TEMPORARY SUBSTITUTE WATER SUPPLY PLAN
BROWNWOOD PIT
DMG# M-1979-059

Prepared For:
Office of the State Engineer
1313 Sherman St., Rm 818
Denver, CO 80203

Prepared By:
Weiland, Inc.
P.O. Box 18087
Boulder, CO 80308

Revised
January 21, 2016

Figures

Appendices

1.0 INTRODUCTION

Coulson Excavating Company, Inc. (CEC) contracted Weiland, Inc. (WI) to complete the well application/temporary substitute supply plan (SWSP) for the Brownwood Pit gravel operation (M-1979-059). The pit is owned by CEC of Loveland, Colorado.

1.1. LEGAL DESCRIPTION AND SITE LOCATION

The legal description of the new permit area is: The east half of the southeast quarter of Section 19, Township 5 North, Range 68 West of the 6th P.M. The Larimer County parcel number is 85190-00-020. A site location map is given in Figure 1.

1.2. JUSTIFICATION AND NEED

CEC provides services that utilize gravel for construction of roads and development of the infrastructure of Colorado. Their need is to excavate gravel at the property below to keep up with their demand for services.

1.3. PROJECT DESCRIPTION

This plan replaces the plan that was approved December 11, 2014. Since the previous plan, an amendment application was filed with the Colorado Division of Reclamation Mining & Safety (DRMS). The amended application gives specification for construction of a compacted clay liner for the existing 12.8 acre Brownwood north east pond. This plan also includes the Pfeiff pond, which is a reclaimed 3.7 acre clay lined pond containing water routed from a pipe which drains the farm pond to the north west on the neighboring property. This pond has a discharge pipe back to the Big Thompson River. The plan is to remove the inlet pipe in the spring of 2016 and conduct a liner leak test for this pit. Evaporative loss from the pond has been added to this plan until the leak test is approved. Dedication of 5/6th of a share of the Big Thompson Ditch & Mfg. water right as indicated in this plan is provided in lieu of bonding for the liner construction with DRMS. In the City of Loveland's change of use case involving Big Thompson Ditch & Mfg. water rights (2002CW392), the historic consumptive use credit yielded 91.86 acre-ft per share per year. Mr. Coulson's 5/6 share would therefore yield 76.55 acre-ft per year.

Mining at the Brownwood pit has been completed and the site is currently undergoing final reclamation. A compacted clay liner was constructed in the southeast mining cell in the spring of 2012. A 90 day clay liner leak test was conducted in May-Aug 2012 and was approved by the division office on Oct 4, 2012. The approval letter is given in Appendix III

Approximately 12.8 acres (Brownwood north east pond) + 3.7 acres (Pfeiff Pond) of groundwater are currently exposed. This plan calculates evaporative loss due to the exposed groundwater and offsets the depletions with historic crop credits. Additional depletions are replaced with fully-consumable effluent from the City of Loveland's (City) Waste Water Treatment Plant, of which the point of delivery occurs just north and approximately 500 yards west of the Brownwood Site.

An average of 139.68 acres have been historically irrigated with two shares of Big Thompson Ditch & Manufacturing Company (BTDM) water rights. CEC (Richard Coulson) currently owns 5/6 of a share of BTDM associated with the property. There are approximately 24.6 acres remaining in crop production (see Figure 2). This plan claims a dry-up credit of 16.76 acres or 0.24 shares of BTDM.

During irrigation season, the Big Thompson & Manufacturing Ditch Company water will continue to be delivered to the farm. Historical return flows associated with the 16.76 acre dry-up will be measured back to the river at the property.

During the non-irrigation season, water from CEC's 100-year lease with the City will be delivered to the river to cover evaporative depletions and to maintain historical irrigation lagged deep percolation return flows.

2.0 OPERATIONAL WATER BALANCE

2.1. PREDICTED OPERATIONAL DEPLETIONS

2.1.1. Evaporative Losses

The gross surface water evaporation calculation is based on a free water surface evaporation of 39 inches year^{-1} (Farnsworth and Peck 1982). The total water surface area of existing ponds constructed after December 31, 1980 is 12.8 acres. Total monthly evaporative loss for the exposed groundwater is given in Appendix I – Table AI.1.

Evaporative depletions have been lagged utilizing the IDS AWAS digital Model (See Appendix AI.5).

2.2. HISTORICAL CONSUMPTIVE USE CREDIT

A consumptive use analysis was completed for the entire Brownwood Farm utilizing the IDS Consumptive Use Model (IDSCU). The crop rotation is given in Table 2.2.1.

Table 2.2.1 – Brownwood farm Crop Rotation

Date	Silage Corn	Pasture Grass	Alfalfa	Totals
1951-1971	100.11 acres	40.34 acres		140.45 acres
1972-1975	54.4 acres	16.71 acres	63.21 acres	134.32 acres
1976-1979	23.92 acres	38.8 acres	78.25 acres	140.97 acres

29 Year Weighted Average for Irrigated Acres = 139.68

The crop rotation is based on information form Richard Coulson and Aerial Photography shown in Figures 3-5. The period of 1951-1979 was chosen based on the earliest available aerial photograph for the area and the knowledge that CEC began mining the northern portion of the property in approximately 1980.

The farm was irrigated solely by two shares in the BTDM. These two shares were historically used to irrigate approximately 139.68 acres. There are a total of 20.792 shares in the BTDM (case #2002CW392). In accordance with 2002CW392 section 9.3.13, the average irrigated acreage equals 9.6% of the total 1,455 irrigated acreage under the ditch. The 2 shares divided by the 20.792 total shares also equals 9.6 %. The percentage of land under the ditch equals the

percentage of fractional ownership of shares in the ditch and therefore satisfies section 9.3.13 of the decree.

Natural Streamflow (S:1, U:1) diversion flow values were input electronically directly from the CDSS Hydrobase into the IDSCU model for the years of 1951-1979. Climate data was likewise imported from Hydrobase, as were crop characteristics and coefficients.

Crops were irrigated through wild flood and furrows, therefore the analysis used an irrigation efficiency of 60% (per 2002CW392). The water holding capacity was taken from NRCS Soil survey data and was set at 1.92 in/ft. Ditch loss was set at 15% per 2002CW392.

Table AI.2 gives the IDS AWAS Consumptive Use Model output for each year. Table AI.3 gives the 29 year averages used to calculate the Net Consumptive Use Crop Credit. In accordance with 2002CW392 section 9.3.1, the total average annual consumptive use crop credit has been normalized so as not to exceed 91.78 acre-ft / share. The model assumes that 50% of the return flow runs off as tailwater and 50% percolates into the ground as deep percolation. This is based on the knowledge that the soil has a layer of clay above the sand and gravel deposit. The deep percolation return flows were lagged also utilizing the IDS AWAS Model (see Appendix AI.5). The ditch water continues to be delivered to the farm annually; therefore lagged ditch seepage was not considered.

2.3. NET WATER DEPLETION

The net water loss per year can be written as:

(Monthly Lagged Evaporative Loss) – (Monthly Historic Net Consumptive Use Credit) = (Net Stream Depletion / Replacement)

The net annual water loss or potential injury to the Big Thompson River is given in Appendix I – Table AI.4.

2.4. REPLACEMENT

During the irrigation season, plan operation will measure return flows given in Table AI.3, Column (4) back to the river. A Parshall flume has been installed for flow measurement and accounting.

Replacement water to be delivered to the river to offset Net Stream Depletions (See Column (3) Table AI.4) shall come from the City's wastewater treatment Plant located at 700 South Boise Avenue, Loveland, Colorado. CEC has executed a long term lease with the City for the delivery of fully consumable

effluent. The point of delivery occurs approximately 500 yards upstream of the Brownwood Pit. Due to the close proximity of the point of delivery to the point of injury, transit loss has not been calculated. A copy of the lease agreement for 100 acre-ft annually is given in Appendix III

3.0 REFERENCES

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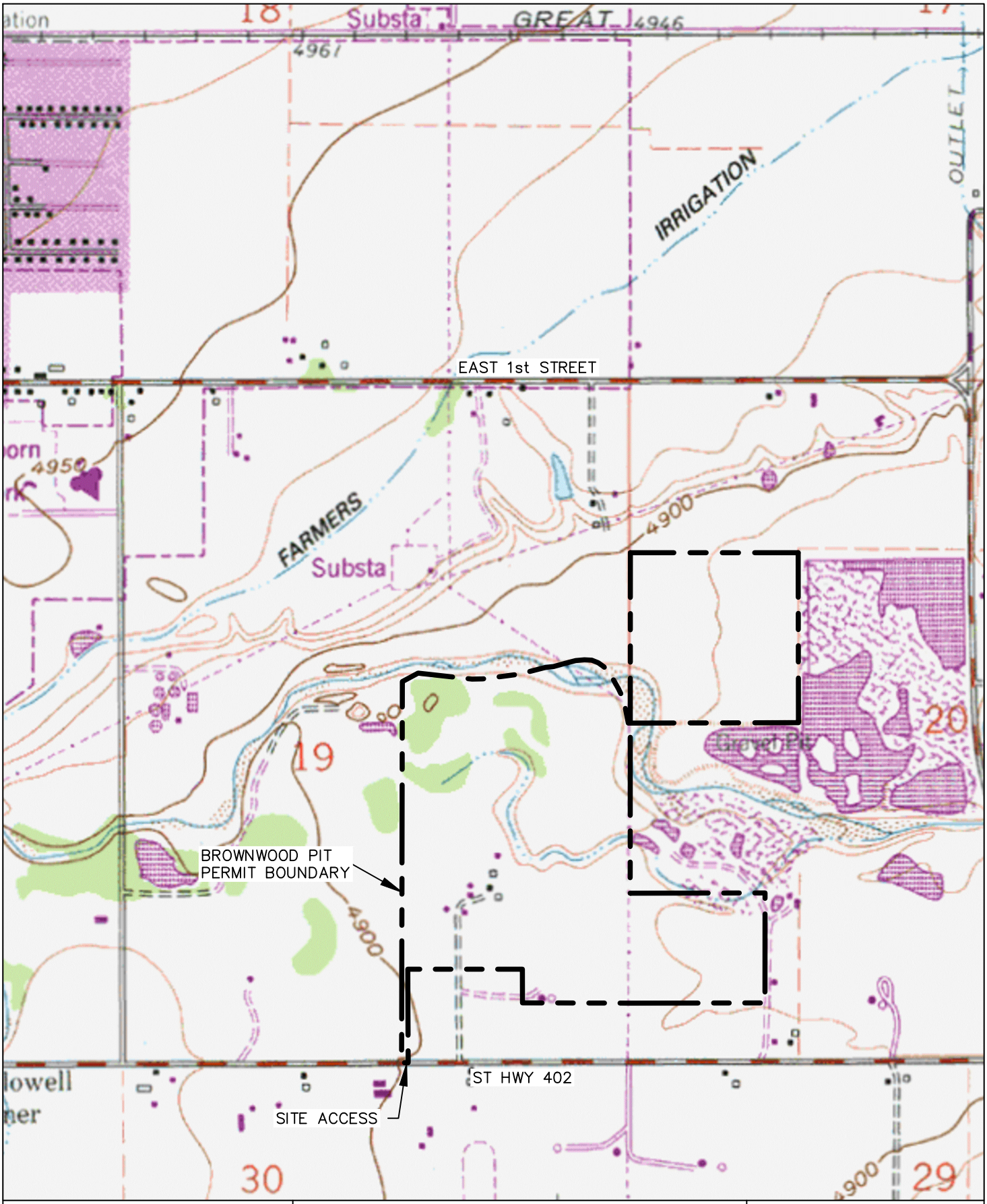

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SITE LOCATION MAP

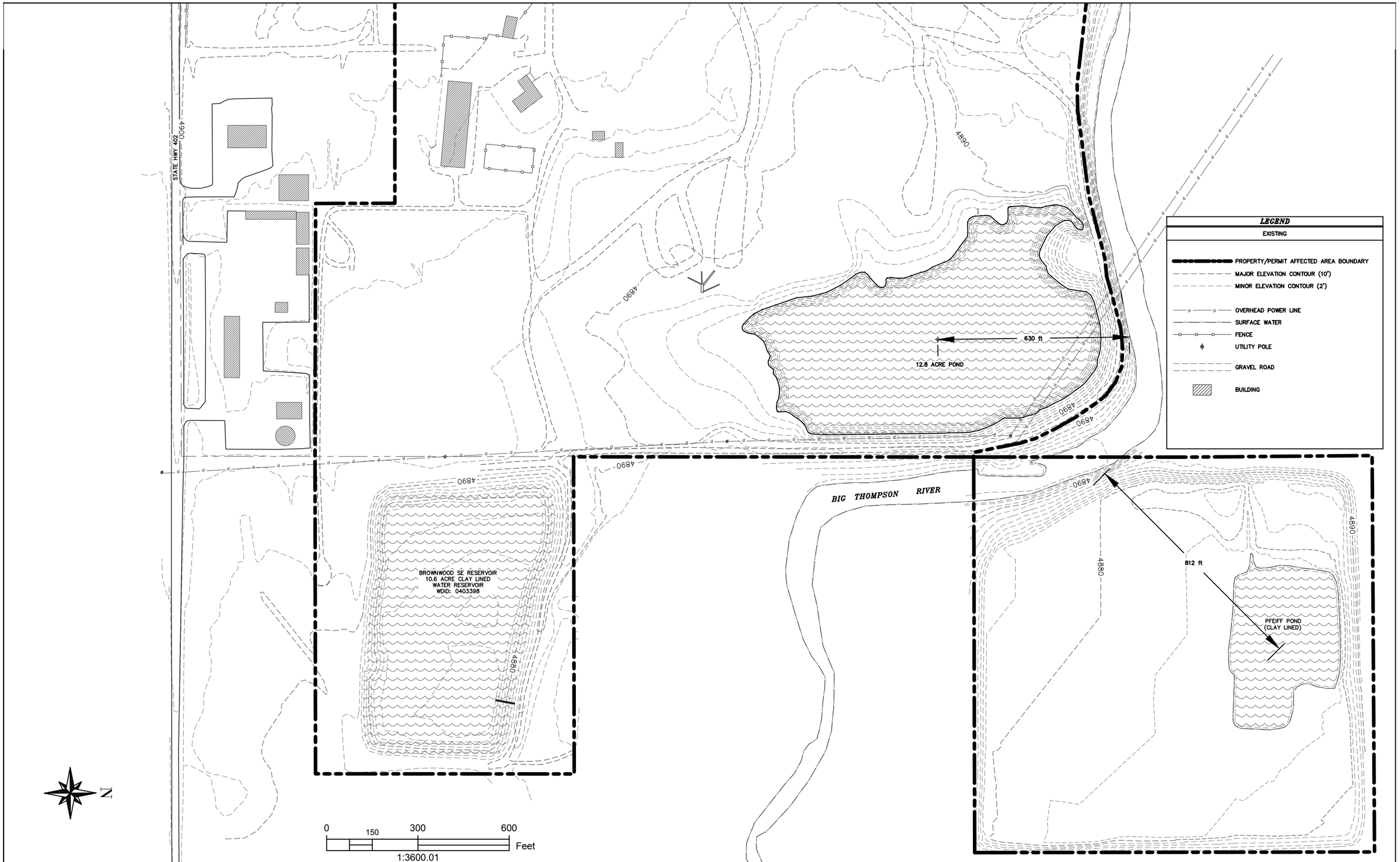
BROWNWOOD PIT M-1979-059

FIGURE 1

1"=1000'

SECTIONS 19 & 20, T5N, R68W

USGS 7.5' QUAD: LOVELAND, CO



LEGEND

EXISTING

- PROPERTY/PERMIT AFFECTED AREA BOUNDARY
- MAJOR ELEVATION CONTOUR (10')
- MINOR ELEVATION CONTOUR (2')
- OVERHEAD POWER LINE
- SURFACE WATER
- FENCE
- UTILITY POLE
- GRAVEL ROAD
- BUILDING

REVISIONS

REV	DESCRIPTION	DATE	APPROVED

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TEMPORARY SUBSTITUTE WATER SUPPLY PLAN - BROWNWOOD PIT

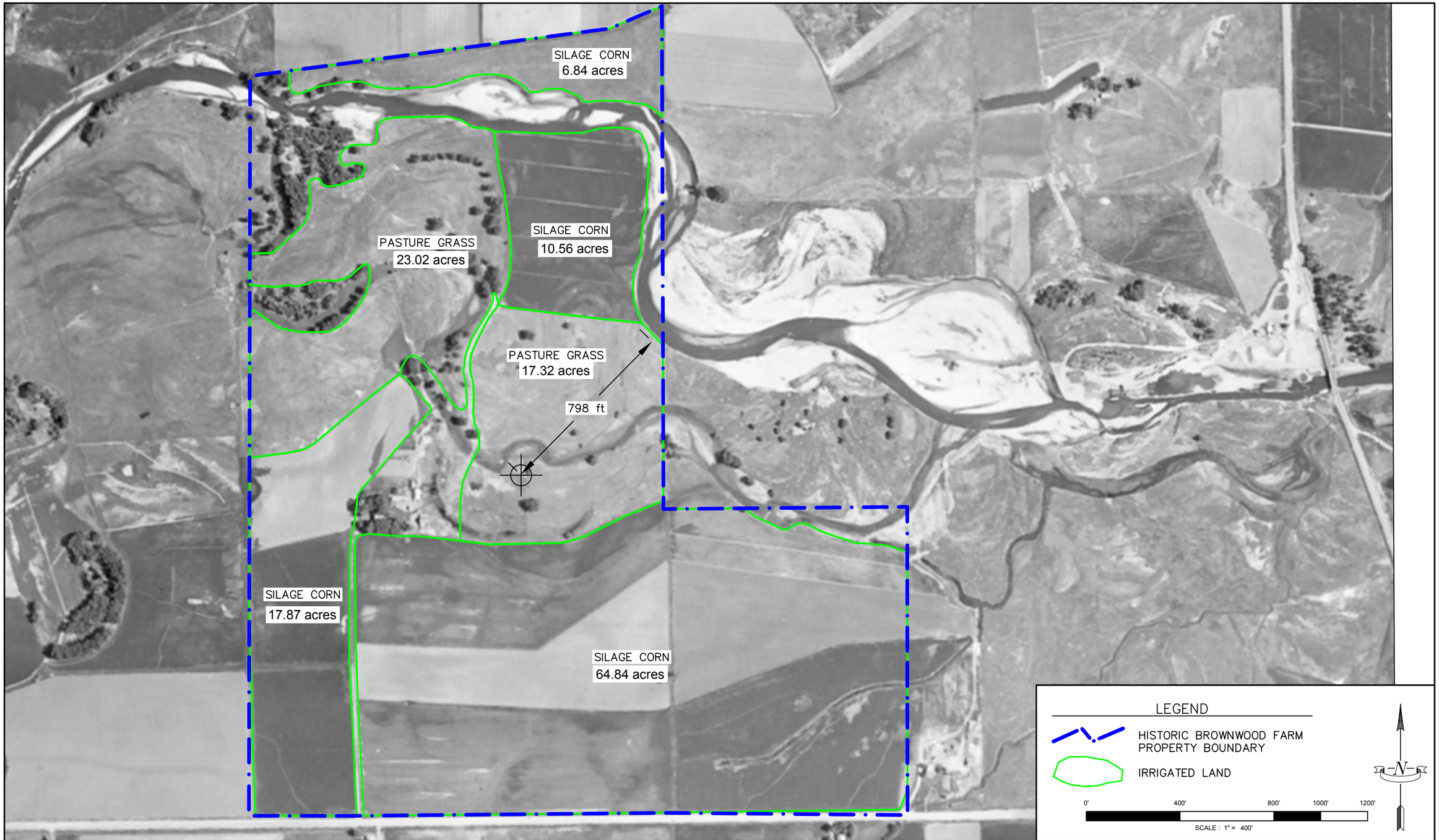
LOVELAND, CO

PREPARED FOR: COULSON EXCAVATING CO., INC

FIGURE 2
EXPOSED GROUNDWATER 2015

SCALE	DWG NO.	REV.
1"=300'	SITE PLAN.DWG	REV

DRAWN BY:	CHECKED BY:	DATE:	SHEET
CTW	PFW	01/19/2016	1 OF 1



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LARIMER COUNTY, CO

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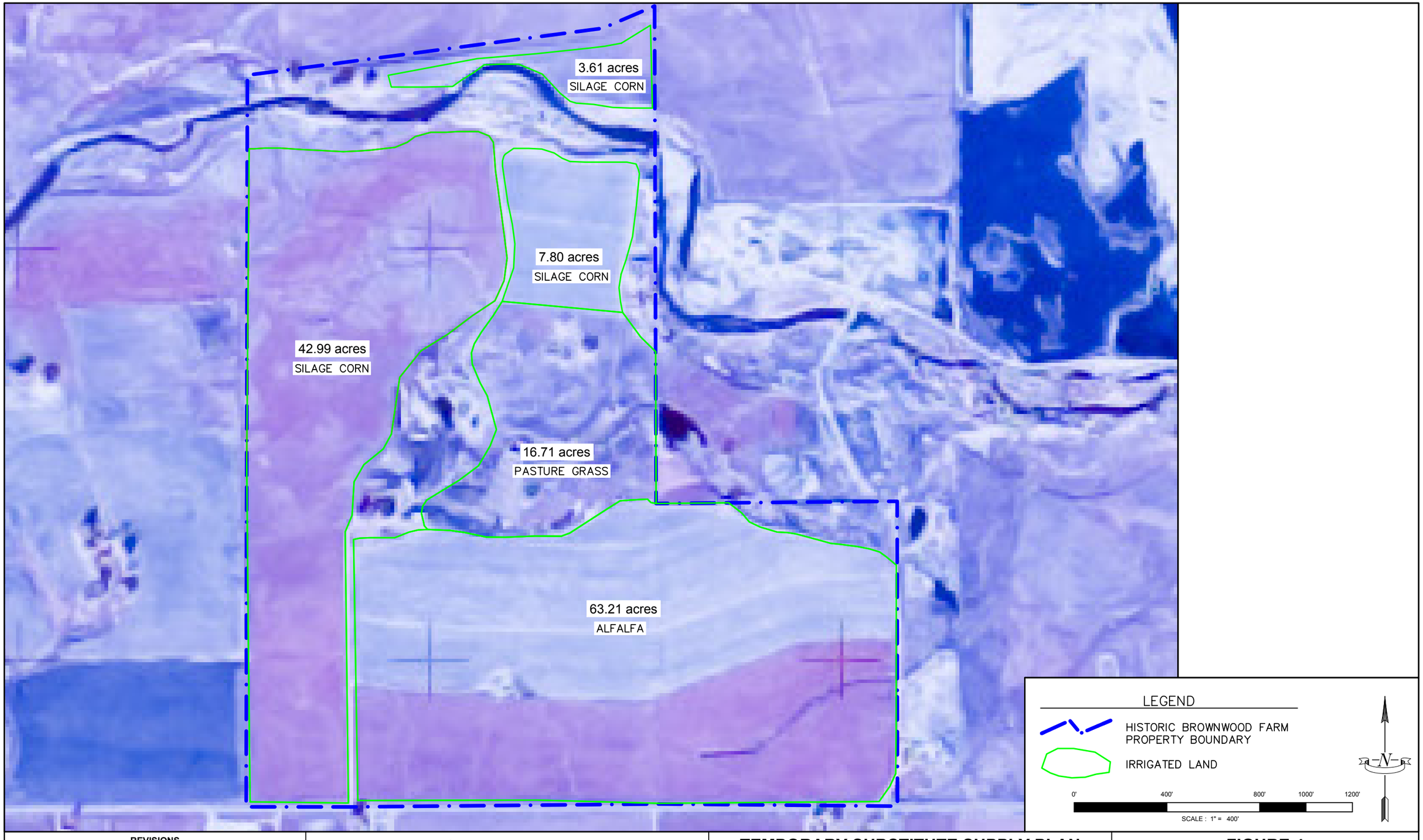
FIGURE 3
IRRIGATED CROPLAND 1950

SCALE	DWG NO.	REV.
1"=400'	10-2004-1	REV

DRAWN BY:	CHECKED BY:	DATE:	SHEET
PFW	WCK	1/15/2012	1



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TEMPORARY SUBSTITUTE SUPPLY PLAN
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LARIMER COUNTY, CO

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FIGURE 4
IRRIGATED CROPLAND 1972

SCALE	DWG NO.	REV.
1"=400'	10-2004-1	REV

DRAWN BY:	CHECKED BY:	DATE:	SHEET
PFW	WCK	11/15/2011	1

SILAGE CORN
2.53 acres

5.57 acres
PASTURE GRASS

21.39 acres
SILAGE CORN

PASTURE GRASS
16.43 acres

16.39 acres
PASTURE GRASS

10.84 acres
ALFALFA

67.41 acres
ALFALFA

LEGEND

HISTORIC BROWNWOOD FARM PROPERTY BOUNDARY

IRRIGATED LAND

N

0' 400' 800' 1000' 1200'

SCALE : 1" = 400'

REVISIONS

REV	DESCRIPTION	DATE	APPROVED

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BROWNWOOD PIT
LARIMER COUNTY, CO

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FIGURE 5
IRRIGATED CROPLAND 1976

SCALE	DWG NO.	REV.
1"=400'	10-2004-1	REV

DRAWN BY:	CHECKED BY:	DATE:	SHEET
PFW	WCK	11/15/2011	1

APPENDIX I

Table AI.1. Evaporative Loss Brownwood North East Pond

Area of Exposed Groundwater: *12.8 acres*

Month	(1) Monthly Fraction of Evaporation	(2) Gross Free Surface Evaporation [ft]	(3) Monthly Evaporation [ft]	(4) Free Water Surface Area [acre]	(5) Gross Evaporation [acre-ft]	(6) Mean Rainfall [in]	(7) Effective Precipitation [in]	(8) Effective Precipitation [acre-ft]	(9) Total Net Evaporation [acre-ft]	(10) Total Net Lagged Evaporation [acre-ft]
Jan	0.03	3.25	0.10	0.00	0.00	0.36	0.25	0.00	0.00	0.60
Feb	0.04	3.25	0.11	0.00	0.00	0.48	0.34	0.00	0.00	0.34
Mar	0.06	3.25	0.18	12.80	2.29	1.20	0.84	0.90	1.39	0.82
Apr	0.09	3.25	0.29	12.80	3.74	1.98	1.39	1.48	2.27	1.53
May	0.12	3.25	0.39	12.80	4.99	2.72	1.90	2.03	2.96	2.20
June	0.15	3.25	0.47	12.80	6.03	1.83	1.28	1.37	4.67	3.33
Jul	0.15	3.25	0.49	12.80	6.24	1.60	1.12	1.19	5.05	4.16
Aug	0.14	3.25	0.44	12.80	5.62	1.44	1.01	1.08	4.54	4.33
Sep	0.10	3.25	0.33	12.80	4.16	1.30	0.91	0.97	3.19	3.79
Oct	0.07	3.25	0.23	12.80	2.91	1.13	0.79	0.84	2.07	2.96
Nov	0.04	3.25	0.13	12.80	1.66	0.59	0.41	0.44	1.22	2.14
Dec	0.03	3.25	0.10	0.00	0.00	0.49	0.34	0.00	0.00	1.15
totals			3.25		37.65	15.12	10.58	10.30	27.35	27.35

Notes:

(1) = Monthly fraction of evaporation for elevations below 6500 ft from Guidelines for Substitute Water Supply Plans.
(2) = Gross free water surface evaporation from NOAA Technical Report NWS 33
(3) = Columns (1) x (2)
(4) = Total free water surface area - 12.8 ac. Assumes ice cover for Dec-Feb
(5) = Columns (3) x (4)
(6) = Mean Rainfall (1948-2000) at Longmont, from Table AI.6
(7) = Effective Rainfall = Column (6)* 0.7
(8) = Column (7) * (1/12)* Column (4)
(9) = Column (5) - Column (8)
(10) = IDS AWAS Steady State Lagged Depletion Output from Table AI.5 and Normalized to equal the total in Column (9)

Table AI.1. Evaporative Loss Pfeiff Pond

Area of Exposed Groundwater: *3.7 acres*

Month	(1) Monthly Fraction of Evaporation	(2) Gross Free Surface Evaporation [ft]	(3) Monthly Evaporation [ft]	(4) Free Water Surface Area [acre]	(5) Gross Evaporation [acre-ft]	(6) Mean Rainfall [in]	(7) Effective Precipitation [in]	(8) Effective Precipitation [acre-ft]	(9) Total Net Evaporation [acre-ft]	(10) Total Net Lagged Evaporation [acre-ft]
Jan	0.03	3.25	0.10	0.00	0.00	0.36	0.25	0.00	0.00	0.06
Feb	0.04	3.25	0.11	0.00	0.00	0.48	0.34	0.00	0.00	0.01
Mar	0.06	3.25	0.18	3.73	0.67	1.20	0.84	0.26	0.41	0.19
Apr	0.09	3.25	0.29	3.73	1.09	1.98	1.39	0.43	0.66	0.47
May	0.12	3.25	0.39	3.73	1.45	2.72	1.90	0.59	0.86	0.71
June	0.15	3.25	0.47	3.73	1.76	1.83	1.28	0.40	1.36	1.05
Jul	0.15	3.25	0.49	3.73	1.82	1.60	1.12	0.35	1.47	1.34
Aug	0.14	3.25	0.44	3.73	1.64	1.44	1.01	0.31	1.32	1.37
Sep	0.10	3.25	0.33	3.73	1.21	1.30	0.91	0.28	0.93	1.15
Oct	0.07	3.25	0.23	3.73	0.85	1.13	0.79	0.25	0.60	0.83
Nov	0.04	3.25	0.13	3.73	0.48	0.59	0.41	0.13	0.36	0.54
Dec	0.03	3.25	0.10	0.00	0.00	0.49	0.34	0.00	0.00	0.24
totals			3.25		10.97	15.12	10.58	3.00	7.97	7.97

Notes:

(1) = Monthly fraction of evaporation for elevations below 6500 ft from Guidelines for Substitute Water Supply Plans.
(2) = Gross free water surface evaporation from NOAA Technical Report NWS 33
(3) = Columns (1) x (2)
(4) = Total free water surface area - 3.7 ac. Assumes ice cover for Dec-Feb
(5) = Columns (3) x (4)
(6) = Mean Rainfall (1948-2000) at Longmont, from Table AI.6
(7) = Effective Rainfall = Column (6)* 0.7
(8) = Column (7) * (1/12)* Column (4)
(9) = Column (5) - Column (8)
(10)= IDS AWAS Steady State Lagged Depletion Output from Table AI.5 and Normalized to equal the total in Column (9)

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1951	140.45	acres										
Jan-51	0	0	0	0.6	0	8.54	0	0	0	4.27	0	0
Feb	0	0	0	0.6	0	8.19	0	0	0	8.37	0	0
Mar	0	0	0	0.6	0	4.1	0	0	0	10.42	0	0
Apr	0	0	0	0.6	0	12.99	0	0	0	16.91	0	0
May	29.38	4.41	24.98	0.6	14.98	30.31	9.78	17.89	8.11	23.79	9.99	14.98
Jun	113.71	17.06	96.66	0.6	57.99	24.7	12.77	34.53	21.76	35.29	63.4	33.25
Jul	125.75	18.86	106.89	0.6	64.13	23.06	14.7	77.11	62.41	35.29	44.48	62.41
Aug	40.35	6.05	34.3	0.6	20.58	86.49	43.81	63.77	19.96	35.29	14.34	19.96
Sep	67.87	10.18	57.69	0.6	34.61	11.24	1.9	11.03	9.13	35.29	48.56	9.13
Oct	7.06	1.06	6	0.6	3.6	31.95	2.5	3.24	0.75	35.29	5.25	0.75
Nov	0	0	0	0.6	0	7.72	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	11	0	0	0	35.29	0	0
Year Total	384.13	57.62	326.51	0.6	195.9	260.3	85.46	207.57	122.1	35.29	186.03	140.48
1952	140.45	acres										
Jan-52	0	0	0	0.6	0	0.82	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	0.94	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	18.38	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	22.12	0.86	2.11	1.25	34.04	0	0
May	0	0	0	0.6	0	43.42	14.83	20.73	5.9	28.14	0	0
Jun	107.23	16.08	91.14	0.6	54.69	28.79	15.92	51.7	35.78	35.29	48.22	42.93
Jul	121.15	18.17	102.98	0.6	61.79	8.43	5.53	75.78	70.25	26.82	41.19	61.79
Aug	128.98	19.35	109.63	0.6	65.78	11.35	7.09	67.61	60.52	32.08	43.85	65.78
Sep	68.82	10.32	58.5	0.6	35.1	0.47	0	11.49	11.49	35.29	43.79	14.7
Oct	0	0	0	0.6	0	2.34	0.14	4.06	3.92	31.36	0	0
Nov	0	0	0	0.6	0	12.06	0	0	0	33.1	0	0
Dec	0	0	0	0.6	0	0	0	0	0	33.1	0	0
Year Total	426.18	63.93	362.25	0.6	217.35	149.11	44.37	233.48	189.1	33.1	177.06	185.19

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1953	140.45	acres										
Jan-53	0	0	0	0.6	0	2.22	0	0	0	33.41	0	0
Feb	0	0	0	0.6	0	5.74	0	0	0	34.24	0	0
Mar	0	0	0	0.6	0	12.29	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	21.89	0	0	0	35.29	0	0
May	26.52	3.98	22.54	0.6	13.53	22	4.94	12.37	7.43	35.29	15.11	7.43
Jun	157.79	23.67	134.12	0.6	80.47	32.65	17.33	45.97	28.64	35.29	105.48	28.64
Jul	174.39	26.16	148.23	0.6	88.94	14.4	9.48	76.97	67.5	35.29	80.73	67.5
Aug	139.28	20.89	118.39	0.6	71.03	7.61	4.77	67.53	62.76	35.29	55.62	62.76
Sep	41.97	6.3	35.68	0.6	21.41	5.62	1.31	19.17	17.87	35.29	17.81	17.87
Oct	73.8	11.07	62.73	0.6	37.64	1.4	0.02	6.02	5.99	35.29	56.74	5.99
Nov	14.94	2.24	12.7	0.6	7.62	5.27	0.05	0.25	0.2	35.29	12.5	0.2
Dec	0	0	0	0.6	0	2.57	0	0	0	35.29	0	0
Year Total	628.69	94.3	534.38	0.6	320.63	133.66	37.9	228.29	190.4	35.29	343.99	190.39
1954	140.45	acres										
Jan-54	0	0	0	0.6	0	1.29	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	0.7	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	10.53	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	4.1	0	0	0	35.29	0	0
May	136.23	20.43	115.79	0.6	69.48	13.34	5.71	22.54	16.83	35.29	98.96	16.83
Jun	135.71	20.36	115.36	0.6	69.21	10.42	6.12	51.55	45.43	35.29	69.92	45.43
Jul	131.08	19.66	111.41	0.6	66.85	11.12	7.85	90.14	82.29	19.85	44.57	66.85
Aug	77.46	11.62	65.84	0.6	39.51	14.51	7.96	60.14	52.18	7.17	26.34	39.51
Sep	16.83	2.52	14.3	0.6	8.58	11.59	1.86	11.8	9.94	10.69	5.72	8.58
Oct	65.35	9.8	55.55	0.6	33.33	4.1	0.52	5.67	5.15	35.29	26.98	28.57
Nov	0	0	0	0.6	0	6.2	0.08	0.37	0.29	35	0	0
Dec	0	0	0	0.6	0	5.5	0	0	0	35.29	0	0
Year Total	562.65	84.4	478.26	0.6	286.95	93.4	30.11	242.22	212.1	35.29	272.49	205.77

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1955	140.45	acres										
Jan-55	0	0	0	0.6	0	4.21	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	7.37	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	13.46	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	2.57	0.03	0.87	0.85	34.44	0	0
May	111.67	16.75	94.92	0.6	56.95	19.19	8.52	24.88	16.36	35.29	77.71	17.21
Jun	78.81	11.82	66.99	0.6	40.19	30.2	15.94	43.22	27.28	35.29	39.71	27.28
Jul	138.86	20.83	118.03	0.6	70.82	14.4	9.88	85.66	75.78	30.32	47.21	70.82
Aug	129.78	19.47	110.31	0.6	66.19	16.62	8.94	61.29	52.34	35.29	53.01	57.3
Sep	81.28	12.19	69.09	0.6	41.45	22.35	3.41	11.07	7.65	35.29	61.44	7.65
Oct	41.19	6.18	35.01	0.6	21.01	2.22	0.16	5.37	5.21	35.29	29.8	5.21
Nov	0	0	0	0.6	0	12.29	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	6.91	0	0	0	35.29	0	0
Year Total	581.59	87.24	494.35	0.6	296.61	151.8	46.89	232.36	185.5	35.29	308.88	185.48
1956	140.45	acres										
Jan-56	0	0	0	0.6	0	8.19	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	7.72	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	8.31	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	19.55	1.04	2.72	1.67	33.61	0	0
May	77.21	11.58	65.63	0.6	39.38	30.66	12.78	25.72	12.94	35.29	51.02	14.61
Jun	153.21	22.98	130.23	0.6	78.14	3.63	1.83	56.39	54.56	35.29	75.67	54.56
Jul	144.43	21.66	122.77	0.6	73.66	26.1	16.49	77.67	61.18	35.29	61.59	61.18
Aug	94.71	14.21	80.5	0.6	48.3	22.35	11.5	54.07	42.57	35.29	37.94	42.57
Sep	30.22	4.53	25.69	0.6	15.41	0.35	0	11.8	11.8	35.29	13.89	11.8
Oct	72.9	10.94	61.97	0.6	37.18	0.59	0	5.66	5.66	35.29	56.31	5.66
Nov	0	0	0	0.6	0	9.25	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	5.97	0	0	0	35.29	0	0
Year Total	572.69	85.9	486.79	0.6	292.07	142.67	43.65	234.02	190.4	35.29	296.41	190.37

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1957	140.45	acres										
Jan-57	0	0	0	0.6	0	8.19	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	6.09	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	4.92	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	46.11	0.6	0.6	0.01	35.28	0	0
May	0	0	0	0.6	0	70.69	13.8	14.11	0.31	34.97	0	0
Jun	68.06	10.21	57.85	0.6	34.71	11.94	6.67	41.2	34.53	35.15	23.14	34.71
Jul	174.41	26.16	148.24	0.6	88.95	5.03	3.1	76.11	73.01	35.29	75.1	73.15
Aug	94.56	14.18	80.37	0.6	48.22	35.93	21.26	71.24	49.98	33.53	32.15	48.22
Sep	56.46	8.47	47.99	0.6	28.79	9.48	2.52	19.33	16.81	35.29	29.42	18.57
Oct	26.79	4.02	22.77	0.6	13.66	23.29	2.63	4.93	2.3	35.29	20.47	2.3
Nov	0	0	0	0.6	0	7.26	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	0	0	0	0	35.29	0	0
Year Total	420.26	63.04	357.22	0.6	214.33	228.93	50.58	227.52	177	35.29	180.28	176.95

1958	140.45	acres										
Jan-58	0	0	0	0.6	0	1.99	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	4.68	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	21.89	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	22.82	0.11	0.28	0.17	35.12	0	0
May	0	0	0	0.6	0	62.03	23.58	28.22	4.64	30.48	0	0
Jun	134.85	20.23	114.63	0.6	68.78	26.92	15.04	52.48	37.44	35.29	72.38	42.25
Jul	140.67	21.1	119.57	0.6	71.74	18.49	11.74	72.42	60.68	35.29	58.89	60.68
Aug	113.39	17.01	96.38	0.6	57.83	11.82	6.27	59.43	53.17	35.29	43.21	53.17
Sep	53.27	7.99	45.28	0.6	27.17	5.38	0.82	11.68	10.87	35.29	34.41	10.87
Oct	1.05	0.16	0.89	0.6	0.54	9.95	1.36	5.94	4.58	31.24	0.36	0.54
Nov	0	0	0	0.6	0	6.67	0	0	0	32.2	0	0
Dec	0	0	0	0.6	0	11.47	0	0	0	33.85	0	0
Year Total	443.23	66.49	376.75	0.6	226.05	204.12	58.92	230.46	171.5	33.85	209.25	167.5

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1959	140.45	acres										
Jan-59	0	0	0	0.6	0	5.38	0	0	0	34.62	0	0
Feb	0	0	0	0.6	0	6.79	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	15.92	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	31.72	1.3	1.95	0.65	34.63	0	0
May	13.28	1.99	11.29	0.6	6.77	41.43	12.86	18.51	5.65	35.29	4.98	6.31
Jun	151.89	22.78	129.11	0.6	77.46	4.56	2.41	48.49	46.08	35.29	83.02	46.08
Jul	162.69	24.4	138.29	0.6	82.97	3.63	2.03	78.23	76.2	35.29	62.09	76.2
Aug	132.07	19.81	112.26	0.6	67.35	7.02	4.51	73.95	69.44	33.2	44.9	67.35
Sep	49.91	7.49	42.43	0.6	25.46	23.06	4.06	12.28	8.22	35.29	32.12	10.3
Oct	0	0	0	0.6	0	31.72	2.34	3.01	0.67	34.61	0	0
Nov	0	0	0	0.6	0	0.47	0	0	0	34.68	0	0
Dec	0	0	0	0.6	0	0	0	0	0	34.68	0	0
Year Total	509.84	76.48	433.36	0.6	260.02	171.7	29.5	236.42	206.9	34.68	227.12	206.25

1960	140.45	acres										
Jan-60	0	0	0	0.6	0	4.33	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	6.2	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	9.83	0	0	0	35.29	0	0
Apr	11.68	1.75	9.93	0.6	5.96	10.3	0	0	0	35.29	9.93	0
May	93.17	13.97	79.19	0.6	47.51	29.26	10.45	20.4	9.95	35.29	69.24	9.95
Jun	145.39	21.81	123.58	0.6	74.15	8.43	4.85	48.45	43.59	35.29	79.99	43.59
Jul	150.17	22.53	127.65	0.6	76.59	9.36	6.25	78.65	72.4	35.29	55.25	72.4
Aug	86.91	13.04	73.87	0.6	44.32	0.35	0	69.87	69.87	9.74	29.55	44.32
Sep	16.69	2.5	14.18	0.6	8.51	4.56	0.67	11.72	11.05	10.05	5.67	8.51
Oct	57.7	8.65	49.04	0.6	29.43	24.7	3.1	5.29	2.2	35.29	29.33	19.71
Nov	0	0	0	0.6	0	3.28	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	6.55	0	0	0	35.29	0	0
Year Total	561.69	84.25	477.44	0.6	286.46	117.16	25.32	234.37	209.1	35.29	278.96	198.48

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1961	140.45	acres										
Jan-61	0	0	0	0.6	0	2.46	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	7.49	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	39.56	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	11.7	0.29	1.27	0.98	34.3	0	0
May	20.01	3	17.01	0.6	10.21	82.63	20.08	20.5	0.42	35.29	15.61	1.4
Jun	77.6	11.64	65.96	0.6	39.57	21.42	11.83	45.49	33.66	35.29	32.3	33.66
Jul	157.12	23.57	133.55	0.6	80.13	49.98	28.93	75.41	46.48	35.29	87.07	46.48
Aug	143.48	21.52	121.96	0.6	73.17	46.82	26.08	68.83	42.75	35.29	79.21	42.75
Sep	70.83	10.62	60.21	0.6	36.12	46.82	6.3	8.46	2.16	35.29	58.05	2.16
Oct	46.17	6.93	39.25	0.6	23.55	13.69	1.4	3.97	2.57	35.29	36.68	2.57
Nov	0	0	0	0.6	0	7.26	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	1.17	0	0	0	35.29	0	0
Year Total	515.21	77.28	437.93	0.6	262.76	330.99	94.91	223.93	129	35.29	308.91	129.02
1962	140.45	acres										
Jan-62	0	0	0	0.6	0	13.69	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	8.19	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	6.44	0	0	0	35.29	0	0
Apr	6.87	1.03	5.84	0.6	3.5	11.7	0	0	0	35.29	5.84	0
May	101.04	15.16	85.89	0.6	51.53	27.62	12.17	25.43	13.26	35.29	72.63	13.26
Jun	117.3	17.6	99.71	0.6	59.82	24.93	13.58	45.61	32.03	35.29	67.68	32.03
Jul	130.88	19.63	111.25	0.6	66.75	24.23	15.16	74.1	58.94	35.29	52.31	58.94
Aug	90.07	13.51	76.56	0.6	45.94	3.63	1.56	53.49	51.93	29.29	30.63	45.94
Sep	65.73	9.86	55.87	0.6	33.52	4.8	0.69	10.51	9.81	35.29	41.51	14.36
Oct	57.77	8.67	49.11	0.6	29.46	20.48	2.92	6.37	3.45	35.29	45.65	3.45
Nov	0	0	0	0.6	0	6.67	0.15	0.62	0.47	34.82	0	0
Dec	0	0	0	0.6	0	2.11	0	0	0	35.12	0	0
Year Total	569.67	85.45	484.22	0.6	290.53	154.5	46.23	216.12	169.9	35.12	316.25	167.97

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1963	140.45	acres										
Jan-63	0	0	0	0.6	0	7.84	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	4.92	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	14.98	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	5.85	0.23	2.27	2.04	33.24	0	0
May	145.52	21.83	123.69	0.6	74.21	4.92	2.19	26.88	24.69	35.29	96.96	26.73
Jun	78.02	11.7	66.31	0.6	39.79	43.89	23.24	53.15	29.91	35.29	36.4	29.91
Jul	138.19	20.73	117.46	0.6	70.48	1.52	0.22	86.97	86.74	19.02	46.99	70.48
Aug	81.53	12.23	69.3	0.6	41.58	19.78	9.73	54.35	44.62	15.98	27.72	41.58
Sep	41.59	6.24	35.35	0.6	21.21	24.58	3.81	12.42	8.62	35.29	15.11	20.24
Oct	0	0	0	0.6	0	3.51	0.43	7.09	6.66	28.83	0	0
Nov	0	0	0	0.6	0	2.22	0.03	0.63	0.6	28.83	0	0
Dec	0	0	0	0.6	0	6.44	0	0	0	29.76	0	0
Year Total	484.85	72.73	412.12	0.6	247.27	140.45	39.88	243.76	203.9	29.76	223.18	188.94

1964	140.45	acres										
Jan-64	0	0	0	0.6	0	3.63	0	0	0	30.28	0	0
Feb	0	0	0	0.6	0	2.46	0	0	0	30.63	0	0
Mar	0	0	0	0.6	0	10.77	0	0	0	32.18	0	0
Apr	0	0	0	0.6	0	19.78	0.48	1.35	0.87	31.31	0	0
May	113.9	17.09	96.82	0.6	58.09	21.89	9.39	24.84	15.45	35.29	77.39	19.43
Jun	78.61	11.79	66.82	0.6	40.09	6.32	3.5	45.41	41.91	33.46	26.73	40.09
Jul	163.32	24.5	138.82	0.6	83.29	12.17	8.49	87.9	79.4	35.29	57.6	81.22
Aug	117.91	17.69	100.22	0.6	60.13	5.27	2.66	54.87	52.21	35.29	48.01	52.21
Sep	33.48	5.02	28.46	0.6	17.08	3.98	0.54	10.48	9.94	35.29	18.53	9.94
Oct	59.34	8.9	50.44	0.6	30.26	0.7	0	5.34	5.34	35.29	45.09	5.34
Nov	0	0	0	0.6	0	5.38	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	2.11	0	0	0	35.29	0	0
Year Total	566.56	84.98	481.58	0.6	288.95	94.45	25.07	230.19	205.1	35.29	273.35	208.23

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1965	140.45	acres										
Jan-65	0	0	0	0.6	0	7.72	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	3.63	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	9.83	0	0	0	35.29	0	0
Apr	0.95	0.14	0.81	0.6	0.49	13.93	1.44	5.12	3.68	32.09	0.32	0.49
May	81.28	12.19	69.09	0.6	41.45	22.12	8.1	19.95	11.86	35.29	54.04	15.05
Jun	32.24	4.84	27.41	0.6	16.44	61.68	29.63	42.3	12.67	35.29	14.74	12.67
Jul	159.7	23.95	135.74	0.6	81.44	26.8	16.92	78.1	61.18	35.29	74.56	61.18
Aug	123.64	18.55	105.09	0.6	63.05	5.15	2.94	62.9	59.95	35.29	45.14	59.95
Sep	82.04	12.31	69.74	0.6	41.84	27.27	3.87	7.75	3.88	35.29	65.85	3.88
Oct	17.36	2.6	14.76	0.6	8.85	5.97	0.85	6.6	5.75	35.29	9	5.75
Nov	0	0	0	0.6	0	0	0	1.02	1.02	34.26	0	0
Dec	0	0	0	0.6	0	5.15	0	0	0	35	0	0
Year Total	497.21	74.58	422.63	0.6	253.58	189.26	63.75	223.75	160	35	263.65	158.97

1966	140.45	acres										
Jan-66	0	0	0	0.6	0	1.4	0	0	0	35.2	0	0
Feb	0	0	0	0.6	0	7.02	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	0.12	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	16.27	0	0	0	35.29	0	0
May	116.77	17.51	99.25	0.6	59.55	3.16	0.8	18.46	17.66	35.29	81.59	17.66
Jun	98.64	14.8	83.84	0.6	50.31	18.73	10.41	44.72	34.3	35.29	49.54	34.3
Jul	159.31	23.9	135.42	0.6	81.25	7.26	5.02	89.07	84.05	32.48	54.17	81.25
Aug	98.93	14.84	84.09	0.6	50.45	7.37	4.46	64.2	59.73	23.2	33.63	50.45
Sep	49.61	7.44	42.17	0.6	25.3	13.58	2.15	11.34	9.19	35.29	25.32	16.85
Oct	24.42	3.66	20.76	0.6	12.46	5.03	0.57	4.89	4.32	35.29	16.44	4.32
Nov	0	0	0	0.6	0	5.27	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	0.7	0	0	0	35.29	0	0
Year Total	547.67	82.15	465.52	0.6	279.31	85.91	23.43	232.68	209.3	35.29	260.69	204.83

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1967	140.45	acres										
Jan-67	0	0	0	0.6	0	7.14	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	4.1	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	7.14	0	0	0	35.29	0	0
Apr	5.91	0.89	5.03	0.6	3.02	35.35	1.14	1.83	0.69	35.29	4.34	0.69
May	16.98	2.55	14.43	0.6	8.66	56.06	11.47	13.66	2.19	35.29	12.25	2.19
Jun	5.72	0.86	4.87	0.6	2.92	38.16	18.82	34.5	15.68	23.35	1.95	2.92
Jul	47.32	7.1	40.22	0.6	24.13	36.28	21.45	71.36	49.91	4.66	16.09	24.13
Aug	117.15	17.57	99.58	0.6	59.75	21.3	13	66.52	53.51	10.89	39.83	59.75
Sep	48.65	7.3	41.35	0.6	24.81	10.88	3.07	21.33	18.26	17.44	16.54	24.81
Oct	20.99	3.15	17.84	0.6	10.7	7.14	1	6.19	5.19	25.25	7.14	10.7
Nov	0	0	0	0.6	0	13.34	0	0	0	31.92	0	0
Dec	0	0	0	0.6	0	12.29	0	0	0	35.29	0	0
Year Total	262.72	39.41	223.32	0.6	133.99	249.18	69.94	215.38	145.4	35.29	98.13	125.19

1968	140.45	acres										
Jan-68	0	0	0	0.6	0	1.05	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	7.02	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	10.53	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	21.65	0.31	0.68	0.38	34.91	0	0
May	46.74	7.01	39.73	0.6	23.84	37.45	10.48	16.04	5.56	35.29	33.8	5.93
Jun	105.32	15.8	89.52	0.6	53.71	10.07	5.76	45.81	40.06	35.29	49.46	40.06
Jul	168.09	25.21	142.88	0.6	85.73	23.99	15.13	75.54	60.41	35.29	82.46	60.41
Aug	82.42	12.36	70.06	0.6	42.04	24.7	14.72	64.28	49.56	27.76	28.02	42.04
Sep	61.05	9.16	51.9	0.6	31.14	1.05	0	15.76	15.76	35.29	28.62	23.28
Oct	42.36	6.35	36	0.6	21.6	7.61	0.95	5.2	4.24	35.29	31.76	4.24
Nov	0	0	0	0.6	0	9.13	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	1.52	0	0	0	35.29	0	0
Year Total	505.99	75.9	430.09	0.6	258.05	155.78	47.35	223.31	176	35.29	254.13	175.96

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1969	140.45	acres										
Jan-69	0	0	0	0.6	0	6.91	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	3.86	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	6.91	0	0	0	35.29	0	0
Apr	2.29	0.34	1.95	0.6	1.17	17.09	0.26	0.96	0.7	35.29	1.25	0.7
May	29.95	4.49	25.46	0.6	15.28	44.48	20.89	28.28	7.39	35.29	18.07	7.39
Jun	45.03	6.75	38.27	0.6	22.96	29.96	15.9	44.22	28.32	29.93	15.31	22.96
Jul	149.77	22.47	127.31	0.6	76.38	9.83	6.76	84.71	77.95	28.37	50.92	76.38
Aug	163.32	24.5	138.82	0.6	83.29	20.13	8.94	51.38	42.44	35.29	89.46	49.36
Sep	65.82	9.87	55.95	0.6	33.57	7.37	1.16	11.58	10.42	35.29	45.53	10.42
Oct	0	0	0	0.6	0	56.77	1.59	1.59	0	35.29	0	0
Nov	0	0	0	0.6	0	3.75	0	0	0	35.29	0	0
Dec	0	0	0	0.6	0	0.23	0	0	0	35.29	0	0
Year Total	456.19	68.43	387.76	0.6	232.66	207.28	55.51	222.73	167.2	35.29	220.54	167.22

1970	140.45	acres										
Jan-70	0	0	0	0.6	0	0.7	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	0.23	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	31.02	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	12.17	0.6	2.18	1.58	33.7	0	0
May	56.48	8.47	48	0.6	28.8	24.58	8.94	20.51	11.56	35.29	34.86	13.15
Jun	54.57	8.19	46.38	0.6	27.83	28.56	15.27	44.55	29.28	33.84	18.55	27.83
Jul	118.29	17.74	100.55	0.6	60.33	31.02	19.4	79.36	59.96	34.2	40.22	60.33
Aug	118.48	17.77	100.71	0.6	60.43	11.35	7.26	72.53	65.27	29.36	40.28	60.43
Sep	49.22	7.38	41.84	0.6	25.1	18.84	2.86	9.9	7.03	35.29	34.81	7.03
Oct	0	0	0	0.6	0	14.63	1.08	2.84	1.75	33.53	0	0
Nov	0	0	0	0.6	0	6.32	0	0	0	34.44	0	0
Dec	0	0	0	0.6	0	1.87	0	0	0	34.71	0	0
Year Total	397.04	59.56	337.49	0.6	202.49	181.3	55.41	231.86	176.5	34.71	168.72	168.76

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1971	140.45	acres										
Jan-71	0	0	0	0.6	0	6.91	0	0	0	35.29	0	0
Feb	0	0	0	0.6	0	5.85	0	0	0	35.29	0	0
Mar	0	0	0	0.6	0	5.97	0	0	0	35.29	0	0
Apr	0	0	0	0.6	0	51.73	4.84	4.84	0	35.29	0	0
May	6.11	0.92	5.19	0.6	3.11	27.27	8.86	18.27	9.4	29	2.08	3.11
Jun	108.94	16.34	92.6	0.6	55.56	2.34	0.83	48.29	47.46	35.29	38.85	53.75
Jul	124.59	18.69	105.9	0.6	63.54	6.09	3.83	73.23	69.4	29.42	42.36	63.54
Aug	99.6	14.94	84.66	0.6	50.79	2.22	0.83	71.88	71.05	9.16	33.86	50.79
Sep	22.7	3.41	19.3	0.6	11.58	41.55	6.76	11.3	4.54	16.2	7.72	11.58
Oct	0	0	0	0.6	0	11	1.23	4.29	3.06	16.74	0	0
Nov	0	0	0	0.6	0	0.23	0	0	0	16.86	0	0
Dec	0	0	0	0.6	0	2.46	0	0	0	18.09	0	0
Year Total	361.94	54.29	307.65	0.6	184.59	163.62	27.18	232.11	204.9	18.09	124.87	182.78

1972	134.32	acres										
Jan-72	0	0	0	0.6	0	6.04	0	0	0	20.59	0	0
Feb	0	0	0	0.6	0	0.67	0	0	0	20.93	0	0
Mar	0	0	0	0.6	0	4.81	0	0	0	23.33	0	0
Apr	22.51	3.38	19.14	0.6	11.48	15.45	0	0	0	42.54	7.65	11.48
May	80.9	12.13	68.76	0.6	41.26	6.16	2.87	32.75	29.88	46.15	35.27	33.5
Jun	97.69	14.65	83.03	0.6	49.82	15.67	9.63	60.7	51.07	44.91	33.21	49.82
Jul	157.41	23.61	133.79	0.6	80.28	8.06	5.3	73.16	67.86	46.15	64.69	69.11
Aug	102.46	15.37	87.09	0.6	52.25	25.07	14.4	62.62	48.21	46.15	38.87	48.21
Sep	2.48	0.37	2.11	0.6	1.26	5.71	1.83	23.42	21.59	26.93	0.84	1.26
Oct	0	0	0	0.6	0	6.38	1.69	10.96	9.27	19.17	0	0
Nov	0	0	0	0.6	0	10.19	0	0	0	22.2	0	0
Dec	0	0	0	0.6	0	6.72	0	0	0	24.2	0	0
Year Total	463.44	69.52	393.92	0.6	236.35	110.93	35.73	263.62	227.9	24.2	180.54	213.38

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1973	134.32	acres										
Jan-73	0	0	0	0.6	0	2.91	0	0	0	25.06	0	0
Feb	0	0	0	0.6	0	0.22	0	0	0	25.13	0	0
Mar	0	0	0	0.6	0	8.84	0	0	0	27.76	0	0
Apr	0	0	0	0.6	0	11.19	0	0	0	31.09	0	0
May	23.85	3.58	20.27	0.6	12.16	18.25	8.11	30.4	22.28	20.97	8.11	12.16
Jun	122.68	18.4	104.28	0.6	62.57	3.81	2.04	57.82	55.78	27.76	41.71	62.57
Jul	117.15	17.57	99.58	0.6	59.75	28.65	17.8	73.8	56	31.51	39.83	59.75
Aug	91.96	13.79	78.17	0.6	46.9	2.01	0.7	71.74	71.04	7.37	31.27	46.9
Sep	49.8	7.47	42.33	0.6	25.4	19.03	6.09	22.05	15.96	20.24	16.93	25.4
Oct	0.38	0.06	0.32	0.6	0.19	4.81	1.21	12.39	11.18	13.49	0.13	0.19
Nov	0	0	0	0.6	0	25.63	0	0	0	23.29	0	0
Dec	0	0	0	0.6	0	13.1	0	0	0	27.19	0	0
Year Total	405.82	60.87	344.95	0.6	206.97	138.46	35.95	268.2	232.3	27.19	137.98	206.97
1974	134.32	acres										
Jan-74	0	0	0	0.6	0	3.69	0	0	0	28.29	0	0
Feb	0	0	0	0.6	0	0.67	0	0	0	28.48	0	0
Mar	0	0	0	0.6	0	11.75	0	0	0	31.25	0	0
Apr	0	0	0	0.6	0	18.47	2.11	6.67	4.56	26.68	0	0
May	72.69	10.9	61.79	0.6	37.07	0.11	0	40.23	40.23	23.52	24.72	37.07
Jun	92.34	13.85	78.49	0.6	47.1	33.69	19.29	60.84	41.55	29.07	31.4	47.1
Jul	124.4	18.66	105.74	0.6	63.44	18.47	12.57	83.81	71.24	21.27	42.3	63.44
Aug	97.11	14.57	82.55	0.6	49.53	1.34	0.08	53.56	53.48	17.32	33.02	49.53
Sep	37.4	5.61	31.79	0.6	19.07	12.09	3.95	21.56	17.61	21.02	12.71	19.07
Oct	110.66	16.6	94.06	0.6	56.44	22.5	6.56	13.48	6.92	46.15	62.01	32.05
Nov	0	0	0	0.6	0	6.6	0	0	0	46.15	0	0
Dec	0	0	0	0.6	0	0.67	0	0	0	46.15	0	0
Year Total	534.61	80.19	454.42	0.6	272.65	130.07	44.56	280.16	235.6	46.15	206.15	248.26

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1975	134.32	acres										
Jan-75	0	0	0	0.6	0	0.56	0	0	0	46.15	0	0
Feb	0	0	0	0.6	0	6.04	0	0	0	46.15	0	0
Mar	0	0	0	0.6	0	17.57	0	0	0	46.15	0	0
Apr	1.14	0.17	0.97	0.6	0.58	17.13	0.39	0.95	0.56	46.15	0.42	0.56
May	39.49	5.92	33.57	0.6	20.14	50.71	16.24	24.1	7.86	46.15	25.71	7.86
Jun	62.39	9.36	53.03	0.6	31.82	19.81	11.34	49.72	38.38	39.59	21.21	31.82
Jul	134.89	20.23	114.66	0.6	68.79	10.3	7.03	79.32	72.29	36.09	45.86	68.79
Aug	77.65	11.65	66.01	0.6	39.6	32.01	19.13	68.54	49.41	26.29	26.4	39.6
Sep	67.35	10.1	57.25	0.6	34.35	4.37	1.5	26.61	25.11	35.53	22.9	34.35
Oct	21.37	3.21	18.16	0.6	10.9	10.07	1.78	8.38	6.6	39.83	7.27	10.9
Nov	0	0	0	0.6	0	7.84	0	0	0	41.67	0	0
Dec	0	0	0	0.6	0	14.66	0	0	0	45.12	0	0
Year Total	404.29	60.64	343.65	0.6	206.19	191.07	57.41	257.62	200.2	45.12	149.77	193.88
1976	139.93	acres										
Jan-76	0	0	0	0.6	0	3.5	0	0	0	46.98	0	0
Feb	0	0	0	0.6	0	6.65	0	0	0	47.28	0	0
Mar	0	0	0	0.6	0	7.46	0	0	0	47.28	0	0
Apr	6.68	1	5.68	0.6	3.41	19.12	4.08	11.87	7.79	42.89	2.27	3.41
May	52.47	7.87	44.6	0.6	26.76	13.18	6.98	39.64	32.66	36.99	17.84	26.76
Jun	113.9	17.09	96.82	0.6	58.09	11.08	6.85	61.83	54.98	40.11	38.73	58.09
Jul	146.53	21.98	124.55	0.6	74.73	12.01	8.32	85.95	77.63	37.21	49.82	74.73
Aug	139.85	20.98	118.87	0.6	71.32	21.92	13.22	66.58	53.36	47.28	55.44	63.43
Sep	84.14	12.62	71.52	0.6	42.91	22.62	10.14	34.2	24.05	47.28	47.47	24.05
Oct	0.19	0.03	0.16	0.6	0.1	2.92	0.35	6.76	6.42	40.96	0.06	0.1
Nov	0	0	0	0.6	0	0.93	0	0	0	41.35	0	0
Dec	0	0	0	0.6	0	1.75	0	0	0	42.08	0	0
Year Total	543.77	81.56	462.2	0.6	277.32	123.14	49.93	306.82	256.9	42.08	211.63	250.57

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1977	139.93	acres										
Jan-77	0	0	0	0.6	0	0.47	0	0	0	42.27	0	0
Feb	0	0	0	0.6	0	0.58	0	0	0	42.51	0	0
Mar	0	0	0	0.6	0	1.52	0	0	0	43.15	0	0
Apr	1.53	0.23	1.3	0.6	0.78	31.37	8.45	16.49	8.04	35.88	0.52	0.78
May	89.1	13.37	75.74	0.6	45.44	12.83	7.37	47.2	39.83	41.49	30.29	45.44
Jun	145.58	21.84	123.74	0.6	74.24	3.73	2.13	79.11	76.98	38.76	49.5	74.24
Jul	71.74	10.76	60.98	0.6	36.59	68.33	40.13	87.23	47.11	28.24	24.39	36.59
Aug	69.45	10.42	59.03	0.6	35.42	13.99	8.2	62.61	54.41	9.25	23.61	35.42
Sep	57.62	8.64	48.98	0.6	29.39	1.63	0.23	40.03	39.8	4.66	19.59	29.39
Oct	20.8	3.12	17.68	0.6	10.61	1.63	0.12	12.13	12.01	4.69	7.07	10.61
Nov	0	0	0	0.6	0	4.08	0.02	0.12	0.1	5.89	0	0
Dec	0	0	0	0.6	0	1.28	0	0	0	6.53	0	0
Year Total	455.81	68.37	387.44	0.6	232.46	141.45	66.66	344.93	278.3	6.53	154.97	232.46

1978	139.93	acres										
Jan-78	0	0	0	0.6	0	7	0	0	0	10.03	0	0
Feb	0	0	0	0.6	0	3.03	0	0	0	11.54	0	0
Mar	0	0	0	0.6	0	5.13	0	0	0	14.11	0	0
Apr	2.29	0.34	1.95	0.6	1.17	15.04	0	0	0	21.92	0.78	1.17
May	1.91	0.29	1.62	0.6	0.97	71.71	22.68	28.88	6.19	16.7	0.65	0.97
Jun	150.15	22.52	127.63	0.6	76.58	16.21	10.02	64.58	54.56	38.72	51.05	76.58
Jul	155.5	23.32	132.17	0.6	79.3	11.89	8.21	85.22	77.01	41.02	52.87	79.3
Aug	103.41	15.51	87.9	0.6	52.74	9.21	5.82	67.07	61.25	32.51	35.16	52.74
Sep	35.3	5.29	30	0.6	18	1.4	0.08	38.9	38.82	11.69	12	18
Oct	44.84	6.73	38.11	0.6	22.87	22.62	5.45	12.29	6.84	29.38	15.24	22.87
Nov	0	0	0	0.6	0	0.82	0	0	0	29.61	0	0
Dec	0	0	0	0.6	0	9.33	0	0	0	32.22	0	0
Year Total	493.39	74.01	419.39	0.6	251.63	173.4	52.27	296.94	244.7	32.22	167.75	251.63

Date	River Supply	Conveyance Loss	Farm Surf. Water Supply	Composite Field Efficiency	Surface Water Avail. for CU	Total Rainfall	Effective Rainfall to CU	Crop CU	NWR	Carry-over Soil Moisture (EOM)	Total DP & Runoff of Water Supplies	On Farm Dep. of Surf. Water
1979	139.93	acres										
Jan-79	0	0	0	0.6	0	4.2	0	0	0	33.39	0	0
Feb	0	0	0	0.6	0	3.38	0	0	0	34.33	0	0
Mar	0	0	0	0.6	0	27.17	0	0	0	41.93	0	0
Apr	0	0	0	0.6	0	16.09	0	0	0	46.43	0	0
May	0	0	0	0.6	0	59.24	18.61	27.59	8.98	37.45	0	0
Jun	20.8	3.12	17.68	0.6	10.61	36.5	20.56	60.94	40.38	10.77	7.07	10.61
Jul	118.48	17.77	100.71	0.6	60.43	11.08	7.6	83.63	76.03	3.24	40.28	60.43
Aug	69.26	10.39	58.87	0.6	35.32	36.5	20.93	64.92	43.99	1.48	23.55	35.32
Sep	53.99	8.1	45.9	0.6	27.54	12.01	5.9	40.1	34.2	1.48	18.36	27.54
Oct	28.05	4.21	23.84	0.6	14.3	10.14	3.32	16.9	13.57	2.99	9.54	14.3
Nov	0	0	0	0.6	0	23.32	0	0	0	14.65	0	0
Dec	0	0	0	0.6	0	17.72	0	0	0	23.51	0	0
Year Total	290.58	43.59	246.99	0.6	148.2	257.35	76.91	294.08	217.2	23.51	98.8	148.2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average Farm Surface Water Supply	**Average DP & Runoff of Water Supplies**	**Average Deep Perc**	**Average Runoff**	**Average Lagged Deep Perc**	**Net Consump-tive Use Crop Credit**	**Net Consump-tive Use Crop Credit Normalized**	**Net Consumptive Use Crop Credit for 16.76 acres of dryup**
Jan	0.00	0.00	0.00	0.00	2.54	-2.54	-2.96	-0.36
Feb	0.00	0.00	0.00	0.00	1.45	-1.45	-1.87	-0.22
Mar	0.00	0.00	0.00	0.00	0.82	-0.82	-1.25	-0.15
Apr	1.81	1.15	0.57	0.57	0.67	0.57	0.14	0.02
May	46.39	33.41	16.70	16.70	6.40	23.29	22.86	2.74
Jun	83.66	44.36	22.18	22.18	13.44	48.03	47.61	5.71
Jul	117.43	52.96	26.48	26.48	18.96	71.98	71.56	8.59
Aug	88.67	39.45	19.72	19.72	19.97	48.97	48.55	5.83
Sep	42.86	27.63	13.81	13.81	17.49	11.56	11.14	1.34
Oct	24.64	17.87	8.94	8.94	13.92	1.78	1.35	0.16
Nov	0.44	0.43	0.22	0.22	8.47	-8.25	-8.67	-1.04
Dec	0.00	0.00	0.00	0.00	4.48	-4.48	-4.90	-0.59
Totals	405.88	217.26	108.63	108.63	108.63	188.63	183.56	22.03

(1) = 29 Year Average farm Surface Water Supply
(2) = 29 Year Average of the Total (Deep Percolation) DP & Runoff of Water Supplies
(3) = 50% of Column (3)
(4) = 50% of Column (3)
(5) = Steady State Lagged Depletions from AWAS Model Based on Column (4) Model Input
(6) = Column (1) minus (Column (5)+Column (6))
(7) Column (6) normalized to not exceed 91.78 acre-ft/share (per 2002CW392)
(8) = Column (7) * 12% or 0.24 shares of Big Thompson Ditch = 16.76 acres of dryup

Table AI.4. Net Water Loss / Replacement

Month	(1) Total Net Lagged Evaporation [acre-ft]	(2) Net Consump-tive Use Crop Credit	(3) Net Stream Depletion / Replacement
JAN	0.65	-0.36	1.01
FEB	0.35	-0.22	0.58
MAR	1.01	-0.15	1.16
APR	2.00	0.02	1.98
MAY	2.91	2.74	0.17
JUN	4.38	5.71	0.00
JUL	5.50	8.59	0.00
AUG	5.71	5.83	0.00
SEP	4.94	1.34	3.61
OCT	3.79	0.16	3.63
NOV	2.68	-1.04	3.72
DEC	1.39	-0.59	1.98
totals	35.32	22.03	17.83

Notes:
(1) = Sum of Column (10), Table AI.1
(2) = Column (7), Table AI.3
(3) = Column (1) - Column (2) (Negative Values Set to 0)

Brownwood North East Pond

Boundary Condition	W to Bdry (Ft)	Transmissivity (GPD/FT)	Specific Yield	X to Well (Ft)
Alluvial Aquifer	2000	44883	0.2	630 ft

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
1	0	0	0
2	0	0	0
3	0.0151	0.6252	0.6252
4	0.028	2.042	1.4168
5	0.0397	4.1805	2.1385
6	0.0622	7.4734	3.2929
7	0.0729	11.6128	4.1394
8	0.072	15.935	4.3222
9	0.0588	19.7196	3.7846
10	0.0441	22.6771	2.9575
11	0.0307	24.816	2.1389
12	0.0129	25.969	1.153
13	0.0073	26.5643	0.5953
14	0.0042	26.903	0.3387
15	0.0175	27.7212	0.8181
16	0.0294	29.2479	1.5267
17	0.0404	31.4489	2.2011
18	0.0626	34.7775	3.3286
19	0.0731	38.9372	4.1597
20	0.0722	43.2709	4.3337
21	0.0589	47.0621	3.7912
22	0.0441	50.0234	2.9613
23	0.0307	52.1644	2.1411
24	0.013	53.3186	1.1542
25	0.0074	53.9146	0.596
26	0.0042	54.2537	0.3391
27	0.0175	55.0721	0.8184
28	0.0294	56.5989	1.5268
29	0.0404	58.8001	2.2011
30	0.0626	62.1287	3.3286
31	0.0731	66.2884	4.1597
32	0.0722	70.6221	4.3338
33	0.0589	74.4133	3.7912
34	0.0441	77.3746	2.9613
35	0.0307	79.5157	2.1411
36	0.013	80.6699	1.1542
37	0.0074	81.2659	0.596
38	0.0042	81.605	0.3391
39	0.0175	82.4233	0.8184
40	0.0294	83.9501	1.5268
41	0.0404	86.1513	2.2011
42	0.0626	89.4799	3.3286
43	0.0731	93.6396	4.1597

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
44	0.0722	97.9733	4.3338
45	0.0589	101.765	3.7912
46	0.0441	104.726	2.9613
47	0.0307	106.867	2.1411
48	0.013	108.021	1.1542
49	0.0074	108.617	0.596
50	0.0042	108.956	0.3391
51	0.0175	109.775	0.8184
52	0.0294	111.301	1.5268
53	0.0404	113.503	2.2011
54	0.0626	116.831	3.3286
55	0.0731	120.991	4.1597
56	0.0722	125.325	4.3338
57	0.0589	129.116	3.7912
58	0.0441	132.077	2.9613
59	0.0307	134.218	2.1411
60	0.013	135.372	1.1542
61	0.0074	135.968	0.596
62	0.0042	136.307	0.3391
63	0.0175	137.126	0.8184
64	0.0294	138.653	1.5268
65	0.0404	140.854	2.2011
66	0.0626	144.182	3.3286
67	0.0731	148.342	4.1597
68	0.0722	152.676	4.3338
69	0.0589	156.467	3.7912
70	0.0441	159.428	2.9613
71	0.0307	161.569	2.1411
72	0.013	162.724	1.1542
73	0.0074	163.32	0.596
74	0.0042	163.659	0.3391
75	0.0175	164.477	0.8184
76	0.0294	166.004	1.5268
77	0.0404	168.205	2.2011
78	0.0626	171.534	3.3286
79	0.0731	175.693	4.1597
80	0.0722	180.027	4.3338
81	0.0589	183.818	3.7912
82	0.0441	186.78	2.9613
83	0.0307	188.921	2.1411
84	0.013	190.075	1.1542
85	0.0074	190.671	0.596
86	0.0042	191.01	0.3391
87	0.0175	191.828	0.8184
88	0.0294	193.355	1.5268
89	0.0404	195.556	2.2011
90	0.0626	198.885	3.3286
91	0.0731	203.045	4.1597
92	0.0722	207.378	4.3338

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
93	0.0589	211.17	3.7912
94	0.0441	214.131	2.9613
95	0.0307	216.272	2.1411
96	0.013	217.426	1.1542
97	0.0074	218.022	0.596
98	0.0042	218.361	0.3391
99	0.0175	219.179	0.8184
100	0.0294	220.706	1.5268
101	0.0404	222.907	2.2011
102	0.0626	226.236	3.3286
103	0.0731	230.396	4.1597
104	0.0722	234.73	4.3338
105	0.0589	238.521	3.7912
106	0.0441	241.482	2.9613
107	0.0307	243.623	2.1411
108	0.013	244.777	1.1542
109	0.0074	245.373	0.596
110	0.0042	245.712	0.3391
111	0.0175	246.531	0.8184
112	0.0294	248.058	1.5268
113	0.0404	250.259	2.2011
114	0.0626	253.587	3.3286
115	0.0731	257.747	4.1597
116	0.0722	262.081	4.3338
117	0.0589	265.872	3.7912
118	0.0441	268.833	2.9613
119	0.0307	270.974	2.1411
120	0.013	272.128	1.1542

Pfeiff Pond

Boundary Condition	W to Bdry (Ft)	Transmissivity (GPD/FT)	Specific Yield	X to Well (Ft)
Alluvial Aquifer	1,400	56,103.80	0.2	812 ft

1	0	0	0
2	0	0	0
3	0.0051	0.1864	0.1864
4	0.0095	0.6574	0.471
5	0.0132	1.366	0.7086
6	0.0203	2.4203	1.0543
7	0.0234	3.7588	1.3385
8	0.0223	5.1302	1.3714
9	0.017	6.2834	1.1532
10	0.0117	7.115	0.8316
11	0.0073	7.6583	0.5433
12	0.0017	7.8951	0.2368
13	0.0004	7.9509	0.0557
14	0.0001	7.9641	0.0133
15	0.0051	8.1536	0.1895

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
16	0.0096	8.6254	0.4717
17	0.0132	9.3342	0.7088
18	0.0203	10.3885	1.0543
19	0.0234	11.727	1.3385
20	0.0223	13.0984	1.3714
21	0.017	14.2517	1.1532
22	0.0117	15.0833	0.8316
23	0.0073	15.6266	0.5433
24	0.0017	15.8634	0.2368
25	0.0004	15.9191	0.0557
26	0.0001	15.9324	0.0133
27	0.0051	16.1219	0.1895
28	0.0096	16.5936	0.4717
29	0.0132	17.3024	0.7088
30	0.0203	18.3567	1.0543
31	0.0234	19.6953	1.3385
32	0.0223	21.0667	1.3714
33	0.017	22.2199	1.1532
34	0.0117	23.0515	0.8316
35	0.0073	23.5948	0.5433
36	0.0017	23.8316	0.2368
37	0.0004	23.8874	0.0557
38	0.0001	23.9006	0.0133
39	0.0051	24.0901	0.1895
40	0.0096	24.5619	0.4717
41	0.0132	25.2707	0.7088
42	0.0203	26.325	1.0543
43	0.0234	27.6635	1.3385
44	0.0223	29.035	1.3714
45	0.017	30.1882	1.1532
46	0.0117	31.0198	0.8316
47	0.0073	31.5631	0.5433
48	0.0017	31.7999	0.2368
49	0.0004	31.8556	0.0557
50	0.0001	31.8689	0.0133
51	0.0051	32.0584	0.1895
52	0.0096	32.5301	0.4717
53	0.0132	33.2389	0.7088
54	0.0203	34.2933	1.0543
55	0.0234	35.6318	1.3385
56	0.0223	37.0032	1.3714
57	0.017	38.1564	1.1532
58	0.0117	38.988	0.8316
59	0.0073	39.5314	0.5433
60	0.0017	39.7681	0.2368
61	0.0004	39.8239	0.0557
62	0.0001	39.8371	0.0133
63	0.0051	40.0266	0.1895
64	0.0096	40.4984	0.4717

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
65	0.0132	41.2072	0.7088
66	0.0203	42.2615	1.0543
67	0.0234	43.6	1.3385
68	0.0223	44.9715	1.3714
69	0.017	46.1247	1.1532
70	0.0117	46.9563	0.8316
71	0.0073	47.4996	0.5433
72	0.0017	47.7364	0.2368
73	0.0004	47.7921	0.0557
74	0.0001	47.8054	0.0133
75	0.0051	47.9949	0.1895
76	0.0096	48.4667	0.4717
77	0.0132	49.1755	0.7088
78	0.0203	50.2298	1.0543
79	0.0234	51.5683	1.3385
80	0.0223	52.9397	1.3714
81	0.017	54.093	1.1532
82	0.0117	54.9246	0.8316
83	0.0073	55.4679	0.5433
84	0.0017	55.7047	0.2368
85	0.0004	55.7604	0.0557
86	0.0001	55.7737	0.0133
87	0.0051	55.9632	0.1895
88	0.0096	56.4349	0.4717
89	0.0132	57.1437	0.7088
90	0.0203	58.198	1.0543
91	0.0234	59.5366	1.3385
92	0.0223	60.908	1.3714
93	0.017	62.0612	1.1532
94	0.0117	62.8928	0.8316
95	0.0073	63.4361	0.5433
96	0.0017	63.6729	0.2368
97	0.0004	63.7286	0.0557
98	0.0001	63.7419	0.0133
99	0.0051	63.9314	0.1895
100	0.0096	64.4032	0.4717
101	0.0132	65.112	0.7088
102	0.0203	66.1663	1.0543
103	0.0234	67.5048	1.3385
104	0.0223	68.8762	1.3714
105	0.017	70.0295	1.1532
106	0.0117	70.8611	0.8316
107	0.0073	71.4044	0.5433
108	0.0017	71.6412	0.2368
109	0.0004	71.6969	0.0557
110	0.0001	71.7102	0.0133
111	0.0051	71.8997	0.1895
112	0.0096	72.3714	0.4717
113	0.0132	73.0802	0.7088

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
114	0.0203	74.1345	1.0543
115	0.0234	75.4731	1.3385
116	0.0223	76.8445	1.3714
117	0.017	77.9977	1.1532
118	0.0117	78.8293	0.8316
119	0.0073	79.3726	0.5433
120	0.0017	79.6094	0.2368

Brownwood Farm Deep Percolation

Boundary Condition	W to Bdry (Ft)	Transmissivity (GPD/FT)	Specific Yield	X to Well (Ft)
Alluvial Aquifer	2000	44883	0.2	798
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0.0054	0.2045	0.2045	
5	0.1602	6.3349	6.1304	
6	0.2627	19.6271	13.2922	
7	0.3488	38.5048	18.8777	
8	0.3236	58.4274	19.9226	
9	0.2689	75.8843	17.4569	
10	0.2053	89.7922	13.9079	
11	0.0979	98.2534	8.4612	
12	0.055	102.73	4.4762	
13	0.0313	105.268	2.5382	
14	0.0178	106.713	1.4456	
15	0.0102	107.537	0.8234	
16	0.0112	108.21	0.6735	
17	0.1635	114.608	6.3975	
18	0.2646	128.052	13.4443	
19	0.3499	147.016	18.9644	
20	0.3242	166.988	19.972	
21	0.2692	184.473	17.485	
22	0.2055	198.397	13.9239	
23	0.098	206.868	8.4703	
24	0.0551	211.349	4.4814	
25	0.0314	213.89	2.5411	
26	0.0179	215.337	1.4473	
27	0.0102	216.162	0.8243	
28	0.0112	216.836	0.6741	
29	0.1635	223.233	6.3978	
30	0.2646	236.678	13.4445	
31	0.3499	255.643	18.9645	
32	0.3242	275.615	19.972	
33	0.2692	293.099	17.485	
34	0.2055	307.023	13.9239	
35	0.098	315.494	8.4703	
36	0.0551	319.975	4.4814	

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
37	0.0314	322.516	2.5411
38	0.0179	323.964	1.4473
39	0.0102	324.788	0.8243
40	0.0112	325.462	0.6741
41	0.1635	331.86	6.3978
42	0.2646	345.304	13.4445
43	0.3499	364.269	18.9645
44	0.3242	384.241	19.972
45	0.2692	401.726	17.485
46	0.2055	415.65	13.9239
47	0.098	424.12	8.4703
48	0.0551	428.601	4.4814
49	0.0314	431.142	2.5411
50	0.0179	432.59	1.4473
51	0.0102	433.414	0.8243
52	0.0112	434.088	0.6741
53	0.1635	440.486	6.3978
54	0.2646	453.93	13.4445
55	0.3499	472.895	18.9645
56	0.3242	492.867	19.972
57	0.2692	510.352	17.485
58	0.2055	524.276	13.9239
59	0.098	532.746	8.4703
60	0.0551	537.228	4.4814
61	0.0314	539.769	2.5411
62	0.0179	541.216	1.4473
63	0.0102	542.04	0.8243
64	0.0112	542.714	0.6741
65	0.1635	549.112	6.3978
66	0.2646	562.557	13.4445
67	0.3499	581.521	18.9645
68	0.3242	601.493	19.972
69	0.2692	618.978	17.485
70	0.2055	632.902	13.9239
71	0.098	641.372	8.4703
72	0.0551	645.854	4.4814
73	0.0314	648.395	2.5411
74	0.0179	649.842	1.4473
75	0.0102	650.667	0.8243
76	0.0112	651.341	0.6741
77	0.1635	657.738	6.3978
78	0.2646	671.183	13.4445
79	0.3499	690.147	18.9645
80	0.3242	710.119	19.972
81	0.2692	727.604	17.485
82	0.2055	741.528	13.9239
83	0.098	749.999	8.4703
84	0.0551	754.48	4.4814
85	0.0314	757.021	2.5411

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
86	0.0179	758.468	1.4473
87	0.0102	759.293	0.8243
88	0.0112	759.967	0.6741
89	0.1635	766.365	6.3978
90	0.2646	779.809	13.4445
91	0.3499	798.774	18.9645
92	0.3242	818.746	19.972
93	0.2692	836.231	17.485
94	0.2055	850.155	13.9239
95	0.098	858.625	8.4703
96	0.0551	863.106	4.4814
97	0.0314	865.647	2.5411
98	0.0179	867.095	1.4473
99	0.0102	867.919	0.8243
100	0.0112	868.593	0.6741
101	0.1635	874.991	6.3978
102	0.2646	888.435	13.4445
103	0.3499	907.4	18.9645
104	0.3242	927.372	19.972
105	0.2692	944.857	17.485
106	0.2055	958.781	13.9239
107	0.098	967.251	8.4703
108	0.0551	971.732	4.4814
109	0.0314	974.274	2.5411
110	0.0179	975.721	1.4473
111	0.0102	976.545	0.8243
112	0.0112	977.219	0.6741
113	0.1635	983.617	6.3978
114	0.2646	997.062	13.4445
115	0.3499	1016.03	18.9645
116	0.3242	1036	19.972
117	0.2692	1053.48	17.485
118	0.2055	1067.41	13.9239
119	0.098	1075.88	8.4703
120	0.0551	1080.36	4.4814
121	0.0314	1082.9	2.5411
122	0.0179	1084.35	1.4473
123	0.0102	1085.17	0.8243
124	0.0112	1085.85	0.6741
125	0.1635	1092.24	6.3978
126	0.2646	1105.69	13.4445
127	0.3499	1124.65	18.9645
128	0.3242	1144.62	19.972
129	0.2692	1162.11	17.485
130	0.2055	1176.03	13.9239
131	0.098	1184.5	8.4703
132	0.0551	1188.98	4.4814
133	0.0314	1191.53	2.5411
134	0.0179	1192.97	1.4473

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
135	0.0102	1193.8	0.8243
136	0.0112	1194.47	0.6741
137	0.1635	1200.87	6.3978
138	0.2646	1214.31	13.4445
139	0.3499	1233.28	18.9645
140	0.3242	1253.25	19.972
141	0.2692	1270.74	17.485
142	0.2055	1284.66	13.9239
143	0.098	1293.13	8.4703
144	0.0551	1297.61	4.4814
145	0.0314	1300.15	2.5411
146	0.0179	1301.6	1.4473
147	0.0102	1302.42	0.8243
148	0.0112	1303.1	0.6741
149	0.1635	1309.5	6.3978
150	0.2646	1322.94	13.4445
151	0.3499	1341.9	18.9645
152	0.3242	1361.88	19.972
153	0.2692	1379.36	17.485
154	0.2055	1393.29	13.9239
155	0.098	1401.76	8.4703
156	0.0551	1406.24	4.4814
157	0.0314	1408.78	2.5411
158	0.0179	1410.23	1.4473
159	0.0102	1411.05	0.8243
160	0.0112	1411.72	0.674
161	0.1635	1418.12	6.3978
162	0.2646	1431.57	13.4445
163	0.3499	1450.53	18.9645
164	0.3242	1470.5	19.972
165	0.2692	1487.99	17.485
166	0.2055	1501.91	13.9239
167	0.098	1510.38	8.4703
168	0.0551	1514.86	4.4814
169	0.0314	1517.4	2.5411
170	0.0179	1518.85	1.4473
171	0.0102	1519.68	0.8243
172	0.0112	1520.35	0.6741
173	0.1635	1526.75	6.3978
174	0.2646	1540.19	13.4445
175	0.3499	1559.16	18.9645
176	0.3242	1579.13	19.972
177	0.2692	1596.61	17.485
178	0.2055	1610.54	13.9239
179	0.098	1619.01	8.4703
180	0.0551	1623.49	4.4814
181	0.0314	1626.03	2.5411
182	0.0179	1627.48	1.4473
183	0.0102	1628.3	0.8243

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
184	0.0112	1628.98	0.6741
185	0.1635	1635.37	6.3978
186	0.2646	1648.82	13.4445
187	0.3499	1667.78	18.9645
188	0.3242	1687.76	19.972
189	0.2692	1705.24	17.485
190	0.2055	1719.16	13.9239
191	0.098	1727.63	8.4703
192	0.0551	1732.12	4.4814
193	0.0314	1734.66	2.5411
194	0.0179	1736.1	1.4473
195	0.0102	1736.93	0.8243
196	0.0112	1737.6	0.674
197	0.1635	1744	6.3978
198	0.2646	1757.45	13.4445
199	0.3499	1776.41	18.9645
200	0.3242	1796.38	19.972
201	0.2692	1813.87	17.485
202	0.2055	1827.79	13.9239
203	0.098	1836.26	8.4703
204	0.0551	1840.74	4.4814
205	0.0314	1843.28	2.5411
206	0.0179	1844.73	1.4473
207	0.0102	1845.56	0.8243
208	0.0112	1846.23	0.674
209	0.1635	1852.63	6.3978
210	0.2646	1866.07	13.4445
211	0.3499	1885.04	18.9645
212	0.3242	1905.01	19.972
213	0.2692	1922.49	17.485
214	0.2055	1936.42	13.9239
215	0.098	1944.89	8.4703
216	0.0551	1949.37	4.4814
217	0.0314	1951.91	2.5411
218	0.0179	1953.36	1.4473
219	0.0102	1954.18	0.8243
220	0.0112	1954.86	0.674
221	0.1635	1961.25	6.3978
222	0.2646	1974.7	13.4445
223	0.3499	1993.66	18.9645
224	0.3242	2013.63	19.972
225	0.2692	2031.12	17.485
226	0.2055	2045.04	13.9239
227	0.098	2053.51	8.4703
228	0.0551	2057.99	4.4814
229	0.0314	2060.54	2.5411
230	0.0179	2061.98	1.4473
231	0.0102	2062.81	0.8243
232	0.0112	2063.48	0.674

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
233	0.1635	2069.88	6.3978
234	0.2646	2083.32	13.4445
235	0.3499	2102.29	18.9645
236	0.3242	2122.26	19.972
237	0.2692	2139.75	17.485
238	0.2055	2153.67	13.9239
239	0.098	2162.14	8.4703
240	0.0551	2166.62	4.4814
241	0.0314	2169.16	2.5411
242	0.0179	2170.61	1.4473
243	0.0102	2171.43	0.8243
244	0.0112	2172.11	0.6741
245	0.1635	2178.51	6.3978
246	0.2646	2191.95	13.4445
247	0.3499	2210.91	18.9645
248	0.3242	2230.89	19.972
249	0.2692	2248.37	17.485
250	0.2055	2262.3	13.9239
251	0.098	2270.77	8.4703
252	0.0551	2275.25	4.4814
253	0.0314	2277.79	2.5411
254	0.0179	2279.24	1.4473
255	0.0102	2280.06	0.8243
256	0.0112	2280.73	0.6741
257	0.1635	2287.13	6.3978
258	0.2646	2300.58	13.4445
259	0.3499	2319.54	18.9645
260	0.3242	2339.51	19.972
261	0.2692	2357	17.485
262	0.2055	2370.92	13.9239
263	0.098	2379.39	8.4703
264	0.0551	2383.87	4.4814
265	0.0314	2386.41	2.5411
266	0.0179	2387.86	1.4473
267	0.0102	2388.69	0.8243
268	0.0112	2389.36	0.6741
269	0.1635	2395.76	6.3978
270	0.2646	2409.2	13.4445
271	0.3499	2428.17	18.9645
272	0.3242	2448.14	19.972
273	0.2692	2465.62	17.485
274	0.2055	2479.55	13.9239
275	0.098	2488.02	8.4703
276	0.0551	2492.5	4.4814
277	0.0314	2495.04	2.5411
278	0.0179	2496.49	1.4473
279	0.0102	2497.31	0.8244
280	0.0112	2497.99	0.6741
281	0.1635	2504.38	6.3978

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
282	0.2646	2517.83	13.4445
283	0.3499	2536.79	18.9645
284	0.3242	2556.77	19.972
285	0.2692	2574.25	17.485
286	0.2055	2588.17	13.9239
287	0.098	2596.64	8.4703
288	0.0551	2601.13	4.4814
289	0.0314	2603.67	2.5411
290	0.0179	2605.11	1.4473
291	0.0102	2605.94	0.8244
292	0.0112	2606.61	0.6741
293	0.1635	2613.01	6.3978
294	0.2646	2626.46	13.4445
295	0.3499	2645.42	18.9645
296	0.3242	2665.39	19.972
297	0.2692	2682.88	17.485
298	0.2055	2696.8	13.9239
299	0.098	2705.27	8.4703
300	0.0551	2709.75	4.4814
301	0.0314	2712.29	2.5411
302	0.0179	2713.74	1.4473
303	0.0102	2714.56	0.8244
304	0.0112	2715.24	0.6741
305	0.1635	2721.64	6.3978
306	0.2646	2735.08	13.4445
307	0.3499	2754.05	18.9645
308	0.3242	2774.02	19.972
309	0.2692	2791.5	17.485
310	0.2055	2805.43	13.9239
311	0.098	2813.9	8.4703
312	0.0551	2818.38	4.4814
313	0.0314	2820.92	2.5411
314	0.0179	2822.37	1.4473
315	0.0102	2823.19	0.8244
316	0.0112	2823.87	0.6741
317	0.1635	2830.26	6.3978
318	0.2646	2843.71	13.4445
319	0.3499	2862.67	18.9645
320	0.3242	2882.64	19.972
321	0.2692	2900.13	17.485
322	0.2055	2914.05	13.9239
323	0.098	2922.52	8.4703
324	0.0551	2927	4.4814
325	0.0314	2929.55	2.5411
326	0.0179	2930.99	1.4473
327	0.0102	2931.82	0.8244
328	0.0112	2932.49	0.6741
329	0.1635	2938.89	6.3978
330	0.2646	2952.33	13.4445

Time	Dep. Rate(CFS)	Vol. of Dep. (acre-feet)	Vol. of Dep. This Step (acre-feet)
331	0.3499	2971.3	18.9645
332	0.3242	2991.27	19.972
333	0.2692	3008.76	17.485
334	0.2055	3022.68	13.9239
335	0.098	3031.15	8.4703
336	0.0551	3035.63	4.4814
337	0.0314	3038.17	2.5411
338	0.0179	3039.62	1.4473
339	0.0102	3040.44	0.8244
340	0.0112	3041.12	0.6741
341	0.1635	3047.52	6.3978
342	0.2646	3060.96	13.4445
343	0.3499	3079.92	18.9645
344	0.3242	3099.9	19.972
345	0.2692	3117.38	17.485
346	0.2055	3131.31	13.9239
347	0.098	3139.78	8.4703
348	0.0551	3144.26	4.4814
349	0.0314	3146.8	2.5412
350	0.0179	3148.25	1.4473
351	0.0102	3149.07	0.8244
352	0.0112	3149.74	0.6741
353	0.1635	3156.14	6.3978
354	0.2646	3169.59	13.4445
355	0.3499	3188.55	18.9645
356	0.3242	3208.52	19.972
357	0.2692	3226.01	17.485
358	0.2055	3239.93	13.9239
359	0.098	3248.4	8.4703
360	0.0551	3252.88	4.4813

Table AI.6. Period of Record General Climate Summary
- Temperature and Precipitation

Weather Station: **Fort Collins NOAA**

Period of Record: From Year 1893 to Year 2010

Month	Mean Temperature [F]	Mean Rainfall [in]
January	**27.5**	0.36
February	**30.6**	0.48
March	37.5	1.20
April	46.8	1.98
May	55.6	2.72
June	64.8	1.83
July	70.5	1.60
August	68.8	1.44
September	60.2	1.30
October	49.2	1.13
November	37.1	0.59
December	**29.1**	0.49

	(1) **Average Farm Surface Water Supply**	(2) **Total Return Flows**	(3) **Return Flow Obligation for 0.24 shares of BTDM**
Jan	0.00	2.54	0.30
Feb	0.00	1.45	0.17
Mar	0.00	0.82	0.10
Apr	1.81	1.25	0.15
May	46.39	23.10	2.77
Jun	83.66	35.62	4.27
Jul	117.43	45.45	5.45
Aug	88.67	39.70	4.76
Sep	42.86	31.30	3.76
Oct	24.64	22.86	2.74
Nov	0.44	8.69	1.04
Dec	0.00	4.48	0.54
Totals	405.88	217.26	26.07

(1) = 29 Year Average farm Surface Water Supply
(2) = Total (Deep Percolation) DP (Lagged) & Runoff of Water Supplies
Column (4) + Column (5) of AI.3
(3) = Column (2) * 0.12 (12% = 0.24 shares of Big Thompson Ditch & Mfg. Co)
to be Delivered to the Big Thompson River via Parshall Flume along West Property Line

APPENDIX II

TRANSMISSIVITY CALC.

GIVEN:

b = AQUIFER THICKNESS = 10 ft

K = HYDRAULIC CONDUCTIVITY = 600 ft/day

$T = K \cdot b = 600\ ft/day \times 10\ ft = 6000\ ft^2/day$

CONVERT TO G/d ft:

$6000\ ft^2/day \times 7.4805\ gal/ft^3 = \boxed{44,883.0\ \frac{Gal}{day \cdot ft}}$

Transmissivity Calculation

Given:

b= aquifer saturated thickness = average of 12.5 ft

K = Hydraulic Conductivity = 600 ft/day

T= K*b

Therefore:

T= K*b= 600 ft/day x 12.5 ft = 7,500 ft^2/day

Convert to Gal/day ft:

7,500 ft^2/day x 7.4805 gal/ft^3 = 56,103.75 **gal/day ft**

APPENDIX III

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RESOURCES

October 4, 2012

WEILAND, INC.
PETER WAYLAND
P.O. BOX 18087
BOULDER, CO 80308

RE: COMPACTED CLAY LINER APPROVAL
BROWNWOOD SOUTH EAST RESERVOIR (WDID 0403398)
BROWNWOOD PIT, DRMS M-1979-059 (WDID 0403014)
S20-T5N-R68W, WATER DIVISION 1, WATER DISTRICT 4

Dear Peter:

The purpose of this letter is to approve the lining of the south east mining cell of the Brownwood Pit. This reservoir is located in the SWSW of Section 20, Township 5 North, Range 68 West of the 6th P.M. and is a part of the Brownwood Pit (DRMS M-1979-059). This compacted clay liner leak test commenced May 10, 2012 and concluded on August 9, 2012. A site inspection was done by our office on October 2, 2012.

Your report dated October 2, 2012 provides the liner summary and leak test result. The test data provided indicates that **the reservoir has been lined to the design standard** referenced in the August 1999 State Engineer Guidelines for Lining Criteria for Gravel Pits (1999 SEO Guidelines). **Meeting the design standard requires that during reservoir operations all water inflows and outflows for the liner perimeter enclosed area be accounted for on a monthly basis.**

With this liner approval, the Brownwood South East Reservoir is now classified as a lined reservoir in accordance with the 1999 SEO Guidelines. Water shall not be impounded in the reservoir except pursuant to lawful diversions allowed by statute or decree. At all other times, all inflow of water into the reservoir from any source, including precipitation and ground water inflows shall be removed to prevent illegal storage of water. Prior to ANY use of this site, the owner or operator will need to coordinate with Jason Smith, District 4 Water Commissioner, to review operations, measurement structures, stage-storage curves, and accounting.

Please contact me at the number below if you have any questions.

Sincerely,

Jonathan M. Hernandez, P.E.
Water Resource Engineer

ec: Jason Smith, District 4 Water Commissioner (Jason.Smith2@state.co.us)
WDID File (0403398, 0403014)

'HOMPSON DITCH & MANUFACTURING CO.

7005. • Loveland, Colorado 80537 • 303/667-6487

HEFFERD
IDENT
probasco
ESIDENT
OSBORN
-TREASURER

January 12, 1993

Landmark Engineering, Ltd.
3521 W. Eisenhower Blvd.
Loveland, Colorado 80538

David Shupe,

Re: The Date irrigating history of the Richard Coulson farm and prior to Coulson, the Brownwood farm, which is one and the same.

They have irrigated this farm with 2 shares of Big Thompson Ditch + Mfg. water with priority of 64.56 CFS, going back to 1863 for the ditch system.

No water has ever been measured to individual farms, and on this particular farm, there are no headgates - only checks and boards to raise the level of water in main ditch to run into farm laterals. There has never been any measuring devices on our ditch system except at the point where it diverts from the river.

The Coulson (Brownwood) farm is about 1½ miles east of Highway 287 on Highway 402.

I hope this will answer your questions.

Big Thompson Ditch + Mfg. Co
Edwin R. Hefferd, President

№ 718

Perpetual Charter

5/6th Shares

THE BIG THOMPSON DITCH AND MANUFACTURING CO.

CAPITAL STOCK, $4,800.00

48 SHARES, $100.00 EACH

This Certifies That RICHARD L. COULSON

is the owner of 5/6th Shares of the Capital Stock of the Big Thompson Ditch and Manufacturing Company, incorporated under the laws of the State of Colorado. Stock transferable only on the books of the Company, in person, or by attorney on the surrender of this Certificate.

Witness, the seal of the Company and the signatures of the President and Secretary at Loveland, Colorado,

this 10th day of January A. D., 1996

J. J. Schwab

President.

John Weber

Secretary.

DEDICATION OF WATER RIGHTS

I Richard Coulson, do hereby dedicate 0.24 shares of Big Thompson Ditch and Manufacturing Co. water rights to operation of the Temporary Substitute Water Supply Plan for the Brownwood Pit (M-1979-059). I also dedicate as much of my ownership of 5/6 of a share in the Big Thompson Ditch and Manufacturing Co. water right as may be required for the long term replacement of depletions to the Big Thompson River. Furthermore, the required portion of my 5/6 of a share can be used in the court augmentation plan and will be used, unless a sufficient alternative replacement source is identified and dedicated.

Signature _____ Date 11-29-12

TEMPORARY DRY-UP AGREEMENT

This agreement shall temporarily remove 16.76 acres of land from irrigation by 0.24 shares of Big Thompson Ditch and Manufacturing Co. (BTDM) water rights for the property owned by Coulson Excavating, Co., Inc. known as the Brownwood Pit (DRMS Permit # M-1979-059, east half of the southeast quarter of Section 19, Township 5 North, Range 68 West of the 6th P.M.). The purpose of this dry up is to make the above mentioned historical consumptive use portion of BTDM water rights available to offset depletions associated with the Brownwood Pit Temporary Substitute Water Supply Plan. The term of this agreement shall be for the duration of the Temporary Substitute Water Supply Plan.

Signature of Landowner

Date 2-24-12

June, 4 2003

Mr. Peter Wayland
Weiland, Inc.
10395 W Colfax, Suite 350
Lakewood, CO 80215

Re: Brownwood Farm Historical Agricultural Use

Peter,

The Coulson family acquired the Brownwood Farm in 1972. The north fields have been farmed with silage corn from when we acquired the property until mining began in 1979-1980. Prior to our ownership the north fields were farmed with silage corn for a dairy operation. Since our ownership in 1972 the south fields have been farmed with alfalfa and grass hay.

Sincerely,

Richard Coulson

LEASE OF FULLY CONSUMABLE WATER

THIS LEASE is made and entered into this 13th day of Jan, 1998, by and between the City of Loveland, Colorado, a Colorado home rule municipality ("City"), whose address is 500 East Third Street, Loveland, Colorado 80537, and Coulson Excavating Company, a Colorado corporation ("Lessee"), whose address is 3609 North County Road 13, Loveland, Colorado 80538.

WHEREAS, the City owns certain water which, pursuant to the water laws of the state of Colorado, may be used, re-used and successively used to extinction (the "Fully Consumable Water"); and

WHEREAS, the Lessee wishes to lease from the City the right to use a portion of the City's Fully Consumable Water; and

WHEREAS, the City is willing to lease to Lessee a portion of its Fully Consumable Water pursuant to certain terms and conditions as set forth in this Lease,

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein and other good and valuable consideration, the receipt of which is hereby acknowledged, the parties agree as follows:

1. The City hereby leases to the Lessee the right to receive one hundred acre feet of the City's Fully Consumable Water, as defined in paragraph 4 of this Lease, on an annual basis. This Lease shall be for a term of twenty-five (25) years, ending on December 31, 2022. However, Lessee shall have the option to renew this Lease for successive terms of twenty-five years, which option shall terminate only if Lessee is in default of its payment obligations under paragraphs 6 or 7 of this Lease or if Lessee elects not to exercise its option to renew by giving notice to the City pursuant to paragraph 12 of this Lease not later than three (3) months prior to the end of any twenty-five (25) year term. In the event Lessee is not in default of its payment obligations and elects to renew the Lease for any successive twenty-five year period, Lessee shall not be required to pay any additional amounts under this Lease for the right to receive its allotted amount of the City's Fully Consumable Water as set forth above.

2. The one hundred acre feet of Fully Consumable Water which the Lessee shall be entitled to receive annually is hereinafter referred to as the "Leased Water." The parties

recognize that, simultaneously with the execution of this Lease, the City has leased the right to receive two hundred acre feet of its Fully Consumable Water to Loveland Ready Mix and that the City may, in the future, lease additional portions of its Fully Consumable Water to persons other than Lessee. The Lessee's right to receive one hundred acre feet of the City's Fully Consumable Water pursuant to this Lease shall be equal to the right of Loveland Ready Mix to receive its two hundred acre feet of Fully Consumable Water such that in the event less than three hundred acre feet of Fully Consumable Water is available in any year, Lessee and Loveland Ready Mix shall each be entitled to receive a proportionate share of the available Fully Consumable Water. The right of Lessee to receive one hundred acre feet of the City's Fully Consumable Water under this Lease shall be deemed to be a first right relative to all others, such that in the event the available Fully Consumable Water in any year is in excess of three hundred acre feet but is not sufficient to meet the needs of all persons holding leases of Fully Consumable Water, Lessee shall receive up to its entire one hundred acre feet allotment from the first three hundred acre feet of Fully Consumable Water available.

3. In consideration of the right to receive the Leased Water, Lessee shall, upon execution of this Lease, pay City the sum of Two Hundred Twenty Thousand and 00/100 ($ 220,000.00) Dollars in certified funds. By entering into this Lease with the Lessee, the City is and shall be under no obligation to file an application for a change of water rights or for a plan of augmentation concerning the use of the Leased Water by the Lessee.

The City shall not be responsible for the implementation of any temporary substitute supply plan or augmentation plan concerning the use of the Leased Water. The cost and expense of any such proceeding shall be that of the Lessee. The City agrees to furnish sufficient Leased Water so that, subject to the provisions of this Agreement, the net usable first use or subsequent use water obtained by the Lessee shall be 100 acre feet. The City shall not be obligated to deliver Leased Water to Lessee unless Lessee shall have first provided written notice to the City that Leased Water will be required in a given year by April 1 of the preceding year.

The City shall deliver the Leased Water under this Lease in a total annual quantity as specified by the Lessee and at specific monthly delivery times and in specific monthly quantities according to the evaporation table, attached hereto as

Exhibit A, or as otherwise agreed by the City and the Lessee in writing. In no event shall the monthly deliveries exceed the monthly amounts shown on Exhibit A unless hereafter agreed in writing by the City and the Lessee.

The Lessee shall not have the right to carryover from month to month or from year to year any Leased Water which was deliverable, but not requested for delivery, in a prior time period. If the maximum allowable delivery under this Lease is not requested by Lessee in any month, the right of Lessee to call for the delivery of such water shall lapse and all such water shall remain the sole property of the City.

4. In supplying the Leased Water pursuant to this Lease, the City may use any water, including, but not limited to the following sources of water which may be used to extinction (the "Fully Consumable Water"):

a. Native water from the Big Thompson River basin which, when stored within the City's reservoir system, may be totally consumed pursuant to the terms and conditions of the Decree for Change of Water Rights for the City of Loveland, dated June 18, 1985, Case No. 82-CW-202A, Water Court Division One, State of Colorado or subsequent actions; and

b. Water under an Allotment Contract with the Municipal Sub-District of the Northern Colorado Water Conservancy District (the "Northern District"), commonly known as Windy Gap Water; and

c. Any water subsequently acquired by the City and determined by Water Court Decree to be totally consumable.

5. The City shall have the right to deliver the Leased Water to Lessee from any of the sources of Fully Consumable Water, at the City's sole discretion, and shall have the right to determine if any or all of the Leased Water shall be first use water or subsequent use water. The City shall never be required to deliver first use water, even if it is the only Fully Consumable Water available to meet the terms of this Lease. In the event the only water available to the City to meet the terms of this Lease is first use Windy Gap Water and the City is willing to deliver such first use water, the City shall notify the Lessee prior to delivering such water and the Lessee shall

have the option to accept the first use Windy Gap Water and pay the costs of delivering such water pursuant to the terms of paragraph 6 of this Lease. In the event the Lessee refuses to accept the delivery of the first use Windy Gap Water, the City shall be deemed to have met its obligations under this Lease, until such time as a source of Fully Consumable Water, other than first use Windy Gap Water, becomes available. In the event the City is reasonably able to but fails to exercise its rights under Case No. 82CW202A sufficient to meet the demands under this Agreement, (unless the exercise of such rights would impair the City's ability to meet the normal domestic needs of the City), and the only water available to the City to meet the terms of this Lease is first use Windy Gap Water, the Lessee shall not be required to pay the delivery charges provided in paragraphs 5 or 6 for the delivery of such first use Windy Gap Water.

6. In the event the Lessee agrees to accept the delivery of first use water from the City's allotment of Windy Gap Water, Lessee shall pay to the City, the total costs of all pumping and conveyance charges, plus any assessments and fees for administrative, operating, maintenance and any other fees or costs charged by the Sub-District for delivery of the water to the City. The Lessee shall pay the City the total estimated costs in advance, and the City shall not be obligated to deliver any such water until it has received the full estimated payment. In the event the estimated costs paid by the Lessee are less than the actual costs incurred by the City in delivery of Windy Gap Water to the Lessee, Lessee shall pay the City any additional amounts owed within thirty days of receipt of an invoice from the City setting forth the amount owed. In the event the Lessee shall fail to pay such additional amounts upon receipt of an invoice from the City, the City shall have the right, in addition to any other legal or equitable remedies it may have, to refuse to deliver any Leased Water until such time as all additional amounts owed pursuant to this paragraph have been paid in full. In the event the estimated costs paid by the Lessee are greater than the actual costs incurred by the City in delivery of Windy Gap Water to the Lessee, the City shall refund any excess within thirty days of the City's receipt of an invoice from the Northern District.

7. Lessee shall pay the City's reasonable costs incurred in administering the terms of this Lease. For the first five years of this Lease, the administrative costs shall be One Thousand and 00/100 Dollars($1,000.00) per year, payable in advance. The City shall recalculate the reasonable administrative costs every five years and inform the Lessee in writing of the

change at least thirty days prior to the start of the new five year period. In the event the Lessee does not require the delivery of any of the Leased Water in a given year, there shall be no administrative costs charged. The City shall invoice the Lessee for the annual administrative costs in January of each year and Lessee shall pay said costs within thirty days of the invoice date. In the event the Lessee shall fail to pay its accrued administrative costs in any year, the City shall have the right, in addition to any other legal or equitable remedies it may have, to refuse to deliver the Leased Water until such time as all accrued administrative fees have been paid in full.

8. At the option of the City, delivery of the Leased Water shall be made at the City's Waste Water Treatment Plant, 700 South Boise Avenue, Loveland, CO, or at such other downstream location or locations above the Lessee's original point of need as agreed by and between the Lessee and City in writing. Lessee shall not unreasonably withhold its approval of any request by the City to move the point of delivery.

9. Subject to the provisions of paragraph 5, the City shall only be obligated to deliver the Leased Water to the Lessee if water meeting the requirements of this Lease is reasonably available to the City. In the event of a drought or other conditions, restrictions or emergency situations beyond the control of the City which limit the City's ability to receive or deliver all or a portion of the Leased Water to the Lessee, the City shall be relieved of its obligations to deliver such water under the terms of this Lease until such time as conditions permit the City's receipt and delivery of the Leased Water.

10. The Lessee shall take the Leased Water AS IS and the City makes no express or implied warranties of any kind or nature, including the warranties of merchantability or fitness for a particular purpose, concerning the water quality of the Leased Water.

11. In the event the Lessee wishes to assign, encumber or exchange its rights to receive all or any portion of the Leased Water not already used to satisfy a temporary substitute supply plan or permanent augmentation decree to a third party, the City shall have the first right of refusal to reacquire said rights. In such event, Lessee shall notify the City in writing and shall provide the City with a copy of the signed agreement between the Lessee and the third party. The City shall have the right to reacquire the water rights within ninety days from receipt of the notice, by informing Lessee of its intent to exercise its first

right of refusal and by paying Lessee the contract price as set forth in the agreement between the Lessee and the third party. If the City does not exercise its right of first refusal, the Lessee may assign or transfer its rights to a third party, and the third party shall be bound by all terms and conditions of this Lease, including the obligation to allow the City the first right of refusal on any transfer or assignment of the Leased Water, it being the intent of this Lease that the City's right of first refusal shall apply to each and every transfer of the Leased Water which may arise at any time during the existence of this or any subsequent Lease. The right of first refusal set forth in this paragraph shall not apply in the event the Lessee wishes to assign, encumber or exchange its rights to receive all or any portion of the Leased Water to a third party pursuant to an exchange which is a transfer, sale or assignment of all or substantially all of Lessee's assets to said third party.

12. After the City has increased the storage capacity of Green Ridge Glade Reservoir to at least five thousand (5,000) acre feet, and upon sufficient advance written notice so as to permit the City to place appropriate orders for replacement water, the Lessee may temporarily sub-lease the Leased Water or portions thereof to third parties without activating the City's right of first refusal as set forth in paragraph 11, so long as the length of the sub-lease term and the amounts and times of discharge required by the Sub-lessee are acceptable to the City. Any such lease arrangement shall first be provided to the City for its review and approval, which approval shall not be unreasonably withheld.

13. All notices shall be in writing and shall be deemed given if personally delivered or mailed, certified mail, return receipt requested, to the following addresses:

If to City, to:

City of Loveland Water & Power Department
Attn: Ralph Mullinix, Director
200 North Wilson Avenue
Loveland, Colorado 80537

with a copy to:
City of Loveland
Attn: City Attorney
500 East Third Street
Loveland, Colorado 80537

If to Lessee, to:
Coulson Excavating Company
3609 North County Road 13
Loveland, Colorado 80538

14. No alteration or other modification of this Lease shall be effective unless such modification shall be in writing and signed by the parties.

15. In the event any portion of this Lease should become invalid, the remainder of the Lease shall remain in full force and effect.

16. This Lease shall be governed by and construed in accordance with the laws of the State of Colorado. This Lease shall inure to the benefit of, and be binding upon, the successors in interest of the respective parties.

IN WITNESS WHEREOF, the parties have executed this Lease on the day and year first above written.

CITY OF LOVELAND

Kathleen G. Gilliland
Mayor

CITY OF LOVELAND SEAL COLORADO

ATTEST:

City Clerk

APPROVED AS TO FORM:

Jane S. Brautigam
City Attorney

LESSEE
COULSON EXCAVATING COMPANY

Coulson Excavating Company Inc.
By: Richard Coleman
Its: President

ATTEST:

Diana Montgomery
Asst. Secretary

EXHIBIT A TO LEASE OF FULLY CONSUMABLE WATER
BETWEEN
THE CITY OF LOVELAND AND COULSON EXCAVATING COMPANY

EVAPORATION BY MONTHS

MONTH	PERCENT EVAPORATION
January	3.0%
February	3.5
March	5.5
April	9.0
May	12.0
June	14.5
July	15.0
August	13.5
September	10.0
October	7.0
November	4.0
December	3.0