	
29	1993	12-May	31-Oct	172	16.20	5-Jun						151	758	582	243	119	50.5	1904	
30	1994	19-Apr	31-Oct	196	18.40	20-Jun					23.8	136	874	899	480	283	152	2848	
31	1995	24-May	31-Oct	161	16.80	9-Jun						139	787	805	518	175	139	2563	
32	1996	23-Apr	31-Oct	191	17.80	22-Jun					190	738	794	567	340	139	123	2891	
33	1997 No diversion record or comment available																		
34	1998	28-Jul	7-Oct	72	0.49	28-Jul								3.89	30.1	29.2	6.8	70	
35	1999	5-Mar	31-Oct	192	7.88	9-Jun				1.07	1.19	62.2	370	304	0.69		4.58	744	
36	2000	9-Nov	27-Sep	324	18.90	16-Jun	66.8	94.1	88	85.9	39.3	274	913	248	259	90.4		2253	
37	2001	17-Apr	24-Sep	146	8.00	22-Jun					5.55	10.9	149	204	202	4.01		575	
38	2002	24-Apr	16-Oct	176	6.56	31-May					56.8	145	239	205	229	98.2	16.2	989	
39	2003	27-May	15-Sep	112	8.63	27-May						85.6	490	208	362	184		1350	
40	2004	17-May	13-Oct	150	6.91	17-May						206	320	74.9	225	67.8	25.8	920	
41	2005	23-May	12-Sep	113	5.66	14-Jun						61.4	278	216	230	69.5		845	
AVG:		2-Jun	8-Oct	162	14.60	18-Jun	9.84	5.77	5.94	5.37	10.0	171	692	640	365	142	57.5	2131	
34 years with diversion records Average Flow = 6.63 CFS																			
Notes: The average considers all years with diversion records, even if no water is diverted.																			
Diversion comments are NOT considered in the average.																			

Figure 1: Hyde Sneva Ditch  
Total Diversion, AF

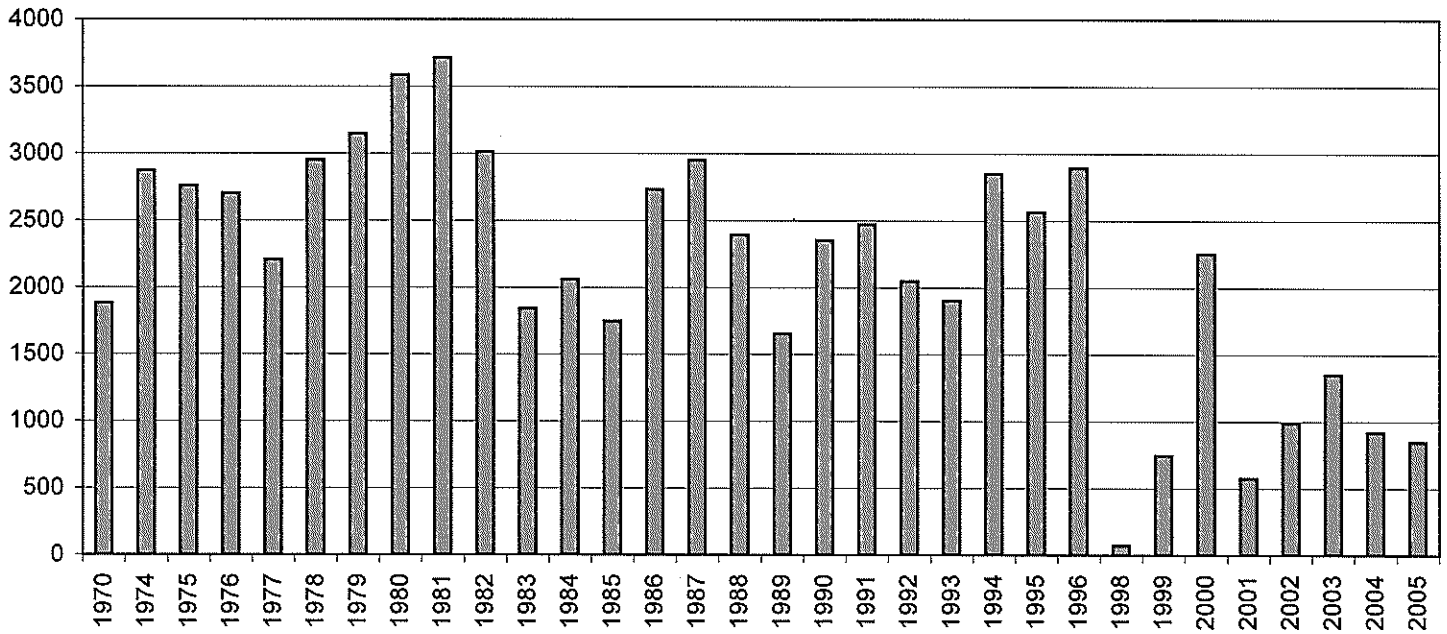
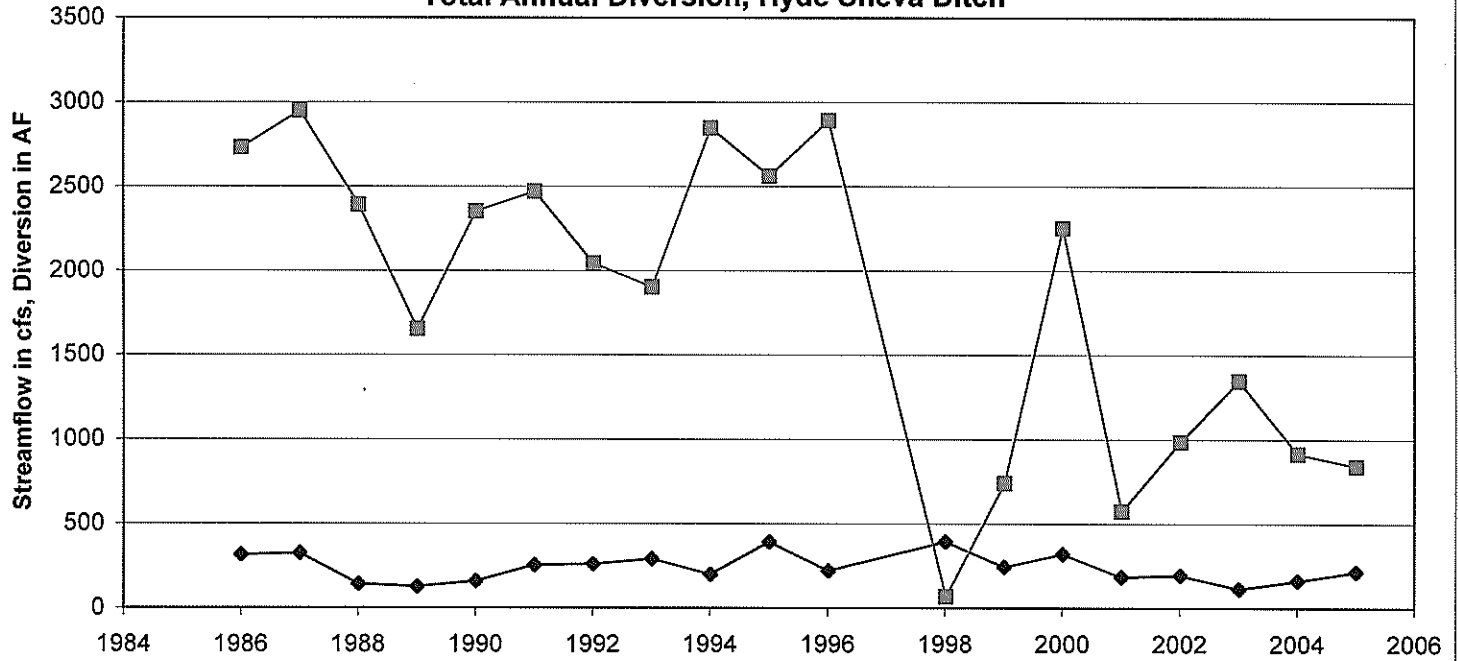
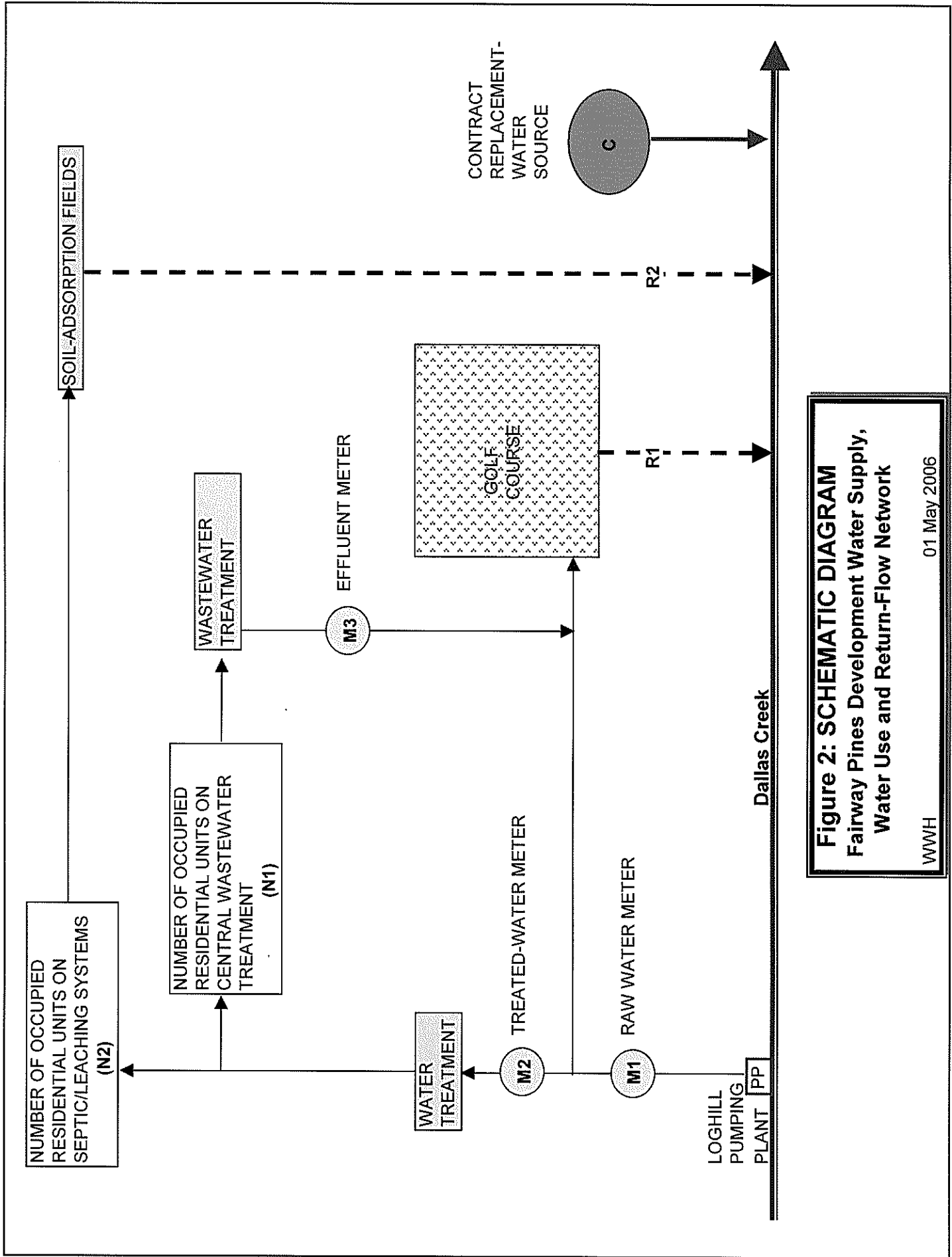


Figure 2: Average Annual Flow, Uncompahgre River  
Total Annual Diversion, Hyde Sneva Ditch





**Figure 2: SCHEMATIC DIAGRAM**  
 Fairway Pines Development Water Supply,  
 Water Use and Return-Flow Network

WWH

01 May 2006

*January 2005*



***WATER SUPPLY FACILITIES PLAN***

*for the*

***DALLAS CREEK WATER COMPANY***

***OURAY COUNTY, COLORADO***

Jim Willey  
970 209 3547 cell  
334 S 5th St  
(LAGARDE)



January 28, 2005

Mr. Jim Willey  
Dallas Creek Water Company  
334 South 5th Street  
Montrose, Colorado 81401

**RE: Water Supply Facilities Plan**

Dear Mr. Willey:

Submitted attached is our Facilities Plan for the Water Company's raw water delivery system.

The existing system includes 3 pumping stations (one not now used) and a little over one mile of 6" transmission line.

These facilities furnish supply to the water treatment plant (potable water system) and for golf course irrigation.

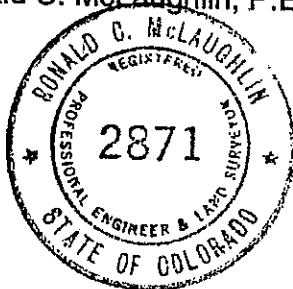
It is planned to increase delivery capacity, as demand increases, so as to later have capacity equaling the Company's decreed water rights, 3.245 cfs.

This facilities master plan proposes a three phase capital expansion/improvement program.

Respectfully submitted,  
**McLaughlin Rincón, Ltd.**

Ronald C. McLaughlin, P.E.

Ronald J. McLaughlin, P.E.



**TABLE OF CONTENTS**

**WASTEWATER SUPPLY FACILITIES PLAN**  
**FOR THE**  
**DALLAS CREEK WATER COMPANY**  
**OURAY COUNTY, COLORADO**

**I. INTRODUCTION**

Background .....I-1  
 Purpose .....I-2

**II. EXISTING SUPPLY SYSTEM**

DALLAS CREEK DIVERSION .....II-1  
 PUMPING STATIONS .....II-1  
 Pump Station No. 1 (at the Dallas Creek Diversion) .....II-1  
 Pump Station No. 2 .....II-1  
 Pump Station No. 3 .....II-2  
 RAW WATER TRANSMISSION LINE .....II-2  
 SYSTEM HYDRAULICS .....II-2

**III. MASTER PLAN**

GOALS .....III-1  
 PHASE I: IMPROVEMENTS .....III-1  
 Pump Station No. 2 .....III-1  
 Pump Station No. 1 .....III-1  
 Pump Station No. 3 .....III-2  
 PHASE II: ATTAIN MAXIMUM CAPACITY WITH LOWER 6"  
 TRANSMISSION LINE – REPLACE UPPER LINE .....III-2  
 Pump Station No. 1 .....III-2  
 Pump Station No. 2 .....III-2  
 Transmission Line Replacement .....III-2  
 PHASE III: ATTAIN DECREED CAPACITY .....III-2

**FIGURES**

FIGURE II-A. System Hydraulics – Existing 6" Pipeline .....II-3



## I. INTRODUCTION

### Background

The Dallas Creek Water Company supplies potable water to the Log Hill Mesa/Fairway Pines developments, west of Ridgway, in Ouray County. It also delivers irrigation water to the Fairway Pines Golf Course.

The existing raw water supply system consists of:

- ◆ Intake on Dallas Creek.
- ◆ Pumping Station (No. 1) at the intake.
- ◆ 6" raw water transmission line from Dallas Creek to the Mesa.
- ◆ Booster Pump Station (No. 2) located at an intermediary point on the pipeline.
- ◆ Booster Pump Station (No. 3), not now in use, located near the water treatment plant.
- ◆ Terminal Reservoir just above the treatment plant.

According to the as-built drawings, most of the raw water supply system was constructed circa 1974.

A Master Plan for Water Treatment and (potable) Distribution was prepared, McLaughlin Water Engineers, April, 1997. Based on this Plan, a new water treatment plant was completed in the spring of 2002 – and the above mentioned terminal reservoir constructed at about the same time.

Recently the Dallas Creek Water Company has determined it appropriate to initiate a capital improvement program to upgrade the raw water pumping stations. The upgrades are to effectively increase water deliveries to satisfy increasing future demands.

**Purpose**

The purpose of this report is to develop a Master Plan for upgrading the raw water supply system. The scope includes evaluation of existing facilities. It does not include an analysis of legal water rights or stream hydrology.

## II. EXISTING SUPPLY SYSTEM

### DALLAS CREEK DIVERSION

Originally this diversion consisted of a subsurface infiltration gallery. Improvements have included a constructed rock subsurface filter and a surface connection to the two existing pumps.

The design diversion capacity is defined by senior and junior water rights owned by the Water Company. These are:

Old (1885 – 1975) Absolute summer right	1.375 cfs
1972 Municipal Right, Absolute	.75 cfs
1972 Municipal Right (Conditional)	1.112 cfs
Total Ultimate Capacity:	3.245 cfs

### PUMPING STATIONS

The pumping stations are designed similarly. The three stations each have two vertical turbine Peerless pumps using small concrete wet wells. The buildings are masonry, and have pre-cast concrete roofs. The stations are shown on the 1974 Mesa Engineering Drawings. All pumps are nominal 3,500 rpm.

#### Pump Station No. 1 (at the Dallas Creek Diversion)

This station has two vertical turbine pumps. Ground level is given as 7,123 with the intake at about 40 depth. The pumps were sized at 200 gpm each at 150 ft. TDH. This pumping head was evidently in error (the pump curve showed 3 stages). The present pumps have 6 stages with 25 HP motors. With 6 bowls, the design rate for each pump would be 200 gpm @ 300 ft. TDH; shut off head should be approximately 420 ft.

#### Pump Station No. 2

This is a booster station on the pipeline. It has 2 turbine pumps set in a wet well. Ground elevation is given as 7,420, with a pump setting depth of about 8 ft. The design

point for each pump was 200 gpm @ 514 ft. TDH. Each pump has a 40 HP motor. Shut off head is approximately 624 ft.

### **Pump Station No. 3**

This station is located at the original treatment plant. It pumped treated water to the tank to pressurize the potable distribution system. Ground level is given as 7,900 ft.

With construction of the new treatment plant, this station's only function at this time is to pump irrigation water to the golf course. It is now being bypassed, with the golf course being directly supplied by Pump Station No. 2.

Each pump was sized for 200 gpm @ 246 ft. TDH. 20 HP motors were furnished.

### **RAW WATER TRANSMISSION LINE**

The transmission line from the Dallas Creek Pump Station No. 1 to the old water treatment plant is all 6" ductile iron pipe. As-built drawing lengths are:

Pump Station No. 1 to Pump Station No. 2 – 3,235 l.f.

Pump Station No. 2 to Pump Station No. 3 – 2,350 l.f.

The 6" line to the new terminal reservoir is approximately 400 ft. long. The terminal reservoir by Water Level is 7,932.

Water is transmitted from the Pump Station No. 3 site to the irrigation reservoir in 6" PVC piping. The hydraulic gradient control is at a high point in the line (approximate elevation 7,943 ft.). It is a distance of approximately 4,500 l.f. from Pump Station No. 3.

### **SYSTEM HYDRAULICS**

Calculated system hydraulics are illustrated on the attached curves, Figure II-A.

**Dallas Creek Water Co.**  
**Raw Water Supply**  
 System Hydraulics - Existing 6" Pipeline

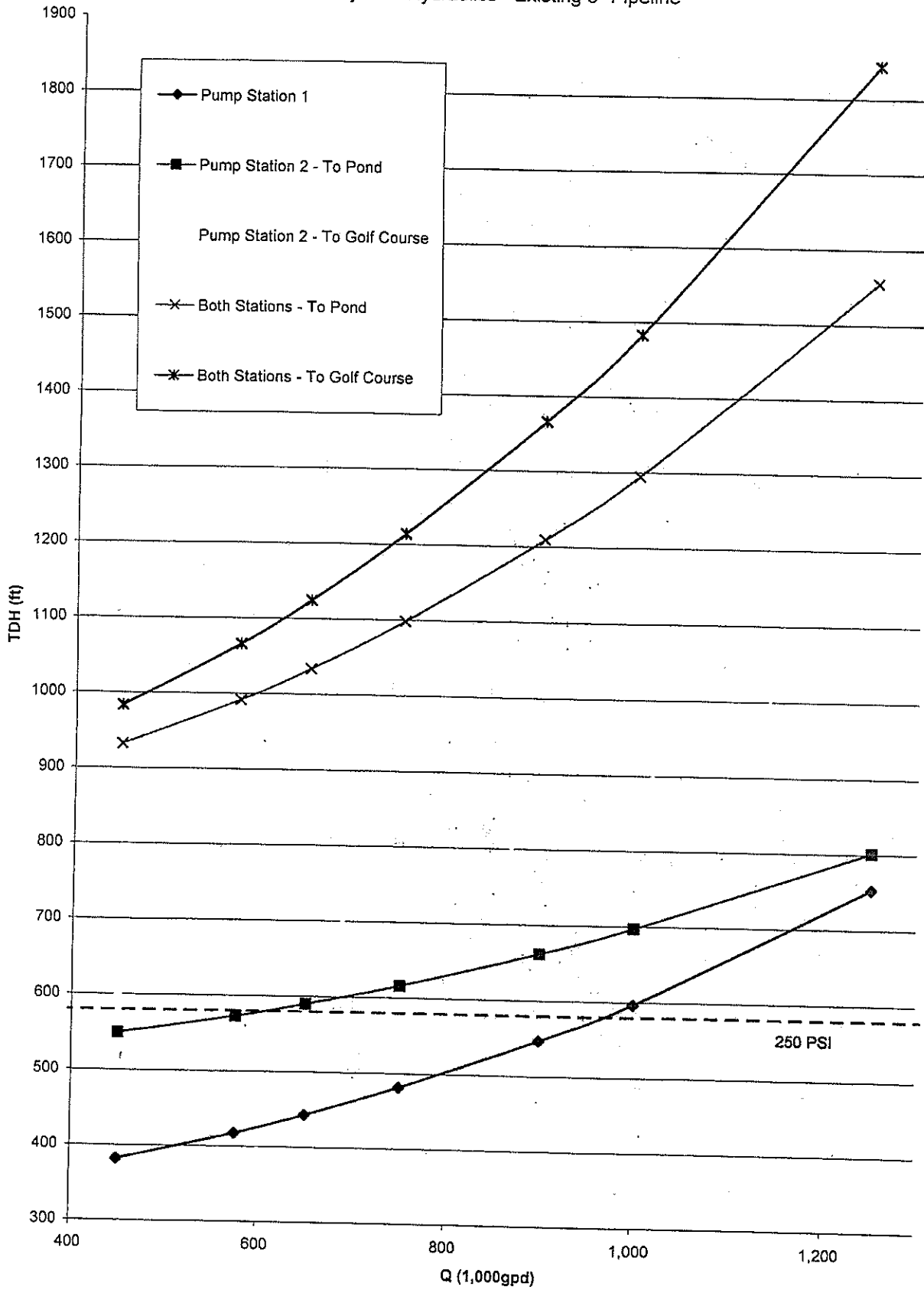


Figure II-A

### III. MASTER PLAN

#### GOALS

The ultimate goal of the Raw Water Supply Master Plan is to develop a reliable delivery rate of 3.245 cfs, which matches the total water diversion rights of the Dallas Creek Water Company. For hydraulic facility design purposes, million gallons per day (MGD) will be used as the flow rate unit. 3.245 cfs equates to approximately 2.1 MGD or 1460 gpm; the existing pumps design rate of 400 gallons per minute (gpm) equates to 0.576 MGD.

It is proposed to attain this goal in three steps – to be accomplished as required by increase in water demand, and as dictated by timing of the need to replace existing facilities.

The phases are summarized following:

- Phase 1.** Maximize deliveries using existing pumping station configurations. Upgrade pumps as necessary.
- Phase 2.** Maximize deliveries using the lower existing raw water pipeline – but replacing the line from Pump Station 2 to Pump Station 3.
- Phase 3.** Attain the full decreed delivery capacity of 2.1 MGD (3.245 cfs).

Descriptions of improvements needed for each phase, along with approximate resulting delivery capacities, follow.

#### **PHASE I: IMPROVEMENTS – 600,000 gpd (.93 cfs) Approximate Capacity**

**Pump Station No. 2** (The capacity of this station controls the system)

1. Use existing 40 HP pumps. 2 pumps – 210 gpm each @ 594' TDH.

**Pump Station No. 1**

2. Need 2 new pumps 210 gpm each @ 430' TDH. Best to install 2 new pumps – probably 30 HP.

3. Install 6" Flow Meter.

#### **Pump Station No. 3**

4. Reactive Pump Station No. 3 for golf course supply only. Design conditions 210 gpm each @ 90' TDH. Option – new pumps – or remove 2 bowls from existing pumps (could reduce motor size, but not necessary).

#### **PHASE II: ATTAIN MAXIMUM CAPACITY WITH LOWER 6" TRANSMISSION LINE - REPLACE UPPER LINE**

**Approximately 900,000 gpd (1.39 cfs) capacity.**

#### **Pump Station No. 1**

1. Install 2 new pumps, sized at 315 gpm each @ 550 ft, (approximately) TDH. Horsepower approximately 75 HP each.
2. Re-pipe Station – Design to accommodate future expansion to ultimate capacity.

#### **Pump Station No. 2**

3. Install 2 new pumps, 315 gpm @ 600 ft. TDH, approximately 75 HP each. Probably variable speed drives.
4. Re-pipe Station – Design to accommodate futures expansion to ultimate capacity.

#### **Transmission Line Replacement**

5. Replace existing 6" transmission line from Pump Station No. 2 to Pump Station No. 3 with new 12 ductile iron pipe – length of 2,350 lineal ft.

#### **PHASE 3: ATTAIN DECREED CAPACITY**

This phase to be implemented when demand exceeds 900,000 gpd, or when the existing lower pipeline needs replacement. The ultimate design capacity is 1,460 gpm.

1. Replace the 6" transmission line from Pump Station No. 1 to Pump Station No. 2 with new 12" pipe. Approximate length 3,235 lineal ft.

2. Replace pump station piping and all pumps as required to attain capacity of 730 gpm each.
3. Increase pumping capacity at Pump Station 3 to approximately 1000 gpm. It will also be necessary to increase pipeline capacity from Pump Station No. 3 to the point of delivery.