SPRING VALLEY WASTEWATER FACILY PLAN AMENDMENT

PROFESSIONAL ENGINEER
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3/8/2021
STATE OF IDAHO
JUSTIN WALKER

MARCH 2021

PROJECT NO. 220147-000

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Table of Contents

LIST OF FIGURES

LIST OF TABLES

APPENDICES

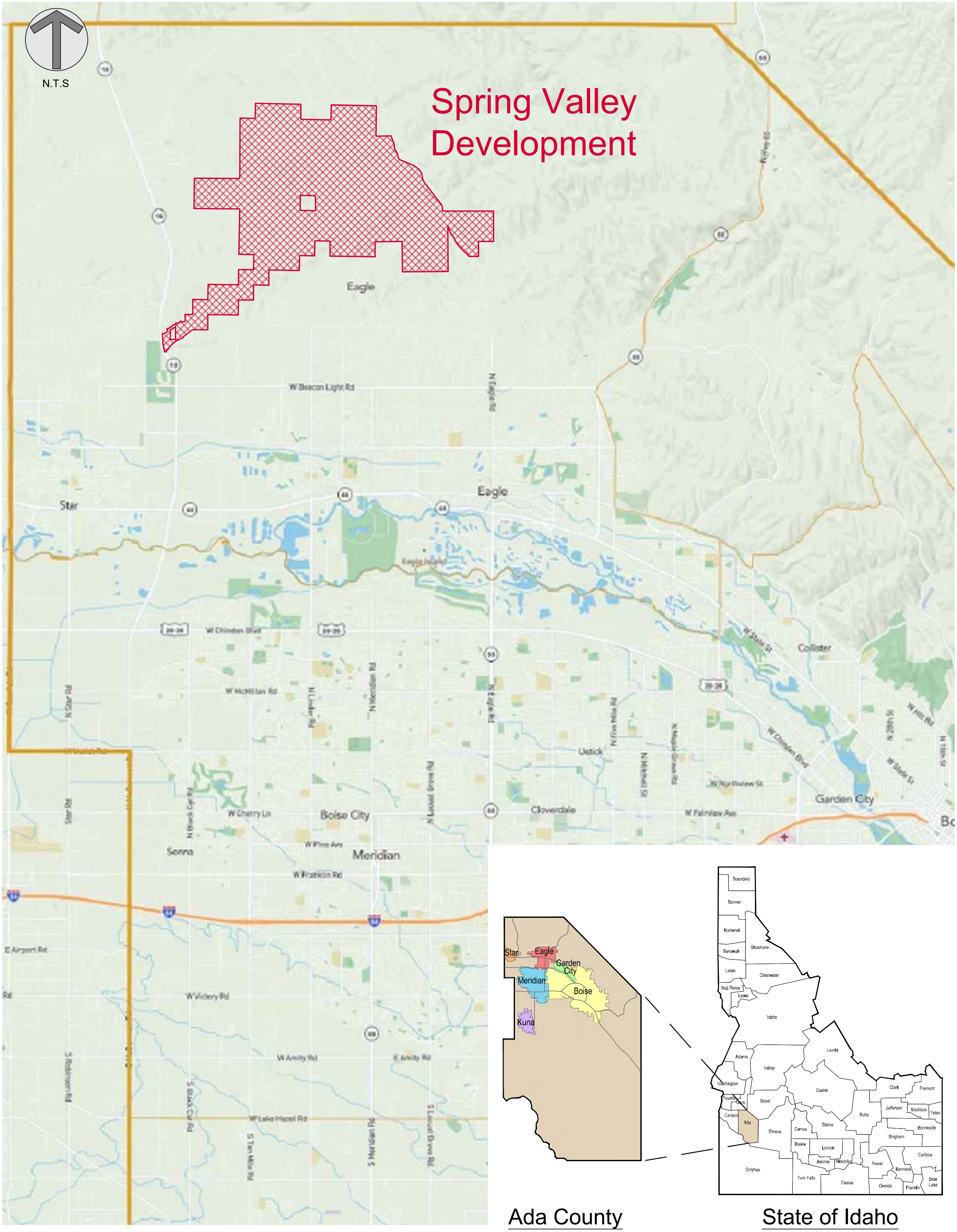
AMENDMENT SUMMARY

The purpose of this document is to amend the 2013 Spring Valley Wastewater Facility Plan that was completed for M3 Companies by JUB Engineers, Inc. The Spring Valley property and project documents were acquired by GWC Capital, a land development group, in 2020. The facility plan is being updated to reflect the new owner's master plan for the property. It is intended that this facility planning study (FPS) amendment only address changes to project phasing and treatment facilities required to support the revised master planning effort. The remainder of the approved facility plan is still applicable for the proposed development.

The location, purpose, and ultimate scope of this project has not changed [27]. However, wastewater treatment facilities will be phased in a different manner. The first phase will provide treatment facilities to serve approximately 2,200 equivalent residential units (ERUs). Rather than a secondary mechanical plant, screening and aerated lagoon facilities will be constructed to treat the initial flows. The intent is to operate the proposed lagoons as a complete containment evaporative system until full and then transition to reusing the lagoon effluent to irrigate crops during the summer with winter storage during the nongrowing season. A mechanical treatment plant will be constructed to produce Class B or Class A effluent as identified in the approved facility plan to serve future development phases. This amendment only modifies the proposed wastewater treatment facilities for the first 2,200 ERUs.

SECTION 1 - INTRODUCTION

For Section 1.1, replace Figure 1-1 with the following updated Figure:



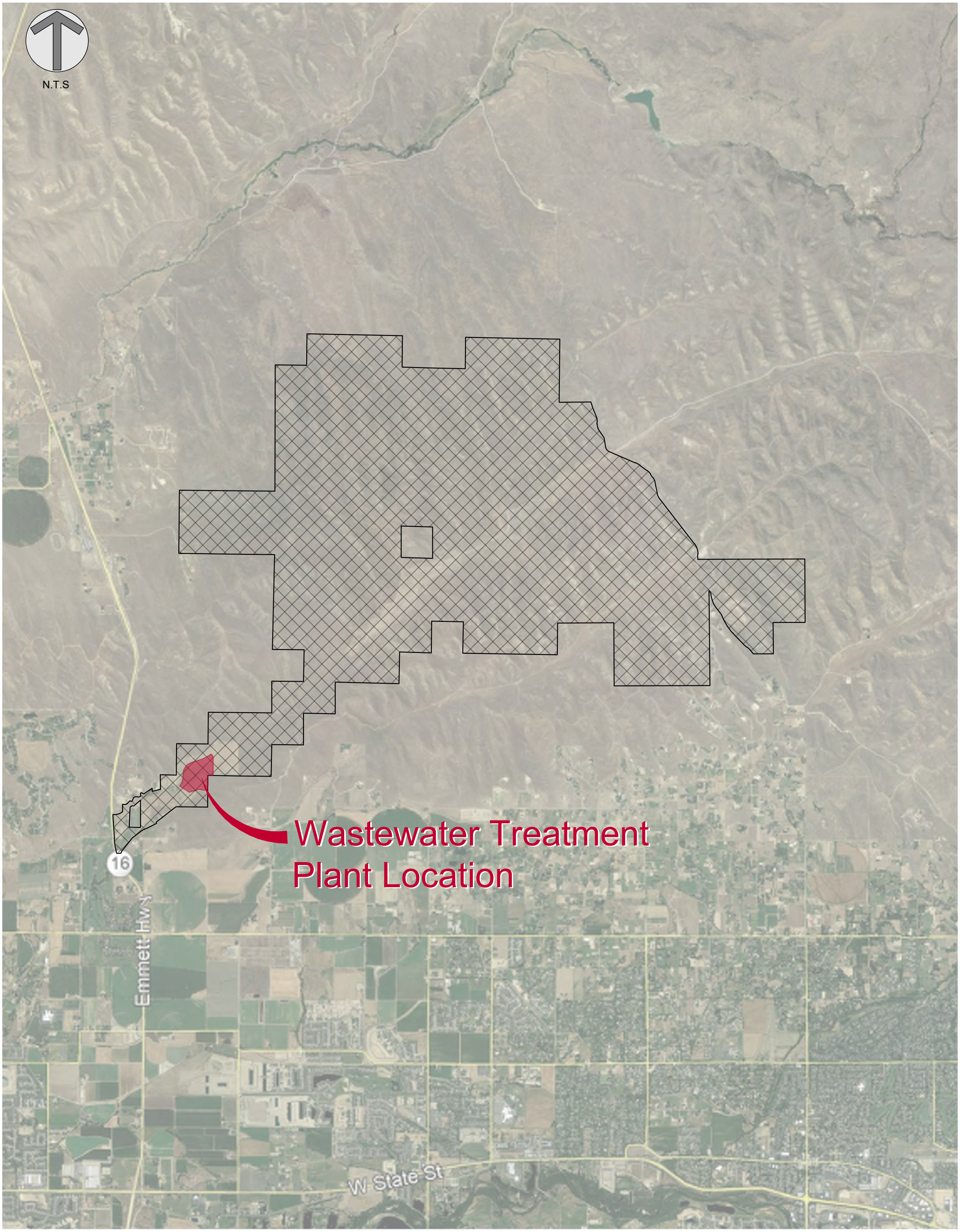
KELLER ASSOCIATES	Spring Valley Wastewater Treatment Plant	Project Location	PROJECT NO: 220147 FIGURE NO: 1-1

In Section 1.3, Abbreviations, replace all abbreviations with the following:

BLM	Bureau of Land Management
BOD_5	Biochemical Oxygen Demand, 5-day
CLOMR	Conditional Letter of Map Revisions
COD	Chemical Oxygen Demand
ERU	Equivalent Residential Unit
ESD	Eagle Sewer District
FEMA	Federal Emergency Management Agency
FPS	Facility Planning Study
ft	Feet
gpcd	Gallons per Capita Per Day
gpd	Gallons per Day
gpm	Gallons per Minute
IDAPA	Idaho Administrative Procedure Act
IDEQ	Idaho Department of Environmental Quality
IFAS	Integrated Fixed Film Activated Sludge
MBR	Membrane Bioreactor
MCL	Maximum Contaminate Level
MG	Million Gallons
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
MLSS	Mixed Liquor Suspended Solids
O&M	Operations and Maintenance
P	Phosphorus
PER	Preliminary Engineering Report
SBR	Sequence Batch Reactor
SF	Square Feet
TN	Total Nitrogen
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
UV	Ultraviolet
U.S.	United States
WW	Wastewater
WWTP	Wastewater Treatment Plant

SECTION 2 – SITE DESCRIPTION AND CONSIDERATION

Replace Figure 2-1 – Spring Valley Wastewater Treatment Plant Location with the following figure:



KELLER ASSOCIATES	Spring Valley Wastewater Treatment Plant	Wastewater Treatment Plant Location	PROJECT NO: 220147
			FIGURE NO: 2-1

Refer to 2.5 Floodplains and add the following:

The 100-year flood elevation is not established for the new treatment plant site, as stated previously. The developer plans to reroute Big Gulch around the proposed treatment plant site and submit an application for a Conditional Letter of Map Revision (CLOMR) to FEMA to establish the 100-year flood elevations along the Big Gulch channel. As required by Idaho Code, all facilities will be constructed to comply with IDAPA 58.01.16.450.01.b.

SECTION 3 – WASTEWATER TREATMENT DESIGN CRITERIA

In Section 3.1 Wastewater Design Criteria, replace the last sentence with the following:

The Spring Valley Development phasing plan includes two development phases projected to occur over a 20- to 30-year timeframe.

Remove Section 3.2 Phasing Plan, and replace with the following:

The first phase will serve an estimated 2,200 ERUs. The second phase will be constructed to provide wastewater treatment for full buildout up to 7,153 ERUs. For the first phase, the wastewater treatment plant (WWTP) will consist of influent screening; influent lift station; flow measurement; aerated, complete-mix lagoons; and settling lagoons. Winter storage lagoons and disinfection facilities will be constructed adjacent to the treatment lagoons. It is estimated that the combined treatment lagoon volume and winter storage volume will be sufficient to contain all flows from 600 homes without reuse or other disposal means for the first three to five years of development. This timeframe takes into account the number of homes projected to be constructed each year and will vary depending on actual growth, precipitation, and actual wastewater generation rates. At the end of this time, the lagoons are expected to reach capacity.

Once the lagoons exceed their evaporative capacity, WWTP effluent will be disposed of by irrigating crops and for construction. The treatment facilities will be designed to produce Class C effluent that may be applied to crops, used for construction dust suppression, and used to irrigate road ditches [25].

For Phase 2, a mechanical WWTP will be constructed. This upgrade will be designed to produce Class B or Class A effluent for irrigation of turf grass within the development. It is expected that the aerated lagoons will be converted to equalization and/or storage for effluent that does not meet discharge permit limits and requires retreatment prior to land application.

Remove Section 3.3 Design Wastewater Flow Rates and Figure 3-1, and replace with the following:

The flows from the approved 2013 Spring Valley Development Preliminary Engineering Report (PER) were compared to historical data of neighboring communities. In the PER for Phase 1A, a baseline average daily design flowrate of 200 gpd/ERU was used to design the collection system and the WWTP.

The Eagle Sewer District (ESD) currently averages 225 gpd/ERU [28]. ESD likely has higher infiltration and inflow (I/I) due to a high-water table and aging infrastructure. Another neighboring community, Avimor, reportedly generates an average of 150 gpd/ERU. The Avimor community is considered a better model for Spring Valley due to the similar site characteristics such as site elevations, proximity to groundwater, and newer infrastructure.

For the Spring Valley community, it was decided to base the design on the flow rates from the 2013 PER of 200 gpd/ERU [27]. This flow rate includes schools, hotels, and commercial facilities. Although this flow rate is higher than Avimor, it provides a conservative value for design. Subsequent designs will be based on historical flows and loadings. Table 3-1 shows the projected flow rates for various ERU counts, including buildout conditions. The peaking factors for max month and day per ERU are identical to the 2013 PER. Peaking factors for peak-hour flows were calculated using the following equation [21] and an assumed population per ERU.

$$PF_{hr} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

PF_{hr} is the peak hourly flow rate and P is the population in thousands. Refer to the calculations included in Appendix H.

Flow rates and the system capacity will be re-evaluated using historical data for design of the Phase 2 mechanical WWTP.

Table 3-1: Spring Valley Design Flow Rates

ERU's	Annual Average (gpd)	Max Month Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpm)
100	20,000	26,000	40,000	58
500	100,000	130,000	200,000	264
1,000	200,000	260,000	400,000	498
1,500	300,000	390,000	600,000	717
2,200 *	440,000	572,000	880,000	1,006
4,400	880,000	1,144,000	1,760,000	1,838
7,153 **	1,430,600	1,859,800	2,861,200	2,779

** Phase 1, ** Phase 2*

Remove Section 3.4 Design Loading, and replace with the following:

Similar to the flow analysis, design organic and nutrient loadings were reviewed. The approved 2013 PER design values for influent Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN), and Total Phosphorus (P) were 250 mg/L, 250 mg/L, 40 mg/L, and 7 mg/L, respectively [27]. These values were re-evaluated and found to be realistic and somewhat conservative when compared to historical data from Avimor and ESD. Avimor reported an average daily influent BOD_5 concentration of 150 mg/L for 2020 [29], and the ESD reported 216 mg/L BOD_5 for 2014 [17]. ESD also reported the following influent concentrations of 239 mg/L TSS, 35.74 mg/L TKN and 4.2 mg/L P [17].

Due to similar influent organic and nutrient loadings for ESD and Avimor, design will be based on the aforementioned parameters established in the 2013 PER, including the peaking factors.

The following tables show the Peaking Factors (Table 3-2) and Average Day (Table 3-3), Maximum Month (Table 3-4), and Maximum Day (Table 3-5) organic and nutrient loadings for various ERUs, respectively.

Table 3-2: Organic & Nutrient Peaking Factors

	Avg Day	Max Month	Max Day
BOD	1.00	1.30	2.30
TSS	1.00	1.30	2.30
TKN	1.00	1.30	2.30
P	1.00	1.30	1.60

Table 3-3: Spring Valley Design Avg Daily Organic & Nutrient Loading

ERU's	Avg Day Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.02	42	42	7	1
500	0.10	209	209	33	6
1,000	0.20	417	417	67	12
1,500	0.30	626	626	100	18
2,200*	0.44	918	918	147	26
4,400	0.88	1,836	1,836	294	51
7,153**	1.43	2,984	2,984	478	84

** Phase 1, ** Phase 2*

Table 3-4: Spring Valley Design Max Monthly Organic & Nutrient Loading

ERU's	Max Month Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.03	54	54	9	2
500	0.13	271	271	43	8
1,000	0.26	542	542	87	15
1,500	0.39	813	813	130	23
2,200*	0.57	1,193	1,193	191	33
4,400	1.14	2,385	2,385	382	67
7,153**	1.86	3,878	3,878	620	109

** Phase 1, ** Phase 2*

Table 3-5: Spring Valley Design Max Day Organic & Nutrient Loading

ERU's	Max Day Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.04	96	96	15	2
500	0.20	480	480	77	9
1,000	0.40	959	959	153	19
1,500	0.60	1,439	1,439	230	28
2,200*	0.88	2,110	2,110	338	41
4,400	1.76	4,220	4,220	675	82
7,153**	2.86	6,860	6,860	1,098	134

** Phase 1, ** Phase 2*

Remove Section 3.5 Effluent Design Criteria, and replace with the following:

Plant effluent will be contained in the winter storage ponds until the ponds are near capacity after the first few years of development. During this initial stage, a Reuse Permit application will be submitted to land apply Class C effluent to crops and for construction activities. Land application will occur during the growing season from approximately April 1st to October 31st. It is assumed the water will be applied to alfalfa with sprinkler irrigation. Winter storage facilities will be used to hold treated effluent during the non-growing months. Class C effluent will be land applied in this manner until approximately 2,200 ERU's are connected. Prior to that point, the second phase mechanical plant will be constructed in order to produce Class B or Class A effluent. This recycled water will be used to irrigate turf grass and other landscaping within the development.

The requirements for Class C effluent are listed in Recycled Water Rules [25]. The following table summarizes the treatment and land application requirements.

Table 3-6: Idaho Recycled Water Classification Table

Classification	Class A	Class B	Class C	Class D
Oxidized	Yes	Yes	Yes	Yes
Clarified	Yes	Yes	No	No
Filtered	Yes	Yes	No	No
Disinfected	Yes	Yes	Yes	Yes
BOD	< 5 mg/L recharge < 10 mg/L other			
Turbidity (NTU) [A]	< 2 (mean) < 5 (max)	< 5 (mean) < 10 (max)		
Total Nitrogen [B]	< 10 mg/L recharge < 30 mg/L other or as Required by GW Analysis	If Required by GW analysis		
pH	Between 6 and 9			
Coliform Median for X-days	< 2.2/100mL 7-day	< 2.2/100mL 7-day	< 23/100mL 5-day	< 230/100mL 3-day
Max Coliform (mg/L)	23	23	230	2300
Coliform Monitoring	Daily	Daily	Weekly	Monthly
Disinfection	450 mg-min L with 90 min of modal time or disinfection to 5-log inactivation of virus	Total CL > 1 mg/L after 30 min contract time at peak flow or alternate process		
Buffer Zones [C]	No	Yes	Yes	Yes
Fence [C]	No	No	Yes	Yes
Sign [C]	Yes	Yes	Yes	Yes

A – Systems using membrane filtration have a turbidity limit of <0.2 NTU (mean) & <0.5 NTU (max)
B – Total N limits may be required per IDAPA 58.01.17.602.01 and would be specifically addressed in the reuse permit
C – See the Reuse Water Buffer Zones, Sprinkler Applied, Rural Area Table for more information

Remove Section 3.6 References.

SECTION 4 – WASTEWATER COLLECTION SYSTEM

No substantial modifications to the collection system concepts are proposed at this time.

SECTION 5 – WASTEWATER TREATMENT ALTERNATIVES

Section 5.1, after the 2nd paragraph, add the following:

Three wastewater treatment options were evaluated in the original 2013 FPS. This FPS amendment provides an evaluation of a fourth treatment option for the first 2,200 ERU's, namely complete-mix aerobic lagoons with settling ponds. A separate FPS will likely be conducted at a later date to re-evaluate a mechanical plant which will be utilized for WW treatment from 2,200 ERU's through full build-out.

This alternate treatment approach is desirable because there is an abundance of undeveloped property, less equipment maintenance, less frequent sludge handling and disposal, and lagoons can be utilized to treat and evaporate the very low flows generated during the early stages of development.

Add new section, Section 5.10, Evaporative Lagoon System, after section 5.9:

5.10 Complete-Mix Aerobic Lagoon System

5.10.1 Complete-Mix Aerobic Lagoon System

As part of the 2021 FPS Amendment and specifically for Phase 1, a complete-mix aerobic lagoon system was investigated as an alternative treatment option to a mechanical plant for the Spring Valley Development. Treatment facilities that produce Class C effluent must oxidize and disinfect wastewater [25]. It is expected that the treatment lagoon system will consist of the following components:

- Manhole with a vertical screen
- Influent pump station with flow measurement
- Four complete-mix aerobic treatment ponds with surface aerators
- Two settling ponds
- Winter storage lagoons
- Chlorine disinfection
- Irrigation lift station

The treatment lagoons will be designed for a maximum month daily flow and peak hour flow of 0.572 MGD and 1.45 MGD, respectively. Preliminary sizing for the proposed facilities is provided in the following sections and was used to provide a preliminary layout of the facilities and a planning phase construction cost estimate.

5.10.2 Influent Lift Station/Screening/Flow Measurement

Due to the depth of the incoming sewerline and the proposed hydraulic profile through the wastewater treatment plant, an influent lift station will likely be necessary. Flow measurement will be required to record the influent flow to the plant. A magnetic flow meter will be installed in the influent pump station valve vault following the influent screen for this purpose.

Phase 1 will include a 6-mm coarse screen sized for the peak hour flow of 1.45 MGD equipped with a bypass. A vertical screen will be mounted in a manhole and heat-traced for freeze protection.

This screen has an integrated auger to lift, compact, dewater, and convey screenings to a dumpster. A bagger will be installed on the end of the screen discharge to help contain odors and keep the screenings in the dumpster. Product literature for this screen type is included in Appendix L.

5.10.3 Complete-Mix Aerobic Lagoon Cells

A four-cell, complete-mix, aerobic lagoon system will be designed to produce effluent with a BOD of 30 mg/L while maintaining a minimum dissolved oxygen level of 2 mg/L with all solids in suspension. The surface aerators were sized to provide a minimum mixing energy of 15 kw/1,000 m^3. Calculations are provided in Appendix H. Mixing and aeration will be accomplished with two 20-hp surface aerators per cell. Product literature is contained in Appendix L. The four cells will be configured to operate in series or in two parallel trains.

Each cell will have a minimum surface area of 0.24 acres, an operating depth of twelve feet, and three feet of freeboard. The total system volume will be 1.7 MG minimum with a detention time of three days. Each aerobic cell will be lined with a synthetic liner and will be seepage tested prior to placing into operation [24].

5.10.4 Settling Ponds

Two settling ponds will be located downstream of the aerobic cells to allow the solids to settle before effluent is discharged to winter storage and subsequent disinfection. Each cell will have two feet of depth for sludge storage with a total operating depth of 8 feet, an approximate surface area of 0.37 acres, and a 3-foot freeboard. The cells will be designed to provide a total detention time of two days [18, 31]. Calculations are provided in Appendix H. Two lagoons will be provided for redundancy and ease of maintenance. The settling ponds have a combined capacity of 1.15 MG. It is estimated that sludge will need to be removed from these ponds about every five years (See calculations in Appendix H). The settling ponds will also be lined with a synthetic liner; type to be determined during preliminary design.

5.10.5 Winter Storage Lagoons

The aerobic lagoon system will operate as a flow-through system to the winter storage ponds located adjacent to the treatment plant site. Initially, two winter storage lagoons are proposed to provide 70 million gallons of winter storage during non-growing months from April to November for Phase 1. Calculations are provided in Appendix H, which show preliminary sizing. Each cell will have a minimum surface area of seven acres, a 20-foot operating depth, and three feet of freeboard. Each cell will be lined with a synthetic liner and seepage tested prior to being placed into operation.

5.10.6 Disinfection

As per the IDEQ, the point of compliance for Class C effluent is considered to be after the winter storage facilities [30] described in this section and discussed in Section 6. Effluent from the winter storage ponds will be disinfected in a below-grade pipe or pipes that will serve as a chlorine contact chamber as effluent flows to the irrigation pump station. Initially sodium hypochlorite solution will be used for disinfection. The disinfection system will consist of a small building with a restroom and shower, a room for chemical storage, a chlorination manhole, with static or mechanical mixer, and PVC pipes that provide 30 minutes of contact time at the peak hour design flow. The sodium hypochlorite solution will be dose-paced based on the pumping rates of the irrigation pumps. Class C effluent must have a total Coliform/100 mL of 23 or less (five-day median) [25]. For Class A and B reuse, the point of compliance can be after final wastewater treatment [30]. The volume of 12.5% sodium hypochlorite solution required for disinfection of 0.440 MGD is estimated at 35 gpd (See Appendix H) with a dosing rate of 10 mg/L [18]. The required feed rate for chlorine can be highly variable, and the actual dosage will be adjustable.

5.10.7 Irrigation Lift Station

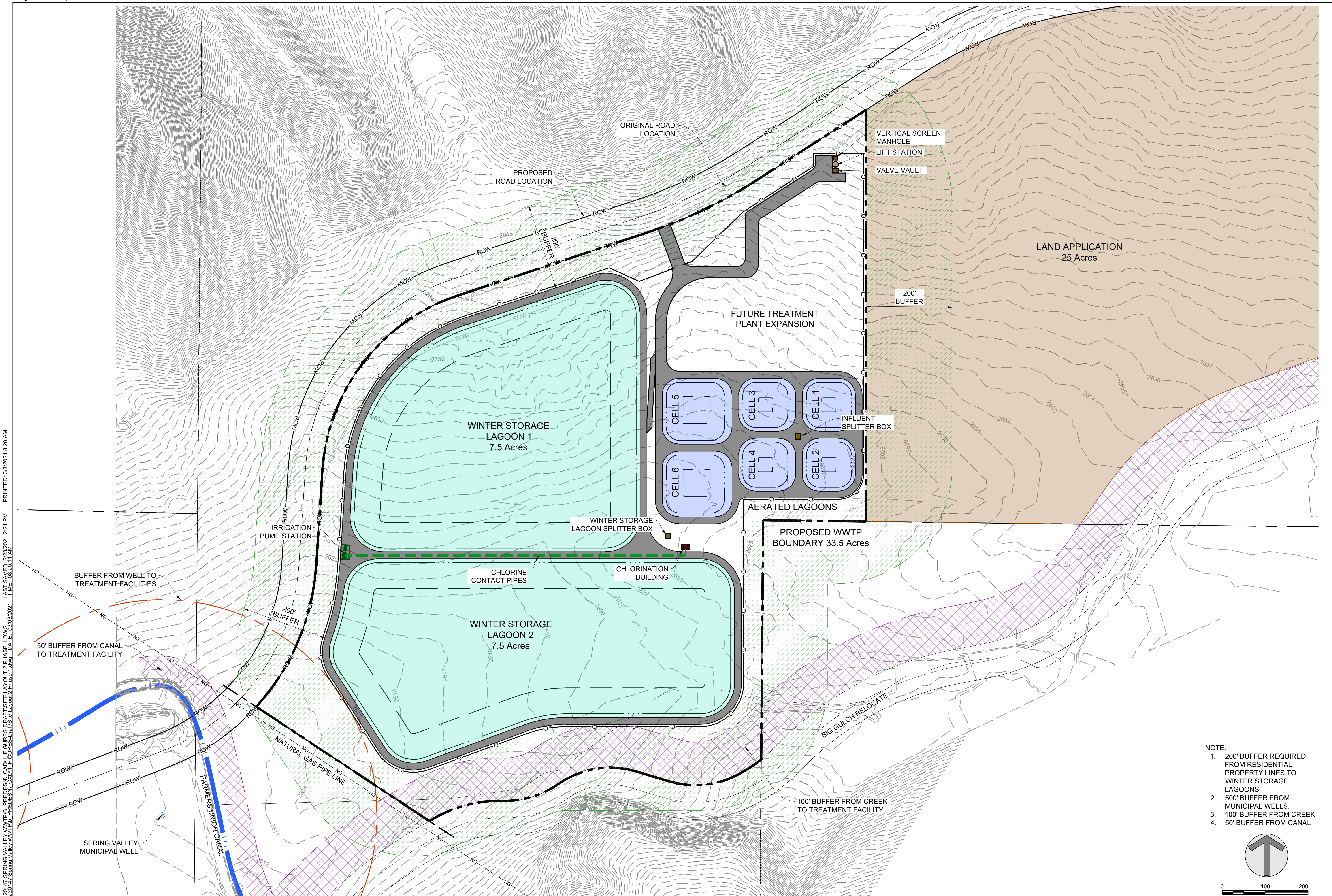
The irrigation lift station will convey all of the treated wastewater flow from the storage facilities to the irrigation sites and serve as the sampling location for compliance with the reuse permit. The lift station will require a minimum of two vertical turbine pumps (1 duty, 1 standby). The series of pumps in the lift station must be capable of pumping to the nearby land application site as well as any additional storage facilities or application sites located throughout the development. The lift station will be expandable for later phases. Initial facilities are expected to include a wet well with a small building located on top of the slab, a sampler, and two pumps with valves and flow meters on the discharge side to record irrigation flows. The size and capacity of the lift station will be investigated in more detail during preliminary design.

510.8 WWTP Site Location

Figure 5-11 shows the layout for Phase 1 (up to 2,200 ERU's) of the complete-mix aerobic lagoons. Buffers were considered when siting the WWTP, which include 200-ft from residential property lines [24], 500-ft from public wells [23], 300-ft from private wells [22], and 50-ft from ditches and canals [24].

Figure 5-12 shows a layout for the future, Phase 2 mechanical plant.

The Big Gulch drainage runs parallel to the proposed WWTP site. FEMA records indicate that Base Flood Elevations are unknown [27]. The developer intends to submit a CLOMR to provide a realigned drainage to contain the floodplain boundary within the new top of the bank to ensure that the flood plain does not negatively impact the WWTP.



KELLER ASSOCIATES

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SPRING VALLEY WASTEWATER TREATMENT PLANT

SITE LAYOUT PHASE 1

PROJECT NO. 220147

FIGURE NO. 5-11

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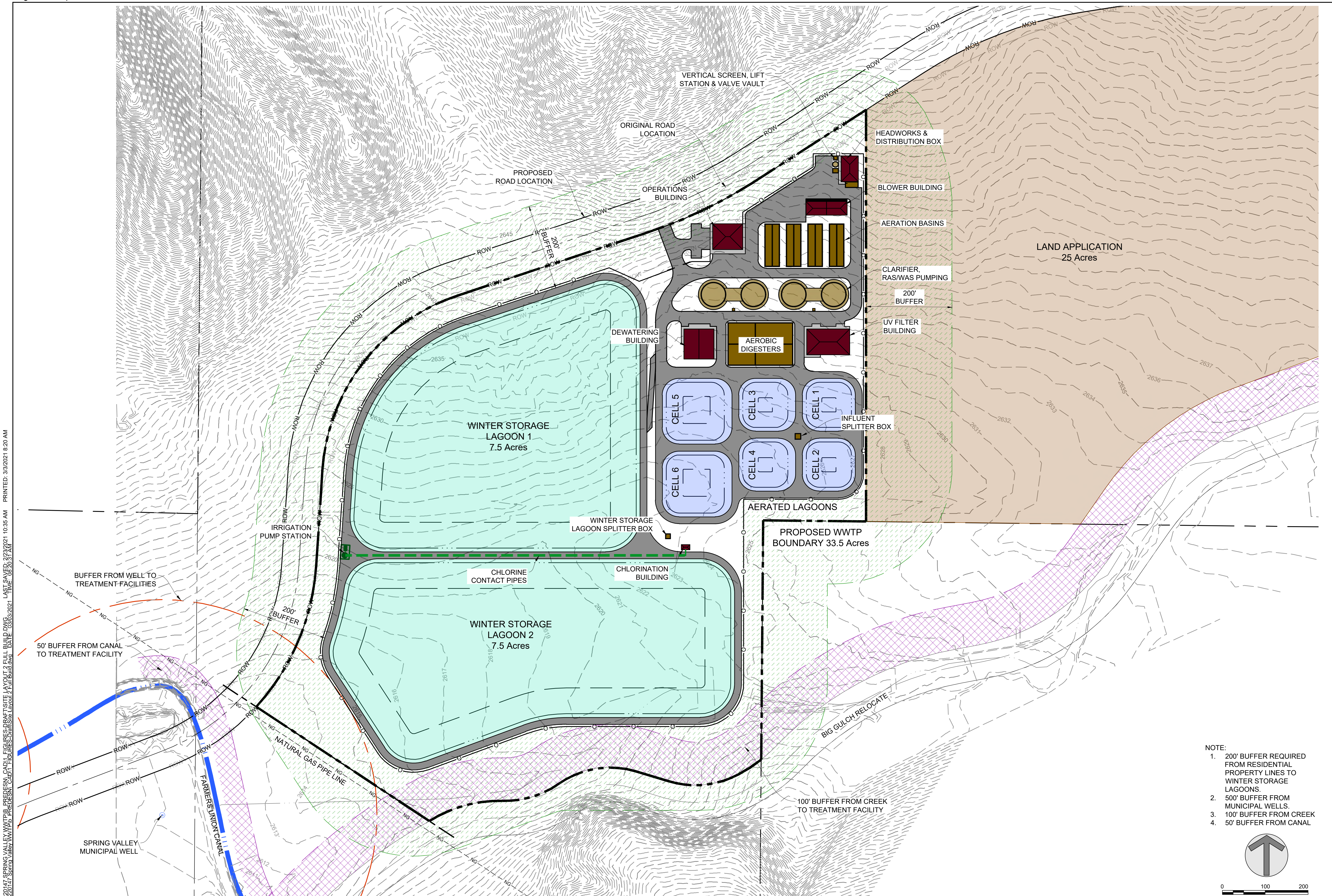

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ALLIANCE CONSULTING & GWC CAPTICAL

SPRING VALLEY WASTEWATER TREATMENT PLANT

SITE LAYOUT PHASE 2

PROJECT NO. 220147

FIGURE NO. 5-12

5.10.9 Present Worth Opinion of Costs

The construction, O&M and life cycle costs were evaluated for the lagoon treatment option. Refer to the following tables. Life-cycle costs are based on a 12-year life cycle which is the estimated timeframe for Phase 1 development. Costs include screening facilities, influent lift station, complete-mix aerated treatment lagoons, settling lagoons, winter storage lagoons, disinfection facilities, and an irrigation pump station; see Appendix G for a more detailed opinion of cost for operation and maintenance.

Table 5-18: Present Worth Opinion of Capital Costs

Item		Subtotal
Influent Screen Facility		$227,000
Influent Lift Station		$450,000
Aerated Lagoons *		$886,000
Site Work		$253,000
Winter Storage Lagoons *		$3,261,000
Reuse Facilities		$374,000
Effluent Lift Station to Application Site		$450,000
Electrical & Controls		$149,000
Subtotal		**$6,050,000**
General Conditions	*10%*	$605,000
Subtotal		**$6,655,000**
Contingency	*30%*	$1,997,000
Subtotal		**$8,652,000**
Contractor OH&P	*15%*	$1,298,000
Total Construction Cost		**$9,950,000**
Engineering and Administrative Cost	20%	$1,990,000
Total Project Cost		**$11,940,000**

** Assume excavated material is hauled 4 miles or less*

Table 5-19: Phase 1 Annual O&M Cost (2021 Dollars)

Item	Itemized Cost *
Labor	$168,900
Equipment Maintenance	$12,600
Sludge & Screening Disposal by Landfilling	$23,000
Electricity	$149,000
Disinfection	$37,000
Annual O&M Costs	**$391,000**

** Based on 2021 dollars, averaged over 12-years, with interest rate of 5.5% and inflation rate of 4%*

Table 5-20: Spring Valley WWTP Phase 1 Life Cycle Costs

Phase	Year	Present Worth of Capital Costs *	Present Worth of O&M Costs *
1	2021	$11,940,000	$3,649,000

** Based on interest rate of 5.5% and an inflation rate of 4%*

SECTION 6 – WASTEWATER REUSE FACILITIES

Replace Section 6.1, Introduction with the following:

The initial plan for effluent disposal in the 2013 FPS was to use 100 percent of the treated effluent for land application. Several disposal options were investigated to determine if there were other viable solutions. It was concluded that land application with winter storage was the best option for the first phase of development and is in line with the Owner's plans for the development. Other viable disposal options identified include discharge to drainage facilities, discharge to irrigation facilities, and rapid infiltration. Each of these potential disposal alternatives would require additional investigation and coordination with stakeholders and IDEQ (see Appendix K).

During the first few years of development, it is expected that the aerobic lagoons and winter storage lagoons will function as an evaporative pond system without discharge. When discharging becomes necessary to maintain adequate winter storage capacity, lagoon effluent will be disinfected to produce Class C effluent and will primarily be land applied to crops. Class C effluent may also be used to irrigate pasture for animals, roadside vegetation, dust suppression at construction sites, soil compaction, and cleaning outdoor work areas [25]. Once a mechanical plant is constructed to produce Class A or B effluent, reuse water will be applied to golf courses, parks, and landscaping throughout the development.

Reuse facilities will be installed during the initial stages of construction of the lagoon facilities, namely storage ponds, distribution piping, and irrigation pump station(s). The intent is to operate with complete containment as long as possible (See Appendix H for calculations). Reuse operators will monitor the storage facilities on a regular basis. A Reuse Permit application will be submitted to IDEQ during the early stages of development in order to finalize a permit well before the lagoons approach their full capacity. Recycled water to be used for irrigation will meet the Idaho Code for reuse [25]. The *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater* manual published by IDEQ provides guidelines for buffer zones [26]. Storage lagoons can be considered part of the WWTP. Storage ponds are subject to a 500-ft buffer from public wells [23] and a 200-ft buffer from residential property lines [24]. Table 6-1 outlines the buffer, fencing, and signage requirements for sprinkler-applied Class B thru E in rural areas (there are no buffer requirements for Class A).

Table 6-1 – Reuse Water Buffer Zones, Sprinkler Applied, Rural Areas

	Buffer Distance, Fence and Sign Requirements [A]			
	Class B	Class C	Class D	Class E
Public Well	1,000-ft			
Private Well	500-ft			
Irrigation Well	100-ft			
Permanent or Intermittent Surface Waters, other than ditches / canals	100-ft			
Temp Surface Waters and Ditches and Canals	50-ft			
Public Access Area	0-ft	0-ft	300-ft	1,000-ft
Inhabited Dwelling	100-ft	300-ft	500-ft	1,000-ft
Fence Type	None	Three-Wire Pasture	Three-Wire Pasture	Woven Pasture
Signage	"Irrigated with Reclaimed Wastewater – Do Not Drink"			"Sewage Effluent Application - Keep Out"

A – Adapted from "Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater"

The developer will be responsible for the design and operation of the irrigation systems based on the final master planning concept. The approved facility plan and this amendment provide guidance regarding the application of recycled water in accordance with applicable state regulations. This section includes a discussion on effluent generation rates, irrigation requirements, storage requirements for effluent during the non-growing season, and the estimated nutrient content of the reuse water.

Replace Section 6.2, Effluent Generation with the following:

For planning purposes, the WWTP influent design flows shown in Table 3-1 were used to predict the volume of effluent available for irrigation for both phases of development (2200 ERUs and 7153 ERUs) and other intermediate stages listed in the previously approved PER. For Phase 1, it was assumed effluent would be land applied to alfalfa with an April – October growing season. For Phase 2, it was assumed that reuse water would be used to irrigate turf grass which has an 8-month growing season. Average monthly precipitation and evaporation rates were used to adjust the effluent flow available for irrigation from the storage ponds. Refer to the calculations included in Appendix H. Depending on the nitrogen concentration in the final effluent, crops and landscaping may need supplemental irrigation so that nitrogen application does not exceed 150% of agronomic rates [26]. It is recommended that a supplemental water supply be provided at the irrigation lift station to utilize the same pumping facilities for irrigation. Depending on the source of supplemental water, an air gap may be required to prevent cross-contamination with the reuse water.

Replace Section 6.3, Irrigation Demands, with the following:

Irrigation demands were estimated using actual evapotranspiration for alfalfa, turf grass, and open water – shallow systems (ponds/streams), and gross precipitation data from the University of Idaho Kimberly Research and Extension website [32]. The treatment plant layout (Figure 5-11) currently shows a proposed irrigation area totaling 25 acres. Additional land application sites will be identified and provided in the application for a reuse permit as necessary for Phase 1.

In addition to irrigation demands, the chemical oxygen demand (COD) loading and total allowable nitrogen loading were calculated for the proposed crop and turf grass. These calculations are included in Appendix H. More discussion is provided in Section 6.6 Reclaimed Water Quality. Nitrogen could impact the number of acres required for land application if lagoon effluent exceeds 29 mg/L Total Nitrogen (TN). Therefore, any supplemental irrigation water would need to be provided from another source (i.e., irrigation water from the Farmers Union Canal or ground water wells). Table 6-2 shows a range for the land application area estimated for Phase 1 and Phase 2. The lower number is based on satisfying the irrigation demand only. The higher number in the range assumes that total nitrogen will determine the number of acres required so that effluent is applied at 150% of agronomic rates.

Table 6-2 – Land Application Area

ERU's	Land Application - Alfalfa (Acres)	Land Application – Turf Grass (Acres)
100	0 [A]	
500	22 - 36[B]	
1,000	51 – 72[B]	
1,500	80 – 107[B]	
2,200	121 - 157[B]	
4,400		230[C]
7,153		386[C]

A – Ponds are Complete Retention
B – Nitrogen loading may increase land application area during Phase 1. Supplemental irrigation may be required. Acreage shown assumes TN levels from 29 mg/L to 40 mg/L.
C – Assumes mechanical plant will produce an effluent with a TN = 10 mg/L.

Table 6-3 shows the irrigation water requirements for the land application area listed above. It was assumed that recycled water would be land applied with pivot irrigation or sprinkler irrigation; an irrigation efficiency of 80% was used in the calculations. For each number of ERU's, the irrigation area, irrigation water requirement, the volume of reclaimed water, and possible additional irrigation water required is provided in the following table.

Table 6-3 – Irrigation Water Requirements

ERU's	Irrigation Area (Acres)	Irrigation Water Requirement (Acre-ft/year)	Reclaimed Water (Acre-ft/year)	Additional Irrigation Water Required (Acre-ft/year)
100	0 [A]	NA	NA	NA
500	36[B]	138	83	55
1,000	72[B]	277	195	82
1,500	107[B]	411	307	104
2,200	157[B]	603	464	139
4,400	229	899	901	0
7,153	386	1,515	1,517	0

A – Ponds are Complete Retention
B – Nitrogen loading may increase land application area during Phase 1. Supplemental irrigation may be required. Acreage shown assumes TN levels = 40 mg/L.
C – Assumes mechanical plant will produce an effluent with a TN = 10 mg/L.

As shown in Table 6-3, supplemental irrigation water may be required if the total nitrogen concentration in the lagoon effluent exceeds 29 mg/L during Phase 1. The Phase 2 mechanical plant will be designed to be consistently under that value, and it is expected that reuse water can be applied to meet the irrigation demand instead of being limited by nitrogen loadings.

Replace Section 6.4, Storage Requirements, with the following:

Effluent from the settling ponds will flow to the winter storage lagoons. For Phase 1 (2,200 ERUs), the storage capacity is based on a water balance that assumes all effluent generated each year will be land applied during a seven-month growing period. For Phase 1, the highest storage volume required is approximately 70 million gallons and occurs in March before the irrigation season begins. Table 6-4 shows the expected storage required at various benchmarks throughout the development's build-out (refer to Appendix H for calculations). For Phase 2, the WWTP will be upgraded to treat a higher level of effluent quality, namely Class A or Class B standards. Once a mechanical WWTP is constructed, the effluent would be used to irrigate golf courses, parks, and other public areas.

Table 6-4 – Spring Valley Winter Storage Requirements

ERU's	Winter Storage (MG)	(acre-ft)
100	0[A]	0
500	15.8[B]	49
1,000	31.2	96
1,500	46.7	143
2,200	68.2	209
4,400	138	425
7,153	225[C]	689

A – All effluent is expected to evaporate in lagoon system.
B - Ponds should be able to still fully contain effluent. Winter storage is volume required if all water is being applied each growing season.
C – Volume shown is based on turf grass irrigation.

The intent is for the storage ponds to be located adjacent to the treatment lagoons. There will be a minimum of two storage ponds for redundancy and ease of operations and maintenance. At some future time, additional storage ponds may be constructed at higher elevations closer to the point of use.

Storage ponds will be lined with a synthetic liner; type to be determined during preliminary design. The ponds will be constructed with a 3:1 side slope, three feet of freeboard, and approximate depth of twenty feet.

The capital cost for constructing reuse facilities is shown in Section 5, Table 5-18. The reuse facilities include winter storage ponds, an irrigation pumping station, chlorine disinfection facilities, and land application equipment.

In Section 6.6, Reclaimed Water Quality, first paragraph last sentence, replace with the following:

A licensed operator will be required to supervise irrigation with Class C effluent during the initial phase of development and Class A or B effluent during the second phase. Land application of treated WW will not likely begin for three to five years, depending on the rate of development. Eagle Sewer District will only operate the wastewater treatment facilities as per the terms of the agreement with M3 Companies in 2013. Therefore, it is anticipated that the developer will contract with another entity to manage the reuse program.

In Section 6.6, Reclaimed Water Quality, second paragraph first sentence, replace "Phases 3, 4, and 5" with "Phase 2".

In Section 6.6, Reclaimed Water Quality, second paragraph fourth sentence, replace "(Phases 1 and 2" with "(Phase 2)".

Replace Section 6.6, Reclaimed Water Quality, fifth paragraph, first sentence, with the following:

> Total nitrogen in Phase 1 effluent will likely be the same as the influent; the aerobic lagoons are not designed to remove nitrogen. Nitrogen will likely be in the TKN form (not readily plant-available) or ammonia (which quickly converts to ammonium nitrogen (readily plant-available)).

In Section 6.6, Reclaimed Water Quality, fifth paragraph second sentence, replace "Phases 1-5 with "Phase 2".

In Section 6.6, Reclaimed Water Quality, sixth paragraph second sentence, remove "(Phase 1A)" and "(Phases 1 and 2)" from the sentence and change "Class E" to "Class C."

In Section 6.6, Reclaimed Water Quality, delete the eighth paragraph and Table 6-6. Replace with the following:

> Effluent will be blended with potable water and/or ditch water after the disinfection facilities to irrigate crops during Phase 1. Phase 2 effluent will be used to irrigate turf grass and landscaping during Phase 2. Nitrogen application rates for alfalfa (Phase 1) and turf grass (Phase 2) are estimated to be 340 lbs./acre/year and 196 lbs./acre/year, respectively. See calculations in Appendix H. During Phase 1, total nitrogen levels will need to be closely monitored to ensure there is adequate acreage to limit nitrogen loads to 150% of agronomic rates. During Phase 2, it is expected that supplemental fertilizer will be required in addition to the nutrients in the reuse water.

In Section 6.7.5, Fertilizer Application, second to last sentence, remove "for Class E (Phase 1A) and Class B (Phases 1 and 2) recycled water" from the sentence.

In Section 6.7.5, Fertilizer Application, last sentence, remove "(beginning with Phase 3)" from the sentence.

SECTION 7 – TECHNICAL, FINANCIAL AND MANAGERIAL RESPONSIBILITIES

In Section 7, Technical, Financial, and Managerial Responsibilities, replace all mentions of "M3 Companies" with "the Owner."

In Section 7.1, Project Financing and Managerial Responsibilities, remove the second paragraph and replace with the following:

> An agreement has been reached with the Owner and ESD to operate the WW treatment facilities (see Appendix J). Initial connection fees and monthly user fees will be developed using construction costs, and operation and maintenance costs provided by equipment manufacturers with input from ESD regarding staffing needs. ESD will be responsible for billing and collection of connection and user fees.

In Section 7.2, Wastewater Operator Classification, remove the second paragraph and replace with the following:

> Initially, the wastewater reuse program will require a wastewater operator licensed to operate a land application system to apply Class C effluent and later Class B or A effluent. The reuse program will be addressed in greater detail as persons are identified to operate the system.
>
> For the Phase 1 wastewater treatment facilities, the minimum class of operator is unrestricted Class I. See Appendix M for the classification worksheet.

After Section 6.10, References, add the following.

REFERENCES

[17] CH2M Hill Engineers (2016). *Wastewater Collection and Treatment Facilities Plan,* Public Records Request, IDEQ (2018)

[18] EPA (1983). *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers*, Print

[19] EPA (1984). *Process Design Manual Land Treatment of Municipal Wastewater Supplement on Rapid Infiltration and Overland Flow*, Print

[20] EPA (2011). *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers*, Web, www.epa.gov/nrmrl.

[21] Health Research Inc., Health Education Services Division (2014). *Recommended Standards for Wastewater Facilities*, Web, https://eec.ky.gov/Environmental-Protection/Water/PermitCert/Documents/10%20State%20Standards%20-%20WW%20-%202014.pdf

[22] Idaho Department of Environmental Quality (2012). *IDAPA 37.03.09 Well Construction Standard Rules.* Idaho Administrative Code

[23] Idaho Department of Environmental Quality (2012). *IDAPA 58.01.08 Public Drinking Water.* Idaho Administrative Code

[24] Idaho Department of Environmental Quality (2012). *IDAPA 58.01.16 Wastewater Rules.* Idaho Administrative Code

[25] Idaho Department of Environmental Quality (2012). *IDAPA 58.01.17 Recycled Water Rules.* Idaho Administrative Code

[26] Idaho Department of Environmental Quality (2007). *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater.*

[27] JUB Engineers (2013). *Wastewater Facility Plan Spring Valley Development,* Public Records Request, IDEQ (2020)

[28] Keller Associates (2020, November 18). *Spring Valley Pre-Design Progress Meeting, Meeting #1*, J. Walker (Organizer). Eagle Sewer District Main Office, Eagle Idaho.

[29] Keller Associates (2021, January 04). *Email Correspondence with OMCS, Avimor WWTP operators,* C. Butterfield

[30] Keller Associates (2021, January 29). *Spring Valley Pre-Design Progress Meeting, Meeting #4*, J. Walker (Organizer). Eagle Sewer District Main Office, Eagle Idaho.

[31] Metcalf & Eddy, Inc. (2003). *Wastewater Engineering Treatment and Reuse, 4th Ed.* Revised by Tchobanoglous, George, Franklin L. Burton, and H. David Stensel. New York, NY: McGraw-Hill.

[32] University of Idaho Kimberly Research and Extension Center (2018). *Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho,* Web (2021), http://data.kimberly.uidaho.edu/ETIdaho/

Insert the following at the end of Appendix G:

APPENDIX G

Opinion of Cost for Operation and Maintenance

KELLER ASSOCIATES

Date 3/2/2021
By: CB
Subject: Spring Valley O&M Costs

inf rate = 0.04 0.055

Power Costs														
		Irrigation Pumps		**Aerator/Mixers**		**Screens**		**Influent Lift Station**						
n	**Year**	**Power Demand (kW)**	**Run Time (Hrs/Yr)**	**Power Demand (kW)**	**Run Time (Hrs/Yr)**	**Power Demand (kW)**	**Run Time (Hrs/Yr)**	**Power Demand (kW)**	**Run Time (Hrs/Yr)**	**Annual KwH**	**Unit Price ($/KwH)**	**Power Cost (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	0	1080	119.2	8760	2.98	2190	20	2920	1109118	0.1	$110,912	$115,348	$109,335
2	2022	0	1080	119.2	8760	2.98	2190	20	2920	1109118	0.1	$110,912	$119,962	$107,780
3	2023	0	1080	119.2	8760	2.98	2190	20	2920	1109118	0.1	$110,912	$124,761	$106,248
4	2024	0	1080	119.2	8760	2.98	2190	40	2920	1167518	0.1	$116,752	$136,583	$110,252
5	2025	111.7	1080	119.2	8760	2.98	2190	40	2920	1288154	0.1	$128,815	$156,724	$119,915
6	2026	111.7	1080	119.2	8760	2.98	2190	40	2920	1288154	0.1	$128,815	$162,993	$118,210
7	2027	111.7	1080	119.2	8760	2.98	2190	60	2920	1346554	0.1	$134,655	$177,197	$121,812
8	2028	111.7	1080	119.2	8760	2.98	2190	60	2920	1346554	0.1	$134,655	$184,285	$120,080
9	2029	111.7	1080	119.2	8760	2.98	2190	60	2920	1346554	0.1	$134,655	$191,657	$118,373
10	2030	111.7	1080	119.2	8760	2.98	2190	80	2920	1404954	0.1	$140,495	$207,968	$121,751
11	2031	111.7	1080	119.2	8760	2.98	2190	80	2920	1404954	0.1	$140,495	$216,286	$120,020
12	2032	111.7	1080	119.2	8760	2.98	2190	80	2920	1404954	0.1	$140,495	$224,938	$118,313
											0	$1,532,571	$2,018,701	$1,392,088

Assumes 3, 75 HP Pumps (2 duty, one standby), operates during irrigation season only, no operation for the first 4-years

Assume 8 aerators constant operation

Assume screens operates 25% of the time, year round

					inf rate =	0.04	0.055
Personnel Costs							
n	**Year**	**Labor Rate**	**Hrs Per Year**	**# of Operators**	**Labor Cost (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	40	2080	1.5	$124,800	$129,792	$123,026
2	2022	40	2080	1.5	$124,800	$134,984	$121,276
3	2023	40	2080	1.5	$124,800	$140,383	$119,552
4	2024	40	2080	1.5	$124,800	$145,998	$117,852
5	2025	40	2080	1.5	$124,800	$151,838	$116,177
6	2026	40	2080	1.5	$124,800	$157,912	$114,525
7	2027	40	2080	2	$166,400	$218,971	$150,529
8	2028	40	2080	2	$166,400	$227,730	$148,389
9	2029	40	2080	2	$166,400	$236,839	$146,279
10	2030	40	2080	2	$166,400	$246,313	$144,199
11	2031	40	2080	2	$166,400	$256,165	$142,149
12	2032	40	2080	2	$166,400	$266,412	$140,128
				Total for 12-Years	$1,747,200	$2,313,337	$1,584,079

		inf rate =	0.04	0.055
Screens Disposal				
n	**Year**	**Current Year (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	360	$374	$355
2	2022	360	$389	$350
3	2023	360	$405	$345
4	2024	360	$421	$340
5	2025	360	$438	$335
6	2026	360	$456	$330
7	2027	360	$474	$326
8	2028	360	$493	$321
9	2029	360	$512	$316
10	2030	360	$533	$312
11	2031	360	$554	$308
12	2032	360	$576	$303
	Total for 12-Years	$4,320	$5,626	$3,941

Assuming 0.5 CY screening will need to be sent to the landfill each week. Assume $30 per month

		inf rate =	0.04	0.055
Equipment Replacement Costs				
n	**Year**	**Current Year (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	0	$0	$0
2	2022	0	$0	$0
3	2023	0	$0	$0
4	2024	0	$0	$0
5	2025	0	$0	$0
6	2026	0	$0	$0
7	2027	0	$0	$0
8	2028	0	$0	$0
9	2029	0	$0	$0
10	2030 (3)	$136,000	$201,313	$117,855
11	2031	0	$0	$0
12	2032	0	$0	$0
	Total for 12-Years	$136,000	$201,313	$117,855

(1) Screen Unit Cost, 20-yr life *$112,500* *Qty = 2*
(2) Influent pumps Unit Cost, 20-yr life *$50,000* *Qty = 3*
(2) Effluent pumps Unit Cost, 20-yr life *$50,000* *Qty = 3*
(3) Aerators Unit Cost, 10-yr life *$17,000* *Qty = 8*
Assumes all equipment is installed in year one

			inf rate =		0.04	0.055
Disinfection Checmicals, NaOCL @ 12.5%						
n	**Year**	**gal/year**	**$ / Gal**	**Current Year (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	292	5	$1,459	$1,517	$1,438
2	2022	1167	5	$5,836	$6,312	$5,671
3	2023	2334	5	$11,672	$13,130	$11,182
4	2024	3502	5	$17,509	$20,483	$16,534
5	2025	4669	5	$23,345	$28,403	$21,732
6	2026	5836	5	$29,181	$36,923	$26,779
7	2027	7003	5	$35,017	$46,080	$31,677
8	2028	8171	5	$40,854	$55,911	$36,431
9	2029	9338	5	$46,690	$66,454	$41,044
10	2030	10505	5	$52,526	$77,751	$45,518
11	2031	11672	5	$58,362	$89,846	$49,856
12	2032	12840	5	$64,198	$102,784	$54,062
			Total for 12-Years	$386,650	$545,595	$341,925

Assumes Chlorine Dosing stops at year 12 when 2200 ERUs are connected

Does not account for UV dosing after year 12

				inf rate =	0.04	0.055
Sludge Disposal						
n	**Year**	**Volume (Gallon)**	**$ / Gallon**	**Current Year (2021)**	**FV 4% Infl**	**PV 5.5% Int**
1	2021	0	1	$0	$0	$0
2	2022	0	1	$0	$0	$0
3	2023	0	1	$0	$0	$0
4	2024	0	1	$0	$0	$0
5	2025	0	1	$0	$0	$0
6	2026	117406	1	$117,406	$148,556	$107,740
7	2027	0	1	$0	$0	$0
8	2028	0	1	$0	$0	$0
9	2029	0	1	$0	$0	$0
10	2030	0	1	$0	$0	$0
11	2031	0	1	$0	$0	$0
12	2032	117406	1	$117,406	$187,971	$98,869
			Total for 12-Years	$234,812	$336,527	$206,609

Sludge removal will depend on the rate of development

Total O&M Cost By Year, 2021 Costs								
n	Year	Power	Personnel	Screens Disp	Equipment	Disinfection	Sludge Disp	Totals
1	2021	$109,335	$123,026	$355	$0	$1,438	$0	$234,154
2	2022	$107,780	$121,276	$350	$0	$5,671	$0	$235,078
3	2023	$106,248	$119,552	$345	$0	$11,182	$0	$237,327
4	2024	$110,252	$117,852	$340	$0	$16,534	$0	$244,978
5	2025	$119,915	$116,177	$335	$0	$21,732	$0	$258,158
6	2026	$118,210	$114,525	$330	$0	$26,779	$107,740	$367,583
7	2027	$121,812	$150,529	$326	$0	$31,677	$0	$304,344
8	2028	$120,080	$148,389	$321	$0	$36,431	$0	$305,221
9	2029	$118,373	$146,279	$316	$0	$41,044	$0	$306,012
10	2030	$121,751	$144,199	$312	$117,855	$45,518	$0	$429,634
11	2031	$120,020	$142,149	$308	$0	$49,856	$0	$312,332
12	2032	$118,313	$140,128	$303	$0	$54,062	$98,869	$411,676
	Totals	$1,392,088	$1,584,079	$3,941	$117,855	$341,925	$206,609	$3,646,497

Summary of all O&M cost year by year

Replace Appendix H with the following:

APPENDIX H

Wastewater Reuse Calculations

Influent Flow
Organic Loading
Complete Mix Aeration
Complete Retention
Reuse up to 100 ERUs
Reuse up to 500 ERUs
Reuse up to 1,000 ERUs
Reuse up to 1,500 ERUs
Reuse up to 2,200 ERUs
Reuse up to 4,400 ERUs
Reuse up to 7,150 ERUs
Winter Storage Summary
Settling Pond, Sludge Build-up
Chlorine Dosage
COD Loading
Nitrogen Nutrient Loading

KELLER ASSOCIATES

Calcs By:	CB
Reviewed by:	HJ
Date:	3/2/2021
Project:	Spring Valley
Project Number:	220147

Influent Characteristics	
Flow/Household (GPD)	200

Design Wastewater Flows				
ERU's	Annual Average (gpd)	Max Month Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpm)
100	20,000	26,000	40,000	58
500	100,000	130,000	200,000	264
1,000	200,000	260,000	400,000	498
1,500	300,000	390,000	600,000	717
2,200	440,000	572,000	880,000	1,006
4,400	880,000	1,144,000	1,760,000	1,838
7,153	1,430,600	1,859,800	2,861,200	2,779

**uses 200 gpd/ERU*

Peak Hour Flows
Use 10-State Stds Formula for ratio of peak hour flow to design average flow (Figure 1)
Assume: 2 people per ERU
Qpk/Qavg = (18 + P^.5)/(4 + P^.5), where P = population (thousands)

Design Wastewater Flows				
ERU's	Estimated Population	Peaking Factor	Annual Avg. Flow (gpd)	Peak Hour Flow MGD
100	200	4.1	20,000	0.08
500	1,000	3.8	100,000	0.38
1,000	2,000	3.6	200,000	0.72
1,500	3,000	3.4	300,000	1.03
2,200	4,400	3.3	440,000	1.45
4,400	8,800	3.0	880,000	2.65
7,153	14,306	2.8	1,430,600	4.00

Calcs By: CB
Reviewed by: HJ
Date: 3/1/2021
Project: Spring Valley
Project Number: 220147

based off 200 gpd/ERU

Table 3.X, Spring Valley Design Daily Average Organic Loading - All Phases					
ERU's	Avg Day Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.02	42	42	7	1
500	0.10	209	209	33	6
1000	0.20	417	417	67	12
1500	0.30	626	626	100	18
2200	0.44	918	918	147	26
4400	0.88	1836	1836	294	51
7153	1.43	2984	2984	478	84

Table 3.X, Spring Valley Design Max Monthly Organic Loading - All Phases					
ERU's	Max Month Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.03	54	54	9	2
500	0.13	271	271	43	8
1000	0.26	542	542	87	15
1500	0.39	813	813	130	23
2200	0.57	1193	1193	191	33
4400	1.14	2385	2385	382	67
7153	1.86	3878	3878	620	109

Table 3.X, Spring Valley Design Max Day Organic Loading - All Phases					
ERU's	Max Day Flow (MGD)	BOD lb/day	TSS lb/day	TKN lb/day	P lb/day
100	0.04	96	96	15	2
500	0.20	480	480	77	9
1000	0.40	959	959	153	19
1500	0.60	1439	1439	230	28
2200	0.88	2110	2110	338	41
4400	1.76	4220	4220	675	82
7153	2.86	6860	6860	1098	134

Table 3.X, Organic & Nutrient Peaking Factors			
	Avg Day	Max Month	Max Day
BOD	1.00	1.30	2.30
TSS	1.00	1.30	2.30
TKN	1.00	1.30	2.30
P	1.00	1.30	1.60

Based on Table 3-11 in Approved PER

Spring Valley Irrigation - Phase 1
By: HCJ
Date: 1/11/2021

Design: Complete Mix Flow Through Aerated Lagoons
Design Method: EPA Municipal Stabilization Ponds, EPA 1983, pg. 186

Assumptions:

Design 3 or 4 pond system — Depth ranges from 2 - 5 meters (6.6 ft to 16.5 ft)
Include polishing pond at the end with 2 days retention time

Flow, Q =	0.572 MGD	2165 m^3/d	Use Max. Month Flow	
Influent BOD, Co =	250 mg/L			
Effluent BOD, Cn =	30 mg/L			
kc_T =	$k_{c20}(1.085)$			
kc_T =	reaction rate at design temperature, $days^{-1}$			
kc20 =	reaction rate at 20 degrees C = 2.5 $days^{-1}$			
Tw =	pond water temperature, degrees C			
Ta1 =	ambient air temperature in winter =	-18 degrees C	0 degrees F	(very conservative for Treasure Valley)
Ta2 =	ambient air temperature in summer =	41 degrees C	105 degrees F	
Ti=	influent wastewater temperature =	15 degrees C	59 degrees F	
f =	proportionality factor =	0.5 (SI units)		
Elevation =		2620		

Solve for detention time, t (days) = n/kc*((Co/Cn)^1/n -1)

t = total detention time in pond system, days
n=number of ponds
kc = complete mix first order reaction rate constant, 2.5 d-1 at 20 degrees C
Co = influent BOD Concentraction, mg/L
Cn = effluent BOD Concentration in cell n, mg/L

No. of Ponds	Detention time, t (days)	
2	1.51	
3	1.23	
4	1.12	Use 4 cells in design
5	1.06	

Determine pond surface area

Assume:	8	degrees C	Tw (pond water temperature) — Per Eric Roundy - Use 8 degrees C to be conservative; Eagle ponds have been 10 degrees C
k_{cT} =	0.94	d^{-1}	
n=	4.00	no. of cells	
t =	2.98	days	
Detention time per cell =	0.74	days	
Volume per cell =	425,714	gallons	
depth =	12	feet	
Pond Surface Area =	4743	sf	
	435.52	meters squared	

Assume Tw is the same temperature in all ponds.

Final Pond Size

Detention Time t:	2.98	days
Volume, Total:	1,702,854	gallons
	227,654	cf
Volume per cell:	425,714	gallons
	56,914	cf
Surface Area, Total:	18,971	sf
	0.44	acres
Surface Area, per cell:	4,743	sf
	0.109	acres
Number of Cells:	4	cells

Determine Pond Dimensions: V = (L*W)+(L-2sd)*(W-2sd)+4*(L-sd)*(W-sd))*d/6

V= Volume, cf
L= length, ft
W= width, ft
s = slope (i.e. 1:3 = 3)
d = depth, ft.

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
102	102	3	12	10404	30	30	66	66	57,456.00	429,771

Lagoon Surface Area, sf = 10404 sf
0.24 acres At Max. Water Depth

Include freeboard of 3 ft.

Estimate Aeration Requirements:

Formula: $N = Na/(alpha*(Csw-C_L/Cs)*(1.025)^{Tw-20})$, where

N=equivalent oxygen transfer to tapwater at standard conditions, kg/hr.
Na = oxygen required to treat the wastewater, kg/hr
α = oxygen transfer in wastewater/oxygen transfer in tapwater = 0.9
CL = min. DO conc. Maintained in the wastewater, assume 2.0 mg/L
Cs = oxygen saturation value of tapwater at 20 degrees C and one atmospheric pressure = 9.17 mg/L
Tw = wastewater temperature, ºC
Csw = β*(Css)*P = oxygen saturation value of the waste, mg/L
β = ww oxygen saturation value/tapwater oxygen saturation value = 0.9
Css = tapwater oxygen saturation value at temperature, Tw
P = ratio of barometric pressure at plant site to barometric pressure at sea level, assume 1.0 for the elevation at 100 m

Maximum O2 transfer is required in the summer.

Determine Tw in the summer:

Tw = (AfTa + QTi)/(Af+Q)

Tw = Lagoon water temperature degrees F
f = proportionality factor = 0.000012
A = surface area, sf
Ta = ambient air temp, degrees F
Ti = influent ww temp, degrees F
Q = flow, mgd

Tw = 62 degrees F
16 degrees C

Determine Css from charts: 1 atm = 760 mm Hg = 10.333 m = 33.9 ft of water

Css @ Tw =	10.29 mg/L	(from chart)
Cs @ 20 ºC, 1 atm. =	9.08 mg/L	(from chart)

BOD in the WW = Co * Q

Co =	250 mg/L = g/m^3
Q =	2165 m^3/d
BOD_5 =	22.6 kg/hr.

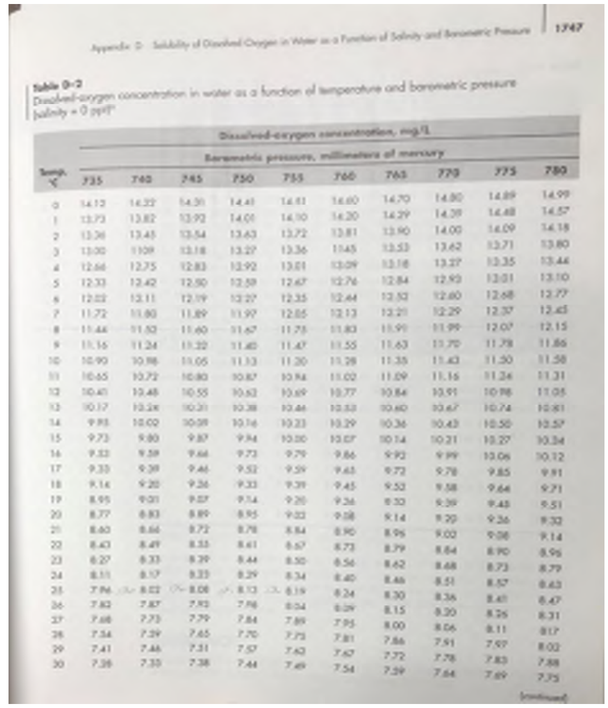
Assume O2 at peak flows will be 1.5 times the mean O2 demand calculated above, therefore:

Na =	33.8 kg O2/hr.
α =	0.85 (metcalf & eddy, 4th edition, pg. 847)
β =	1 (metcalf & eddy, 4th edition, pg. 847)
Plant Site Elev =	2620
Barometric Pressure @ plant site =	0.91 Determine from table on the right
P=	0.91
Csw =	9.36 mg/L

Calculate Aeration Requirements, N:

Na kg O2/hr	α	(Csw-C_L)/Cs	Tw ºC	Tw - 20 ºC	1.025(Tw-20)	N kg O2/hr
33.8	0.85	0.81	16	-4	0.92	53.6

Provide a final lagoon with 2 days of retention for solids settling prior to discharge to the reuse storage lagoons.



Appendix D Solubility of Dissolved Oxygen in Water as a Function of Salinity and Barometric Pressure 1747

Table D-2
Dissolved-oxygen concentration in water as a function of temperature and barometric pressure (salinity = 0 ppt)

Temp, °C	Dissolved-oxygen concentration, mg/L — Barometric pressure, millimeters of mercury: 735	740	745	750	755	760	765	770	775	780
0	14.13	14.22	14.31	14.41	14.51	14.60	14.70	14.80	14.89	14.99
1	13.73	13.82	13.92	14.01	14.10	14.20	14.29	14.39	14.48	14.57
2	13.36	13.45	13.54	13.63	13.72	13.81	13.90	14.00	14.09	14.18
3	13.00	13.09	13.18	13.27	13.36	13.45	13.53	13.62	13.71	13.80
4	12.66	12.75	12.83	12.92	13.01	13.09	13.18	13.27	13.35	13.44
5	12.33	12.42	12.50	12.59	12.67	12.76	12.84	12.93	13.01	13.10
6	12.02	12.11	12.19	12.27	12.35	12.44	12.52	12.60	12.68	12.77
7	11.72	11.80	11.89	11.97	12.05	12.13	12.21	12.29	12.37	12.45
8	11.44	11.52	11.60	11.67	11.75	11.83	11.91	11.99	12.07	12.15
9	11.16	11.24	11.32	11.40	11.47	11.55	11.63	11.70	11.78	11.86
10	10.90	10.98	11.05	11.13	11.20	11.28	11.35	11.43	11.50	11.58
11	10.65	10.72	10.80	10.87	10.94	11.02	11.09	11.16	11.24	11.31
12	10.41	10.48	10.55	10.62	10.69	10.77	10.84	10.91	10.98	11.05
13	10.17	10.24	10.31	10.38	10.46	10.53	10.60	10.67	10.74	10.81
14	9.95	10.02	10.09	10.16	10.23	10.29	10.36	10.43	10.50	10.57
15	9.73	9.80	9.87	9.94	10.00	10.07	10.14	10.21	10.27	10.34
16	9.52	9.59	9.66	9.73	9.79	9.86	9.92	9.99	10.06	10.12
17	9.33	9.39	9.46	9.52	9.59	9.65	9.72	9.78	9.85	9.91
18	9.14	9.20	9.26	9.33	9.39	9.45	9.52	9.58	9.64	9.71
19	8.95	9.01	9.07	9.14	9.20	9.26	9.32	9.39	9.45	9.51
20	8.77	8.83	8.89	8.95	9.02	9.08	9.14	9.20	9.26	9.32
21	8.60	8.66	8.72	8.78	8.84	8.90	8.96	9.02	9.08	9.14
22	8.43	8.49	8.55	8.61	8.67	8.73	8.79	8.84	8.90	8.96
23	8.27	8.33	8.39	8.44	8.50	8.56	8.62	8.68	8.73	8.79
24	8.11	8.17	8.23	8.29	8.34	8.40	8.46	8.51	8.57	8.63
25	7.96	8.02	8.08	8.13	8.19	8.24	8.30	8.36	8.41	8.47
26	7.82	7.87	7.93	7.98	8.04	8.09	8.15	8.20	8.26	8.31
27	7.68	7.73	7.79	7.84	7.89	7.95	8.00	8.06	8.11	8.17
28	7.54	7.59	7.65	7.70	7.75	7.81	7.86	7.91	7.97	8.02
29	7.41	7.46	7.51	7.57	7.62	7.67	7.72	7.78	7.83	7.88
30	7.28	7.33	7.38	7.44	7.49	7.54	7.59	7.64	7.69	7.75

(continued)

Estimate Mixing Energy to keep solids in suspension: Use Metcalf & Eddy, 4th edition pg. 846 - 848

X = Y(So-S)/(1+(kd)*SRT)

Y=	0.65 g/g	
So =	250.00 g/m3	
S =	30.00 g/m3	
kd =	0.07 g/g-d	
SRT =	3.00 days	(same as HRT)
X =	118.18 g/m3 = mg/L	Estimated Biomass
Estimated suspended solids in the lagoon =	368.18 mg/L	

Elevation above sea level, ft.	Barometric Pressure in Head of Water, ft.	Atmospheres
0	33.9	1
1000	32.8	0.97
1500	32.1	0.95
2000	31.5	0.93
4000	29.2	0.86
6000	27.2	0.80
8000	25.2	0.74
10000	23.4	0.69
15000	19.2	0.57

Estimated mixing requirements = P=0.004X + 5 for X≤ 2000 mg/L P = energy input, kw/1000 m3 = 6.5 kw/1000 m3

Volume of Cell = 56,914 cf
1612 meters cubed

Energy input per cell =	10.4 kw per cell
	14 hp per cell

Power Estimate for Solids Suspension (Page 111, EPA Design Manual Municipal WW Stabilization Ponds)

Minimum Power =	15 kw/1000 m3	
Volume per Cell =	1612 cubic meters	
Power Required =	24 kw/cell	
	32 hp/cell	EPA Manual more conservative
Assume 90% efficiency	36 hp/cell	

Size settling pond: Design 2 cell - each with 1 day detention time

Detention Time, t = 2 days (EPA Manual)

Volume = 1,144,000 gallons Each Cell Vol. = 572000 gallons

Determine Pond Dimensions: V = (L*W)+(L-2sd)*(W-2sd)+4*(L-sd)*(W-sd))*d/6

V= Volume, cf
L= length, ft
W= width, ft
s = slope (i.e. 1:3 = 3)
d = depth, ft.

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
126	135	3	6	17010	90	99	108	117	76,464.00	571,951

Lagoon Surface Area, sf = 17010 sf
0.39 acres At Max. Water Depth

Include freeboard of 3 ft.

System Design:

Lagoon depth = 12 ft. (operating depth)
Freeboard = 3 ft.
No. of Aerated Cells = 4
Dimensions: 102 ft x 102 ft. x 12 ft. depth each cell
Horizontal slope: 1:3

Final Settling Cell: 2 cells, each 127 ft x 135 ft x 8 ft deep water surface
Total Depth: 6 ft. operating + 2 ft. sludge +3 ft. freeboard

Estimated O2 demand = 54 kg O2/hr.
Estimated Mixing hp = 36 hp per cell
144 hp total

Spring Valley - Complete Retention Estimates

Facultative Lagoon System (3 cells, 14.1 acres each, 6 ft. operating depth, 2 ft. sludge storage)

Used for complete retention

1 ERU =	200 gpd		
Total Volume =	79,221,772 gallons		
Detention Time =	1 years	365	days
Annual Preciptation =	12,982,063 gallons/year		
Annual ET =	41,999,298 gallons/year		

Formula: Storage Volume = (Det. Time, t, days x WW Q, gpd) + Det time, years x (Annual precip., gal/yr - Annual ET, gal/yr)

Q x t = 108,239,007 gallons/year
Q = 296,545 gpd

#ERUs = 1483

Complete Mix System
Estimate Complete Retention of Flows
Assumption: Construct complete mix lagoon cells, settling pond, and 3 reuse ponds

Total Surface Area:	1.7 acres	**Total Storage Volume:**	1,719,084	Aeration Ponds
	13.9 acres		571,951	Settling Pond
Total	**15.6** acres		68,801,040	Reuse Pond
	679,536 sf	**Total**	**71,092,074**	**gallons**

Development Phasing:

Year	# ERUs Added	Total ERUs	Total Avg. Day Flow (mgd)	Total Influent (gal/yr)	Total Precipitation (gal/yr)	Total Evaporation (gal/yr)	Annual Storage (gallons)	Accumulative Storage (gallons)
1	50	50	0.01	3,650,000	4,776,419	15,452,572	(7,026,153)	0
2	150	200	0.04	14,600,000	4,776,419	15,452,572	3,923,847	3,923,847
3	200	400	0.08	29,200,000	4,776,419	15,452,572	18,523,847	22,447,695
4	200	600	0.12	43,800,000	4,776,419	15,452,572	33,123,847	55,571,542
5	10	610	0.122	44,530,000	4,776,419	15,452,572	33,853,847	89,425,389

Based on water balance, the lagoon will function as complete retention for about 4 years with 600 ERUs total in Year 4

Year 1 Water Balance

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Daily Precip mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg. ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo
Jan	31	0.01	310,000	1.02	31.6	1.24	70495	527,304	0.4	12.4	0.49	27,645	206,786
Feb	28	0.01	280,000	0.85	23.8	0.94	53061	396,895	0.96	26.9	1.06	59,928	448,258
March	31	0.01	310,000	1.14	35.3	1.39	78789	589,340	1.97	61.1	2.40	136,152	1,018,420
April	30	0.01	300,000	1	30.0	1.18	66883	500,288	3.07	92.1	3.63	205,332	1,535,885
May	31	0.01	310,000	1.14	35.3	1.39	78789	589,340	3.89	120.6	4.75	268,849	2,010,992
June	30	0.01	300,000	0.52	15.6	0.61	34779	260,150	4.63	138.9	5.47	309,670	2,316,335
July	31	0.01	310,000	0.2	6.2	0.24	13823	103,393	4.88	151.3	5.96	337,271	2,522,787
Aug	31	0.01	310,000	0.17	5.3	0.21	11749	87,884	4.12	127.7	5.03	284,745	2,129,894
Sept	30	0.01	300,000	0.47	14.1	0.56	31435	235,136	3.11	93.3	3.67	208,008	1,555,897
Oct	31	0.01	310,000	0.67	20.8	0.82	46306	346,366	2.08	64.5	2.54	143,755	1,075,286
Nov	30	0.01	300,000	1.06	31.8	1.25	70896	530,306	0.85	25.5	1.00	56,851	425,245
Dec	31	0.01	310,000	1.18	36.6	1.44	81553	610,018	0.4	12.4	0.49	27,645	206,786
		Total	3,650,000					4,776,419					15,452,572

Year 2 Water Balance

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Daily Precip mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg. ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo
Jan	31	0.04	1,240,000	1.02	31.6	1.24	70495	527,304	0.4	12.4	0.49	27,645	206,786
Feb	28	0.04	1,120,000	0.85	23.8	0.94	53061	396,895	0.96	26.9	1.06	59,928	448,258
March	31	0.04	1,240,000	1.14	35.3	1.39	78789	589,340	1.97	61.1	2.40	136,152	1,018,420
April	30	0.04	1,200,000	1	30.0	1.18	66883	500,288	3.07	92.1	3.63	205,332	1,535,885
May	31	0.04	1,240,000	1.14	35.3	1.39	78789	589,340	3.89	120.6	4.75	268,849	2,010,992
June	30	0.04	1,200,000	0.52	15.6	0.61	34779	260,150	4.63	138.9	5.47	309,670	2,316,335
July	31	0.04	1,240,000	0.2	6.2	0.24	13823	103,393	4.88	151.3	5.96	337,271	2,522,787
Aug	31	0.04	1,240,000	0.17	5.3	0.21	11749	87,884	4.12	127.7	5.03	284,745	2,129,894
Sept	30	0.04	1,200,000	0.47	14.1	0.56	31435	235,136	3.11	93.3	3.67	208,008	1,555,897
Oct	31	0.04	1,240,000	0.67	20.8	0.82	46306	346,366	2.08	64.5	2.54	143,755	1,075,286
Nov	30	0.04	1,200,000	1.06	31.8	1.25	70896	530,306	0.85	25.5	1.00	56,851	425,245
Dec	31	0.04	1,240,000	1.18	36.6	1.44	81553	610,018	0.4	12.4	0.49	27,645	206,786
		Total	14,600,000					4,776,419					15,452,572

Year 3 Water Balance

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Daily Precip mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg. ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo
Jan	31	0.08	2,480,000	1.02	31.6	1.24	70495	527,304	0.4	12.4	0.49	27,645	206,786
Feb	28	0.08	2,240,000	0.85	23.8	0.94	53061	396,895	0.96	26.9	1.06	59,928	448,258
March	31	0.08	2,480,000	1.14	35.3	1.39	78789	589,340	1.97	61.1	2.40	136,152	1,018,420
April	30	0.08	2,400,000	1	30.0	1.18	66883	500,288	3.07	92.1	3.63	205,332	1,535,885
May	31	0.08	2,480,000	1.14	35.3	1.39	78789	589,340	3.89	120.6	4.75	268,849	2,010,992
June	30	0.08	2,400,000	0.52	15.6	0.61	34779	260,150	4.63	138.9	5.47	309,670	2,316,335
July	31	0.08	2,480,000	0.2	6.2	0.24	13823	103,393	4.88	151.3	5.96	337,271	2,522,787
Aug	31	0.08	2,480,000	0.17	5.3	0.21	11749	87,884	4.12	127.7	5.03	284,745	2,129,894
Sept	30	0.08	2,400,000	0.47	14.1	0.56	31435	235,136	3.11	93.3	3.67	208,008	1,555,897
Oct	31	0.08	2,480,000	0.67	20.8	0.82	46306	346,366	2.08	64.5	2.54	143,755	1,075,286
Nov	30	0.08	2,400,000	1.06	31.8	1.25	70896	530,306	0.85	25.5	1.00	56,851	425,245
Dec	31	0.08	2,480,000	1.18	36.6	1.44	81553	610,018	0.4	12.4	0.49	27,645	206,786
		Total	29,200,000					4,776,419					15,452,572

Year 4 Water Balance

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Daily Precip mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg. ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo
Jan	31	0.12	3,720,000	1.02	31.6	1.24	70495	527,304	0.4	12.4	0.49	27,645	206,786
Feb	28	0.12	3,360,000	0.85	23.8	0.94	53061	396,895	0.96	26.9	1.06	59,928	448,258
March	31	0.12	3,720,000	1.14	35.3	1.39	78789	589,340	1.97	61.1	2.40	136,152	1,018,420
April	30	0.12	3,600,000	1	30.0	1.18	66883	500,288	3.07	92.1	3.63	205,332	1,535,885
May	31	0.12	3,720,000	1.14	35.3	1.39	78789	589,340	3.89	120.6	4.75	268,849	2,010,992
June	30	0.12	3,600,000	0.52	15.6	0.61	34779	260,150	4.63	138.9	5.47	309,670	2,316,335
July	31	0.12	3,720,000	0.2	6.2	0.24	13823	103,393	4.88	151.3	5.96	337,271	2,522,787
Aug	31	0.12	3,720,000	0.17	5.3	0.21	11749	87,884	4.12	127.7	5.03	284,745	2,129,894
Sept	30	0.12	3,600,000	0.47	14.1	0.56	31435	235,136	3.11	93.3	3.67	208,008	1,555,897
Oct	31	0.12	3,720,000	0.67	20.8	0.82	46306	346,366	2.08	64.5	2.54	143,755	1,075,286
Nov	30	0.12	3,600,000	1.06	31.8	1.25	70896	530,306	0.85	25.5	1.00	56,851	425,245
Dec	31	0.12	3,720,000	1.18	36.6	1.44	81553	610,018	0.4	12.4	0.49	27,645	206,786
		Total	43,800,000					4,776,419					15,452,572

Year 5 Water Balance

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Daily Precip mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg. ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo
Jan	31	0.122	3,782,000	1.02	31.6	1.24	70495	527,304	0.4	12.4	0.49	27,645	206,786
Feb	28	0.122	3,416,000	0.85	23.8	0.94	53061	396,895	0.96	26.9	1.06	59,928	448,258
March	31	0.122	3,782,000	1.14	35.3	1.39	78789	589,340	1.97	61.1	2.40	136,152	1,018,420
April	30	0.122	3,660,000	1	30.0	1.18	66883	500,288	3.07	92.1	3.63	205,332	1,535,885
May	31	0.122	3,782,000	1.14	35.3	1.39	78789	589,340	3.89	120.6	4.75	268,849	2,010,992
June	30	0.122	3,660,000	0.52	15.6	0.61	34779	260,150	4.63	138.9	5.47	309,670	2,316,335
July	31	0.122	3,782,000	0.2	6.2	0.24	13823	103,393	4.88	151.3	5.96	337,271	2,522,787
Aug	31	0.122	3,782,000	0.17	5.3	0.21	11749	87,884	4.12	127.7	5.03	284,745	2,129,894
Sept	30	0.122	3,660,000	0.47	14.1	0.56	31435	235,136	3.11	93.3	3.67	208,008	1,555,897
Oct	31	0.122	3,782,000	0.67	20.8	0.82	46306	346,366	2.08	64.5	2.54	143,755	1,075,286
Nov	30	0.122	3,660,000	1.06	31.8	1.25	70896	530,306	0.85	25.5	1.00	56,851	425,245
Dec	31	0.122	3,782,000	1.18	36.6	1.44	81553	610,018	0.4	12.4	0.49	27,645	206,786
		Total	44,530,000					4,776,419					15,452,572

Spring Valley Irrigation - 100 ERUs
By: HCJ
Date: 1/21/2021

Data must be entered in highlighted fields
Assumptions: Growing Season is April 1 - October 31 (Same as Bellevue, ID Reuse Permit)
Effluent Generated = 0.02 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	0.02	620,000	13.9	605,484	1.02	31.6	1.24	62813	469,841	0.4	12.4	0.49	24633	184,251	905,590
Feb	28	0.02	560,000	13.9	605,484	0.85	23.8	0.94	47279	353,644	0.96	26.9	1.06	53397	399,410	514,234
March	31	0.02	620,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	1.97	61.1	2.40	121315	907,439	237,678
April	30	0.02	600,000	13.9	605,484	1	30.0	1.18	59595	445,770	3.07	92.1	3.63	182956	1,368,513	(322,743)
May	31	0.02	620,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	3.89	120.6	4.75	239552	1,791,846	(646,729)
June	30	0.02	600,000	13.9	605,484	0.52	15.6	0.61	30989	231,800	4.63	138.9	5.47	275924	2,063,914	(1,232,114)
July	31	0.02	620,000	13.9	605,484	0.2	6.2	0.24	12316	92,126	4.88	151.3	5.96	300517	2,247,868	(1,535,742)
Aug	31	0.02	620,000	13.9	605,484	0.17	5.3	0.21	10469	78,307	4.12	127.7	5.03	253715	1,897,790	(1,199,483)
Sept	30	0.02	600,000	13.9	605,484	0.47	14.1	0.56	28010	209,512	3.11	93.3	3.67	185340	1,386,344	(576,832)
Oct	31	0.02	620,000	13.9	605,484	0.67	20.8	0.82	41260	308,621	2.08	64.5	2.54	128089	958,108	(29,486)
Nov	30	0.02	600,000	13.9	605,484	1.06	31.8	1.25	63171	472,516	0.85	25.5	1.00	50656	378,904	693,612
Dec	31	0.02	620,000	13.9	605,484	1.18	36.6	1.44	72666	543,542	0.4	12.4	0.49	24633	184,251	979,290

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Total **(2,212,726) gallons/year**

Phase 1 (100 ERUs = 0.002 mgd) Assume applied to an alfalfa field with less frequent cuttings

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Alfalfa*** Actual ET* mm/day	Alfalfa Actual ET mm/month	Alfalfa Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic. (Pivot)	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	905,590	0.48	14.88	0.59	1.24	-0.66	No irrigation		0	0	80%	0	905,590	905,590	2,549,005	
Feb	28	514,234	0.86	24.08	0.95	0.94	0.01	No irrigation		0	0	80%	0	514,234	514,234	3,063,240	
March	31	237,678	1.78	55.18	2.17	1.39	0.78	No irrigation		0	0	80%	0	237,678	237,678	**3,300,918**	High Water Storage Month
April	30	(322,743)	4.54	136.2	5.36	1.18	4.18	No irrigation		0	0	80%	-	-322,743	-322,743	2,978,175	
May	31	(646,729)	6.09	188.79	7.43	1.39	6.04	No irrigation		0	0	80%	-	-646,729	-646,729	2,331,446	
June	30	(1,232,114)	5.49	164.7	6.48	0.61	5.87	No irrigation		0	0	80%	-	-1,232,114	-1,232,114	1,099,332	
July	31	(1,535,742)	6.14	190.34	7.49	0.24	7.25	No irrigation		0	0	80%	-	-1,535,742	-1,535,742	-436,410	
Aug	31	(1,199,483)	5.69	176.39	6.94	0.21	6.74	No irrigation		0	0	80%	-	-1,199,483	-1,199,483	-1,635,894	
Sept	30	(576,832)	3.86	115.8	4.56	0.56	4.00	No irrigation		0	0	80%	-	-576,832	-576,832	0	
Oct	31	(29,486)	2.96	91.76	3.61	0.82	2.79	No irrigation		0	0	80%	-	-29,486	-29,486	-29,486	
Nov	30	693,612	0.94	28.2	1.11	1.25	-0.14	No Irrigation		0	0	80%	0	693,612	693,612	664,125	
Dec	31	979,290	0.43	13.33	0.52	1.44	-0.92	No irrigation		0	0	80%	0	979,290	979,290	1,643,416	
Total		(2,212,726)		**1199.65**	**47.23**		**36.0**			**0**	**0**		**-**		**-2,212,726**		

***** Alfalfa - less frequent cuttings Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 1,100,000 gallons each

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
450	450	3	20	202500	330	330	390	390	3,066,000	22,933,680

Lagoon Surface Area, sf = 202500 sf
4.6 acres
Total Surface Area, sf = **13.9 acres**

Spring Valley Irrigation - 500 ERUs
By: HCJ
Date: 1/21/2021

Data must be entered in highlighted fields
Assumptions: Growing Season is April 1 - October 31 (Same as Bellevue, ID Reuse Permit)
Effluent Generated = 0.1 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	0.1	3,100,000	13.9	605,484	1.02	31.6	1.24	62813	469,841	0.4	12.4	0.49	24633	184,251	3,385,590
Feb	28	0.1	2,800,000	13.9	605,484	0.85	23.8	0.94	47279	353,644	0.96	26.9	1.06	53397	399,410	2,754,234
March	31	0.1	3,100,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	1.97	61.1	2.40	121315	907,439	2,717,678
April	30	0.1	3,000,000	13.9	605,484	1	30.0	1.18	59595	445,770	3.07	92.1	3.63	182956	1,368,513	2,077,257
May	31	0.1	3,100,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	3.89	120.6	4.75	239552	1,791,846	1,833,271
June	30	0.1	3,000,000	13.9	605,484	0.52	15.6	0.61	30989	231,800	4.63	138.9	5.47	275924	2,063,914	1,167,886
July	31	0.1	3,100,000	13.9	605,484	0.2	6.2	0.24	12316	92,126	4.88	151.3	5.96	300517	2,247,868	944,258
Aug	31	0.1	3,100,000	13.9	605,484	0.17	5.3	0.21	10469	78,307	4.12	127.7	5.03	253715	1,897,790	1,280,517
Sept	30	0.1	3,000,000	13.9	605,484	0.47	14.1	0.56	28010	209,512	3.11	93.3	3.67	185340	1,386,344	1,823,168
Oct	31	0.1	3,100,000	13.9	605,484	0.67	20.8	0.82	41260	308,621	2.08	64.5	2.54	128089	958,108	2,450,514
Nov	30	0.1	3,000,000	13.9	605,484	1.06	31.8	1.25	63171	472,516	0.85	25.5	1.00	50656	378,904	3,093,612
Dec	31	0.1	3,100,000	13.9	605,484	1.18	36.6	1.44	72666	543,542	0.4	12.4	0.49	24633	184,251	3,459,290
															Total	**26,987,274** gallons/year

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 1 (500 ERUs =0.100 mgd)

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Alfalfa*** Actual ET* mm/day	Alfalfa Actual ET mm/month	Alfalfa Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic. (Pivot)	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	3,385,590	0.48	14.88	0.59	1.24	-0.66	No irrigation		0	0	80%	0	3,385,590	3,385,590	10,349,522	
Feb	28	2,754,234	0.86	24.08	0.95	0.94	0.01	No irrigation		0	0	80%	0	2,754,234	2,754,234	13,103,756	
March	31	2,717,678	1.78	55.18	2.17	1.39	0.78	No irrigation		0	0	80%	0	2,717,678	2,717,678	**15,821,435**	High Water Storage Month
April	30	2,077,257	4.54	136.2	5.36	1.18	4.18		21.5	326,314	2,440,830	80%	3,051,037	2,077,257	-973,780	14,847,654	
May	31	1,833,271	6.09	188.79	7.43	1.39	6.04		21.5	471,496	3,526,792	80%	4,408,490	1,833,271	-2,575,219	12,272,435	
June	30	1,167,886	5.49	164.7	6.48	0.61	5.87		21.5	458,130	3,426,815	80%	4,283,518	1,167,886	-3,115,632	9,156,803	
July	31	944,258	6.14	190.34	7.49	0.24	7.25		21.5	565,796	4,232,151	80%	5,290,188	944,258	-4,345,930	4,810,873	
Aug	31	1,280,517	5.69	176.39	6.94	0.21	6.74		21.5	525,790	3,932,908	80%	4,916,134	1,280,517	-3,635,618	1,175,255	
Sept	30	1,823,168	3.86	115.8	4.56	0.56	4.00		21.5	312,487	2,337,405	80%	2,921,756	1,823,168	-1,098,588	0	
Oct	31	2,450,514	2.96	91.76	3.61	0.82	2.79		21.5	218,127	1,631,587	80%	2,039,483	2,450,514	411,030	411,030	
Nov	30	3,093,612	0.94	28.2	1.11	1.25	-0.14	No Irrigation		0	0	80%	0	3,093,612	3,093,612	3,504,642	
Dec	31	3,459,290	0.43	13.33	0.52	1.44	-0.92	No irrigation		0	0	80%	0	3,459,290	3,459,290	6,963,932	
Total		26,987,274		**1199.65**	**47.23**		**36.0**			**2,878,140**	**21,528,486**		**26,910,607**		**76,667**		

***** Alfalfa - less frequent cuttings Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 5,270,000 gallons each

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
450	450	3	20	202500	330	330	390	390	3,066,000	22,933,680

Lagoon Surface Area, sf = 202500 sf
4.6 acres
Total Surface Area, sf = **13.9 acres**

Phase 1 (500 ERUs =0.100 mgd) * Assumed TN = 40 mg/L so acreage increased to apply reuse water at agronomic rate.

Spring Valley Irrigation - 1000 ERUs
By: HCJ
Date: 1/21/2021

Data must be entered in highlighted fields
Assumptions: Growing Season is April 1 - October 31 (Same as Bellevue, ID Reuse Permit)
Effluent Generated = 0.2 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	0.2	6,200,000	13.9	605,484	1.02	31.6	1.24	62813	469,841	0.4	12.4	0.49	24633	184,251	6,485,590
Feb	28	0.2	5,600,000	13.9	605,484	0.85	23.8	0.94	47279	353,644	0.96	26.9	1.06	53397	399,410	5,554,234
March	31	0.2	6,200,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	1.97	61.1	2.40	121315	907,439	5,817,678
April	30	0.2	6,000,000	13.9	605,484	1	30.0	1.18	59595	445,770	3.07	92.1	3.63	182956	1,368,513	5,077,257
May	31	0.2	6,200,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	3.89	120.6	4.75	239552	1,791,846	4,933,271
June	30	0.2	6,000,000	13.9	605,484	0.52	15.6	0.61	30989	231,800	4.63	138.9	5.47	275924	2,063,914	4,167,886
July	31	0.2	6,200,000	13.9	605,484	0.2	6.2	0.24	12316	92,126	4.88	151.3	5.96	300517	2,247,868	4,044,258
Aug	31	0.2	6,200,000	13.9	605,484	0.17	5.3	0.21	10469	78,307	4.12	127.7	5.03	253715	1,897,790	4,380,517
Sept	30	0.2	6,000,000	13.9	605,484	0.47	14.1	0.56	28010	209,512	3.11	93.3	3.67	185340	1,386,344	4,823,168
Oct	31	0.2	6,200,000	13.9	605,484	0.67	20.8	0.82	41260	308,621	2.08	64.5	2.54	128089	958,108	5,550,514
Nov	30	0.2	6,000,000	13.9	605,484	1.06	31.8	1.25	63171	472,516	0.85	25.5	1.00	50656	378,904	6,093,612
Dec	31	0.2	6,200,000	13.9	605,484	1.18	36.6	1.44	72666	543,542	0.4	12.4	0.49	24633	184,251	6,559,290
															Total	**63,487,274** gallons/year

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 1 (1000 ERUs = 0.2 mgd) Assume applied to an alfalfa field with less frequent cuttings

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Alfalfa*** Actual ET* mm/day	Alfalfa Actual ET mm/month	Alfalfa Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic. (Pivot)	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	6,485,590	0.48	14.88	0.59	1.24	-0.66	No irrigation		0	0	80%	0	6,485,590	6,485,590	19,851,161	
Feb	28	5,554,234	0.86	24.08	0.95	0.94	0.01	No irrigation		0	0	80%	0	5,554,234	5,554,234	25,405,396	
March	31	5,817,678	1.78	55.18	2.17	1.39	0.78	No irrigation		0	0	80%	0	5,817,678	5,817,678	**31,223,074**	High Water Storage Month
April	30	5,077,257	4.54	136.2	5.36	1.18	4.18		51	774,047	5,789,875	80%	7,237,344	5,077,257	-2,160,087	29,062,986	
May	31	4,933,271	6.09	188.79	7.43	1.39	6.04		51	1,118,433	8,365,879	80%	10,457,349	4,933,271	-5,524,078	23,538,909	
June	30	4,167,886	5.49	164.7	6.48	0.61	5.87		51	1,086,728	8,128,723	80%	10,160,904	4,167,886	-5,993,017	17,545,892	
July	31	4,044,258	6.14	190.34	7.49	0.24	7.25		51	1,342,120	10,039,055	80%	12,548,818	4,044,258	-8,504,561	9,041,331	
Aug	31	4,380,517	5.69	176.39	6.94	0.21	6.74		51	1,247,222	9,329,223	80%	11,661,528	4,380,517	-7,281,012	1,760,319	
Sept	30	4,823,168	3.86	115.8	4.56	0.56	4.00		51	741,249	5,544,541	80%	6,930,677	4,823,168	-2,107,509	0	
Oct	31	5,550,514	2.96	91.76	3.61	0.82	2.79		51	517,416	3,870,275	80%	4,837,844	5,550,514	712,669	712,669	
Nov	30	6,093,612	0.94	28.2	1.11	1.25	-0.14	No Irrigation		0	0	80%	0	6,093,612	6,093,612	6,806,281	
Dec	31	6,559,290	0.43	13.33	0.52	1.44	-0.92	No irrigation		0	0	80%	0	6,559,290	6,559,290	13,365,571	
Total		63,487,274		**1199.65**	**47.23**		**36.0**			**6,827,215**	**51,067,571**		**63,834,464**		**-347,190**		

***** Alfalfa - less frequent cuttings Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 10,410,000 gallons each

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
450	450	3	20	202500	330	330	390	390	3,066,000	22,933,680

Lagoon Surface Area, sf = 202500 sf
4.6 acres
Total Surface Area, sf = **13.9 acres**

Spring Valley Irrigation - 1500 ERUs
By: HCJ
Date: 1/21/2021

Data must be entered in highlighted fields
Assumptions: Growing Season is April 1 - October 31 (Same as Bellevue, ID Reuse Permit)
Effluent Generated = 0.3 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	0.3	9,300,000	13.9	605,484	1.02	31.6	1.24	62813	469,841	0.4	12.4	0.49	24633	184,251	9,585,590
Feb	28	0.3	8,400,000	13.9	605,484	0.85	23.8	0.94	47279	353,644	0.96	26.9	1.06	53397	399,410	8,354,234
March	31	0.3	9,300,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	1.97	61.1	2.40	121315	907,439	8,917,678
April	30	0.3	9,000,000	13.9	605,484	1	30.0	1.18	59595	445,770	3.07	92.1	3.63	182956	1,368,513	8,077,257
May	31	0.3	9,300,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	3.89	120.6	4.75	239552	1,791,846	8,033,271
June	30	0.3	9,000,000	13.9	605,484	0.52	15.6	0.61	30989	231,800	4.63	138.9	5.47	275924	2,063,914	7,167,886
July	31	0.3	9,300,000	13.9	605,484	0.2	6.2	0.24	12316	92,126	4.88	151.3	5.96	300517	2,247,868	7,144,258
Aug	31	0.3	9,300,000	13.9	605,484	0.17	5.3	0.21	10469	78,307	4.12	127.7	5.03	253715	1,897,790	7,480,517
Sept	30	0.3	9,000,000	13.9	605,484	0.47	14.1	0.56	28010	209,512	3.11	93.3	3.67	185340	1,386,344	7,823,168
Oct	31	0.3	9,300,000	13.9	605,484	0.67	20.8	0.82	41260	308,621	2.08	64.5	2.54	128089	958,108	8,650,514
Nov	30	0.3	9,000,000	13.9	605,484	1.06	31.8	1.25	63171	472,516	0.85	25.5	1.00	50656	378,904	9,093,612
Dec	31	0.3	9,300,000	13.9	605,484	1.18	36.6	1.44	72666	543,542	0.4	12.4	0.49	24633	184,251	9,659,290
															Total	**99,987,274** gallons/year

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 1 (1500 ERUs = .30 mgd) Assume applied to an alfalfa field with less frequent cuttings

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Alfalfa*** Actual ET* mm/day	Alfalfa Actual ET mm/month	Alfalfa Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic. (Pivot)	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	9,585,590	0.48	14.88	0.59	1.24	-0.66	No irrigation		0	0	80%	0	9,585,590	9,585,590	29,400,230	
Feb	28	8,354,234	0.86	24.08	0.95	0.94	0.01	No irrigation		0	0	80%	0	8,354,234	8,354,234	37,754,465	
March	31	8,917,678	1.78	55.18	2.17	1.39	0.78	No irrigation		0	0	80%	0	8,917,678	8,917,678	**46,672,143**	High Water Storage Month
April	30	8,077,257	4.54	136.2	5.36	1.18	4.18		80	1,214,192	9,082,157	80%	11,352,696	8,077,257	-3,275,440	43,396,703	
May	31	8,033,271	6.09	188.79	7.43	1.39	6.04		80	1,754,405	13,122,947	80%	16,403,684	8,033,271	-8,370,413	35,026,290	
June	30	7,167,886	5.49	164.7	6.48	0.61	5.87		80	1,704,671	12,750,938	80%	15,938,673	7,167,886	-8,770,786	26,255,504	
July	31	7,144,258	6.14	190.34	7.49	0.24	7.25		80	2,105,286	15,747,537	80%	19,684,421	7,144,258	-12,540,163	13,715,340	
Aug	31	7,480,517	5.69	176.39	6.94	0.21	6.74		80	1,956,427	14,634,075	80%	18,292,593	7,480,517	-10,812,077	2,903,264	
Sept	30	7,823,168	3.86	115.8	4.56	0.56	4.00		80	1,162,743	8,697,320	80%	10,871,650	7,823,168	-3,048,482	0	
Oct	31	8,650,514	2.96	91.76	3.61	0.82	2.79		80	811,634	6,071,020	80%	7,588,775	8,650,514	1,061,738	1,061,738	
Nov	30	9,093,612	0.94	28.2	1.11	1.25	-0.14	No Irrigation		0	0	80%	0	9,093,612	9,093,612	10,155,350	
Dec	31	9,659,290	0.43	13.33	0.52	1.44	-0.92	No irrigation		0	0	80%	0	9,659,290	9,659,290	19,814,640	
Total		99,987,274		**1199.65**	**47.23**		**36.0**			**10,709,357**	**80,105,994**		**100,132,492**		**-145,218**		

***** Alfalfa - less frequent cuttings Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 15,560,000 gallons each

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
450	450	3	20	202500	330	330	390	390	3,066,000	22,933,680

Lagoon Surface Area, sf = 202500 sf
4.6 acres
Total Surface Area, sf = **13.9 acres**

Phase 1 (1500 ERUs) Assume applied to an alfalfa field with less frequent cuttings *Use acreage based on TN = 40 mg/L

Spring Valley Irrigation - Phase 1 - 2200 ERUs
By: HCJ
Date: 1/7/2021

Data must be entered in highlighted fields
Assumptions: Growing Season is April 1 - October 31 (Same as Bellevue, ID Reuse Permit)
Effluent Generated = 0.44 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	0.44	13,640,000	13.9	605,484	1.02	31.6	1.24	62813	469,841	0.4	12.4	0.49	24633	184,251	13,925,590
Feb	28	0.44	12,320,000	13.9	605,484	0.85	23.8	0.94	47279	353,644	0.96	26.9	1.06	53397	399,410	12,274,234
March	31	0.44	13,640,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	1.97	61.1	2.40	121315	907,439	13,257,678
April	30	0.44	13,200,000	13.9	605,484	1	30.0	1.18	59595	445,770	3.07	92.1	3.63	182956	1,368,513	12,277,257
May	31	0.44	13,640,000	13.9	605,484	1.14	35.3	1.39	70203	525,117	3.89	120.6	4.75	239552	1,791,846	12,373,271
June	30	0.44	13,200,000	13.9	605,484	0.52	15.6	0.61	30989	231,800	4.63	138.9	5.47	275924	2,063,914	11,367,886
July	31	0.44	13,640,000	13.9	605,484	0.2	6.2	0.24	12316	92,126	4.88	151.3	5.96	300517	2,247,868	11,484,258
Aug	31	0.44	13,640,000	13.9	605,484	0.17	5.3	0.21	10469	78,307	4.12	127.7	5.03	253715	1,897,790	11,820,517
Sept	30	0.44	13,200,000	13.9	605,484	0.47	14.1	0.56	28010	209,512	3.11	93.3	3.67	185340	1,386,344	12,023,168
Oct	31	0.44	13,640,000	13.9	605,484	0.67	20.8	0.82	41260	308,621	2.08	64.5	2.54	128089	958,108	12,990,514
Nov	30	0.44	13,200,000	13.9	605,484	1.06	31.8	1.25	63171	472,516	0.85	25.5	1.00	50656	378,904	13,293,612
Dec	31	0.44	13,640,000	13.9	605,484	1.18	36.6	1.44	72666	543,542	0.4	12.4	0.49	24633	184,251	13,999,290
															Total	**151,087,274 gallons/year**

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 1 (2200 ERUs = .440 mgd) Assume applied to an alfalfa field with less frequent cuttings

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Alfalfa*** Actual ET* mm/day	Alfalfa Actual ET mm/month	Alfalfa Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic. (Pivot)	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.		
Jan	31	13,925,590	0.48	14.88	0.59	1.24	-0.66	No irrigation		0	0	80%	0	13,925,590	13,925,590	42,730,983		
Feb	28	12,274,234	0.86	24.08	0.95	0.94	0.01	No irrigation		0	0	80%	0	12,274,234	12,274,234	55,005,217		
March	31	13,257,678	1.78	55.18	2.17	1.39	0.78	No irrigation		0	0	80%	0	13,257,678	13,257,678	**68,262,895**	High Water Storage Month	209
April	30	12,277,257	4.54	136.2	5.36	1.18	4.18		121	1,836,466	13,736,763	80%	17,170,953	12,277,257	-4,893,697	63,369,199		
May	31	12,373,271	6.09	188.79	7.43	1.39	6.04		121	2,653,537	19,848,458	80%	24,810,572	12,373,271	-12,437,301	50,931,898		
June	30	11,367,886	5.49	164.7	6.48	0.61	5.87		121	2,578,315	19,285,794	80%	24,107,242	11,367,886	-12,739,356	38,192,542		
July	31	11,484,258	6.14	190.34	7.49	0.24	7.25		121	3,184,245	23,818,149	80%	29,772,687	11,484,258	-18,288,429	19,904,113		
Aug	31	11,820,517	5.69	176.39	6.94	0.21	6.74		121	2,959,096	22,134,038	80%	27,667,547	11,820,517	-15,847,031	4,057,082		
Sept	30	12,023,168	3.86	115.8	4.56	0.56	4.00		121	1,758,649	13,154,696	80%	16,443,371	12,023,168	-4,420,203	0		
Oct	31	12,990,514	2.96	91.76	3.61	0.82	2.79		121	1,227,596	9,182,418	80%	11,478,022	12,990,514	1,512,491	1,512,491		
Nov	30	13,293,612	0.94	28.2	1.11	1.25	-0.14	No Irrigation		0	0	80%	0	13,293,612	13,293,612	14,806,103		
Dec	31	13,999,290	0.43	13.33	0.52	1.44	-0.92	No irrigation		0	0	80%	0	13,999,290	13,999,290	28,805,393		
Total		151,087,274		**1199.65**	**47.23**		**36.0**			**16,197,903**	**121,160,316**		**151,450,395**	**151,087,274**	**-363,121**			

***** Alfalfa - less frequent cuttings Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 22,750,000 gallons each

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
450	450	3	20	202500	330	330	390	390	3,066,000	22,933,680

Lagoon Surface Area, sf = 202500 sf
4.6 acres
Total Surface Area, sf = **13.9 acres**

Spring Valley Irrigation - 4400 ERUs
By: HCJ
Date: 3/01/2021

Data must be entered in highlighted fields

Assumptions: Growing season is longer for turf grass than alfalfa — Assume reuse water will be Class A or Class B

Effluent Generated = 0.88 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.	
Jan	31	0.88	27,280,000	40.5	1,764,180	1.02	31.6	1.24	183016	1,368,962	0.4	12.4	0.49	71771	536,848	28,112,114	
Feb	28	0.88	24,640,000	40.5	1,764,180	0.85	23.8	0.94	137754	1,030,402	0.96	26.9	1.06	155581	1,163,748	24,506,654	
March	31	0.88	27,280,000	40.5	1,764,180	1.14	35.3	1.39	204548	1,530,016	1.97	61.1	2.40	353473	2,643,976	26,166,041	
April	30	0.88	26,400,000	40.5	1,764,180	1	30.0	1.18	173640	1,298,825	3.07	92.1	3.63	533074	3,987,394	23,711,431	
May	31	0.88	27,280,000	40.5	1,764,180	1.14	35.3	1.39	204548	1,530,016	3.89	120.6	4.75	697974	5,220,845	23,589,171	
June	30	0.88	26,400,000	40.5	1,764,180	0.52	15.6	0.61	90293	675,389	4.63	138.9	5.47	803952	6,013,562	21,061,827	
July	31	0.88	27,280,000	40.5	1,764,180	0.2	6.2	0.24	35886	268,424	4.88	151.3	5.96	875607	6,549,544	20,998,880	
Aug	31	0.88	27,280,000	40.5	1,764,180	0.17	5.3	0.21	30503	228,160	4.12	127.7	5.03	739242	5,529,533	21,978,628	
Sept	30	0.88	26,400,000	40.5	1,764,180	0.47	14.1	0.56	81611	610,448	3.11	93.3	3.67	540020	4,039,347	22,971,101	
Oct	31	0.88	27,280,000	40.5	1,764,180	0.67	20.8	0.82	120217	899,220	2.08	64.5	2.54	373210	2,791,609	25,387,611	
Nov	30	0.88	26,400,000	40.5	1,764,180	1.06	31.8	1.25	184058	1,376,755	0.85	25.5	1.00	147594	1,104,002	26,672,753	
Dec	31	0.88	27,280,000	40.5	1,764,180	1.18	36.6	1.44	211725	1,583,701	0.4	12.4	0.49	71771	536,848	28,326,853	
															Total	**293,483,065**	**gallons/year**

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**

**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 2 (4400 ERUs)

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Turf Grass*** Actual ET* mm/day	Turf Grass Actual ET mm/month	Turf Grass Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic.	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	28,112,114	0.19	5.89	0.23	1.24	-1.01	No irrigation		0	0	80%	0	28,112,114	28,112,114	87,819,920	
Feb	28	24,506,654	0.42	11.76	0.46	0.94	-0.47	No irrigation		0	0	80%	0	24,506,654	24,506,654	112,326,574	
March	31	26,166,041	1.49	46.19	1.82	1.39	0.43		229	0	1,713	80%	2141.15	26,166,041	26,163,900	**138,490,473**	High Water Storage Month
April	30	23,711,431	4.04	121.2	4.77	1.18	3.59		229	2,984,717	22,325,687	80%	27,907,108	23,711,431	-4,195,677	134,294,796	
May	31	23,589,171	5.46	169.26	6.66	1.39	5.27		229	4,382,822	32,783,508	80%	40,979,386	23,589,171	-17,390,214	116,904,582	
June	30	21,061,827	6.42	192.6	7.58	0.61	6.97		229	5,792,708	43,329,458	80%	54,161,822	21,061,827	-33,099,995	83,804,587	
July	31	20,998,880	6.69	207.39	8.16	0.24	7.92		229	6,584,378	49,251,150	80%	61,563,938	20,998,880	-40,565,058	43,239,529	
Aug	31	21,978,628	5.67	175.77	6.92	0.21	6.71		229	5,579,982	41,738,263	80%	52,172,829	21,978,628	-30,194,201	13,045,328	
Sept	30	22,971,101	4.33	129.9	5.11	0.56	4.56		229	3,789,806	28,347,747	80%	35,434,684	22,971,101	-12,463,583	0	
Oct	31	25,387,611	2.85	88.35	3.48	0.82	2.66		229	2,211,702	16,543,530	80%	20,679,412	25,387,611	4,708,199	4,708,199	
Nov	30	26,672,753	0.73	21.9	0.86	1.25	-0.39	No Irrigation		0	0	80%	0	26,672,753	26,672,753	31,380,953	
Dec	31	28,326,853	0.18	5.58	0.22	1.44	-1.22	No irrigation		0	0	80%	0	28,326,853	28,326,853	59,707,806	
Total		293,483,065		**1175.79**	**46.29**		**35.0**			**31,326,115**	**234,321,056**		**292,901,320**	**293,483,065**	**581,745**		
													899				

***** Turf Grass Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center**

No. of Cells: 3 each
Vol. of Each Cell: 46,160,000 gallons each — **acre-ft of storage** 425

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
767	767	3	20	588289	647	647	707	707	10,020,980	74,956,930

Lagoon Surface Area, sf = 588289 sf
13.5 acres
Total Surface Area, sf = **40.5 acres**

Spring Valley Irrigation - 7153 ERUs
By: HCJ
Date: 1/25/2021

Data must be entered in highlighted fields
Assumptions: Growing season is longer for turf grass than alfalfa — Assume reuse water will be Class A or Class B
Effluent Generated = 1.43 MGD

Month	Days/Month	Daily WW Flow, mgd	Monthly Avg. WW flow gallons/mo.	Assumed Lagoon Surface Area (Acres)	Lagoon Surface Area (SF)	Daily Precip* mm/day	Monthly Avg. Precip. mm/month	Monthly Avg. Precipitation Inches/Mo.	Monthly Avg. Precip. CF/mo.	Monthly Avg. Precip. gal/mo.	Monthly Avg.** ET mm/day	Monthly Avg. ET mm/month	Monthly Avg. ET inches/mo.	Monthly Avg. ET cf/mo.	Monthly Avg. ET gal/mo	Water Available from Water Storage gal/mo.
Jan	31	1.43	44,330,000	40.5	1,764,180	1.02	31.6	1.24	183016	1,368,962	0.4	12.4	0.49	71771	536,848	45,162,114
Feb	28	1.43	40,040,000	40.5	1,764,180	0.85	23.8	0.94	137754	1,030,402	0.96	26.9	1.06	155581	1,163,748	39,906,654
March	31	1.43	44,330,000	40.5	1,764,180	1.14	35.3	1.39	204548	1,530,016	1.97	61.1	2.40	353473	2,643,976	43,216,041
April	30	1.43	42,900,000	40.5	1,764,180	1	30.0	1.18	173640	1,298,825	3.07	92.1	3.63	533074	3,987,394	40,211,431
May	31	1.43	44,330,000	40.5	1,764,180	1.14	35.3	1.39	204548	1,530,016	3.89	120.6	4.75	697974	5,220,845	40,639,171
June	30	1.43	42,900,000	40.5	1,764,180	0.52	15.6	0.61	90293	675,389	4.63	138.9	5.47	803952	6,013,562	37,561,827
July	31	1.43	44,330,000	40.5	1,764,180	0.2	6.2	0.24	35886	268,424	4.88	151.3	5.96	875607	6,549,544	38,048,880
Aug	31	1.43	44,330,000	40.5	1,764,180	0.17	5.3	0.21	30503	228,160	4.12	127.7	5.03	739242	5,529,533	39,028,628
Sept	30	1.43	42,900,000	40.5	1,764,180	0.47	14.1	0.56	81611	610,448	3.11	93.3	3.67	540020	4,039,347	39,471,101
Oct	31	1.43	44,330,000	40.5	1,764,180	0.67	20.8	0.82	120217	899,220	2.08	64.5	2.54	373210	2,791,609	42,437,611
Nov	30	1.43	42,900,000	40.5	1,764,180	1.06	31.8	1.25	184058	1,376,755	0.85	25.5	1.00	147594	1,104,002	43,172,753
Dec	31	1.43	44,330,000	40.5	1,764,180	1.18	36.6	1.44	211725	1,583,701	0.4	12.4	0.49	71771	536,848	45,376,853
															Total	**494,233,065** gallons/year

*** Gross Precipitation for Boise WSFO Airport (1986 to 2016) Average; University of Idaho Kimberly Research Center**
**** Open Water - Shallow Systems (ponds/streams) Actual Evapotranspiration for Boise WSFO Airport (1986-2016); University of Idaho Kimberly Research Center**

Phase 2 (7153 ERUs)

Month	Days/Month	Reuse Water Available from Water Storage gal/mo.	Turf Grass*** Actual ET* mm/day	Turf Grass Actual ET mm/month	Turf Grass Actual ET Inch/Month	Precipitation** Inches/month	Irrigation Requirements inches/month		Irrigated Acres	Irrigation Requirements (cf/month)	Irrigation Requirements gal/mo.	Irrigation Effic.	Irrigation Water Required gallons/month	Reuse Water Available gal/mo	Change in Lagoon Vol. gal/mo.	Storage needed gallons/mo.	
Jan	31	45,162,114	0.19	5.89	0.23	1.24	-1.01	No irrigation		0	0	80%	0	45,162,114	45,162,114	141,292,332	
Feb	28	39,906,654	0.42	11.76	0.46	0.94	-0.47	No irrigation		0	0	80%	0	39,906,654	39,906,654	181,198,986	
March	31	43,216,041	1.49	46.19	1.82	1.39	0.43		386	0	2,887	80%	3609.1	43,216,041	43,212,432	**224,411,417**	High Water Storage Month
April	30	40,211,431	4.04	121.2	4.77	1.18	3.59		386	5,031,009	37,631,944	80%	47,039,930	40,211,431	-6,828,498	217,582,919	
May	31	40,639,171	5.46	169.26	6.66	1.39	5.27		386	7,387,639	55,259,538	80%	69,074,423	40,639,171	-28,435,252	189,147,667	
June	30	37,561,827	6.42	192.6	7.58	0.61	6.97		386	9,764,128	73,035,680	80%	91,294,600	37,561,827	-53,732,773	135,414,895	
July	31	38,048,880	6.69	207.39	8.16	0.24	7.92		386	11,098,559	83,017,223	80%	103,771,529	38,048,880	-65,722,649	69,692,246	
Aug	31	39,028,628	5.67	175.77	6.92	0.21	6.71		386	9,405,559	70,353,579	80%	87,941,973	39,028,628	-48,913,346	20,778,900	
Sept	30	39,471,101	4.33	129.9	5.11	0.56	4.56		386	6,388,057	47,782,665	80%	59,728,332	39,471,101	-20,257,231	0	
Oct	31	42,437,611	2.85	88.35	3.48	0.82	2.66		386	3,728,021	27,885,600	80%	34,857,000	42,437,611	7,580,611	7,580,611	
Nov	30	43,172,753	0.73	21.9	0.86	1.25	-0.39	No Irrigation		0	0	80%	0	43,172,753	43,172,753	50,753,364	
Dec	31	45,376,853	0.18	5.58	0.22	1.44	-1.22	No irrigation		0	0	80%	0	45,376,853	45,376,853	96,130,218	
Total		494,233,065		**1175.79**	**46.29**		**35.0**			**52,802,972**	**394,969,116**		**493,711,396**	**494,233,065**	**521,670**		

***** Turf Grass Actual Evapotranspiration for Boise WSFO Airport; University of Idaho Kimberly Research and Extension Center** — **1,515**

No. of Cells: 3 each
Vol. of Each Cell: 74,800,000 gallons each — **acre-ft of storage** 689

Formula: **V=(LW+(L-2sd)(W-2sd)+4(L-sd)(W-sd))d/6**

V = Volume (cf)
L = Length of pond at water surface, ft.
W = width of pond at water surface, ft.
s =slope factor, (3:1, s=3)
d = depth of pond

Length, ft	Width, ft	slope, s	depth, d ft.	LW, sf	L-2sd	W-2sd	L-sd	W-sd	Volume, cf	Volume, gals
767	767	3	20	588289	647	647	707	707	10,020,980	74,956,930

Lagoon Surface Area, sf = 588289 sf
13.5 acres
Total Surface Area, sf = **40.5 acres**

Spring Valley Development - Summary of Average Winter Storage Required and Land Application Acreage
Date: 2/2/2021
By: HCJ

No. of ERUs	Water Storage Surface Area (acres)	Total Lagoon Volume (gallons)	(acre-ft.)	Winter Storage Required (gallons)	(acre-ft.)	Land Application (acres of alfalfa)
100	13.9	68,801,040	211	3,300,918	10	0
500	13.9	68,801,040	211	15,821,435	49	22
1000	13.9	68,801,040	211	31,223,074	96	51
1500	13.9	68,801,040	211	46,672,143	143	80
2200	13.9	68,801,040	211	68,262,895	209	121

Spring Valley Development - Estimate of sludge production in Settling Pond
Date: **2/3/2021**
By: **HCJ**

Page 851, Metcalf & Eddy, 4th Ed.

Assumptions:

Detention Time, t =	2	days
Influent TSS =	250	mg/L
Effluent TSS =	30	mg/L
TSS VS =	70	%

Assume 60% of the VS generated per year degrade in one year

Year	# of ERUs Constructed	Total ERUs	Flow, Q gpd	Flow, Q MGD	Solids Generated lbs/day	Solids Generated lbs/year	Volatile Solids lbs/year	Fixed Solids lbs/year	Total Solids lbs/year	
1	50	50	10000	0.01	18.3	6,697	4,688	2,009	3,884	
2	150	200	40000	0.04	73.4	26,788	18,752	8,036	15,537	
3	200	400	80000	0.08	146.8	53,576	37,503	16,073	31,074	
4	200	600	120000	0.12	220.2	80,364	56,255	24,109	46,611	
5	200	800	160000	0.16	293.6	107,152	75,007	32,146	62,148	
6	200	1000	200000	0.2	367.0	133,940	93,758	40,182	77,685	
7	200	1200	240000	0.24	440.4	160,728	112,510	48,219	93,223	
8	200	1400	280000	0.28	513.7	187,517	131,262	56,255	108,760	
9	200	1600	320000	0.32	587.1	214,305	150,013	64,291	124,297	563,219
10	200	1800	360000	0.36	660.5	241,093	168,765	72,328	139,834	
11	200	2000	400000	0.4	733.9	267,881	187,517	80,364	155,371	
12	200	2200	440000	0.44	807.3	294,669	206,268	88,401	170,908	466,113
								Total	1,029,332	lbs

Sludge Storage = 2 ft
Surface Area = 17,010 sf

Determine mass of accumulated sludge per square ft.:

Mass per Unit Area (year 9): 33.11 lbs/sf

Determine Depth of Sludge Blanket: 3.3 ft.

Assume density of accumulated sludge is 1.06
Assume solids compact to a volume 15% of the initial solids volume

Depth, d = 3.34 ft.

Mass per Unit Area (year 10-12): 27.40 lbs/sf

Depth of Sludge Blanket: 2.8 ft.

Conclusion: The settling pond will need to be cleaned out at least once or twice during the first 12 - 13 years of operation based on the projected ERUs constructed each year.

Spring Valley Development - Estimated Chlorine Usage
Date: **2/3/2021**
By: **HCJ**

Assumptions: **Size for 10 mg/L dose (Page 69, EPA Design Manual Municipal Wastewater Stabilization Ponds, EPA-625/1-83-015)**

Chlorine Dose = **10 mg/L**
Chlorine Concentration = 12.5 %
12.5% = 125,000 mg/L = 125 g/L = 125 kg/m3

Year	New ERUs	Total ERUs	Annual Avg. Flow, gpd	Annual Avg. Day Flow, MGD	Daily Cl2 Consumption (lbs/day)	Daily Cl2 Consumption (g/d)	Daily Vol. of NaOCl Soln. (m3/day)	Daily Vol. of NaOCl Soln. (gallons/day)	Annual Volume NaOCl Soln. (gallons/year)	Pumping Rate: NaOCl Feed Rate, liter/min.	Pumping Rate: NaOCl Feed Rate, gpm	Pumping Rate: NaOCl Feed Rate, gph
1	50	50	10,000	0.01	0.83	378	0.0030	0.80	292	0.0021	0.0006	0.033
2	150	200	40,000	0.04	3.34	1,513	0.0121	3.20	1,167	0.0084	0.0022	0.133
3	200	400	80,000	0.08	6.67	3,026	0.0242	6.40	2,334	0.0168	0.0044	0.267
4	200	600	120,000	0.12	10.01	4,540	0.0363	9.59	3,502	0.0252	0.0067	0.400
5	200	800	160,000	0.16	13.34	6,053	0.0484	12.79	4,669	0.0336	0.0089	0.533
6	200	1000	200,000	0.20	16.68	7,566	0.0605	15.99	5,836	0.0420	0.0111	0.666
7	200	1200	240,000	0.24	20.02	9,079	0.0726	19.19	7,003	0.0504	0.0133	0.800
8	200	1400	280,000	0.28	23.35	10,592	0.0847	22.39	8,171	0.0588	0.0155	0.933
9	200	1600	320,000	0.32	26.69	12,105	0.0968	25.58	9,338	0.0673	0.0178	1.066
10	200	1800	360,000	0.36	30.02	13,619	0.1089	28.78	10,505	0.0757	0.0200	1.199
11	200	2000	400,000	0.40	33.36	15,132	0.1211	31.98	11,672	0.0841	0.0222	1.333
12	200	2200	440,000	0.44	36.70	16,645	0.1332	35.18	12,840	0.0925	0.0244	1.466

Spring Valley Development - Nutrient Loading on Land
Date: 2/5/2021
By: HCJ

Page 218 - IDEQ Reuse Guidance
Limit COD to 50 lbs COD/acre/day
Assumptions:

Effluent BOD, mg/L =	30	mg/L	
Ratio BOD/COD =	0.1		(Reuse Guidance)
Effluent COD =	300	mg/L	

# of ERUs	Land Application Acreage	Flow, Q MGD	COD lbs/day	COD Loading (lbs/acre/day)	
100	0	0.02	50	NA	
500	22	0.1	250	11	All loading well under 50 lbs/acre/day
1000	51	0.2	500	10	
1500	80	0.3	751	9	
2200	121	0.44	1101	9	
7153	386	1.43	3578	9	

Spring Valley Development - Nutrient Loading on Land
Date: 2/5/2021
By: HCJ

Determine Nitrogen Loading

Assumptions:			
TN =	40 mg/L	Medium strength WW - Table 3-15 (Metcalf & Eddy, 4th Ed)	
NH_4 =	25 mg/L	Assume no nitrification occurs in the complete mix lagoon system as per Metcalf & Eddy - Table 8-29	
organic N =	15 mg/L	pH = 7.4	i.e. most of the ammonia is in ammonium ion form (cannot be removed by air stripping)
Nitrites =	0 mg/L		
Nitrates =	0 mg/L	TN for Phase 2 =	10 mg/L

TKN = organic nitrogen + ammonia = TN = 40 mg/L (Plant Effluent)

# of ERUs	Land Application Acreage to meet irrigation needs	Flow, Q MGD	TN lbs/day	TN lbs/year	TN Loading (lbs/acre/year)	Acres Required Due to N Load	
100	0	0.020	7	2435	NA		
500	22	0.100	33	12176	553.47	36	
1000	51	0.200	67	24353	477.51	72	
1500	80	0.300	100	36529	456.62	107	
2200	121	0.440	147	53576	442.78	157	
7153	386	1.430	119	43531	112.77	333	Assume TN = 10 mg/L

Table 1. Total Annual Nitrogen Requirement
(lbs. N/1,000 sq. ft.) *

Turfgrass Species	Quality Expectation **		
	Low	Medium	High
Kentucky Bluegrass	1½	3	4–5
Tall Fescue	1	2	3–4
Perennial Ryegrass	2	3	4–5
Bermudagrass	2	3	4
Zoysiagrass	1	1–1½	2
Buffalograss	0–1	2	
Bentgrass Putting Greens	3	4	5

* Do not apply more than 1½ pounds nitrogen (N) in any one application. Refer to Table 3 for application schedules.

** The quality expectation of the lawn largely determines how much nitrogen will be applied. High quality lawns will require more frequent mowing and more careful attention to water needs.

Determine permit limit for nitrogen:
IDEQ Reuse Guidance:

Section 7.7.9.1, Table 7-30:

Alfalfa Hay:		Turf Grass:	
Nitrogen Uptake =	50.4 lbs per ton of yield	N Uptake =	3 lbs N/1000 sq. ft
Yield per Acre =	4.5 tons per acre	N Uptake =	130.68 lbs N/acre
N uptake =	226.8 lbs/acre		
Permit Limits (150% of N uptake) =	340.2 lbs/acre/year	150% of N=	196.02 lbs/acre/year

Determine Ammonia removal in aerobic ponds:
Note: Several formulas were utilized for lagoons to estimate total nitrogen and ammonia removal. All indicate that nitrogen removal in the aerated lagoons will essentially be zero as predicted above.
Reference: EPA - 625/1-83-015 Municipal Wastewater Stabilization Lagoons

for temperatures of 1 degree C to 20 degree C: Facultative Lagoons (complete mix equation)

Ce/Co = 1/(1+(A/Q)*(.0038+.000134T)*e^((1.041+0.044T)*(pH-6.6))

Co= influent concentration of ammonia and ammonium ion, mg/L
Ce= effluent concentration of ammonia and ammonium ion, mg/L
A = surface area of pond, m2
Q = flowrate, m3/day
T = Temperature, degrees C

Year	Flow, Q gpd	Flow, Q m3/d	Temp. T degrees C	Co mg/L	Pond SA sf	Pond SA m2	pH	A/Q d/M	pH-6.6			e^x		Ce/Co	Ce mg/L	TN mg/L
1	10,000	37.9	8	25	41,616	3,866	7.4	102.1	0.8	1.393	1.1144	4.7225986	2.35	0.2985	7.46	22.46
2	40,000	151.4	8	25	41,616	3,866	7.4	25.5	0.8	1.393	1.1144	4.7225986	0.59	0.6299	15.75	30.75
3	80,000	302.8	8	25	41,616	3,866	7.4	12.8	0.8	1.393	1.1144	4.7225986	0.29	0.7729	19.32	34.32
4	120,000	454.2	8	25	41,616	3,866	7.4	8.5	0.8	1.393	1.1144	4.7225986	0.20	0.8362	20.91	35.91
5	160,000	605.7	8	25	41,616	3,866	7.4	6.4	0.8	1.393	1.1144	4.7225986	0.15	0.8719	21.80	36.80
6	200,000	757.1	8	25	41,616	3,866	7.4	5.1	0.8	1.393	1.1144	4.7225986	0.12	0.8949	22.37	37.37
7	240,000	908.5	8	25	41,616	3,866	7.4	4.3	0.8	1.393	1.1144	4.7225986	0.10	0.9108	22.77	37.77
8	280,000	1059.9	8	25	41,616	3,866	7.4	3.6	0.8	1.393	1.1144	4.7225986	0.08	0.9226	23.06	38.06
9	320,000	1211.3	8	25	41,616	3,866	7.4	3.2	0.8	1.393	1.1144	4.7225986	0.07	0.9316	23.29	38.29
10	360,000	1362.7	8	25	41,616	3,866	7.4	2.8	0.8	1.393	1.1144	4.7225986	0.07	0.9387	23.47	38.47
11	400,000	1514.2	8	25	41,616	3,866	7.4	2.6	0.8	1.393	1.1144	4.7225986	0.06	0.9445	23.61	38.61
12	440,000	1665.6	8	25	41,616	3,866	7.4	2.3	0.8	1.393	1.1144	4.7225986	0.05	0.9493	23.73	38.73

Small removal during the winter months
Summer removal only slightly better

Appendix J

Wastewater Operations Agreement

KELLER ASSOCIATES

Recording Requested By and
When Recorded Return to:

Eagle Sewer District
44 North Palmetto
Eagle, ID 83616

For Recording Purposes
Do Not Write Above This Line

SPRING VALLEY WASTEWATER AGREEMENT

This SPRING VALLEY WASTEWATER AGREEMENT (this "**Agreement**") is made this 24th day of April, 2014 (the "**Effective Date**"), by and between the Eagle Sewer District (the "**District**"), a political subdivision of the State of Idaho organized pursuant to Idaho Code Section 42-3201, *et seq.*, and M3 Eagle L.L.C., a Texas limited liability company ("**M3**").

RECITALS

A. M3 owns the property legally described on **Exhibit A** attached hereto and made a part hereof, which property consists of approximately 6,017 acres located in the City of Eagle (the "**Property**;" the Property is sometimes referred to herein as "**Spring Valley**").

B. M3 intends to develop the Property as depicted generally on the Conceptual Development Plan, attached hereto as **Exhibit B** and made a part hereof. Final plans for Spring Valley, and the timing, configuration, density, and intensity of each of Spring Valley's phases shall be determined solely by M3 subject to that certain Amended and Restated Development Agreement between M3 and the City of Eagle, recorded on January 24, 2014, as Instrument Number 114006036, as the same may be amended from time to time (the "**Development Agreement**").

C. Pursuant to Idaho Code Section 42-3201, *et seq.* (the "**Sewer District Act**"), M3 has petitioned the District to annex the Property into the District subject to this Agreement. Notice of filing of the petition was issued and caused to be published by the District secretary on February 24 and March 3, 2014. In accordance with said notice, the Board of the District (the "**Board**") conducted a public hearing on March 10, 2014. After considering the petition and testimony at the public hearing, the Board determined that the Property shall be annexed into the District in accordance with the provisions of the Sewer District Act and this Agreement. The Board entered an order to that effect on April 14, 2014.

D. Annexation of the Property into the District is conditioned upon M3's execution of this Agreement and Exhibit "B" to M3's petition for annexation. In the event of any conflict between this Agreement and such Exhibit "B", this Agreement shall control.

E. As described more fully herein, the District's obligation to serve the Property with sewer service is related to the phased development of the sewer system described in that certain Wastewater Facility Plan for Spring Valley, prepared by JUB Engineers and approved by the Idaho Department of Environmental Quality ("**IDEQ**") and the District, as the same may be amended and approved in the same manner from time to time ("**Wastewater Facility Plan**") ("**Sewer System**"). The approximate phasing of the Sewer System for Spring Valley is contained in the Wastewater Facility Plan.

F. The Sewer System consists of two distinct functional components described more particularly in the Wastewater Facility Plan, to wit:

a. Improvements and facilities designed and constructed for the purpose of collecting and conveying wastewater to the Sewer Plant for treatment and disposal (the "**Conveyance Facilities**"); and

b. Improvements and facilities designed and constructed for the purpose of treating and processing wastewater to required standards, including the outfall pond (the "**Treatment Plant**").

A conceptual depiction of the Treatment Plant and Point of Compliance, defined below, is attached hereto as **Exhibit C**, and made a part hereof.

G. As described more fully herein, M3 shall design and construct, in compliance with applicable governmental regulations, a system designed for reuse of the treated effluent from the Sewer System ("the **Recycled Water**"), which system shall include, without limitation, pumping and storage facilities, pipeline and distribution facilities, and real property to which Recycled Water is applied (the "**Reuse System**"). M3 shall retain all right, title and interest in the Reuse System and the Recycled Water, subject to the terms and conditions set forth herein.

H. Spring Valley Community Infrastructure District No. 1 (City of Eagle, Idaho) ("**Spring Valley CID**") has been created pursuant to Idaho Code Section 50-3101, *et. seq.* (the "**CID Act**") in connection with the financing, construction and/or acquisition of certain eligible "community infrastructure", as defined in the CID Act. Such eligible community infrastructure includes the Sewer System.

I. The terms and conditions of this Agreement have undergone review by the District and its approval and execution will, in the opinion of the Board, promote public health, safety and welfare by providing reliable wastewater collection, treatment and disposal services from the Sewer System, or components thereof, to the Property, its owners, and to any Outside Property served pursuant to paragraph 8 herein below ("**Sewer Users**")

J. The parties to this Agreement intend that, upon completion of each phase of the Sewer System, consistent with the terms and conditions set forth herein, ownership thereof shall be conveyed to the District, and that the District thereafter shall own, maintain and operate the same for the primary benefit of Spring Valley, and shall, subject to the terms set forth herein, reimburse to M3 a portion of the construction costs incurred in connection with each duly completed phase of the Treatment Plant (or portion of such phase).

K. It is anticipated that after accepting title to the initial phases of the Sewer System, the Monthly User Fee, defined below, collected by the District within Spring Valley may prove insufficient to cover the costs of operating and maintaining such initial phases, and the parties desire to provide herein for certain subsidies by M3 to the District for the purpose of offsetting a portion of any such revenue shortfall.

L. Subject to the terms and conditions of this Agreement, the District is willing to accept ownership of each phase of the Sewer System when satisfactorily completed, and upon such acquisition, provide sewer services to Sewer Users consistent with the reasonable capacity limitation of such acquired facilities, all as provided more fully herein.

AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged and agreed, and in consideration of the mutual representations, covenants and agreements hereinafter contained, the District and M3 represent, covenant and agree as follows:

1. Annexation.

a. Annexation of Spring Valley. The District has, pursuant to public hearings and proceedings conducted in accordance with law, duly annexed the Property into the District consistent with M3's petition for annexation and consistent with the provisions of the Sewer District Act and this Agreement.

b. Obligation to Serve. The District shall be obligated to provide sewer services from the Sewer System to Sewer Users in Spring Valley on a first-come, first-serve basis; provided, however, that notwithstanding anything to the contrary herein, the District shall not be required to provide sewer service to any Sewer User that would, in the reasonable discretion of the District, exceed the available capacity of the Sewer System.

c. Annexation of Additional Property. The District acknowledges that M3 may acquire additional property and that M3 may desire to subject such additional property to the benefits and obligations of this Agreement. M3 may petition, from time to time, the District to annex such additional property into the District. Upon such petition, the District and M3 shall commence proceedings to consider the annexation of such additional property in accordance with the provisions of the Sewer District Act and this Agreement, and shall not unreasonably withhold or delay a M3-requested grant of annexation of additional property. In the event such annexation is approved, any additional property annexed shall be subject to this Agreement, and, for purposes hereof, be deemed included in the hereinabove defined terms "**Property**" and "**Spring Valley**."

2. Construction of the Sewer System.

a. Obligation to Construct. M3 shall have the obligation to construct the Sewer System, which may be assigned to the Spring Valley CID, defined below, provided, however, that in either event all such construction shall be undertaken and completed in full compliance with the terms and conditions of this Agreement and all applicable statutes, regulations, rules and regulations of every governmental entity or agency having jurisdiction over such construction, including specifically Idaho's public works competitive bidding statute (Idaho Code § 67-5711, et seq.).

b. District and IDEQ Approvals. The Sewer System, and each phase or portion thereof, shall be designed and constructed to comply with applicable state rules and/or regulations, the Wastewater Facility Plan, the District's standard notes regarding construction, which may be amended from time to time, and this Agreement. Prior to the commencement of construction of any phase of the Sewer System (or any portion thereof), the plans and specifications therefor shall first receive written approval from the District, which approval shall not be unreasonably withheld, conditioned or delayed, and from IDEQ. M3 and the District shall use good faith efforts and shall cooperate with one another to obtain expeditiously IDEQ's review and written approval of each phase of the Sewer System, including, without limitation: facility plan(s); engineering report(s); construction plans and specifications; technical, financial and managerial capacity documentation; and operation and maintenance manual(s). The obligation of the District to serve the Sewer Users in Spring Valley shall be contingent upon the development of the Sewer System in compliance with such approvals.

c. Construction Phases. The construction of the Sewer System shall proceed substantially in accordance with the Wastewater Facility Plan, which generally describes development of the Sewer System in 6 phases; provided, however, the parties acknowledge that the phasing described in the Wastewater Facility Plan may be adjusted upon their mutual written consent, which consent shall not be unreasonably withheld, conditioned or delayed. The parties agree to use all good faith efforts and cooperation to coordinate the design and construction of Sewer System phases with adequate capacity to timely meet the sewer service requirements of the various phases of Spring Valley.

d. Use of District Easements. M3, and/or the Spring Valley CID to the extent it has received the obligation to construct the Sewer System, shall have the right, upon receipt from the District of any necessary encroachment permit, to enter and remain upon, and cross over, District-held easements or rights-of-way, if any, to the extent reasonably necessary to facilitate construction, repairs and/or maintenance of the Sewer System, provided such use of said easements and rights-of-way does not unreasonably impede or adversely affect the District's use and enjoyment thereof, and provided further that any damage to said easements or rights-of-way occurring or arising from such use shall be promptly repaired to the conditions existing prior to such use.

e. District Assistance. The District, to the extent of its power and authority, and as reasonably necessary to facilitate construction of the Sewer System, shall cooperate reasonably with M3 (or Spring Valley CID to the extent construction obligations have been assigned to Spring Valley CID) in obtaining the following:

i. the abandonment of any unnecessary public rights-of-way or easements;

ii. the acquisition of any necessary public rights-of-way or easements, provided, however, that any use of the District's power of eminent domain for such purposes shall be at the sole discretion of the District, notwithstanding anything to the contrary set forth herein;

iii. submitting requests or filing applications, or entering into intergovernmental agreements with appropriate governmental entities regarding the abandonment or acquisition of public rights-of-way or easements necessary to develop the Sewer System; and

iv. issuance of encroachment permits to the extent reasonably necessary to facilitate construction, or to perform necessary maintenance or repairs of the Sewer System.

f. Inspection. The District and the District's agents and employees shall be notified of and permitted to attend scheduled pre-construction and construction conferences, and similar meetings between M3 and any contractor or subcontractor involved in construction of the Sewer System. The District shall have reasonable access to the Sewer System property during construction for the purpose of observing and inspecting such construction. M3 shall complete, at M3's expense, such performance testing of the Sewer System as the District deems reasonably necessary. M3 shall have the opportunity to contest any determination of partial or complete unsuitability, and a reasonable opportunity to cure any identified defects.

3. Conveyance of the Sewer System

a. Conveyance of the Sewer System. Upon satisfactory completion of each phase of the Sewer System, or portions thereof, by M3 or Spring Valley CID, the same shall be promptly offered for conveyance to the District, at no cost other than reimbursement to M3 of certain outstanding Eligible Costs as described and provided for in paragraph 6 herein below. The District shall be obligated to accept any such offered conveyance subject to satisfaction of the following terms and conditions:

i. Conveyance shall include a fee simple deed and/or a permanent easement acceptable to the District, transferring to District all real property on which the subject Sewer System components are located, together with reasonable access thereto;

ii. Conveyance shall include a bill of sale or other document acceptable to the District transferring ownership of all personal property and equipment included in the proposed conveyance;

iii. Assignment of all warranties for all equipment being conveyed, to the extent transferrable;

iv. Operation and maintenance manuals for equipment being conveyed, and any other information in the possession of M3 or the transferor regarding the operation of the equipment or facilities being conveyed;

v. Such other documentation or information as may be reasonably requested by the District; and

vi. Receipt of reasonable assurances by the District that the capacity of the Reuse System, or portion thereof, has been approved by the appropriate governmental agencies and is or will be sufficient to accept any Recycled Water delivered from the Sewer System components offered for conveyance to the District.

b. Conditions to Conveyance. The District's obligation to accept the conveyance of each completed phase or portion of the Sewer System shall be conditioned upon:

i. The District's written acceptance of the subject phase, or portion thereof, which shall not be unreasonably withheld, conditioned or delayed. Further, in the event the District refuses to accept any offered phase, or portion thereof, the District shall, in writing to the entity offering to convey the same, set forth the specific defects or unacceptable conditions upon which the refusal is based, and provide the offering entity a reasonable opportunity in which to cure the specific defects or unacceptable conditions; and

ii. Provision to the District by the transferor of a standard policy of title insurance, insuring good title in the District to all real property interests conveyed, if any, issued by a title insurance company and in an amount reasonably acceptable to the District showing that title to such real property to be transferred is free and clear of any material liens, encumbrances or security interests. Any material liens, encumbrances or security interests of a definite or ascertainable amount shall be removed by M3 on or before such conveyance or M3 shall have the title insurance company commit to insure against loss or damage that may be occasioned by such material liens, encumbrances or security interests on or before such conveyance.

c. Warranties. Upon the conveyance of each phase or portion of the Sewer System by M3 and/or the Spring Valley CID to the District, M3 shall provide a 1-year warranty to the District, from the date of conveyance, against defects in design, construction or workmanship of said phase or portion and, during such warranty period, M3 shall pay for the cost to correct defects in design, construction or workmanship. In the event M3 receives warranties for any portions of the Sewer System conveyed to the District that extend beyond the 1-year period, M3 will, to the extent possible, assign to the District the full remaining warranty. Other than as provided in this paragraph, the conveyance of any phases or portions of the Sewer System shall be on an as-is, where-is basis.

d. Risk of Loss. The risk of loss of any phase of the Sewer System of portions thereof conveyed to the District shall be on M3 prior to conveyance to the District, and shall be on the District following such conveyance.

e. Ownership. Upon its acceptance of each phase of the Sewer System, or portion thereof, the District shall assume all responsibility for its ownership, operation and maintenance.

f. Will Serve. Based upon the total available existing capacity of the Sewer System, including all functional components thereof, the District shall, as and when reasonably requested, issue written assurance of sewer service (sometimes referred to as a "**Will Serve Letter**") for any phase or portion of Spring Valley to any interested person including, without limitation, the City or other governmental entity having jurisdiction over Spring Valley. Further, upon request by M3 or government agencies, the District shall, as and when reasonably requested, issue a conditional Will Serve Letter for any proposed phase of Spring Valley to any interested person including, without limitation, the City or other governmental entity having jurisdiction over Spring Valley, expressly conditional upon the acceptable completion of future or uncompleted phases of the Sewer System, or portions thereof.

4. District Fees. In connection with its ownership, operation, maintenance, repair and replacement of the Sewer System, the District is entitled by the Sewer District Act to assess and collect certain fees and charges, including the following, which M3 and the District agree will apply to all Sewer Users:

i. Real property taxes, levied in the manner and amount permitted by law on all real property situated within the District.

ii. A monthly Sewer User fee, payable for each equivalent residential dwelling unit connection ("**EDU**") connected to the Sewer System ("**Monthly User Fee**"). The amount of said Monthly User Fee shall be determined from time to time by the Board, and shall be applicable of all Sewer Users.

iii. A connection fee assessed for each EDU connected to the Sewer System, payable at the time of connection (the "**Connection Fee**"). The Connection Fee shall include a portion related to the Treatment Plant (the "**Treatment Plant Fee**") and the remaining portion related to the Conveyance Facilities (the "**Conveyance Facilities Fee**"). Currently, and until and unless subsequently amended upon the mutual written consent of the parties hereto, the total Connection Fee shall be $6,600.00, $4,030.00 of which shall be the Treatment Plant Fee and $2,570.00 of which shall be the Conveyance Facilities Fee.

5. Operation and Maintenance Shortfalls. The phases of the Sewer System, or portions thereof, which are conveyed to the District shall thereafter be operated, maintained, repaired and replaced by the District, with the exception of any costs resulting from breach of M3's warranty described in paragraph 3.d above. The parties, however, acknowledge that during initial stages of such operation, maintenance, repair and replacement of the Sewer System by the District, the Monthly User Fee revenues collected may be insufficient to cover the District's costs. To protect the District from such shortfalls after the date on which the first phase of the Sewer System (or portion thereof) is conveyed to the District ("**Initial Conveyance Date**"), the parties agree as follows:

i. In connection with the conveyance of the first phase of the Sewer System (or portion thereof) to the District, M3 shall provide to the District the lesser of $100,000.00 or the actual price of a sewage hauling truck with a capacity reasonably calculated by the District to be sufficient for the District to haul wastewater from the Property for off-site treatment and disposal until such time as wastewater volumes generated by Sewer Users is sufficient, in the reasonable opinion, of the District to permit the operation of the Treatment Plant, which sum shall be used by the District to purchase a sewage hauling truck for delivery to the District within 3 months of the District's receipt of such sum and the District shall be responsible and obligated to so haul wastewater from the Property for off-site treatment and disposal.

ii. As of the fifth, sixth and seventh anniversaries of the Initial Conveyance Date, or until the total EDU's connected to the Sewer System reaches 300 EDUs, whichever shall first occur, the District shall calculate, and prepare an accounting of, all costs incurred by the District in the operation and maintenance of the Treatment Plant (not including personnel and/or administrative costs) for the twelve months immediately preceding each of said anniversaries, exclusive of any administrative costs ("**Annual O&M Costs**"). If the Annual O&M costs for any of said twelve-month periods exceed the total Monthly User Fees collected by the District for the same period, the difference ("**Annual Shortfall**") shall be invoiced to M3 by the District, payable by M3 within 45 days after M3's receipt of such invoice. Notwithstanding the foregoing, the Annual Shortfall payable by M3 shall not exceed $40,000.00 for any twelve-month period.

6. Reimbursement.

a. Reimbursement. Subject to the following terms, conditions and limitations, M3 shall be entitled to reimbursement from the District for certain costs (hereinafter described and referred to as "**Eligible Costs**") reasonably incurred in the design and construction of each phase of the Treatment Plant satisfactorily completed and conveyed to the District as herein provided for:

i. The term "**Eligible Costs**" shall exclusively mean and refer to those costs actually incurred by M3 for the "Process Equipment", "Building/Structural", and "Other" components (collectively "**Eligible Components**") as described and included in the estimated cost breakdown listed for each phase of the Treatment Plant in the "Spring Valley Wastewater Treatment Cost Estimate Summary," prepared by JUB Engineers, a copy of which is attached hereto as **Exhibit D** and made a part hereof, together with actual engineering costs incurred and paid by M3 for design and construction supervision services related to said Eligible Components, not to exceed 6% of the cost of construction to which such design and construction supervision services relate. M3 shall retain all invoices and payment records relating to Eligible Costs, and shall make such information available to the District at the time each phase of the Treatment Plant (or portion of such phase) is conveyed to the District.

ii. Eligible Costs incurred by M3 shall not, for purposes of reimbursement from the District, bear interest.

iii. The amount of Eligible Costs reimbursable by the District to M3 shall be reduced by the amount of any reimbursement of Eligible Costs received by M3 from any third parties or entities, including, but not limited to, the Spring Valley CID, any local improvement district or municipal bond proceeds.

iv. Reimbursement of Eligible Costs to M3 by the District shall cease with respect to all such Eligible Costs associated with any phase or portion of the Treatment Plant sold or transferred by M3 to any entity other than the District.

b. Reimbursement Payments. Reimbursement payments from the District to M3 shall be limited and paid as follows:

i. The source of reimbursement payments for Eligible Costs shall be limited exclusively to the Treatment Plant Fees collected by the District.

ii. Notwithstanding anything to the contrary herein expressly provided or implied, only those Treatment Plant Fees collected by the District for a period of 30 years after the first phase of the Treatment Plant has been completed and conveyed to the District, shall be available to reimburse M3 for any outstanding balance of Eligible Costs.

iii. For so long as there remains an outstanding balance of Eligible Costs, the District shall pay to M3, within 30 days of the end of each calendar quarter for the above-referenced time period, the Treatment Plant Fees, if any, collected during such calendar quarter.

7. **Spring Valley CID**. For purposes hereof, the following definitions apply:

CID Development Agreement – Amended and Restated District Development Agreement No. 1 between M3 Eagle, L.L.C. and the Spring Valley Community Infrastructure District No. 1, recorded December 21, 2012 in the records of Ada County, Idaho as Instrument No. 112134984, as the same may be amended or restated from time to time.

Spring Valley CID – Spring Valley Community Infrastructure District No. 1 (City of Eagle, Idaho), a political subdivision of the State of Idaho.

The parties acknowledge that the Spring Valley CID has been established for the purpose of participating in the financing, construction and/or acquisition of certain community infrastructure in connection with the development of Spring Valley, including, without limitation, the Sewer System. Such participation with respect to the Sewer System may be accomplished in one or more of the following methods:

i. Spring Valley CID may, at its expense and consistent with the provisions of this Agreement, construct the Sewer System, or specific phases or portions thereof, and upon completion of any components of the Sewer System shall thereafter offer to convey them to the District consistent with the provisions of paragraph 3 hereinabove; or

ii. Spring Valley CID may, at its expense, purchase and acquire any or all phases of the Sewer System, or specific phases or portions thereof, which have been constructed and completed by M3, provided that any components of the Sewer System so acquired shall thereafter be offered for conveyance to the District consistent with the provisions of paragraph 3 hereinabove; or

iii. M3 may construct the Sewer System, or specific phases or portions thereof, in part or in whole with funds provided by Spring Valley CID, provided that upon completion of any components of the Sewer System in this manner, the same shall thereafter be offered for conveyance to the District consistent with the provisions of paragraph 3 hereinabove.

The parties further acknowledge that M3 may construct all or a portion of the Sewer System with M3's funds with the understanding that the Spring Valley CID may, from time to time, acquire portions of the Sewer System (which have been constructed with such M3 funds) with the proceeds of bonds pursuant to the CID Development Agreement. The Spring Valley CID may thereafter reimburse M3 the funds spent by M3 in connection with construction of the Sewer System and convey such completed portions of the Sewer System to the District. Any such funds received by M3 for, or related to, the Treatment Plant from Spring Valley CID shall be credited by M3 first to any outstanding balances of Eligible Costs. Upon such conveyance, the District shall assume responsibility for the ownership, operation, and maintenance of the completed Sewer System acquired and/or constructed with such bond proceeds. At the request of M3, the District shall reasonably cooperate with M3 and Spring Valley CID in connection with the development of all or a portion of the Sewer System.

8. Service to Property Outside of Spring Valley.

a. Adequate Capacity. The District and M3 acknowledge that some of the capacity of the Sewer System funded by Spring Valley CID bond proceeds and/or M3, and conveyed to the District, may, with the express written consent of M3 and subject to the following criteria, be used by the District to serve property outside of Spring Valley ("**Outside Property**") subject to the following:

i. The District shall ensure M3 shall have priority service in connection with the Sewer System.

ii. The District determines, and demonstrates to M3's reasonable satisfaction, which M3 shall confirm in writing to the District, that the Treatment Plant have sufficient available capacity to properly treat and store wastewater generated by current Sewer Users in Spring Valley and by Sewer Users in such Outside Property.

iii. M3 determines, and demonstrate to the District's reasonable satisfaction, which the District shall confirm in writing to M3 that the Reuse System has sufficient available capacity to properly dispose of Recycled Water generated by current Sewer Users in Spring Valley and by Sewer Users in such Outside Property.

iv. The District determines, and demonstrates to M3's reasonable satisfaction, which M3 shall confirm in writing to the District, that despite such service to Outside Property, the capacity of the Sewer System will continue to be sufficient to meet the service requirements for all Sewer Users in Spring Valley, as they are requested.

v. The District determines, and demonstrates to M3's reasonable satisfaction, which M3 shall confirm in writing to the District, that no such service to Outside Property will render the buildout design capacity of the Sewer System, as set forth in the Wastewater Facility Plan, and the Reuse System, insufficient for the service of total densities approved for Spring Valley by the City of Eagle in the Development Agreement, including amendments thereto.

vi. That any Outside Property proposed to be served has been duly annexed into the District and the parties have used good faith efforts to ensure that such Outside Property has been annexed into the Spring Valley CID; and

In the event the conditions in i through vi above are met and the Sewer System, or any portions thereof, are used to serve Outside Property, M3 shall have and retain all right, title, and interest in and to all of the Recycled Water generated by Sewer Users in such Outside Property and be obligated to accept delivery of Recycled Water for lawful disposal in its Reuse System.

b. Reimbursement. For so long as any outstanding balance of Eligible Costs are payable to M3 pursuant to Section 6 hereinabove, the District agrees to collect, and reimburse to M3, a Treatment Plant Fee for each EDU connected to the Sewer System from the Outside Property. The amount of such

Treatment Plant Fee shall not be less than the Treatment Plant Fee charged at the time of connection for each EDU connection from Sewer Users in Spring Valley.

9. Reuse.

a. Acceptance and Disposal of Recycled Water. All Recycled Water shall be delivered by the District into the Reuse System, at no cost to M3, at the Point of Compliance, defined below. M3 agrees to accept and dispose of said Recycled Water, at no cost to the District, provided that such Recycled Water has been treated at the Treatment Plant as generally described in the Wastewater Facility Plan and as required by IDEQ.

b. Recycled Water. The District's obligation to accept the conveyance of any phase of the Treatment Plant (or portion of such phase) is contingent upon the District's receipt of reasonably acceptable assurances that:

i. The Reuse System has adequate capacity to accommodate all Recycled Water generated from the Treatment Plant from such phase thereof (or portion of such phase); and

ii. M3 is permitted by IDEQ to accept delivery of Recycled Water from the Treatment Plant into the Reuse System at a specified point where the Recycled Water meets the requirements of IDEQ (the "**Point of Compliance**"). **Exhibit C** conceptually depicts the "effluent conveyance pump station" that would be such Point of Compliance where Recycled Water is delivered from the Treatment Plant to the Reuse System.

iii. To the extent the Recycled Water is to be used for land application, M3 shall have designated certain real property as part of the Reuse System to which Recycled Water will be land applied for irrigation and disposal (the "**Reuse Property**") and has, to the reasonable satisfaction of the District, demonstrated that: (A) such Reuse Property is owned or controlled by M3; (B) is sufficient in area to receive all Recycled Water to be delivered to the Reuse System for land application; (C) has been improved with a Recycled Water application/distribution system sufficient for its intended purpose; (D) will continue to be used for land application of Recycled Water unless and until substitute land is designated as Reuse Property for such land application; and (E) that the Reuse Property is permitted by IDEQ to receive the Recycled Water.

c. Irrigation District. M3 may, in M3's sole discretion, form an irrigation district, or work with the City of Eagle to form a municipal irrigation district, pursuant to applicable law in order to administer the storage, distribution, maintenance and use of irrigation facilities in Spring Valley. Such irrigation district may, in the sole discretion of M3 and in accordance with applicable federal, state and local rules and/or regulations, make use of the Recycled Water. M3 may, in M3's sole discretion, assign M3's rights under this Agreement to all or a part of the Recycled Water to any such irrigation district; provided, however, that such assignment shall not eliminate or affect in any manner, M3's obligations, under the terms and conditions set forth herein, to accept all Recycled Water from the Sewer System at the Point of Compliance, and to dispose the Recycled Water in compliance with all applicable governmental permits, regulations and statutes.

d. District Possession of Reuse System. The parties acknowledge and agree that the District's obligation to provide sewer service to Sewer Users is dependent upon M3's continued operation, maintenance and repair of the Reuse System, including the Reuse Property, so as to receive, and dispose of Recycled Water as agreed to herein. To protect the District in the event M3 is unable and/or unwilling, for whatever reason, to accept and dispose of all Recycled Water from the Sewer System ("**Reuse Default**"), M3 agrees as follows:

i. The District is hereby given an irrevocable license ("**License**") to take possession of the Reuse System upon the occurrence of a Reuse Default, permitting the District to take immediate possession of the Reuse System for the purpose of operating, maintaining and repairing the Reuse System, in accordance with any and all applicable laws, regulations, ordinances and governmental approvals until such time as M3 has satisfactorily demonstrated to the District M3's ability and willingness to resume operation, maintenance and repair of the Reuse System, whereupon further utilization of the License by the District shall cease until and unless a subsequent Reuse Default should occur.

ii. To assure the uninterrupted availability of sufficient Reuse Property for the District's disposal of Recycled Water in the event of a Reuse Default by M3, M3 shall, at the time each parcel of Reuse Property is designated for land application of Recycled Water as provided for in paragraph 9(b)(iii) above, grant to the District an easement on said parcel of Reuse Property for the purpose of Recycled Water land application. Each of said easements shall provide that such easement may be exercised and used by the District only in the event of a Reuse Default by M3, and only for so long as the District is in possession of, and operating, the Reuse System pursuant to its License granted in the immediately preceding subparagraph 9(d)(i). Said easement on each designated parcel of Reuse Property shall continue in effect until and unless said parcel of Reuse Property is replaced by a substituted parcel of Reuse Property, designated and approved as provided for in paragraph 9(b)(iii) above, at which time M3 shall grant a like easement on the substituted parcel of Reuse Property and the District shall release its easement from the parcel of Reuse Property which has been replaced, which release shall not be unreasonably withheld, conditioned or delayed by the District.

iii. M3 acknowledges and agrees that the remedies set forth hereinabove for any Reuse Default shall be in addition to any other or further legal or equitable remedies available to the District resulting from, or in any way connected with, said default by M3. Further, M3 hereby agrees to indemnify the District for, and hold the District harmless from and against, any and all claims, liability, expenses, losses or damages that are asserted or incurred by the District by reason of the District's status or actions as a licensee or easement holder pursuant hereto, but excluding any claims or liabilities asserted against the District which are caused by the District's gross negligence or willful misconduct.

10. Miscellaneous.

a. Term. This Agreement shall be binding upon the parties and their respective successors and assigns until the later of 30 years (commencing as of the Initial Conveyance Date); or the completion of the obligations of the parties hereunder.

b. Amendment to this Agreement. The District and M3 acknowledge that amendments to this Agreement may be necessary or appropriate from time to time. When the parties agree that an amendment is necessary or appropriate, the parties shall, unless otherwise required by applicable law, effectuate minor amendments, as reasonably determined by the District administrator, administratively by the District staff. The approval of such minor amendments shall not necessitate formal amendment of this Agreement, but shall be retained in the District's official file for Spring Valley. All major amendments to this Agreement, as reasonably determined by the District administrator, shall be reviewed and approved by the Board in accord with the notice and public hearing procedures of the District. The parties shall cooperate in good faith to agree upon and use reasonable efforts to process any amendments to this Agreement.

c. Agreement to Cooperate. The District and M3 shall use all good faith efforts to cooperate with each other and with any and all applicable governmental entities and agencies in connection with any and all interactions between the District and/or M3 and such applicable governmental entities and agencies regarding the Sewer System and/or the Reuse System.

In the event of any legal or equitable action or other proceeding instituted by a third-party or other governmental entity or official challenging the validity of any provision of this Agreement, the parties hereby agree to cooperate in defending such action or proceeding. The District and M3 may agree to select mutually agreeable legal counsel to defend such action or proceeding with the parties sharing equally in the cost of such joint counsel, or each party may select its own legal counsel at each party's expense. All other costs of such defense(s) shall be shared equally by the parties. Each party shall retain the right to pursue its own independent legal defense.

d. Default. Failure or unreasonable delay by either party to perform or otherwise act in accordance with any term or provision of this Agreement for a period of 30 days following written notice thereof from the other party (the "**Cure Period**"), shall constitute a default under this Agreement; provided, however, that if the failure or delay is such that more than 30 days would reasonably be required to perform such action or comply with any term or provision hereof, then such party shall have such additional time as may be reasonably necessary to perform or comply so long as such party commences performance or compliance within such 30-day period and diligently proceeds to complete such performance or fulfill such obligation (the "**Extended Cure Period**"); and provided further, that such party shall perform its obligations immediately if the nature of the problem presents a hazard or emergency. The written notice provided for above shall specify the nature of the alleged default and the manner in which said default may be satisfactorily cured, if possible.

e. Dispute Resolution. Notwithstanding anything to the contrary herein, if an event of default is not cured within the Cure Period or the Extended Cure Period, if applicable, the non-defaulting party may initiate the process by providing written notice initiating the process to the alleged defaulting party. Within 15 days after delivery of such notice, each party shall appoint one person to act as mediator on behalf of such party and notify the other party. Within 15 days after delivery of such notice, the persons appointed shall themselves appoint one person to serve as the sole mediator. The mediator shall set the time and place of the mediation and shall give reasonable notice of the mediation to the parties. The parties may agree to hold the mediation by telephone.

The parties have structured this dispute resolution process with the goal of providing for the prompt and efficient resolution of all disputes falling within the purview of this process. The mediation of any dispute shall commence as soon as practicable, but in no event later than 30 days after selection of the mediator. This deadline can be extended only with the consent of both parties. Proceedings shall be under the control of the mediator and as informal as practicable. In order to effectuate the parties' goals, the mediation, once commenced, shall proceed from business day to business day until concluded, absent a showing of unforeseen or emergency circumstances. Each party shall pay one-half of all fees and costs associated with the mediation. If those receiving a request for mediation fail to appoint a mediator within the time above specified, or if the result of such mediation is unsatisfactory to one or more parties, then any party may avail itself of any legal or equitable remedy available under Idaho law.

f. Prevailing Party. If either party shall default in the full and timely performance of this Agreement and said default is cured with the assistance of an attorney for the other party and before the commencement of a suit thereon, as a part of curing said default, the reasonable attorneys' fees incurred by the other party shall be reimbursed to the other party upon demand. In the event that either party to this Agreement shall file suit or action at law or equity to interpret or enforce this Agreement hereof, the unsuccessful party to such litigation agrees to pay to the prevailing party all costs and expenses, including reasonable attorney's fees, incurred by the prevailing party, including the same with respect to an appeal.

g. Notices. All notices, filings, consents, approvals and other communications provided for herein or delivered in connection herewith shall be validly delivered, filed, made, or served if in writing and delivered personally or delivered by a nationally recognized overnight courier or sent by certified United States Mail, postage prepaid, return receipt requested or delivered via facsimile.

Any notice or demand to M3 shall be addressed to:

M3:	With a copy to:
William Brownlee	JoAnn Butler
M3 Companies, L.L.C.	Spink Butler, LLP
4222 E. Camelback Road, Suite H-100	251 East Front Street, Suite 200
Phoenix, AZ 85018	Boise, ID 83702
Facsimile: 602-386-1315	Facsimile: 208-388-1001

With a copy to:
Mark Tate
M3 Companies, L.L.C.
533 East Riverside Drive, Suite 110
Eagle, Idaho 83616
Facsimile: 208-939-6752

With a copy to:
Carter Froelich
Development Planning & Financing Group
3302 East Indian School Road
Phoenix, AZ 85018
Facsimile: 602-381-1203

Any notice or demand to the District shall be addressed to:

The District:
Lynn Moser, General Manager
Eagle Sewer District
44 North Palmetto
Eagle, ID 83616
Facsimile: 208-939-8986

With a copy to:
Evan Robertson
Robertson & Slette, PLLC
134 Third Avenue East
P.O. Box 1906
Twin Falls ID 83303-1906
Facsimile: 208-933-0701

Any party may change such party's address as such party hereto may from time to time designate in writing and deliver in a like manner. Notices, filings, consents, approvals and communication given by mail shall be deemed delivered immediately if personally delivered, when sent if by facsimile, 24 hours following deposit with a nationally recognized overnight courier, or 72 hours following deposit in the U.S. mail, postage prepaid and addressed as set forth above.

h. Successors. This Agreement shall be binding upon and inure to the benefit of the parties to this Agreement and their respective heirs, executors, administrators, legal representatives, successors, and assigns; provided, however, this Agreement may not be assigned, either in whole or in part, by any party hereto without the prior written consent of the other party, which consent shall not be unreasonably withheld, conditioned or delayed. In the event of any such assignment with prior written consent, the assignee shall assume such assignor's obligations under this Agreement in writing as though such assignee had been an original party to this Agreement and such assignor shall be released from its obligations hereunder.

i. Severability. If any of the terms and/or conditions hereof shall, for any reason, be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability, shall not affect any other of the terms and conditions hereof and the terms and conditions hereof thereafter shall be construed as if such invalid, illegal, or unenforceable term or condition had never been contained herein.

j. Entire Agreement. This Agreement constitutes the entire agreement between the parties pertaining to the subject matter hereof. All prior and contemporaneous agreements, representations, and understandings of the parties, oral or written, are hereby superseded and merged herein. No modification or amendment to this Agreement of any kind whatsoever made or claimed by any party shall have any force or effect whatsoever unless the same shall be endorsed in writing and signed by the party against which the enforcement of such modification or amendment is sought, and then only to the extent set forth in such instrument.

k. Time. Time is of the essence to the performance of any provision of this Agreement. Each of the parties shall promptly execute and deliver all such documents and perform all such further acts as reasonably necessary, from time to time, to carry out the matters contemplated by this Agreement.

l. Force Majeure. In the event of delays due to, without limitation, strikes, inability to obtain materials, civil commotion, fire, war, terrorism, lockouts, riots, floods, earthquakes, epidemic, quarantine, freight embargoes, failure of contractors to perform, or other circumstances beyond the reasonable control of the parties and that substantially interfere with the ability of either party to perform its obligations under this Agreement, then the time for performance of any such obligation shall be extended for such period of time as the cause of such delay shall exist.

m. Interpretation; Headings; Construction. Titles and captions are for convenience only and shall not constitute a portion of this Agreement. As used in this Agreement, masculine, feminine, or neuter gender and the singular or plural number shall each be deemed to include the others wherever and whenever the context so dictates. Any exhibit attached hereto shall be deemed to have been incorporated herein with the same force and effect as if fully set forth in the body hereof. The recitals set forth above shall be deemed to have been incorporated herein with the same force and effect as if fully set forth in the body hereof. All parties hereto have either been represented by separate legal counsel or have had the opportunity to be so represented. Thus, in all cases, the language herein shall be constructed simply in accord with its fair meaning and not strictly for or against a party, regardless of whether such party prepared or caused the preparation of this Agreement. In the event of conflict between the standard operating policies and procedures of the District and this Agreement, this Agreement shall control.

n. Waiver. No delay in exercising any right or remedy shall constitute a waiver by any party hereto, and no waiver by any party hereto of the breach of any term of this Agreement shall be construed as a waiver of any preceding or succeeding breach of the same or any term of this Agreement.

o. Governing Law. The terms and conditions hereof shall be governed by and construed in accordance with the laws of the State of Idaho.

p. Survival. The terms, provisions, covenants (to the extent applicable), and indemnities provided in this Agreement shall survive any closing and/or any and delivery of any deed or other real or personal property transfer document, and this Agreement shall not be merged therein, but shall remain binding upon and for the parties hereto until fully observed, kept or performed.

q. Capitalized Terms. Capitalized terms used in this Agreement shall, unless otherwise clearly indicated, have the meaning as so defined.

r. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together constitute one and the same instrument.

s. No Partnership; Third Parties. It is hereby specifically understood, acknowledged and agreed that neither the District nor M3 shall be deemed to be an agent of the other for any purpose whatsoever. It is not intended by this Agreement to, and nothing contained in this Agreement shall, create any partnership, joint venture or other arrangement between M3 and the District. No term or provision of this Agreement is intended to, or shall, be for the benefit of any third-party, person, firm, organization or legal entity not a party hereto, and no such other third-party, person, firm, organization or legal entity shall have any right to cause of action hereunder.

t. Good Standing; Authority. Each of the parties represents to the other that: (a) M3 is a Texas limited liability company duly qualified to do business in Idaho; (b) the District is a political subdivision duly qualified to do business in the State of Idaho; and (c) the individual(s) executing this Agreement on behalf of the parties are authorized and empowered to bind the party on whose behalf each such individual is signing.

[end of text – signatures on following page]

IN WITNESS WHEREOF, the parties hereto, having been duly authorized, have executed this Agreement as of the Effective Date.

THE DISTRICT:

EAGLE SEWER DISTRICT, a political subdivision of the State of Idaho

By: Erv Ballou (signature)
Erv Ballou
Chairman of the Board of Directors

M3:

M3 EAGLE L.L.C., a Texas limited liability company

By: Project Holdings, LLC, an Arizona limited liability company, its sole Member

By: M3 BUILDERS, L.L.C., an Arizona limited liability company, its Manager

By: The M3 Companies, L.L.C., an Arizona limited liability company, its sole Member

By: (signature)
William I. Brownlee
Its: Manager

STATE OF IDAHO)
) ss.
County of Ada)

On this 14th day of April, 2014, before me, the undersigned, a Notary Public in and for said State, personally appeared Erv Ballou, known or identified to me to be the Chairman of the Board of Directors of Eagle Sewer District, the political subdivision of the State of Idaho that executed the instrument or the person who executed the instrument on behalf of said political subdivision, and acknowledged to me that such political subdivision executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

LYNNE SEDLACEK NOTARY PUBLIC STATE OF IDAHO

Lynne Sedlacek (signature)
Notary Public for Idaho
Residing at Eagle
My commission expires: 9-13-2018

STATE OF IDAHO)
) ss.
County of Ada)

On this 14th day of March, 2014, before me, the undersigned, a Notary Public in and for said State, personally appeared William I. Brownlee, member of The M3 Companies, L.L.C., an Arizona limited liability company, the sole member of M3 Builders, L.L.C., an Arizona limited liability company, the manager of Project Holdings, LLC, an Arizona limited liability company, known or identified to me to be the sole member of M3 Eagle L.L.C., the Texas limited liability company that executed the instrument, or the person who executed the instrument on behalf of said limited liability company, and acknowledged to me that such limited liability company executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

GERI A. SCROGHAM
NOTARY PUBLIC
STATE OF IDAHO

Geri A. Scrogham (signature)
Notary Public for Idaho
Residing at Boise, Idaho
My commission expires: 1-8-19

Schedule of Exhibits:

Exhibit A: **Legal Description of the Property**
Exhibit B: **Conceptual Development Plan of Spring Valley**
Exhibit C: **Conceptual Depiction of Treatment Plant**
Exhibit D: **Spring Valley Wastewater Treatment Cost Estimate Summary – Eligible Costs**

EAGLE SEWER DISTRICT ANNEXATION DESCRIPTION FOR M3 PROPERTIES

January 3, 2014

PARCEL 1

A PARCEL OF LAND BEING PORTIONS OF SECTIONS 10, 11, 12, 13, 14, 15, 22, 23, 24, 26, 27, 28 AND 33, TOWNSHIP 5 NORTH, RANGE 1 WEST, B.M. AND SECTIONS 7, 17, 18, 19 AND 20, TOWNSHIP 5 NORTH, RANGE 1 EAST, B.M., ADA COUNTY, IDAHO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SECTION 33, T.5 N., R.1 W., B.M., THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION;

THENCE S 51°51'16" W 1038.72 FEET TO A POINT;

THENCE S 08°04'51" E 54.22 FEET TO A POINT;

THENCE S 63°02'18" W 382.31 FEET TO A POINT;

THENCE S 67°11'38" W 254.57 FEET TO A POINT;

THENCE S 52°16'06" W 535.08 FEET TO A POINT;

THENCE S 38°40'25" W 715.30 FEET TO A POINT;

THENCE S 21°05'40" W 84.42 FEET TO A POINT;

THENCE N 88°57'16" W 182.70 FEET TO A POINT ON THE EAST RIGHT OF WAY OF HIGHWAY 16;

THENCE CONTINUING N 88°57'16" W 52.67 FEET TO A POINT ON A CURVE ON THE CENTERLINE OF HIGHWAY 16;

ALONG THE CENTERLINE OF HIGHWAY 16 THE FOLLOWING:

THENCE 274.75 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1909.86 FEET, A DELTA ANGLE OF 8°14'33", A

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

TANGENT OF 137.61 FEET AND A CHORD BEARING OF N 12°55'08" W 274.51 FEET TO A POINT OF SPIRAL CURVATURE;

THENCE 360.00 FEET ALONG A SPIRAL CURVE, HAVING A RADIUS OF 1909.86 FEET, A THETA ANGLE OF 5°24'00" AND A CHORD BEARING N 05°11'51" W 359.86 FEET TO A POINT OF TANGENCY;

THENCE N 03°23'51" W 974.07 FEET TO A POINT;

LEAVING THE CENTERLINE OF HIGHWAY 16;

THENCE N 86°36'09" E 50.00 FEET TO A POINT ON THE EAST RIGHT OF WAY OF HIGHWAY 16;

THENCE N 87°34'55" E 181.86 FEET TO A POINT;

THENCE N 68°21'01" E 96.70 FEET TO A POINT;

THENCE N 58°25'55" E 150.10 FEET TO A POINT;

THENCE N 00°37'49" E 303.23 FEET TO A POINT;

THENCE S 67°20'45" E 25.66 FEET TO A POINT OF CURVATURE;

THENCE 167.31 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 140.00 FEET, A DELTA ANGLE OF 68°28'28", A TANGENT OF 95.28 FEET, A CHORD BEARING N 78°25'01" E 157.53 FEET TO A POINT OF TANGENCY;

THENCE N 44°10'47" E 140.31 FEET TO A POINT OF CURVATURE;

THENCE 25.96 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 250.00 FEET, A DELTA ANGLE OF 05°57'01", A TANGENT OF 12.99 FEET, A CHORD BEARING N 41°12'17" E 25.95 FEET TO A POINT ON A CURVE;

THENCE N 81°23'04" E 27.32 FEET TO A POINT;

THENCE S 68°29'37" E 45.40 FEET TO A POINT;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/16 STATE OF IDAHO MICHAEL S. BYRNS

THENCE N 65°02'00" E 50.04 FEET TO A POINT;

THENCE N 23°32'44" E 64.53 FEET TO A POINT;

THENCE N 20°06'56" E 67.97 FEET TO A POINT;

THENCE N 48°34'57" E 51.57 FEET TO A POINT;

THENCE N 78°24'30" E 51.93 FEET TO A POINT;

THENCE S 86°36'10" E 58.11 FEET TO A POINT;

THENCE S 79°22'07" E 63.34 FEET TO A POINT;

THENCE N 68°30'06" E 48.40 FEET TO A POINT;

THENCE N 55°37'43" E 50.14 FEET TO A POINT;

THENCE N 03°55'40" W 113.44 FEET TO A POINT;

THENCE N 55°04'43" E 50.18 FEET TO A POINT;

THENCE S 60°15'33" E 99.46 FEET TO A POINT;

THENCE N 80°09'11" E 33.37 FEET TO A POINT;

THENCE N 56°26'36" E 395.71 FEET TO A POINT;

THENCE S 01°06'40" E 119.64 FEET TO A POINT;

THENCE N 75°37'00" E 356.02 FEET TO A POINT;

THENCE N 01°07'57" W 597.00 FEET TO A POINT;

THENCE S 88°42'53" E 660.70 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF THE SE ¼, SECTION 28;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

THENCE N 00°30'21" E 1315.63 FEET TO THE NORTHWEST CORNER OF THE SW ¼, SECTION 27;

THENCE S 89°21'49" E 1316.18 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE NW ¼, SECTION 27;

THENCE N 00°28'47" E 1316.75 FEET TO THE NORTHWEST CORNER OF THE SE ¼ OF THE NW ¼, SECTION 27;

THENCE S 89°24'56" E 1315.09 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF THE NW ¼, SECTION 27;

THENCE S 89°24'55" E 1321.60 FEET TO THE NORTHEAST CORNER OF THE SW 1/4 OF THE NE 1/4; SECTION 27;

THENCE N 00°06'10" E 1319.18 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE NE ¼, SECTION 27;

THENCE S 89°28'02" E 1314.00 FEET TO THE SECTION CORNER COMMON TO SECTIONS 22, 23, 26 AND 27;

THENCE N 01°29'36" E 1317.12 FEET TO THE NORTHWEST CORNER OF THE SW ¼ OF THE SW ¼, SECTION 23;

THENCE N 89°24'31" W 1319.64 FEET TO THE SOUTHWEST CORNER OF THE NE ¼ OF THE SE ¼, SECTION 22;

THENCE N 01°14'51" E 1318.39 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE SE ¼, SECTION 22;

THENCE N 01°14'53" E 2631.45 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE NE ¼, SECTION 22;

THENCE N 89°27'52" W 1336.59 FEET TO THE SOUTHWEST CORNER OF THE SE ¼, SECTION 15;

THENCE N 89°12'37" W 2642.31 FEET TO THE SECTION CORNER COMMON TO THE SECTION 15, 16, 21 AND 22;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 9/14 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

THENCE N 00°27'13" E 2630.95 FEET TO THE NORTHWEST CORNER OF THE SW ¼ OF SECTION 15;

THENCE S 89°29'08" E 3967.38 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE NE ¼ SECTION 15;

THENCE N 00°09'50" E 2626.90 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE NE ¼, SECTION 15;

THENCE N 00°16'02" E 2629.59 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE SE ¼ OF SECTION 10;

THENCE S 89°18'05" E 1306.55 FEET TO THE NORTHEAST CORNER OF THE NE ¼ OF THE SE ¼ OF SECTION 10;

THENCE N 00°43'51" E 1313.10 FEET TO THE NORTHWEST CORNER OF THE SW ¼ OF THE NW ¼ OF SECTION 11;

THENCE S 88°48'23" E 2640.93 FEET TO THE NORTHWEST CORNER OF THE SW ¼ OF THE NE ¼ OF SECTION 11;

THENCE S 88°48'22" E 1322.75 FEET TO THE NORTHEAST CORNER OF THE SW ¼ OF THE NE ¼, SECTION 11;

THENCE S 00°08'07" W 1315.01 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE NE ¼ OF SECTION 11;

THENCE S 88°46'53" E 1328.84 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF SECTION 11;

THENCE S 88°41'55" E 1300.16 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE NW ¼ OF SECTION 12;

THENCE N 00°14'37" E 1310.85 FEET TO THE NORTHWEST CORNER OF THE SE ¼ OF THE NW ¼ OF SECTION 12;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

THENCE S 88°29'38" E 1308.82 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF THE NW ¼ OF SECTION 12;

THENCE S 88°54'05" E 2618.91 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF THE NE ¼ OF SECTION 12;

THENCE S 00°38'47" W 2630.61 FEET TO THE NORTHWEST CORNER OF THE SW ¼ OF THE SW ¼ OF SECTION 7, T.5N., R.1E.,OF THE B.M.;

THENCE N 89°27'42" E 1320.99 FEET ALONG THE NORTH LINE OF THE SW ¼ OF THE SW ¼ TO A POINT ON THE CENTERLINE OF WILLOW CREEK ROAD;

ALONG THE CENTERLINE OF WILLOW CREEK ROAD THE FOLLOWING;

THENCE S 17°08'49" E 211.69 FEET TO AN ANGLE POINT;

THENCE S 21°38'20" E 468.10 FEET TO A POINT OF CURVATURE;

THENCE 170.12 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 365.00 FEET, A DELTA ANGLE OF 26°42'14", A TANGENT OF 86.63 FEET, A CHORD BEARING S 08°17'13" E 168.58 FEET TO A POINT OF TANGENCY;

THENCE S 05°03'53" W 109.20 FEET TO A POINT OF CURVATURE;

THENCE 190.35 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 310.00 FEET, A DELTA ANGLE OF 35°10'52", A TANGENT OF 98.28 FEET, A CHORD BEARING S 12°31'32" E 187.37 FEET TO A POINT OF TANGENCY;

THENCE S 30°06'58" E 168.08 FEET TO AN ANGLE POINT;

THENCE S 34°03'01" E 298.62 FEET TO AN ANGLE POINT;

THENCE S 10°42'30" E 414.87 FEET TO A POINT OF CURVATURE;

THENCE 220.70 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 225.00 FEET, A DELTA ANGLE OF 56°12'00", A TANGENT OF 120.14

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

FEET, A CHORD BEARING S 38°48'30" E 211.96 FEET TO A POINT OF TANGENCY;

THENCE S 66°54'30" E 1186.00 FEET TO A POINT OF CURVATURE;

THENCE 243.68 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1000.00 FEET, A DELTA ANGLE OF 13°57'43", A TANGENT OF 122.45 FEET, A CHORD BEARING S 59°55'39" E 243.08 FEET TO A POINT OF TANGENCY;

THENCE S 52°56'47" E 351.88 FEET TO A POINT OF CURVATURE;

THENCE 214.22 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 635.00 FEET, A DELTA ANGLE OF 19°19'45", A TANGENT OF 108.14 FEET, A CHORD BEARING S 44°01'28" E 213.21 FEET TO A POINT OF TANGENCY;

THENCE S 34°21'35" E 166.76 FEET TO A POINT OF CURVATURE;

THENCE 205.28 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 480.00 FEET, A DELTA ANGLE OF 24°30'13", A TANGENT OF 104.23 FEET, A CHORD BEARING S 24°11'03" E 203.72 FEET TO A POINT OF TANGENCY;

THENCE S 11°55'56" E 513.68 FEET TO A POINT OF CURVATURE;

THENCE 177.05 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 395.00 FEET, A DELTA ANGLE OF 25°40'56", A TANGENT OF 90.04 FEET, A CHORD BEARING S 24°46'24" E 175.58 FEET TO A POINT OF TANGENCY;

THENCE S 37°36'51" E 2385.82 FEET TO A POINT OF CURVATURE;

THENCE 470.67 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 720.00 FEET, A DELTA ANGLE OF 37°27'17", A TANGENT OF 244.09 FEET, A CHORD BEARING S 18°53'12" E 462.33 FEET TO A POINT OF TANGENCY;

THENCE S 00°09'34" E 210.73 FEET TO A POINT ON THE NORTH LINE OF SAID SECTION 20;

LEAVING SAID CENTERLINE:

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

THENCE N 89°58'31" E 4449.98 FEET TO THE SECTION CORNER COMMON TO SECTION 16, 17, 20 AND 21;

THENCE S 00°15'26" E 1316.05 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF THE NE ¼, SECTION 20;

THENCE S 00°13'25" E 1316.49 FEET TO THE SOUTHEAST CORNER OF THE NE ¼, SECTION 20;

THENCE N 89°57'10" W 1326.37 FEET TO SOUTHWEST CORNER OF THE SE ¼ OF THE NE ¼ OF SECTION 20;

THENCE S 00°18'35" E 1314.75 FEET TO SOUTHEAST CORNER OF THE NW ¼ OF THE SE ¼ OF SECTION 20;

THENCE N 89°57'26" W 827.46 FEET TO A POINT ON THE WESTERLY RIGHT OF WAY OF WILLOW CREEK ROAD;

ALONG THE WESTERLY RIGHT OF WAY OF WILLOW CREEK ROAD THE FOLLOWING:

THENCE N 41°13'22" W 186.71 FEET TO A POINT OF CURVATURE;

THENCE 208.60 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 949.44 FEET, A DELTA ANGLE OF 12°35'19", A TANGENT OF 104.72 FEET, A CHORD BEARING N 47°31'02" W 208.18 FEET TO A POINT OF A REVERSED CURVATURE;

THENCE 204.80 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1297.79 FEET, A DELTA ANGLE OF 9°02'30", A TANGENT OF 102.61 FEET, A CHORD BEARING N 49°17'26" W 204.59 FEET TO A POINT OF TANGENCY;

THENCE N 44°46'11" W 411.88 FEET TO AN ANGLE POINT;

THENCE N 42°05'07" W 231.38 FEET TO A POINT OF CURVATURE;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/12 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

THENCE 331.68 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1899.41 FEET, A DELTA ANGLE OF 10°00'18", A TANGENT OF 166.26 FEET, A CHORD BEARING N 37°04'58" W 331.25 FEET TO A POINT OF TANGENCY;

THENCE N 32°04'49" W 223.05 FEET TO A POINT OF CURVATURE;

THENCE 234.81 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1040.80 FEET, A DELTA ANGLE OF 12°55'34", A TANGENT OF 117.90 FEET, A CHORD BEARING N 25°37'02" W 234.31 FEET TO A POINT OF REVERSE CURVATURE;

THENCE 200.60 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 573.50 FEET, A DELTA ANGLE OF 20°02'27", A TANGENT OF 101.33 FEET, A CHORD BEARING N 29°10'29" W 199.58 FEET TO A POINT OF TANGENCY;

THENCE N 39°11'42" W 233.00 FEET TO A POINT OF CURVATURE;

THENCE 476.94 FEET ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 970.55 FEET, A DELTA ANGLE OF 28°09'20", A TANGENT OF 243.39 FEET, A CHORD BEARING N 25°07'02" W 472.15 FEET TO A POINT OF TANGENCY;

THENCE N 11°02'22" W 144.76 FEET TO A POINT OF CURVATURE;

THENCE 113.94 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 400.40 FEET, A DELTA ANGLE OF 16°18'14", A TANGENT OF 57.36 FEET, A CHORD BEARING N 19°11'29" W 113.55 FEET TO A POINT OF TANGENCY;

THENCE N 27°20'36" W 62.21 FEET TO A POINT ON THE NORTH LINE OF THE SE ¼ OF THE NW ¼, SECTION 20;

LEAVING THE WESTERLY RIGHT OF WAY OF WILLOW CREEK ROAD:

THENCE N 89°59'20" W 9.92 FEET TO THE NORTHEAST CORNER OF THE SW ¼ OF THE NW ¼ OF SECTION 20;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

THENCE S 00°32'40" E 3941.70 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE SW ¼ OF SECTION 20;

THENCE N 89°52'12" W 1321.63 FEET TO THE SECTION CORNER COMMON TO SECTIONS 19, 20, 29 AND 30;

THENCE S 89°36'15" W 2663.86 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF SECTION 19;

THENCE N 00°25'12" W 2625.76 FEET TO THE NORTHWEST CORNER OF THE SE ¼ OF SECTION 19;

THENCE S 89°33'40" W 2335.42 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF SECTION 24, T.5N., R.1W., OF THE B.M.;

THENCE S 00°22'27" W 1312.13 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF THE SE ¼ OF SECTION 24;

THENCE N 89°08'33" W 3934.61 FEET TO THE SOUTHWEST CORNER OF THE NE ¼ OF THE SW ¼ OF SECTION 24;

THENCE N 00°43'27" E 1309.91 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE NW ¼ OF SECTION 24;

THENCE N 89°10'27" W 1309.03 FEET TO THE SOUTHWEST CORNER OF THE NW ¼ OF SECTION 24;

THENCE S 00°50'15" W 1309.18 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF THE SE ¼ OF SECTION 23;

THENCE N 88°41'36" W 1322.58 FEET TO THE SOUTHWEST CORNER OF THE NE ¼ OF THE SE ¼ OF SECTION 23;

THENCE S 01°00'18" W 1311.15 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE SE ¼ OF SECTION 23;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/14 STATE OF IDAHO MICHAEL S. BYRNS

THENCE N 88°46'46" W 2652.80 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE SW ¼ OF SECTION 23;

THENCE S 00°08'13" W 1318.99 FEET TO THE SOUTHEAST CORNER OF THE NW ¼ OF THE NW ¼ OF SECTION 26;

THENCE N 88°50'07" W 1318.00 FEET TO THE SOUTHWEST CORNER OF THE NW ¼ OF THE NW ¼ OF SECTION 26;

THENCE S 00°13'35" E 1320.46 FEET TO THE SOUTHEAST CORNER OF THE SE ¼ OF THE NE ¼ OF SECTION 27;

THENCE N 89°21'49" W 1329.19 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE NE ¼ OF SECTION 27;

THENCE S 00°43'20" W 1316.23 FEET TO THE SOUTHEAST CORNER OF THE NW ¼ OF THE SE ¼ OF SECTION 27;

THENCE N 89°24'53" W 1322.53 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF THE SW ¼ OF SECTION 27;

THENCE N 89°19'29" W 1317.26 FEET TO THE SOUTHWEST CORNER OF THE NE ¼ OF THE SW ¼ OF SECTION 27;

THENCE S 00°28'44" W 1316.52 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE SW ¼ OF SECTION 27;

THENCE N 89°17'09" W 1317.43 FEET TO THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION. THIS PARCEL CONTAINS 5,660.78 ACRES, MINUS THE EXCEPTION PARCELS (49.36 ACRES) FOR A NET AREA OF 5,611.42 ACRES.

EXCEPT THE FOLLOWING TWO PARCELS:

(1ST EXCEPTION PARCEL)
A PARCEL OF LAND BEING THE SE ¼ OF THE SE ¼ OF SECTION 14, TOWNSHIP 5 NORTH, RANGE 1 WEST OF THE BOISE MERIDIAN, ADA COUNTY, IDAHO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR — REGISTERED — 11334 — 1/9/16 — STATE OF IDAHO — MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 14, T.5N., R.1W., B.M., THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION;

THENCE N 88°25'48" W 1311.65 FEET TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE SE ¼;

THENCE N 00°11'03" W 1312.45 FEET TO THE NORTHWEST CORNER OF THE SE ¼ OF THE SE ¼;

THENCE S 88°17'02" E 1305.96 FEET TO THE NORTHEAST CORNER OF THE SE ¼ OF THE SE ¼;

THENCE S 00°26'15" E 1309.31 FEET TO THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION.

THIS EXCEPTION PARCEL CONTAINS 39.36 ACRES.

(2nd EXCEPTION PARCEL)
LOT 2, BLOCK 1, OF GULCH RANCH ESTATES SUBDIVISION, RECORDED IN BOOK 61, PAGES 6097-6098, OF ADA COUNTY RECORDS OF IDAHO:

THIS EXCEPTION PARCEL CONTAINS 10.00 ACRES.

PARCEL 2

A PARCEL OF LAND LOCATED IN THE SE 1/4 OF SECTION 21 AND THE NE ¼ OF SECTION 28, TOWNSHIP 5 NORTH, RANGE 1 WEST OF THE BOISE MERIDIAN, ADA COUNTY, IDAHO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 21, T.5N., R.1W., B.M., THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION;

THENCE N 88°39'16" W 1325.31 FEET ALONG THE SOUTH LINE TO THE SOUTHWEST CORNER OF THE SE ¼ OF THE SE ¼ OF SAID SECTION 21;

THENCE S 00°26'35" W 2632.13 FEET TO THE SOUTHEAST CORNER OF THE SW ¼ OF THE NE ¼ OF SECTION 28;

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/11 STATE OF IDAHO MICHAEL S. BYRNS

THENCE N 88°41'42" W 933.28 FEET ALONG THE SOUTH LINE OF SAID SW ¼ OF THE NE ¼ TO A POINT ON THE RIGHT-OF-WAY OF HIGHWAY 16;

THENCE CONTINUING N 88°41'42" W 71.43 FEET ALONG THE SOUTH LINE OF SAID SW ¼ OF THE NE ¼ TO A POINT ON THE CENTERLINE OF HIGHWAY 16;

ALONG THE CENTERLINE OF HIGHWAY 16 THE FOLLOWING:

THENCE N 12°48'04" E 2787.48 FEET TO A POINT OF SPIRAL CURVATURE;

THENCE 300.00 FEET ALONG A SPIRAL CURVE HAVING A RADIUS OF 2291.85 FEET, A THETA ANGLE OF 3°45'00" AND A CHORD BEARING N 11°33'04" E 299.94 FEET TO A POING OF CURVATURE;

THENCE 931.80 FEET ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 2291.85 FEET, A DELTA ANGLE OF 23°17'42", A TANGENT OF 472.43 FEET AND A CHORD BEARING N 02°35'47" W 925.40 FEET TO A POINT ON THE NORTH LINE OF THE SOUTH ½ OF THE SE ¼ OF SAID SECTION 21;

LEAVING THE CENTERLINE OF HIGHWAY 16:

THENCE S 88°48'04" E 113.92 FEET ALONG SAID NORTH LINE TO THE EAST RIGHT-OF-WAY OF HIGHWAY 16;

THENCE S 88°48'04" E 1619.66 FEET TO THE NORTHEAST CORNER OF THE SOUTH 1/2 OF THE SE 1/4 OF SAID SECTION 21;

THENCE S 00°49'56" W 1322.34 FEET TO THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION, CONTAINING 94.45 ACRES, MORE OR LESS.

PARCEL 3

A PARCEL OF LAND LOCATED IN THE SW ¼ OF SECTION 15, THE NORTH ½ OF SECTION 21 AND THE NW ¼ OF THE NW ¼ OF SECTION 22, TOWNSHIP 5 NORTH, RANGE 1 EAST OF THE BOISE MERIDIAN, ADA COUNTY, IDAHO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Prepared, correcting certain scrivener errors, summarizing areas, and incorporating Highway 16 from information of record: the original description signed by Michael Marks, PLS 4998, on 10/12/09; Record of Survey 8110 signed by Walter Neitz, PLS 797, on 10/31/07; and Record of Survey 6981 signed by Robert Jones, PLS 8023, on 6/20/05. No survey was performed by me.

PROFESSIONAL LAND SURVEYOR REGISTERED 11334 1/9/15 STATE OF IDAHO MICHAEL S. BYRNS

COMMENCING AT THE CORNER COMMON TO SECTIONS 15, 16, 21 AND 22, T.5N., R.1E., B.M., THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION;

THENCE N 00°26'10" E 2637.96 FEET TO THE NORTHWEST CORNER OF THE SW ¼; SECTION 15;

THENCE S 89°13'00" E 2637.98 FEET TO THE NORTHEAST CORNER OF THE SW ¼; SECTION 15;

THENCE S 00°04'45" W 2611.85 FEET TO THE SOUTHEAST CORNER OF THE SW ¼; SECTION 15;

THENCE N 89°47'01" W 1326.69 FEET TO THE NORTHEAST CORNER OF THE NW ¼ OF THE NW ¼; SECTION 22;

THENCE S 00°11'26" E 1318.17 FEET TO THE SOUTHEAST CORNER OF THE NW ¼ OF THE NW ¼ OF SECTION 22;

THENCE N 89°49'56" W 1324.65 FEET TO THE SOUTHWEST CORNER OF THE NW ¼ OF THE NW ¼; SECTION 22;

THENCE N 89°52'44" W 2672.12 FEET TO THE SOUTHEAST CORNER OF THE NE ¼ OF THE NW ¼; SECTION 22;

THENCE N 89°52'55" W 1306.10 FEET THE SOUTHWEST CORNER OF THE NE ¼ OF THE NW ¼; SECTION 22;

THENCE N 00°17'22" W 1318.61 FEET TO THE NORTHWEST CORNER OF THE NE ¼ OF THE NW ¼; SECTION 21;

THENCE S 89°53'23" E 3977.62 FEET TO THE **REAL POINT OF BEGINNING** OF THIS DESCRIPTION, CONTAINING 320.04 ACRES, MORE OR LESS.

TOTAL AREA OF THESE PARCELS:

PARCEL 1:	5660.78 – 39.36 – 10.00 = 5611.42 ACRES
PARCEL 2:	94.45 ACRES
PARCEL 3:	320.04 ACRES
SUM:	6025.91 ACRES

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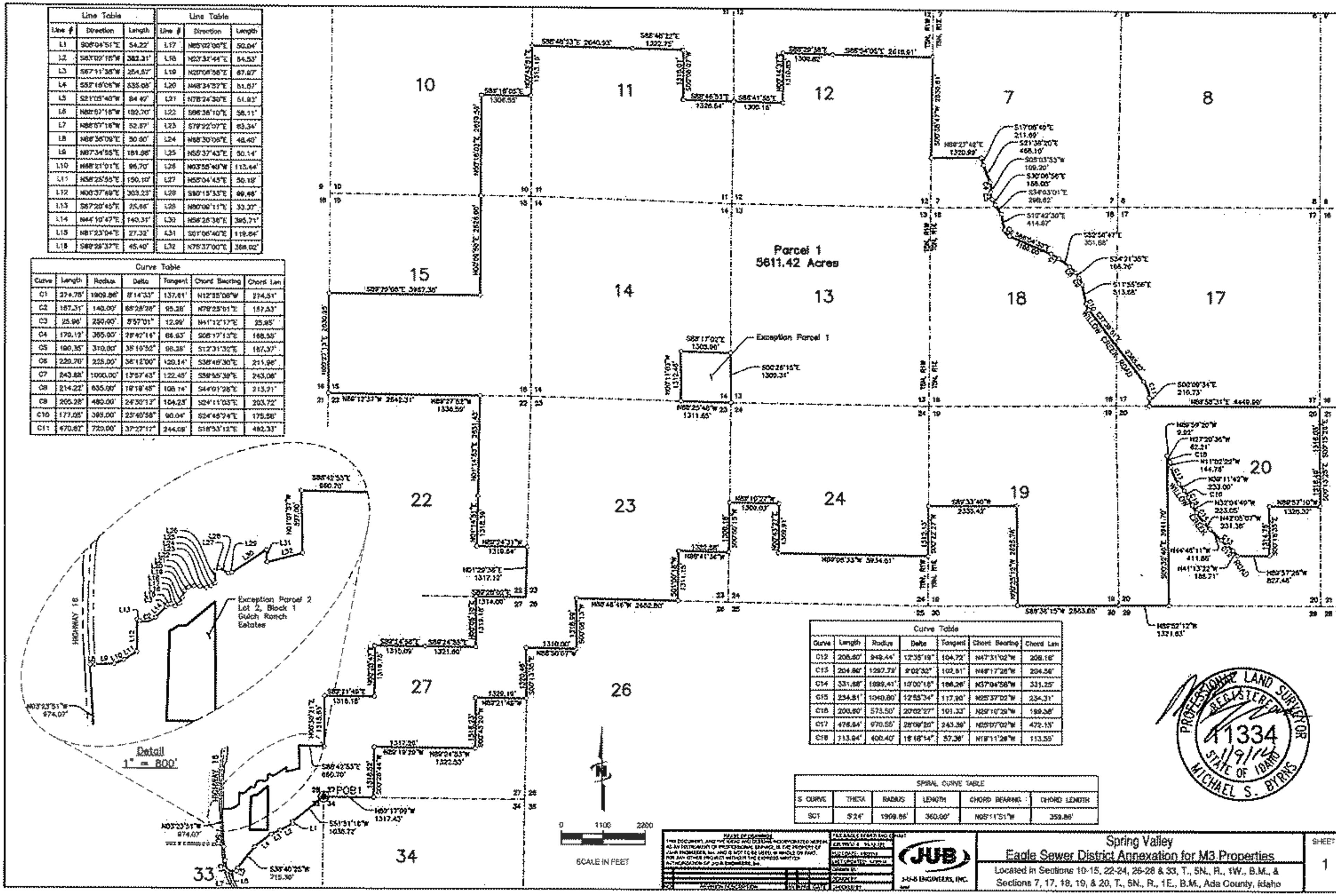
PROFESSIONAL LAND SURVEYOR REGISTERED 11334 STATE OF IDAHO MICHAEL S. BYRNS

a 250 S. Beechwood Avenue, Suite 201, Boise, ID 83709 p 208-376-7330 f 208-323-9336 w www.jub.com



Line Table			Line Table		
Line #	Direction	Length	Line #	Direction	Length
L1	S06°04'51"E	54.22'	L17	N65°02'00"E	50.04'
L2	S63°02'16"W	382.31'	L18	N23°32'44"E	54.53'
L3	S67°11'36"W	254.57'	L19	N20°08'58"E	67.97'
L4	S52°16'06"W	335.08'	L20	N48°34'57"E	51.57'
L5	S21°05'40"W	84.49'	L21	N78°24'35"E	51.93'
L6	N82°57'16"W	192.70'	L22	S86°38'10"E	58.11'
L7	N88°57'16"W	52.87'	L23	S79°22'07"E	63.34'
L8	N88°36'09"E	30.00'	L24	N88°30'09"E	48.40'
L9	N87°34'55"E	181.86'	L25	N55°37'43"E	50.14'
L10	N68°21'01"E	96.70'	L26	N03°55'40"W	113.44'
L11	N58°25'55"E	150.10'	L27	N55°04'43"E	50.18'
L12	N00°37'49"E	303.23'	L28	S80°15'35"E	99.48'
L13	S87°20'45"E	25.66'	L29	N80°09'11"E	33.37'
L14	N44°10'47"E	140.31'	L30	N56°28'36"E	395.71'
L15	N81°23'04"E	27.32'	L31	S01°06'40"E	119.64'
L16	S89°29'37"E	45.40'	L32	N75°37'00"E	368.02'

Curve Table						
Curve	Length	Radius	Delta	Tangent	Chord Bearing	Chord Len
C1	274.78'	1909.86'	8°14'33"	137.61'	N12°55'06"W	274.51'
C2	157.31'	140.00'	65°28'26"	95.26'	N78°25'01"E	157.53'
C3	25.96'	250.00'	5°57'01"	12.99'	N41°12'17"E	25.95'
C4	170.12'	365.00'	26°42'14"	86.63'	S06°17'13"E	168.58'
C5	190.35'	310.00'	35°10'52"	98.28'	S12°31'32"E	187.37'
C6	220.70'	225.00'	56°12'00"	120.14'	S38°48'30"E	211.96'
C7	243.68'	1000.00'	13°57'43"	122.45'	S38°55'38"E	243.08'
C8	214.22'	635.00'	19°19'45"	108.14'	S44°01'26"E	213.21'
C9	205.28'	480.00'	24°30'13"	104.25'	S24°11'03"E	203.72'
C10	177.05'	395.00'	25°40'58"	90.04'	S24°45'24"E	175.58'
C11	470.61'	720.00'	37°27'17"	244.09'	S18°53'12"E	462.33'

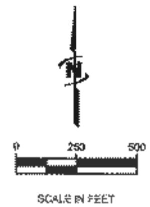
Curve Table						
Curve	Length	Radius	Delta	Tangent	Chord Bearing	Chord Len
C12	208.60'	949.44'	12°35'19"	104.72'	N47°31'02"W	208.18'
C13	204.86'	1297.79'	9°02'32"	102.61'	N49°17'28"W	204.58'
C14	331.68'	1899.41'	10°00'15"	166.28'	N37°04'58"W	331.25'
C15	234.81'	1040.80'	12°55'34"	117.90'	N25°37'02"W	234.31'
C16	200.80'	573.50'	20°02'27"	101.33'	N29°10'29"W	199.38'
C17	476.94'	970.56'	28°09'20"	243.39'	N25°07'02"W	472.15'
C18	113.94'	400.40'	16°18'14"	57.36'	N19°11'26"W	113.55'

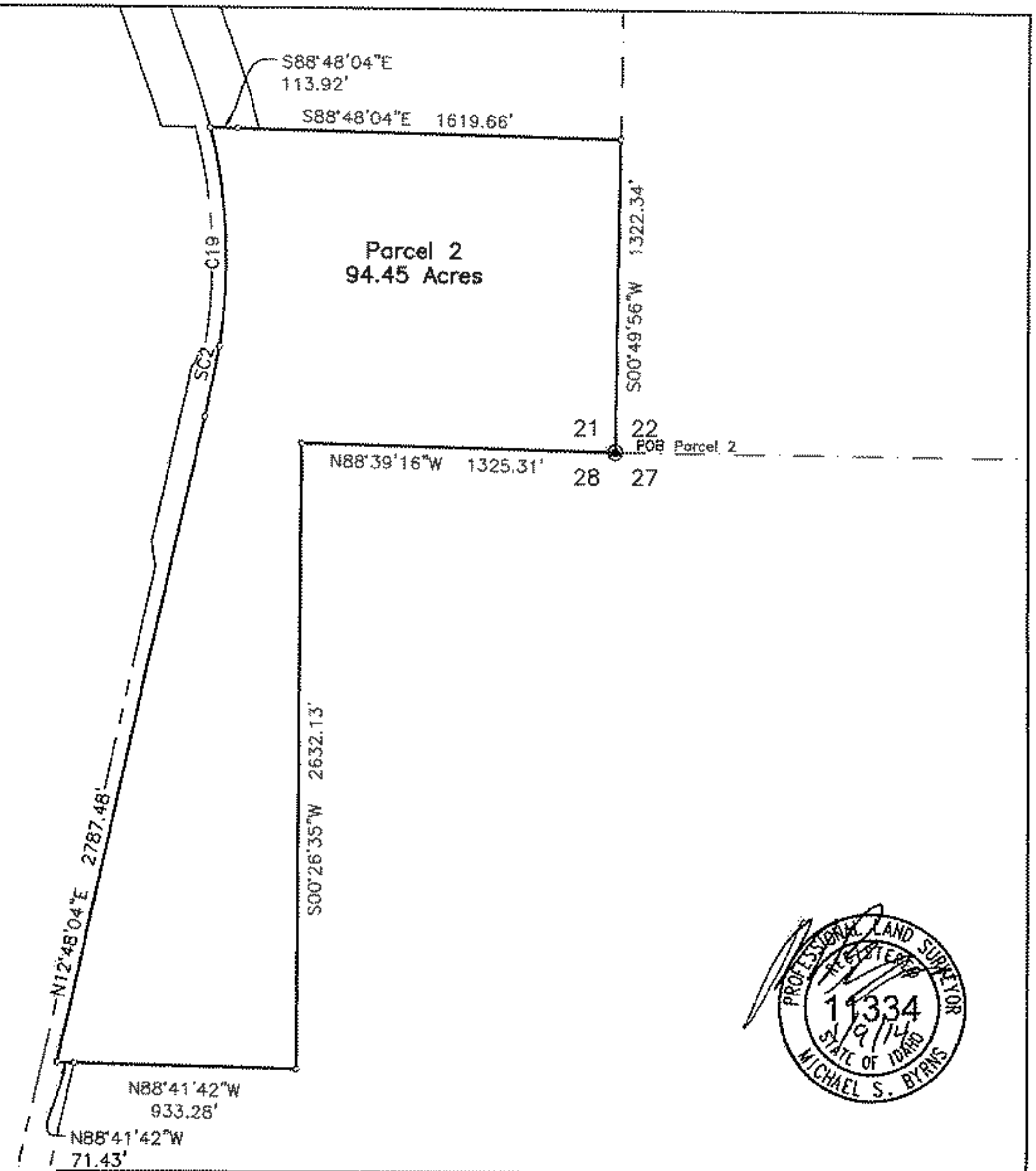
SPIRAL CURVE TABLE					
S CURVE	THETA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
SC1	5°24'	1909.86'	360.00'	N05°11'51"W	359.86'

J-U-B ENGINEERS, INC.

Spring Valley
Eagle Sewer District Annexation for M3 Properties
Located in Sections 10-15, 22-24, 26-28 & 33, T., 5N., R., 1W., B.M., &
Sections 7, 17, 18, 19, & 20, T., 5N., R., 1E., B.M., Ada County, Idaho

SHEET
1





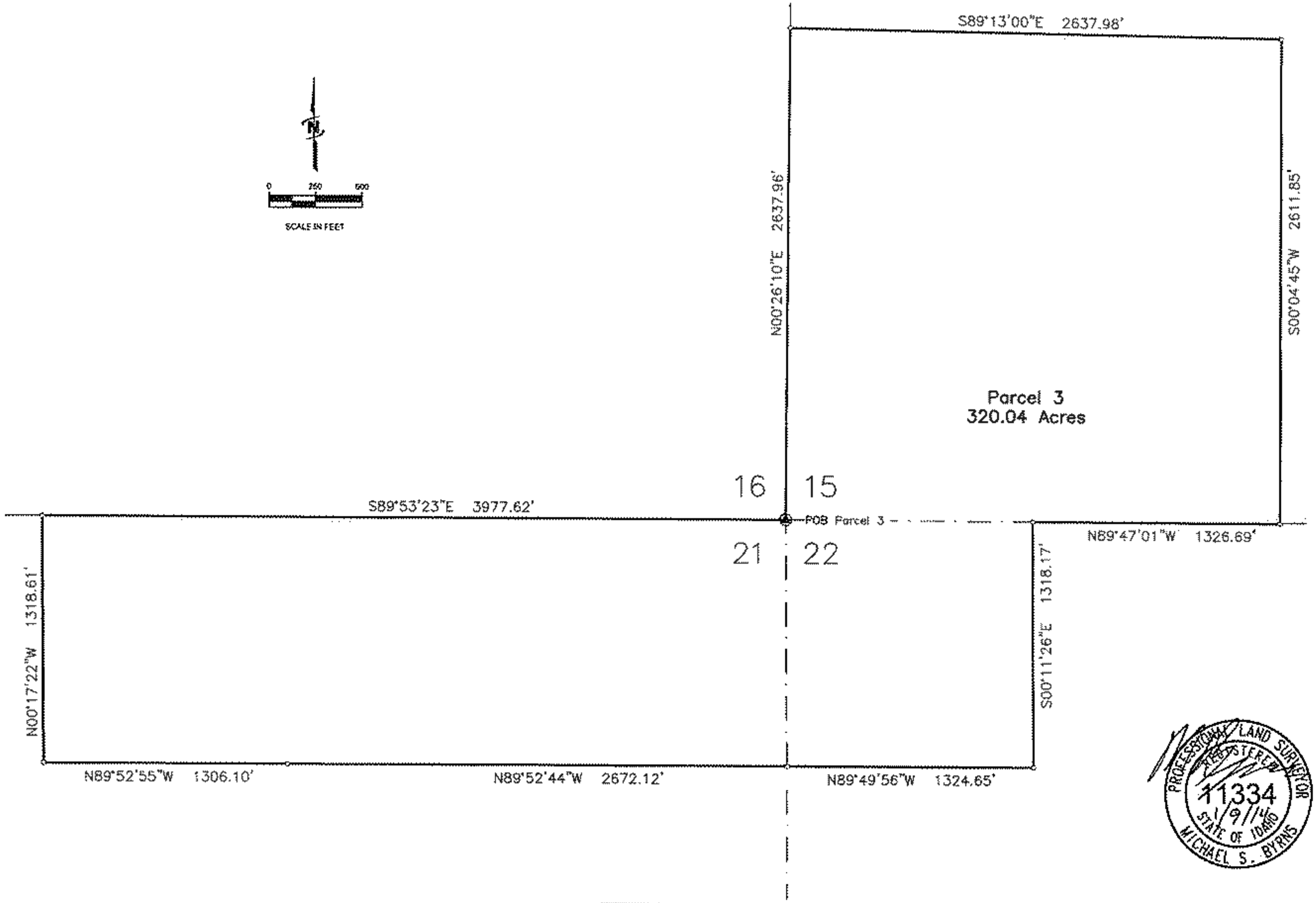
SPIRAL CURVE TABLE					
S CURVE	THETA	RADIUS	LENGTH	CHORD BEARING	CHORD LENGTH
SC2	3°43'	2291.85'	300.00'	N11°33'04"E	299.84'

Curve Table						
Curve	Length	Radius	Delta	Tangent	Chord Bearing	Chord Len
C19	931.80'	2291.85'	23°17'42"	472.43'	N02°35'47"W	923.40'

J-U-B ENGINEERS, INC.

Spring Valley
Eagle Sewer District Parcel 2
Located in the SE 1/4 of Section 21, and the NE 1/4 of Section 28, Township 5 North, Range 1 West, B.M., Ada County, Idaho

SHEET
2

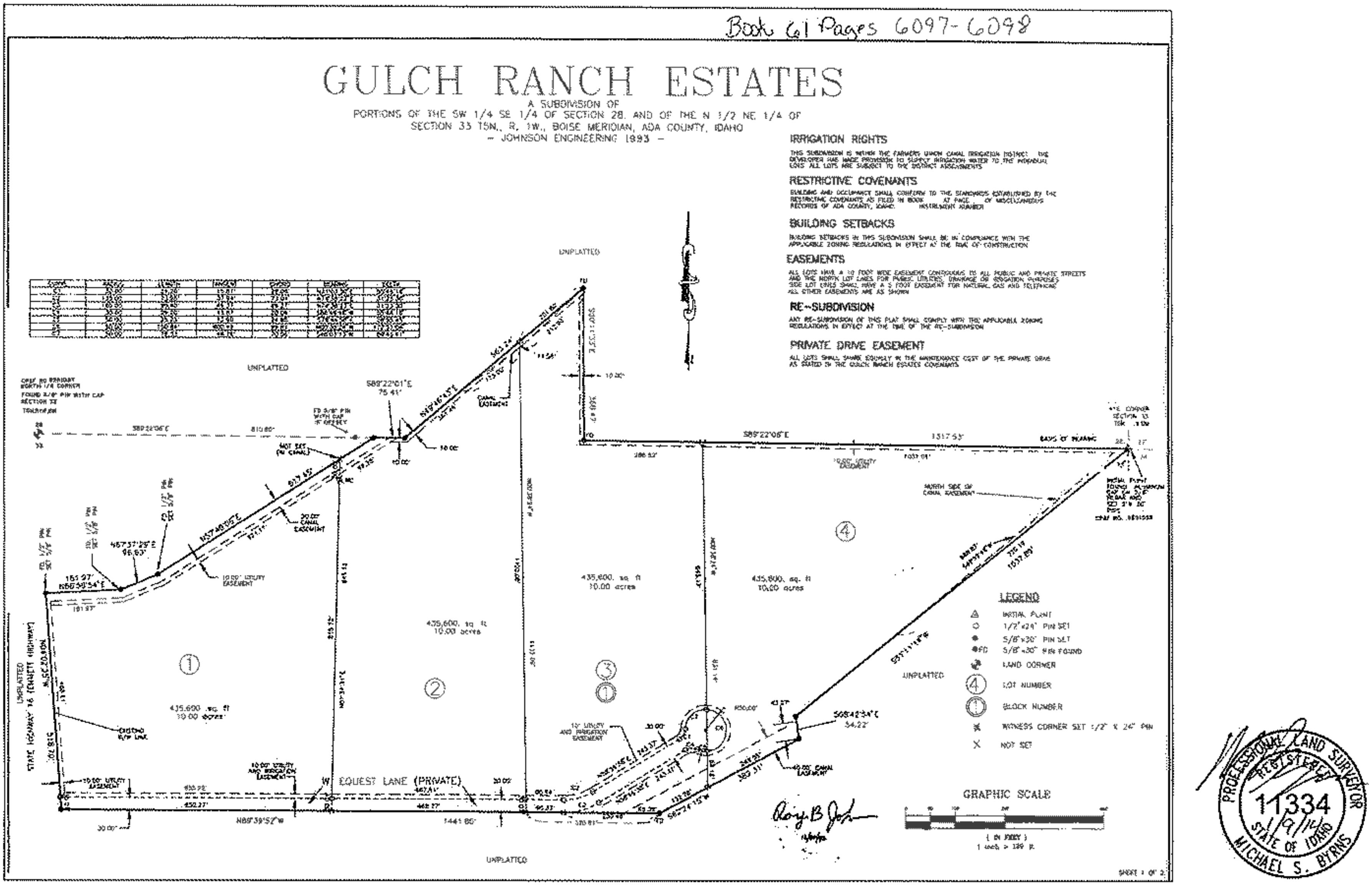


JUB
J-U-B ENGINEERS, INC.

Spring Valley
Eagle Sewer District Parcel 3

Located in the SW 1/4 of Section 15, the N 1/2 of Section 21 and the NW 1/4 of Section 22, Township 5 North, Range, 1 East, B.M., Ada County, Idaho

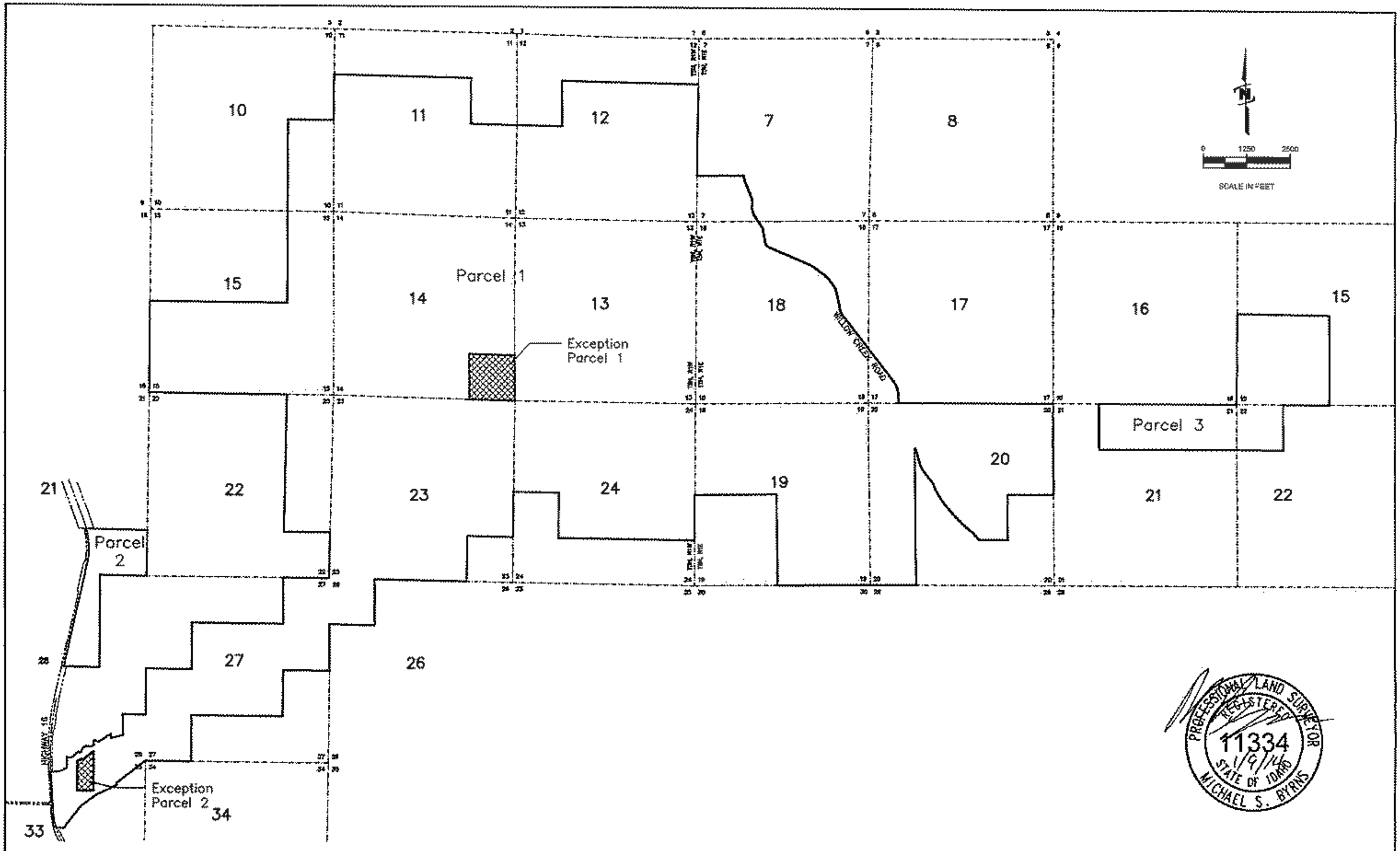
SHEET
3



JUB
J-U-B ENGINEERS, INC.

Spring Valley
Eagle Sewer District Exception Parcel 2
Lot 2 of Block 1
Gulch Ranch Estates

SHEET
4



J-U-B ENGINEERS, INC.

Spring Valley
Eagle Sewer District Parcels
Eagle Sewer District Parcel and Exception Parcels Exhibit

SHEET 5

EXHIBIT B
CONCEPTUAL DEVELOPMENT PLAN OF SPRING VALLEY

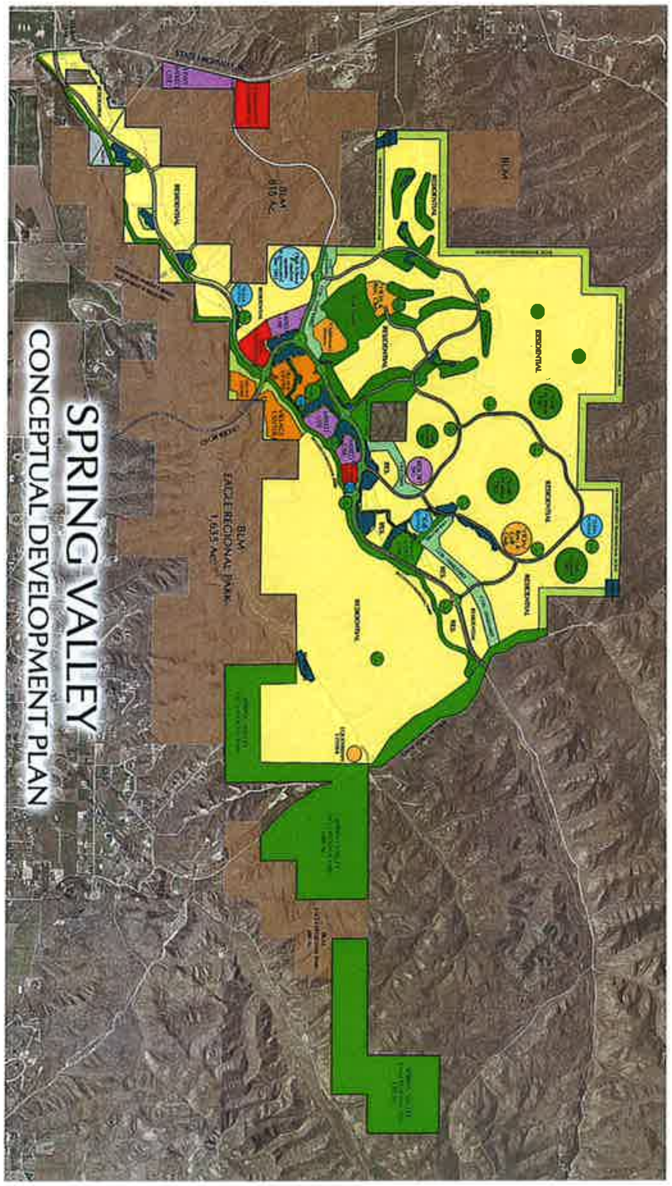
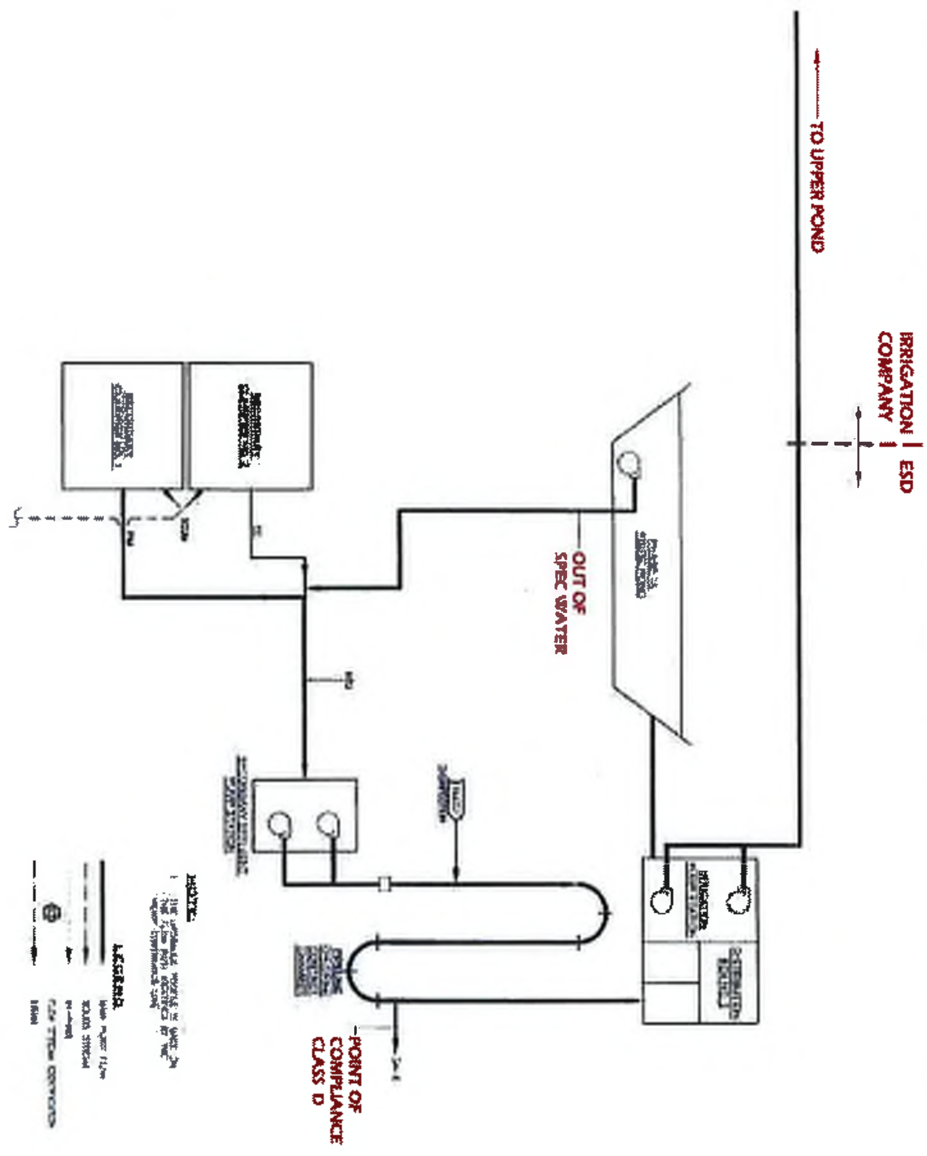


EXHIBIT C
Conceptual Depiction of Treatment Plan



10% PRELIMINARY PLANS

M3 COMPANIES, LLC
SPRING VALLEY - WWTP PHASE IA
GENERAL
PROCESS FLOW SCHEMATIC

CONCEPT

J-U-B ENGINEERS, INC.
250 S. Beechwood Ave
Suite 201
Boise, ID 83709-0944

007
G00-07A

EXHIBIT C – CONT'D

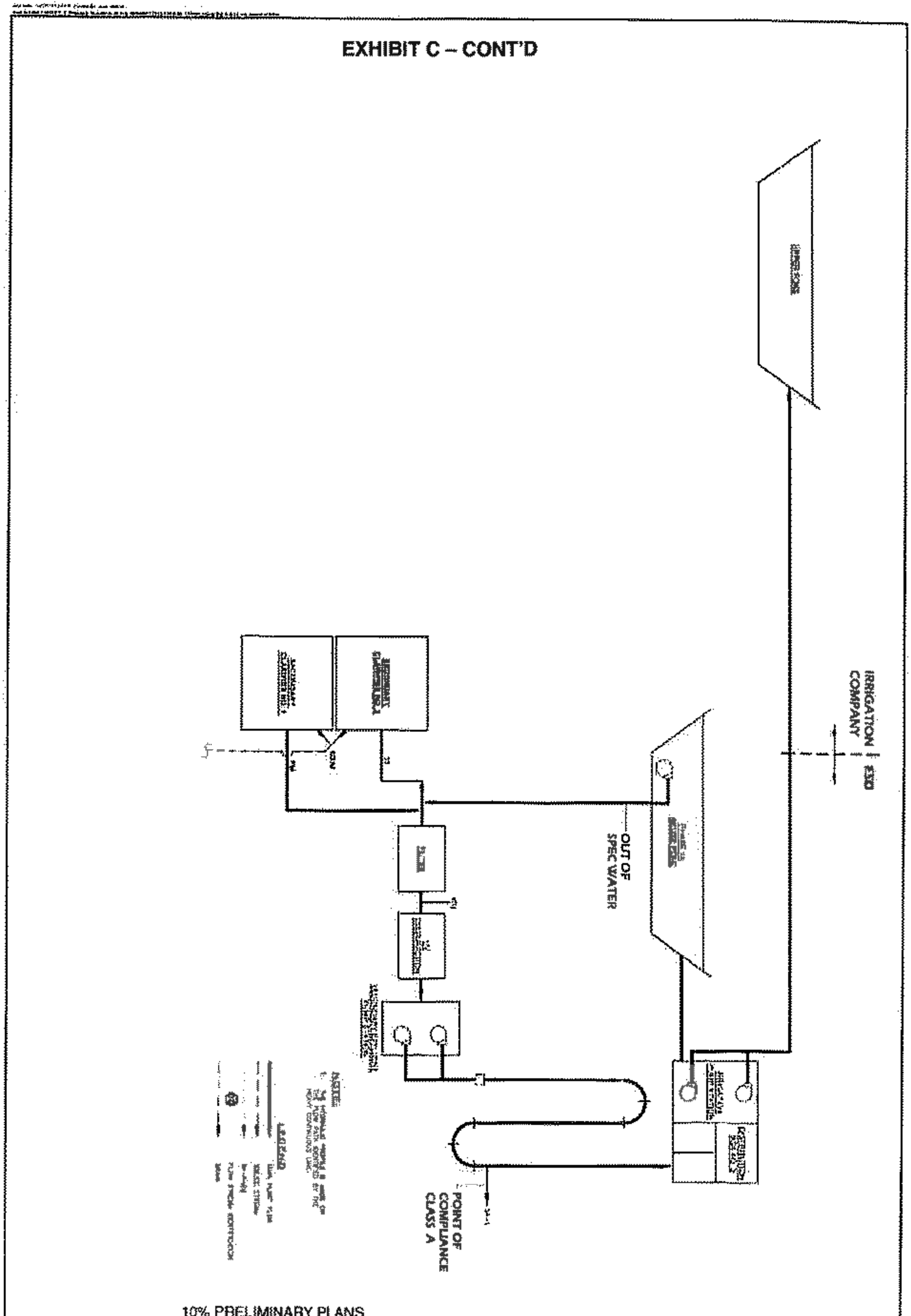


EXHIBIT D
SPRING VALLEY WASTEWATER TREATMENT
COST ESTIMATE SUMMARY – ELIGIBLE COSTS

Spring Valley Wastewater Treatment Cost Estimate Summary

	Land	Capital Cost*	Contingency**	Engineering***	Total
Phase 1A	$ -	$ 3,133,325	$ 313,333	$ 188,000	$ 3,634,658
Phase 1B	$ -	$ 10,972,000	$ 1,097,000	$ 659,000	$ 12,728,000
Phase 2	$ -	$ 1,412,000	$ 142,000	$ 85,000	$ 1,639,000
Phase 3	$ -	$ 8,635,000	$ 864,000	$ 518,000	$ 10,017,000
Phase 4	$ -	$ 7,371,000	$ 738,000	$ 443,000	$ 8,552,000
Phase 5	$ -	$ 3,025,000	$ 303,000	$ 182,000	$ 3,510,000
	$ -	$ 34,548,325	$ 3,457,333	$ 2,075,000	$ 40,080,658

* Capital Cost includes site work, processing equipment, buildings, structures, piping, electrical, instrumentation, and controls

** Equals 10% of Capital Cost

*** Equals 6% of Capital Cost

M3 Eagle WWTP			
IFAS Phase 1A - 0.073 MGD			
Process Equipment	**Vendor Quote**	**Markup**	**Cost**
6 mm Screens	$100,000	0%	$ 100,000
EQ Tank Pumps, Diffusers, Mixers	$110,000	0%	$ 110,000
STM Aerotors	$215,000	0%	$ 215,000
Secondary Clarifiers	$150,000	0%	$ 150,000
Blowers	$40,000	0%	$ 40,000
RAS/WAS Pumps	$30,000	0%	$ 30,000
SH tank pumps, Diffusers, Mixers	$150,000	0%	$ 150,000
Disinfection System	$20,000	0%	$ 20,000
Secondary Effluent Pumps	$80,000	0%	$ 80,000
Standby Generator	$80,000	0%	$ 80,000
Installation		40%	$ 390,000
	Equipment Subtotal		**$ 1,365,000**
Buildings/Structural			
Headworks manhole			$ 15,000
Influent Lift Station			$ 20,000
EQ tank			$ 35,000
Aeration basin			$ 165,000
Blowers and RAS/WAS Building			$ 248,000
SH tank			$ 106,000
Secondary Effluent Pump Station			$ 61,000
Standby Generator Slab			$ 6,500
	Buildings/Structural Subtotal		**$ 656,500**
	Equipment + Structural Subtotal		**$ 2,021,500**
Other			
Mobilization, Bonding, and Administration		10%	$ 202,150
Site Work		5%	$ 101,075
Piping		10%	$ 202,150
Electrical, Instrumentation & Controls		25%	$ 505,375
HVAC		5%	$ 101,075
	Other Subtotal		**$ 1,111,825**
	Equipment + Structural + Other Subtotal		**$ 3,133,325**
Contingency & Engineering			
Contingency		10%	$ 313,333
Engineering		6%	$ 188,000
	Contingency & Engineering Subtotal		**$ 501,332**
	Phase I Grand Total		**$ 3,635,000**

M3 Eagle WWTP				
IFAS Phase 1B - 0.25 MGD				
Process Equipment	**Vendor Quote**	**Markup**		**Cost**
Influent Lift Station	$45,000	0%	$	45,000
6 mm Screens	$93,000	0%	$	93,000
Grit Removal	$191,500	0%	$	192,000
IFAS/Clarifiers/Pumps	$767,000	0%	$	767,000
Cloth Disk Filters	$430,461	0%	$	430,000
UV Equipment	$369,000	0%	$	369,000
1 Screw Press, Conveyor, Polymer Feed	$300,000	0%	$	300,000
Installation	-	40%	$	878,400
		Equipment Subtotal	**$**	**3,074,000**
Buildings/Structural				
Influent Lift Station			$	200,000
Grit Removal Structure			$	135,000
Headworks Building/Concrete Structures			$	135,000
IFAS Basins/Aerobic Digesters/Clarifiers			$	861,679
Filter/UV Disinfection Building			$	1,072,500
Dewatering Building			$	600,000
Operations Building/Maintenance Area			$	600,000
Blower/Generator Building			$	400,000
		Buildings/Structural Subtotal	**$**	**4,004,000**
		Equipment + Structural Subtotal	**$**	**7,078,000**
Other				
Mobilization, Bonding, and Administration		10%	$	708,000
Site Work		5%	$	354,000
Piping		10%	$	708,000
Electrical, Instrumentation & Controls		25%	$	1,770,000
HVAC		5%	$	354,000
		Other Subtotal	**$**	**3,894,000**
		Equipment + Structural + Other Subtotal	**$**	**10,972,000**
Contingency & Engineering				
Contingency		10%	$	1,097,000
Engineering		6%	$	659,000
		Contingency & Engineering Subtotal	**$**	**1,756,000**
		Phase I Grand Total	**$**	**12,728,000**

EXHIBIT D (CONT'D)
PLANT COSTS BREAKDOWN

M3 Eagle WWTP			
IFAS Phase 2 - 0.69 MGD			
Process Equipment	**Vendor Quote**	**Markup**	**Cost**
Influent Lift Station	$45,000	0%	$ 45,000
6 mm Screens	$93,000	0%	$ 93,000
IFAS/Clarifiers/Pumps	$125,365	0%	$ 125,365
Cloth Disk Filters	-	0%	$ -
UV Equipment	$126,000	0%	$ 126,000
1 Screw Press, Conveyor, Polymer Feed	-	0%	$ -
Installation	-	40%	$ 156,000
		Equipment Subtotal	**$ 545,000**
Buildings/Structural			
Influent Lift Station			$ -
Grit Removal Structure			
Headworks Building/Concrete Structures			$ -
IFAS Basins/Aerobic Digesters/Clarifiers	$378,123		$ 378,123
Filter/UV Disinfection Building			$ -
Dewatering Building			$ -
Operations Building/Maintenance Area			$ -
Blower/Generator Building			$ -
		Buildings/Structural Subtotal	**$ 378,000**
		Equipment + Structural Subtotal	**$ 923,000**
Other			
Mobilization, Bonding, and Administration		10%	$ 92,000
Site Work		3%	$ 28,000
Piping		10%	$ 92,000
Electrical, Instrumentation & Controls		25%	$ 231,000
HVAC		5%	$ 46,000
		Other Subtotal	**$ 489,000**
		Equipment + Structural + Other Subtotal	**$ 1,412,000**
Contingency & Engineering			
Contingency		10%	$ 142,000
Engineering		6%	$ 85,000
		Contingency & Engineering Subtotal	**$ 227,000**
		Phase II Grand Total	**$ 1,639,000**

M3 Eagle WWTP				
IFAS Phase 3 - 1.34 MGD				
Process Equipment	**Vendor Quote**	**Markup**		**Cost**
Influent Lift Station	$120,000	0%	$	120,000
Grit Removal	$191,500	0%	$	191,500
IFAS/Clarifiers/Pumps	$1,887,080	0%	$	1,887,080
Cloth Disk Filters	$500,000	0%	$	500,000
UV Equipment	$226,000	0%	$	226,000
1 Screw Press, Conveyor, Polymer Feed	$300,000	0%	$	300,000
Installation	-	40%	$	1,290,000
		Equipment Subtotal	**$**	**4,515,000**
Buildings/Structural				
Influent Lift Station			$	350,000
Grit Removal Structure			$	135,000
IFAS Basins/Aerobic Digesters/Clarifiers			$	569,540
Filter/UV Disinfection Building			$	-
Dewatering Building			$	-
Operations Building/Maintenance Area			$	-
Blower/Generator Building			$	-
		Buildings/Structural Subtotal	**$**	**1,055,000**
		Equipment + Structural Subtotal	**$**	**5,570,000**
Other				
Mobilization, Bonding, and Administration		10%	$	557,000
Site Work		5%	$	279,000
Piping		10%	$	557,000
Electrical, Instrumentation & Controls		25%	$	1,393,000
HVAC		5%	$	279,000
		Other Subtotal	**$**	**3,065,000**
		Equipment + Structural + Other Subtotal	**$**	**8,635,000**
Contingency & Engineering				
Contingency		10%	$	864,000
Engineering		6%	$	518,000
		Contingency & Engineering Subtotal	**$**	**1,382,000**
		Phase III Grand Total	**$**	**10,018,000**

M3 Eagle WWTP			
IFAS Phase 4 - 2.02 MGD			
Process Equipment	**Vendor Quote**	**Markup**	**Cost**
Influent Lift Station	$50,000	0%	$ 50,000
Grit Removal	$191,500	0%	$ 191,500
IFAS/Clarifiers/Pumps	$2,112,358	0%	$ 2,112,358
Cloth Disk Filters	$50,000	0%	$ 50,000
UV Equipment	$189,000	0%	$ 189,000
1 Screw Press, Conveyor, Polymer Feed	-	0%	$ -
Installation	-	40%	$ 1,037,000
	Equipment Subtotal		**$ 3,630,000**
Buildings/Structural			
Influent Lift Station			$ -
Grit Removal Structure			$ -
IFAS Basins/Aerobic Digesters/Clarifiers			$ 861,679
RAS WAS Building			$ 225,000
Filter/UV Disinfection Building			$ -
Dewatering Building			$ -
Operations Building/Maintenance Area			$ -
Blower/Generator Building			$ 100,000
	Buildings/Structural Subtotal		**$ 1,187,000**
	Equipment + Structural Subtotal		**$ 4,817,000**
Other			
Mobilization, Bonding, and Administration		10%	$ 482,000
Site Work		3%	$ 145,000
Piping		10%	$ 482,000
Electrical, Instrumentation & Controls		25%	$ 1,204,000
HVAC		5%	$ 241,000
	Other Subtotal		**$ 2,554,000**
	Equipment + Structural + Other Subtotal		**$ 7,371,000**
Contingency & Engineering			
Contingency		10%	$ 738,000
Engineering		6%	$ 443,000
	Contingency & Engineering Subtotal		**$ 1,181,000**
	Phase IV Grand Total		**$ 8,552,000**

M3 Eagle WWTP			
IFAS Phase 5 - 2.5 MGD			
Process Equipment	**Vendor Quote**	**Markup**	**Cost**
Influent Lift Station	-	0%	$ -
Grit Removal	-	0%	$ -
IFAS/Clarifiers/Pumps	$621,833	0%	$ 621,833
Cloth Disk Filters	$465,000	0%	$ 465,000
UV Equipment	$189,000	0%	$ 189,000
1 Screw Press, Conveyor, Polymer Feed	-	0%	$ -
Installation	-	40%	$ 510,000
	Equipment Subtotal		**$ 1,786,000**
Buildings/Structural			
Influent Lift Station			$ -
Grit Removal Structure			$ -
IFAS Basins/Aerobic Digesters/Clarifiers			$ 191,417
Filter/UV Disinfection Building			$ -
Dewatering Building			$ -
Operations Building/Maintenance Area			$ -
Blower/Generator Building			$ -
	Buildings/Structural Subtotal		**$ 191,000**
	Equipment + Structural Subtotal		**$ 1,977,000**
Other			
Mobilization, Bonding, and Administration		10%	$ 198,000
Site Work		3%	$ 59,000
Piping		10%	$ 198,000
Electrical, Instrumentation & Controls		25%	$ 494,000
HVAC		5%	$ 99,000
	Other Subtotal		**$ 1,048,000**
	Equipment + Structural + Other Subtotal		**$ 3,025,000**
Contingency & Engineering			
Contingency		10%	$ 303,000
Engineering		6%	$ 182,000
	Contingency & Engineering Subtotal		**$ 485,000**
	Phase V Grand Total		**$ 3,510,000**

Appendix K

Disposal Alternatives Reassessment

KELLER ASSOCIATES

KELLER ASSOCIATES

Technical Memorandum

TO: Alliance Consulting

FROM: Keller Associates, Inc. – Justin Walker, PE

DATE: February 4, 2021

SUBJECT: Spring Valley Wastewater Treatment Plant Disposal Alternatives Reassessment

PURPOSE

This technical memorandum provides a high-level reassessment of viable disposal alternatives for treated effluent from the wastewater treatment plant (WWTP) proposed to serve the Spring Valley community.

BACKGROUND

The Spring Valley development is a proposed master-planned community located in the foothills north of Eagle, Idaho, in Ada County. The development includes approximately 6,000 acres and is bordered by Willow Creek Road to the east, Bureau of Land Management (BLM) property to the south, and State Highway 16 and BLM property on the west. Figure 1 shows the location and orientation of the proposed development. The property is mostly undeveloped rolling hills with two major drainage basins; Big Gulch and Little Gulch. The property generally slopes from northeast to southwest with elevations ranging from 2,600 feet above mean sea level (msl) to 3,100 feet.

The former property owners (M3 Companies) had developed preliminary wastewater treatment and collection plans for the property. The previous plans for wastewater disposal relied on the reuse and winter storage of treated effluent from a mechanical wastewater treatment plant. Reuse consisted of various classifications of recycled water from Class D through Class A.

The new property owners desire to conduct a high-level reassessment of treated wastewater disposal alternatives to confirm the best apparent alternative is selected. This disposal evaluation would also be updated based on discharge options for lagoon treatment, future mechanical treatment, and Idaho's current disposal regulations. The rest of this technical memorandum summarizes those alternatives considered and our findings.

WASTEWATER FLOW PROJECTIONS

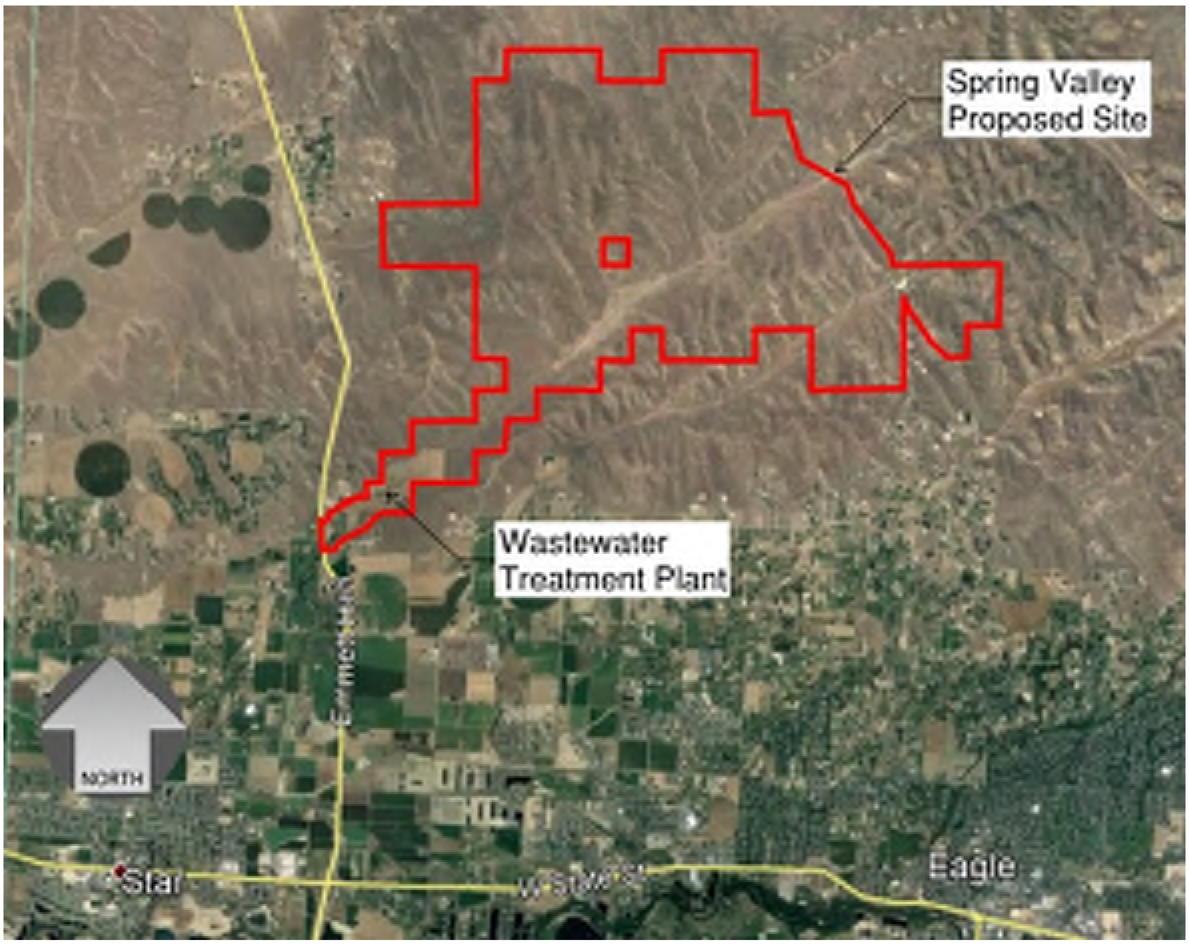
For purposes of this analysis, the following wastewater flows were used. More information about how these flows were established can be found in the Spring Valley Wastewater Treatment Plant Facility Planning Study Amendment.

Table 1 – Flow Projection Table

ERU's	Annual Average (gpd)	Max Month Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpm)	Winter Storage (MG)	(acre-ft)	Land App (acre alfalfa)
100	20,000	26,000	40,000	56	3.3	10	0
500	100,000	130,000	200,000	278	15.8	49	22
1,000	200,000	260,000	400,000	556	31.2	96	51
1,500	300,000	390,000	600,000	834	46.7	143	80
2,200	440,000	572,000	880,000	1,223	68.2	209	121
7,153	1,431,000	1,860,000	2,861,000	3,975	224.4	689	386 [A]

A −Applied to Turfgrass

Figure 1 – Vicinity Map



EFFLUENT DISPOSAL ALTERNATIVES

There are different alternatives to dispose of the Spring Valley community's treated wastewater. The main categories are surface water discharge and reuse. Surface water discharges are governed by the Clean Water Act and are permitted as part of the National Pollutant Discharge Elimination System (NPDES) program. The Idaho Department of Environmental Quality (DEQ) is currently authorized to administer and enforce the permits under their Idaho Pollutant Discharge Elimination System (IPDES) program.

Reuse of recycled water is governed by state rather than national regulations. Reuse provides additional options for disposal, including irrigating crops, irrigating community, public, and residential property, and aquifer recharge. Also, two or more recycled water options may be used together, such as crop irrigation in the summer and aquifer recharge in the winter. Specific treatment requirements for recycled water are listed in Idaho's Recycled Water Rules (IDAPA 58.01.17). The recycled water rules identify the classes of recycled water and associated allowable uses. They also provide a background for the state-issued permits. In addition to complying with the recycled water rules, the water must also comply with the groundwater quality rule (IDAPA 58.01.11), which means the groundwater quality must not be significantly degraded.

SURFACE WATER DISCHARGE

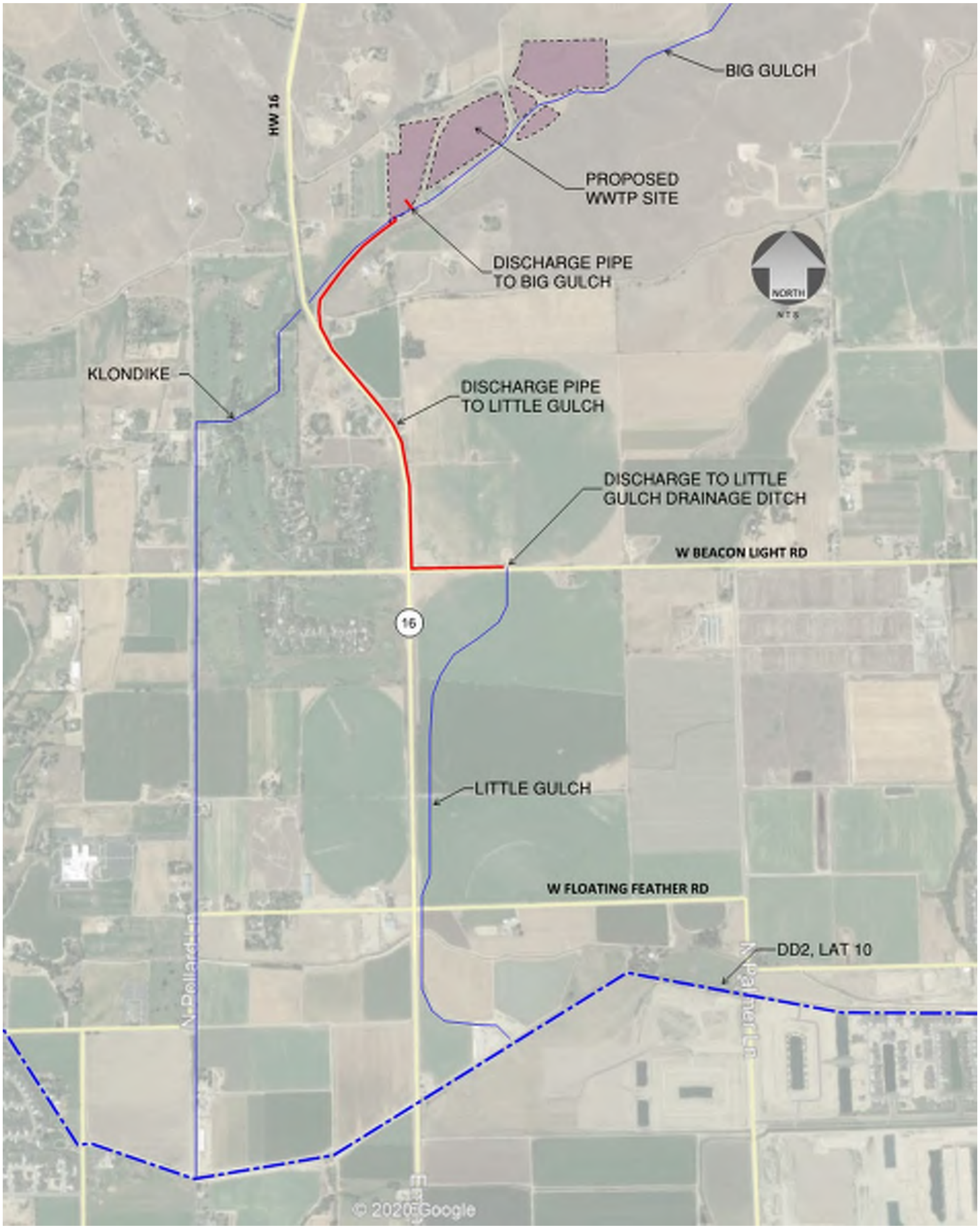
If the Spring Valley community were to consider surface water discharge for disposal, the most likely discharge points would be either the Klondike drainage ditch or Little Gulch. Both the Klondike and Little Gulch drainage facilities have intermediate seasonal flows and dump into the Drainage District 2 (DD2) Lateral 10 drainage ditch, which discharges into the Lawrence-Kennedy Canal just east of Duff Lane, which ultimately discharges into the Boise River near the Middleton wastewater treatment plant. Consequently, it is likely that an IPDES permit would be required. No irrigation or drainage entity claims ownership or responsibility for either the Klondike drain or Little Gulch.

Near the southwest corner of the Spring Valley community, where the Farmers Union Canal transverses the development, there is a diversion structure. At this location, the Farmers Union Canal has a collection culvert, which can receive diverted waters from the canal and conveys it to the Klondike drainage ditch. This diversion structure is used infrequently by the Farmers Union Canal Company, only for emergency diversion operations, during flooding events, or to drain the Farmers Union Canal. The most logical discharge point from the WWTP to the Klondike drainage ditch is into Big Gulch canal, which flows near this diversion structure; see Figure 2, which shows the nearest point of connection to the Klondike drainage ditch.

The other conveyance option from the Spring Valley WWTP to the DD2 Lateral 10 besides the Klondike Drain is Little Gulch. There are fewer property owners and fewer maintenance concerns on Little Gulch than the Klondike Drain. Based on conversations with Alan Funkhouser, it may be the preferred conveyance option to Lateral 10. Initial conversations with Bryce Farris (attorney for DD2) and Alan Funkhouser (ditch rider for DD2) suggest there is adequate hydraulic capacity for up to 5+ cubic feet per second (cfs) from the Spring Valley WWTP in the Lateral 10. It is noted that the Star WWTP effluent discharges into the DD2 Lawrence-Kennedy Canal. Consequently, DD2 has experience with WWTP discharges. Further investigation and conversations with Drainage District 2, and other governing agencies, would be needed to determine the viability of this discharge option to convey the water downstream. Eventually, a license agreement with DD2 would be required that spells out the terms of the discharge.

As noted above, it is likely that the Lateral 10 drainage ditch ties into the Boise River. The Boise River has the following designated beneficial uses: 1) agricultural water supply, 2) cold water biota, 3) salmonid spawning, 4) primary contact recreation, and 5) secondary contact recreation. Additionally, several water quality issues have been identified for the Boise River. A Total Maximum Daily Load (TMDL) for the lower Boise River was issued for total suspended solids (TSS), bacteria (E. coli), and phosphorus. Also, although there are currently no TMDL limits for the Boise River for temperature, nearby wastewater treatment plants have been issued with continuous monitoring requirements. Due to the TMDL and the cold-water biota beneficial river use, a surface water discharge alternative would likely require a mechanical treatment plant and high additional future costs for phosphorus and temperature treatment. The lagoon system currently being considered for the development would not consistently meet likely IPDES permit requirements.

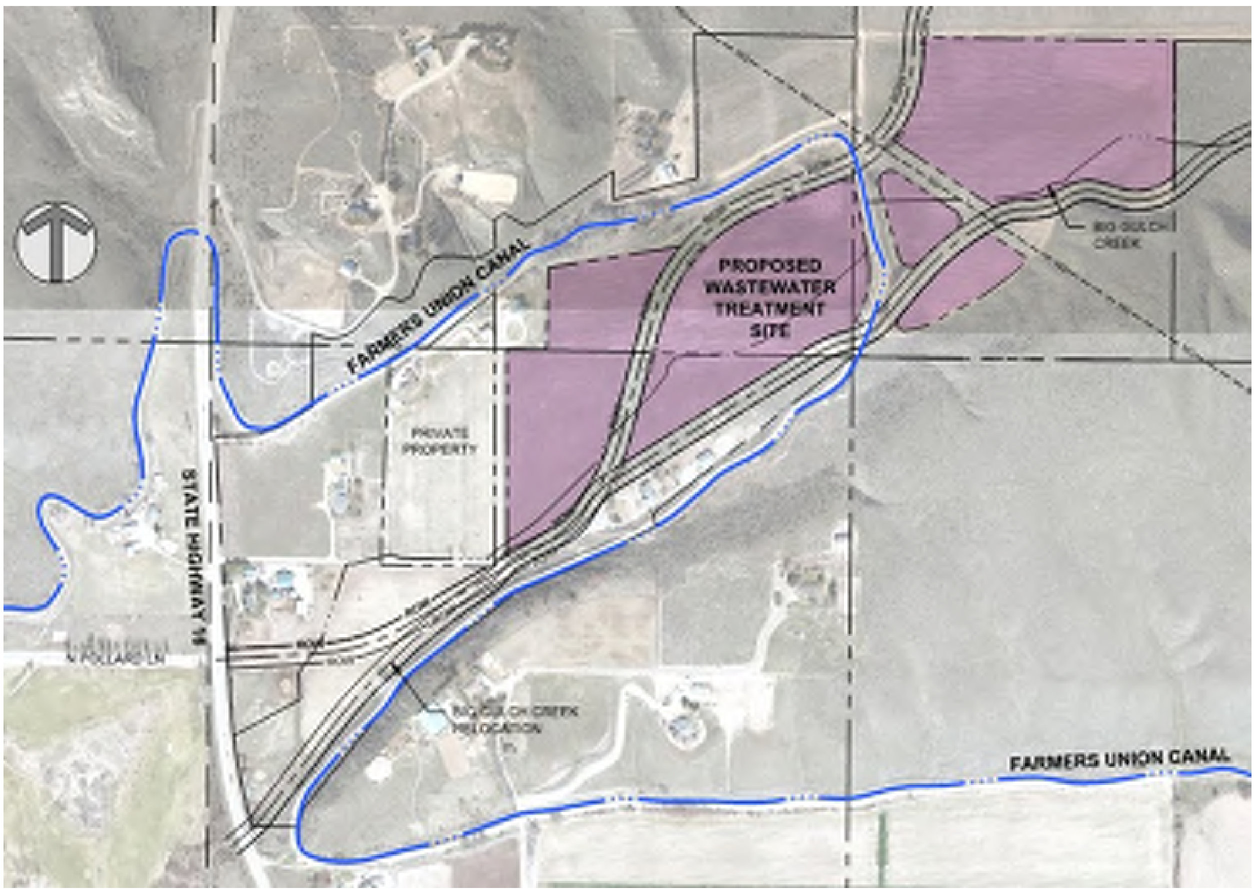
Figure 2 – Klondike Drainage Ditch Point of Discharge



IRRIGATION WATERWAY DISCHARGE

Similar to the surface water discharge option, treated effluent could be discharged into a local irrigation waterway. The most likely irrigation waterway, because of proximity, is the Farmers Union Ditch (Ditch) under an agreement with the Farmers Union Ditch Company (Farmers). The Ditch runs along the southwest corner of the development. The distance to the Ditch varies but is as near as 10 ft of the proposed WWTP site. This irrigation waterway is a delivery facility to agricultural lands. Consequently, its hydraulic capacity gets smaller as it proceeds southwest (downstream). The Ditch alignment near the Spring Valley wastewater treatment plant is illustrated in Figure 3.

Figure 3 – Farmers Union Canal Alignment Near Spring Valley WWTP



In 2014, the City of Boise and Farmers entered into an agreement (see Appendix A) that authorized the City of Boise to discharge treated wastewater into the Ditch. It is understood that under the City of Boise agreement, once the treated effluent is discharged into the Ditch, it is not subject to NPDES or IPDES requirements. It is noted that actual discharge has not yet occurred in part because of significant public resistance. With that said, based on phone conversations with representatives of Farmers, they look favorably on the practice. They are also willing to consider similar agreements depending on the circumstances and water quality.

The following observations are made regarding the Boise-Farmers agreement and its application to a potential agreement between Farmers and Spring Valley.

1. Discharge is limited to 25 cfs maximum capacity, and duration is limited to between April 1 and November 30.

   The future max flow discharge at build-out of the Spring Valley development is estimated to be 11.5 cfs, which is well less than the approved maximum discharge for the City of Boise. It seems unlikely a maximum discharge — if imposed on the Spring Valley — would be an obstacle unless the City of Boise dramatically increased its projected build-out flows beyond 11.5 cfs. However, the limited duration for discharge would be a significant obstacle and hindrance to the Spring Valley development. A winter discharge would be very helpful to the Spring Valley development because it could reduce the winter storage requirements. With that said, a redundant disposal option from April 1 through November 30 would reduce the storage requirements and provide flexibility.

2. Discharge requires weekly coordination between wastewater operators and ditch riders to quantify discharge volumes and timing.

   While this requirement, if imposed on the Spring Valley development, would add a level of coordination and complexity, it is manageable and not a significant obstacle. Regular communication between those responsible for treated effluent at the Spring Valley WWTP and Farmers' ditch riders would be necessary.

3. Class A water is required for discharge.

   This limitation would make this alternative not viable until the mechanical plant upgrades are operational (contemplated after equivalent dwelling unit [ERU] connections are greater than 2,200). A lagoon facility is not capable of meeting the Class A water quality requirements. However, the proposed mechanical WWTP facilities and the necessary emergency storage and disinfection redundancy requirements can produce Class A quality effluent.

4. An accurate measuring device is required on the discharge.

   Flow meters on the influent and effluent/discharge of WWTPs are standard practice. This requirement would not be an obstacle.

5. City of Boise pays an annual maintenance fee of $50,000 or the same rate other users of the system pay for Farmers maintenance costs whether water is discharged or not.

   While this would add cost to the WWTP operation, this cost compared to the overall operation and maintenance costs for WWTPs of this size, is not unreasonable.

6. Farmers cannot terminate the agreement within the first 25 years without breach of contract. The City of Boise cannot terminate the agreement without Farmer's breach of contract or ten years' notice.

   This requirement, if imposed on the Spring Valley WWTP, is reasonable to both parties. The time window would give Spring Valley adequate time to take advantage of their original investment and implement another disposal alternative while also giving Farmers time to deal with eliminating Spring Valley's water.

Based on the above considerations, a discharge to the Ditch may be a viable late spring/summer/fall discharge alternative. However, it is unlikely to be a year-round discharge option because Farmers does not allow flow in their facilities during most of the winter months to clean and maintain the canal facilities in preparation for the irrigation season. Consequently, this option does not eliminate or minimize the winter storage requirements. Furthermore, this discharge alternative would likely require Class A effluent for approval by Farmers, which lagoons cannot consistently produce.

It is possible that this disposal alternative could provide a desirable backup or emergency disposal option during non-winter months once the mechanical plant improvements are operational. However, it does involve significant coordination requirements with Farmers staff. Furthermore, based on the City of Boise's experience, this alternative may experience significant public resistance during the land development and platting approval stages.

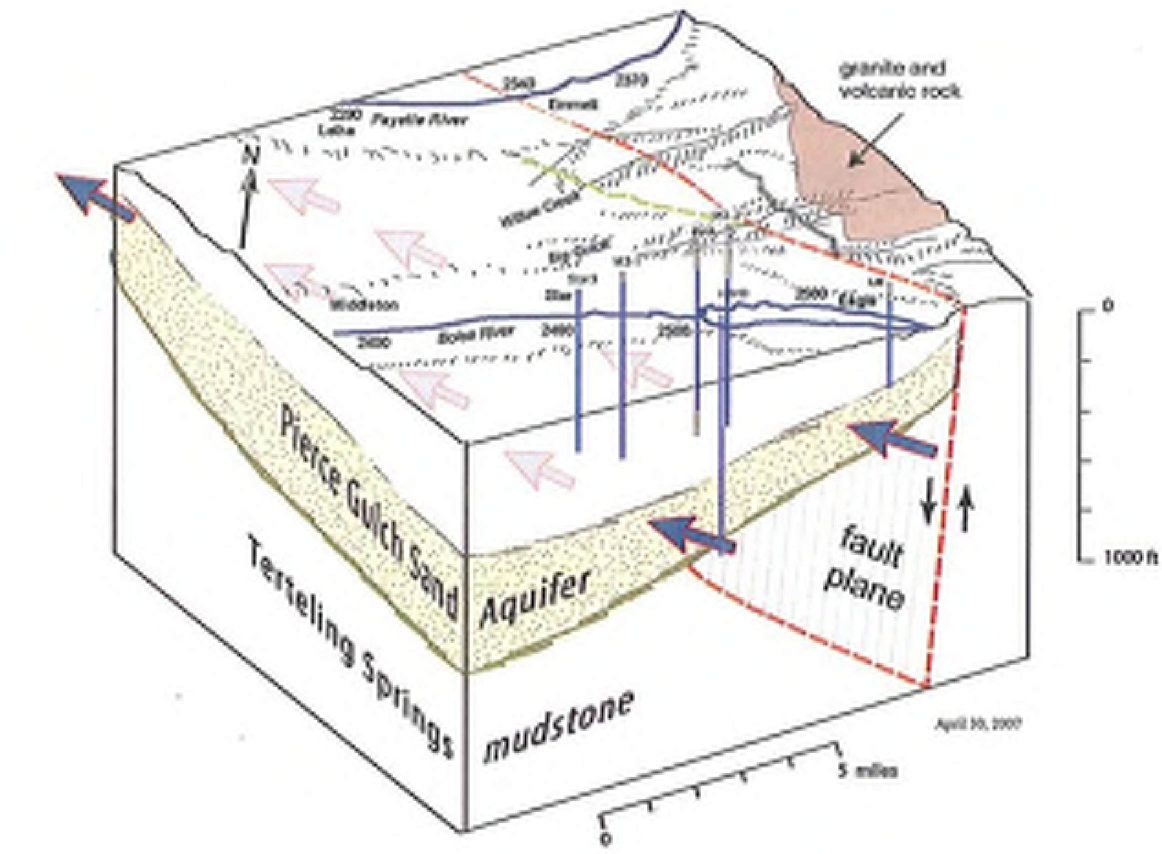
RAPID INFILTRATION DISCHARGE

Another alternative for discharging plant effluent would be rapid infiltration basins (RIBs). The effluent would likely need to meet Class B or better. Ultimately the quality of the treated effluent applied to an RIB is determined by a groundwater study. The RIB is considered part of the treatment process, and depending on the soil quality and its ability to treat for nutrients, lower levels of treated effluent may be permissible. A major consideration for RIB's is that no significant degradation of the groundwater would be allowed. Determining the allowable nitrate levels in the effluent would require a study of nitrate levels in the groundwater above and below the gradient of the proposed RIBs, and modeling of aquifer mixing and transport. For this alternative, we would assume that mechanical treatment would be required as lagoon treatment would not be capable of consistently meeting Class B requirements.

Avimor, a neighboring community, is currently permitted to operate five RIB's and discharges up to 0.19 MGD during winter months for up to 633 ERU's, totaling 2.7 acres, including basins, berms, and access road. Avimor has a mechanical plant that allows them to produce Class B effluent; a copy of Avimor's approved RIB construction plans is attached for reference (see Appendix B). It is expected that an RIB system for Spring Valley would look and operate very similar to these.

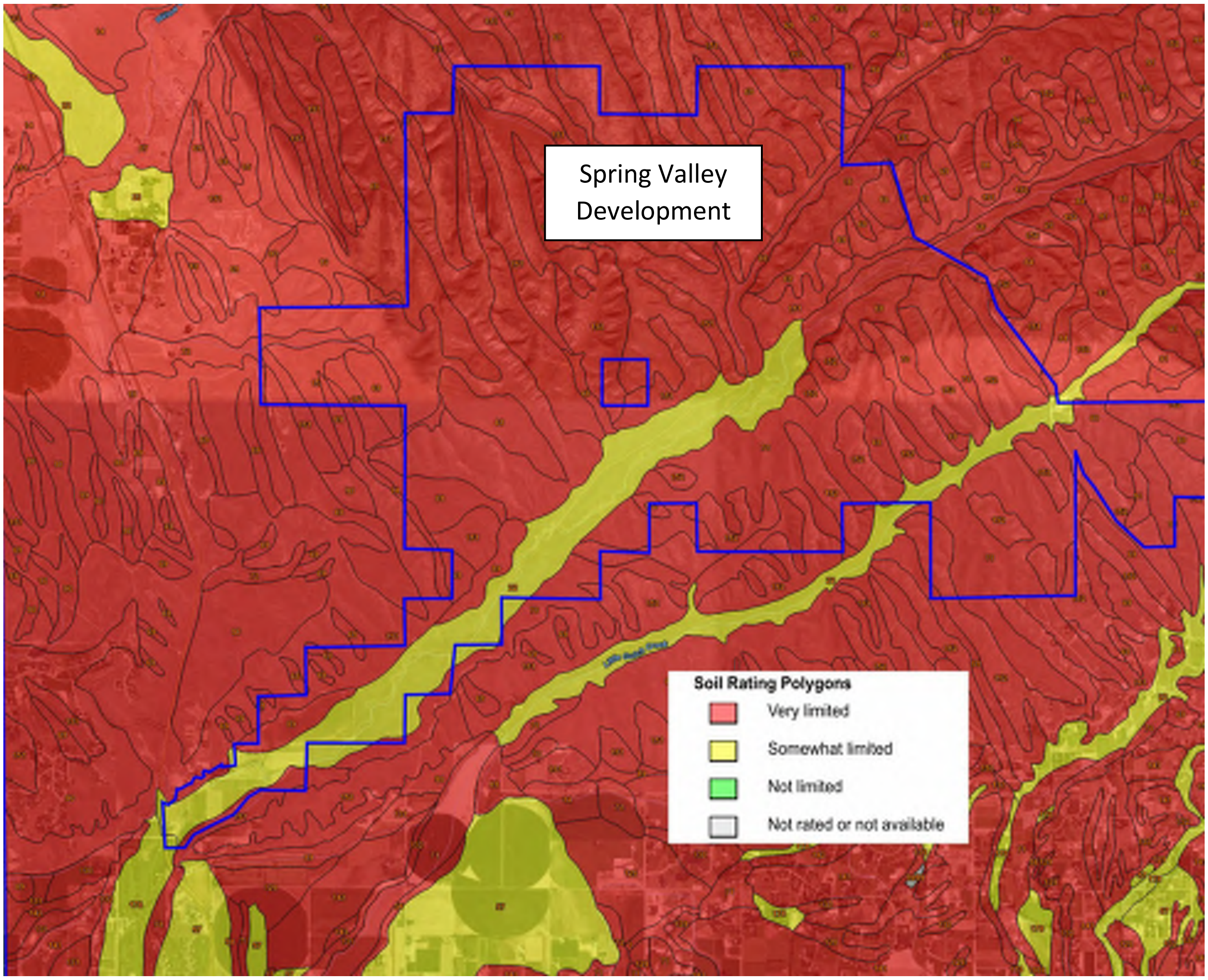
The Spring Valley development is using the Pierce Gulch Sand Aquifer as the source for potable water, which would be directly below the RIBs. This may make approval of RIBs difficult. The groundwater flow in the Pierce Gulch Sand Aquifer is elevation driven and flows from the Boise River northwest towards the Payette River, as shown in Figure 4. RIBs should be designed such that the longitudinal side of the RIBs are perpendicular to the groundwater flow.

Figure 4 – Conceptual Block Diagram of the Pierce Gulch Sand Aquifer



National Resources Conservation Services (NRCS) creates soil maps to help identify soils that may be suitable for rapid infiltration. As shown in Figure 5, approximately 89.4% of the rated soils are "Very Limited" (red areas in Figure 5), and 10.6% are rated as "Somewhat Limited" (yellow areas in Figure 5). According to NRCS, "Somewhat Limited" indicates that the soil has features that are moderately favorable for the specified use. A "Very Limited" rating means that the soil has one or more unfavorable features. If selected as a discharge method, RIBs would have to be coordinated with the overall site development plan.

Figure 5 – Rapid Infiltration Discharge



In summary, rapid infiltration may be a viable option for discharge. However, RIB's are not practical until the treatment facility is able to treat the Class B quality effluent with a mechanical plant. Further investigation and coordination with the overall site development plan would be warranted to determine the exact quantity, location, and size of the RIBs. The volume and quantity of the RIBs would need to be coordinated with other discharge methods that are being utilized (i.e., evaporative, land application, surface discharge, etc.). A minimum of two RIBs is recommended to allow for alternating wetting and resting cycles.

DEEP GROUNDWATER INJECTION DISCHARGE

Rather than constructing RIBs, the effluent could be disposed of using injection wells. However, the level of treatment required for this option would be very high. Based on current regulatory requirements and public perception, this alternative is not considered a viable solution and is not considered further at this time.

CROP LAND APPLICATION AND WINTER STORAGE

The early phase development plan in the approved 2013 FPS and PER proposed to use onsite agricultural land application for discharging treated effluent. The updated approach is to use evaporation as much as possible utilizing surface aerators/evaporators. Once the influent wastewater rates exceed the evaporative rates, operations will change to agricultural land application. Before that time, a Reuse Permit Application must be approved by IDEQ.

Lagoon wastewater treatment would likely meet Class C recycled water requirements. Potential land application sites must provide sufficient acreage, including buffers. The acreage must be sufficient for Spring Valley's year-round effluent flows with sufficient setback distances to surrounding lands, surface water bodies, and wells. In rural areas, wastewater treated to Class C standards requires a minimum of 300 feet distance from the nearest inhabited dwelling and zero (0) feet to areas accessible by the public.

The *Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater* manual published by IDEQ, provides guidelines for buffer zones in areas that use reclaimed water for irrigation. Per conversations with IDEQ, storage lagoons do not fall under this category and can be considered part of the treatment plant and are subject to a 500-ft buffer from public wells (IDAPA 58.01.08) and 200-ft from residential property lines (IDAPA 58.01.16). Table 2 outlines the buffer, fencing, and signage requirements for sprinkler applied treated effluent classes B thru E in rural areas.

Table 2 – Reuse Water Buffer Zones, Sprinkler Applied, Rural Areas

	Land Application Buffer Distance, Fence and Sign Requirements [A]			
	Class B	Class C	Class D	Class E
Public Well	1,000-ft			
Private Well	500-ft			
Irrigation Well	100-ft			
Permanent or Intermittent Surface Waters, other than ditches / canals	100-ft			
Temp Surface Waters and Ditches and Canals	50-ft			
Public Access Area	0-ft	0-ft	300-ft	1,000-ft
Inhabited Dwelling	100-ft	300-ft	500-ft	1,000-ft
Fence Type	None	Three-Wire Pasture	Three-Wire Pasture	Woven Pasture
Signage	"Irrigated with Reclaimed Wastewater – Do Not Drink"			"Sewage Effluent Application - Keep Out"

A – Adapted from Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater manual, for Rural Areas, Sprinkler Applied.

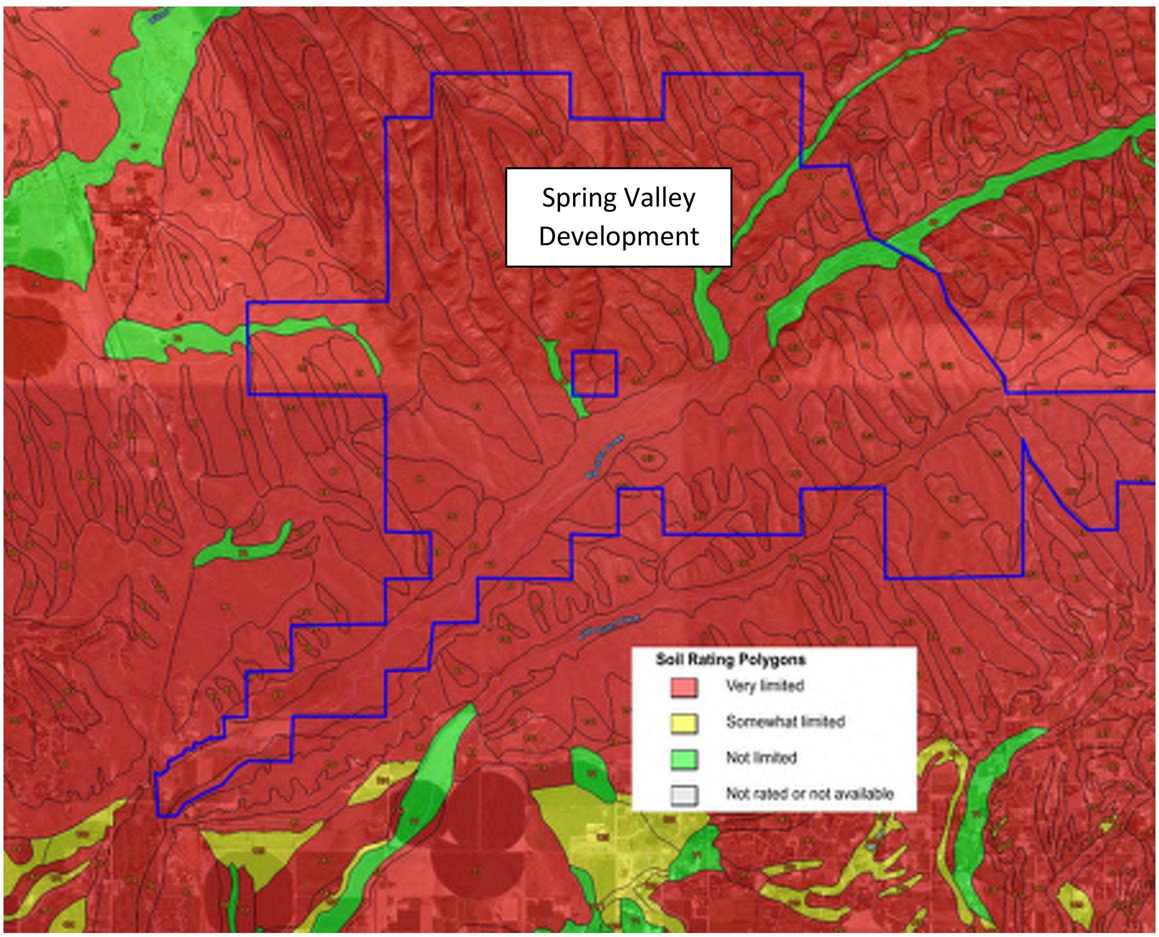
There also must be enough room for winter storage. This alternative assumes that the effluent would be pumped to a storage site sized to store winter WWTP effluent. Approximately 120 acres of alfalfa crop would be required to dispose of summer flows from 2,200 ERUs (0.44 MGD average annual flows). This acreage does not include buffer and setback requirements.

During non-growing seasons, treated effluent would be stored in a series of lined winter storage ponds. Winter storage will likely be required from November 1st to April 1st, which equates to 151 days. Based on 2,200 ERUs and an annual average flow rate of 0.44 MGD, approximately 70 million gallons (MG), or 209 acre-ft, of effluent storage would be required. The spatial requirements for winter storage ponds at an average depth of 20 feet equates to about 14 acres. Multiple cells/ponds are recommended for testing and operational redundancy. Initially, three 4.7-acre ponds are proposed. Winter storage ponds will likely be located close to the point of irrigation use and would require pumping facilities to convey water from the WWTP site to the various crops.

A reuse permit from IDEQ would be required before any Class C to D treated effluent could be applied to croplands. Reuse permit outlines the required monitoring frequency, organic and nutrient limits for ground water, surface water, crops, and soil. The permit will also provide a schedule of reports and due dates.

NRCS creates soil maps to help identify soils that may be suitable for Land Application. As shown in Figure 6, approximately 91.1% of the rated soils are "Very Limited" (red areas), 3.3% are rated as "Somewhat Limited" (yellow areas), and 5.6% of the area is rated as "Not Limited" (green areas). According to the NRCS, a "Somewhat Limited" rating indicates that the soil has features that are moderately favorable for the specified use, "Very Limited" indicates that the soil has one or more unfavorable features, and "Not Limited" indicates the soil has no unfavorable features. These ratings are approximate and additional investigation may identify lands that are more favorable to this method of reuse.

Figure 6 – Land Application Discharge



PUBLIC / COMMERCIAL LAND APPLICATION

The long-term plan from the 2013 approved FPS and PER was to land apply treated effluent to the golf course, parks, and landscaping throughout the community once the mechanical plant is operational.

The new Spring Valley development includes approximately 230 acres of golf course that can be irrigated with Class A or B treated wastewater effluent. There are also additional public/common areas within the development that would qualify for recycled water, such as parks, playgrounds, schoolyards, and roadside vegetation. Additional design constraints, setbacks, watering times, and signage would be required for Class A or B reuse.

This alternative assumes that the effluent would be pumped to several storage ponds prior to irrigating during the growing season. The small storage ponds would allow the irrigation to occur when needed and hold the water during rain events. The effluent can typically only be applied during the growing season and would require winter storage when irrigation operations are suspended. While the Eagle Sewer District will own and operate the wastewater treatment facilities, the Spring Valley community would likely be responsible for all costs of monitoring (soils, crops, and groundwater) required by the reuse permit.

The main concern with irrigation on commercial and public lands is balancing hydraulic and nutrient loads to avoid standing water and nutrient buildup in the soils. This typically translates to irrigating at rates that match the net requirements of the grass (likely ground cover). Also, nitrogen (total Kjeldahl nitrogen [TKN]) and phosphorus (total phosphorus [TP]) application rates are typically monitored. Agronomic irrigation rates vary month to month based on precipitation and temperature, but average historical precipitation deficit values can be used for estimating purposes. Historical values are available from ETIdaho -- Evapotranspiration and Net Irrigation Requirements for Idaho.

Based on historical averages, turfgrass in the vicinity of spring valley would require approximately 45 inches of irrigation per acre per year on average, assuming 85% irrigation efficiency. However, it should be noted that less water is required during the spring and fall than in summer. Recycled water would need to be pumped from the WWTP to storage ponds to distribute to golf courses, parks, and various landscaped areas. Pump stations would pump from each storage pond to the irrigation systems. It is assumed the community would be responsible for the construction and maintenance of the irrigation facilities.

Similar to cropland application, public and commercial land application would also require either winter storage or another winter disposal methodology. Since this disposal methodology would not be possible till after the mechanical plant is operational, which can produce Class B effluent, which is beyond the 2,200 ERUs, quantities for acreage and winter storage have not been determined as part of this analysis.

CONCLUSIONS AND FINDINGS

Several options were discussed and evaluated for discharging treated wastewater effluent. It is anticipated that methods of discharging plant effluent will change as the community grows and develops. Initially, enhanced surface evaporation in a lagoon wastewater treatment plant (complete containment lagoons) makes the most sense. Once flows increase beyond the capacity of a complete containment lagoon system, the lagoon system should be expanded to allow Class C or D cropland application with winter storage. In the future (for this project, it is assumed to be beyond 2,200 ERUs), when irrigation of golf courses and other community land application is desired, a mechanical plant should be constructed with the ability to treat the water to meet Class B requirements. At that time, additional winter disposal would be needed with either additional winter storage capacity, RIB, or a surface water discharge. These alternatives should be explored in more detail between now and then. The following phasing is recommended:

Table 3: Recommended Reuse Phasing Plan

Phase	Approximate ERU Service [A]	Treatment	Disposal	Water Quality
Initial	~600, w/ ~4-yrs service	Evaporative Lagoon System	None	N/A
Intermediate	2,200	Aerated Lagoons	Crop Land Application & Winter Storage	Class C
Ultimate	7,153	Mechanical Plant	Public - Commercial Land Application; RIB; Surface Water Discharge; Partial Winter Storage	Class B+

A – Assumes 50 ERU's Yr-1, 150 ERU's Yr-2, 200 ERU's Yr 3&4, 200 ERU's Yr-5+

A few other disposal alternatives were investigated in this technical memorandum; however, each of the options would cost more than the lagoon treatment, cropland application, and winter storage option for flows from the first 2,200 ERUs. Furthermore, these options would also have several administrative challenges to work through. These other options require a high-quality effluent, which generally a mechanical plant can provide. These alternate options would also require significant additional investigation, negotiations with stakeholders, and coordination with regulatory agencies. However, they may provide a reliable secondary method of discharge if the primary methods or storage facilities are at capacity or are not useable for whatever reason.

Appendix A

Farmers Union and City of Boise Discharge Agreement

KELLER ASSOCIATES

TREATED WASTEWATER DISCHARGE AND USE AGREEMENT

June 18, 2014

This Agreement is made and entered into as of the date of the latest signature on the signature pages of this Agreement, by and between the City of Boise City ("City") and the Farmers Union Ditch Company, Ltd ("Farmers") for the purpose of allowing the discharge of treated wastewater from the Boise City Lander Street Wastewater Treatment Facility to the Farmers Union canal.

WHEREAS, City owns, operates and maintains a public wastewater collection and treatment system which provides wastewater and collection services to City patrons; and

WHEREAS, City owns and operates two Wastewater Treatment Facilities (WWTFs), including the Lander Street WWTF located at 790 Lander Street, Boise, ID 83703, to treat collected wastewater; and

WHEREAS, Farmers owns and operates an irrigation canal, located next to the Lander Street WWTF, which provides irrigation water to properties located within the Farmers service area; and

WHEREAS, City currently discharges treated wastewater from the Lander Street WWTF to the Boise River pursuant to an NPDES discharge permit issued by the U.S. Environmental Protection Agency (EPA); and

WHEREAS, the City wishes to have the option to seasonally discharge treated wastewater to Farmers' facilities as necessary to assure continued compliance with NPDES permit requirements; and

WHEREAS, Farmers desires to seasonally receive the discharge of treated wastewater from the City to assist it with meeting system irrigation demands; and

WHEREAS, City and Farmers agree that it is in the best interests of the patrons of both City and Farmers to enter into a long-term Agreement providing terms for the discharge and use of treated wastewater from the Lander Street WWTF to the Farmers Canal system.

NOW, THEREFORE, in consideration of the foregoing, it is mutually agreed by the parties that:

SECTION A – CITY OBLIGATIONS

1. City, at its sole cost, shall design, construct and maintain necessary improvements to connect the outflow of the Lander Street WWTF to the Farmers Union Canal. Connection will be made downstream of the Boise Valley Irrigation Ditch Company Diversion as shown on Exhibit "A" attached hereto. Boise shall obtain written approval of piping and connection

plans and designs from Farmers prior to beginning construction of the improvements necessary to make the connection.

2. Upon connection, the City shall be authorized to discharge up to 25 cfs of treated wastewater, or more if approved by Farmers, from April 1 through November 30 of each year of this Agreement. The City is not obligated, nor does it guarantee, to provide any treated wastewater flow to Farmers. The City shall decide, on a weekly basis, based upon WWTF flow and maintenance requirements, NPDES permit requirements or limitations or other system requirements, the amount and duration of any discharge to the Farmers canal. On a weekly basis or upon request by Farmers, City will provide Farmers ditchrider or other designated Farmers operator the estimated flow rates and duration of any anticipated treated wastewater discharge to the Farmers canal. City shall attempt to discharge to the canal as soon as water year 2020.

3. Unless otherwise agreed to in writing by the parties and approved by both EPA and the Idaho Division of Environmental Quality (DEQ), all treated wastewater discharged to Farmers shall meet or exceed the water quality requirements for Class A Recycled Water as specified in IDAPA 58.01.17 Recycled Water Rules, however, it is understood that all non-water quality requirements such as signage, setbacks and recycled water piping will not be applicable. The City shall also be responsible for meeting more stringent requirements, if required, by applicable agencies such as EPA or DEQ

4. City, at its sole cost, will be responsible to operate and maintain all piping, pumping and other conveyance facilities from the Lander WWTF to the point of connection to the Farmers canal. City shall ensure that at all times a functioning and accurate measurement device is installed, maintained and operating downstream of the WWTF but upstream from the point of connection to the Farmers canal for purposes of measuring discharges by City into Farmers canal. Farmers shall have the right to verify measurements performed by City.

5. City shall comply with all city, state and federal regulations in the construction and maintenance of the connection facilities and in the discharge of treated wastewater to the Farmers Union canal.

6. City shall pay Farmers an annual maintenance assessment fee for the use of the canal. The assessment fee shall be $50,000.00 (fifty thousand dollars) annually or the same rate other users of the system pay on a miners inch basis based upon the City peak day flow discharged to the canal, whichever is greater. The first payment shall be $50,000 and shall be made on or before January 1 proceeding the first year of discharge to Farmers Canal. After the first year of discharge to the canal, the calculation for establishing the City annual payment to Farmers shall be as follows: (Upcoming irrigation season Maintenance Annual Assessment Fee $/Miners Inch) x (50 Miners Inch/cfs) x (Previous year Peak City Daily cfs Discharge to the

Canal). Following the irrigation season, the City shall calculate the peak daily flow recorded during the preceding irrigation season and provide Farmers the calculation. Farmers shall send City its annual assessment in January of each year using City's calculation to determine the correct assessment amount as set forth herein (Peak Flow x Annual Assessment Fee or $50,000.00). City shall pay its annual assessment by March 15 of each year. The assessment fee shall not be charged if the City notifies Farmers prior to January 1 that it does not intend to discharge flow to the canal in which case the City shall not be allowed to discharge to the canal during the following irrigation season.

7. The City shall conduct effluent testing in accordance with State and Federal discharge permit requirements. The test results shall be shared with Farmers via electronic media on a monthly basis. The City shall notify Farmers within 24 hours of determination that the City is out of compliance with any Class A Recycled Water quality requirement and shall take steps reasonably necessary to cease all discharges into the canal until City has established it is able to discharge within Class A permit requirements. City shall immediately cease discharge to the canal if the City determines that its discharge presents an immediate health risk to the Canal users.

8. Up to a maximum amount of $5,000, City agrees to pay all attorney fees, and any other fees and costs incurred by Farmers from and after April 15, 2014 in connection with the negotiation, preparation and execution of this Agreement and any related agreements and other documents, within forty five (45) days of the City receiving itemized invoices. The billing shall be sent directly to the City, attention John Tensen.

9. City shall use its best efforts to obtain all necessary discharge permits and, upon obtaining said permits shall complete design and construction of piping and other construction necessary to enable it to discharge into the canal as soon as possible.

10. City shall attempt to obtain a waiver of permit requirements or obtain approval of State and Federal agencies to allow discharges to the canal of water less than Class A quality pending approval of discharges of Class A water.

11. During the term of this agreement, City agrees it will not discharge Lander Street treated wastewater to another Irrigation District, Lateral Association or Canal Company, or allow the use of Lander Street treated wastewater by another Irrigation District, Lateral Association or Canal Company unless specifically approved in writing by Farmers.

<u>SECTION B – FARMERS OBLIGATIONS</u>

1. Subject to the provisions of this agreement, Farmers agrees to allow the City to do all things reasonably necessary to connect the outflow of the City Lander Street WWTF to the Farmers Union canal at a point as shown on Exhibit "A" attached hereto. Farmers shall review and

provide written comment and/or approval of City prepared piping and connection plans and designs prior to the City beginning construction of the improvements necessary to make the connection. Farmers will grant the City all necessary licenses and easements to allow for construction and maintenance of the connection.

2. Upon connection, Farmers authorizes the City to discharge up to 25 cfs of treated wastewater to the Farmers Union canal from April 1 through November 30 of each year of this Agreement.

3. Farmers acknowledge the City is not obligated, nor does it guarantee, to provide any treated wastewater flow to Farmers. Farmers also acknowledge that the City needs the use of the Canal for effluent temperature mitigation and that, except for irrigation consumption, the City effluent will be in the canal to at least the diversion downstream of Pierce Park Road.

SECTION C – MISCELLANEOUS PROVISIONS

1. This Agreement shall continue in force until terminated by either party as provided herein.

2. Due to the substantial up-front costs incurred by the City in making the connection and the NPDES compliance requirements during the first twenty five years of this agreement, Farmers may only terminate this agreement if: 1) the City is determined to be in material breach of this contract; or 2) the discharge of treated wastewater into the Canal will require Farmers to comply with an NPDES permit for their operations; or 3) the acceptance of the effluent will trigger additional requirements such as monitoring or reporting above and beyond what would be required for simply using their irrigation water right; or 4) termination is required pursuant to a legal order; or 5) the discharge of treated wastewater will cause Farmers to be in violation of any law, rule or regulation of any governmental agency having or asserting jurisdiction over Farmers and its activities . After twenty-five (25) years, Farmers may terminate this Agreement by providing at least five (5) years written notice to the City of intent to terminate. At termination the City will take all necessary steps, at its own expense to disconnect the City piping from the Farmer system.

3. The City may terminate this Agreement if Farmers is determined to be in material breach of this Agreement; or without cause by providing at least ten years written notice to Farmers of its intent to terminate. In the event either party claims a material breach of the contract, the parties shall enter into a dispute resolution process, which will include good faith negotiations to resolve the dispute and continue the terms of the Agreement.

4. This Agreement shall be declared null and void should the City fail to obtain written approval of the Idaho Department of Environmental Quality (IDEQ) and the U.S.

Environmental Protection Agency (EPA) for the discharge of treated wastewater to the Farmers Union canal.

5. The City shall defend, indemnify and save and hold harmless Farmers from and for any and all losses, claims, actions, judgments for damages, or injury to persons or property and losses and expenses arising or resulting from the City's discharge of treated effluent to the canal, obligations and performance under this Agreement and not caused by or arising out of the negligent conduct of Farmers or its employees. Notwithstanding anything herein to the contrary, nothing herein shall be construed as a waiver of City's protections afforded the City under the Idaho Tort Claims Act.

6. If necessary and agreed to by the parties, Farmers and City shall cooperatively educate and inform the public and Farmers shareholders of the benefits and advantages, including the minimal risk involved, realized by Farmers and City as a result of this agreement.

7. No waiver or modification of this Agreement shall be valid unless it is in writing and signed by each of the parties hereto.

8. This Agreement shall be binding upon, and inure to the benefit of, the parties and their successors, assigns, heirs, legal representatives, executors and administrators.

9. If either party hereto shall be determined to be in material breach of any of the terms hereof, such party shall pay to the non-defaulting party all of the non-defaulting party's costs and expenses, including attorneys' fees, incurred by such party in enforcing the terms of this Agreement.

10. This Agreement constitutes the entire Agreement between the parties with respect to the subject matter hereof. This Agreement supersedes any and all other Agreements, whether or not in writing, between the parties with respect to the subject matter hereof.

11. This Agreement shall be subject to and governed by the law of the State of Idaho. Exclusive jurisdiction and venue for the interpretation and enforcement of this Agreement lies in the State Courts of the State of Idaho, in and for Ada County.

12. The headings in this Agreement are inserted for convenience only and shall not be considered in interpreting the provisions hereof. The recitals are a part of this Agreement and shall be considered in interpreting the provisions hereof.

13. If any term or provision of this Agreement shall to any extent be determined by a court of competent jurisdiction to be invalid or unenforceable, the remainder of this Agreement shall not be affected thereby, and each term and provision of this Agreement shall be valid and be enforceable to the fullest extent permitted by law and it is the intention of the parties that if any provision of this Agreement is capable of two constructions, one of which would render

the provision void and the other of which would render the provision valid, then the provision shall be interpreted to have the meaning which renders it valid.

14. All notices shall be given in writing to the other party at their address set forth below, and shall be effective upon receipt:

Farmers:	Farmers Union Ditch Company, Ltd P.O. Box 1474 Eagle, ID 83616 Attn: Legal Counsel
Boise City:	City of Boise PO Box 500 Boise, ID 83701 Attention: Public Works Director

15. This Agreement shall not be effective until approved Board of Directors of the Farmers Union Ditch Company and by the City Council and Mayor of the City, as required by applicable law.

16. Whether or not expressly set forth above, the indemnity and other similar obligations shall survive termination of this agreement.

17. Farmers shall have the right to suspend discharges to its canal in the event of an emergency or other circumstance which require Farmers to dewater or reduce flows in the canal such as for completing emergency repairs to the canal.

THE PARTIES hereto have executed this Agreement effective as of the latest date of execution set forth below.

THE CITY OF BOISE, IDAHO

Dated June 24th, 2014

By:
David H. Bieter, Mayor

ATTEST:

City Clerk Jade Riley

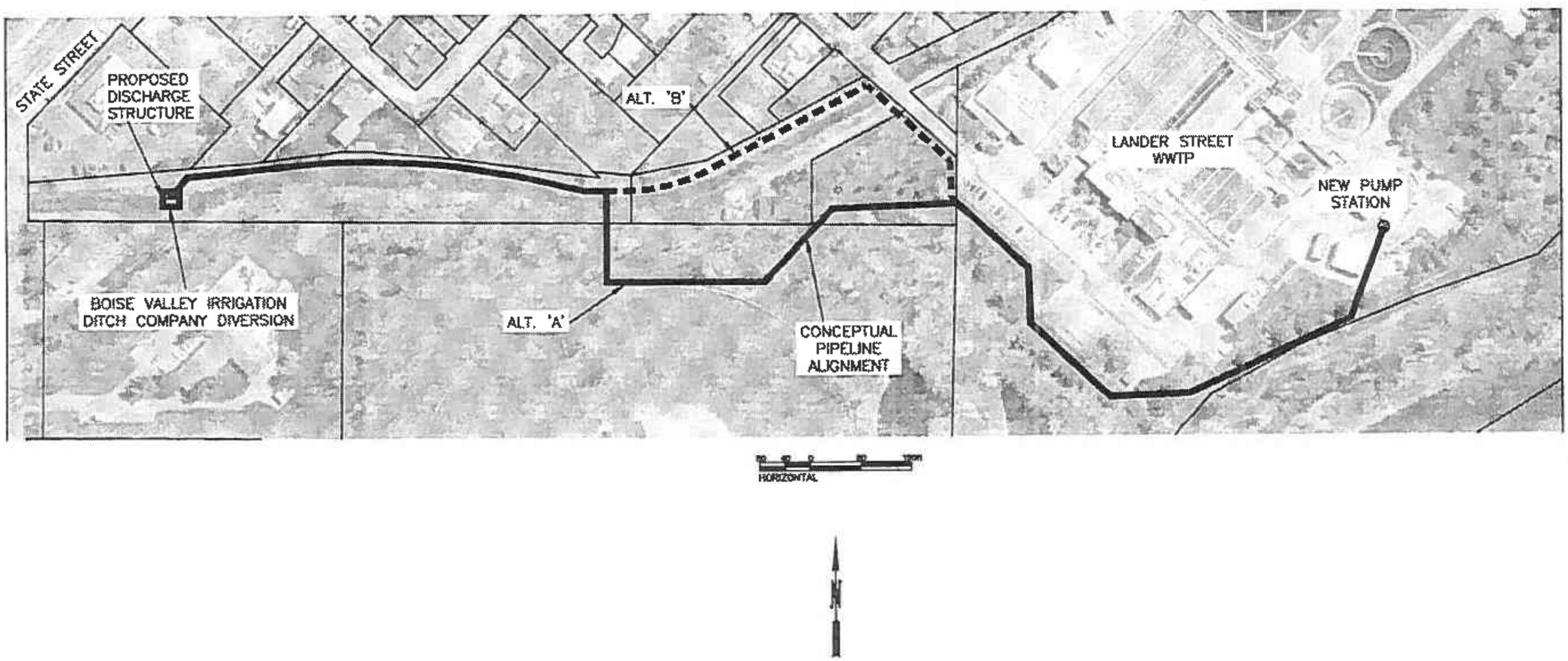
FARMERS UNION DITCH COMPANY, Ltd

Dated June 18th, 2014

By:
Brian Harm, President

ATTEST:

Tom Foster, Secretary



PUBLIC WORKS DEPARTMENT

BOISE

CONCEPT PLAN FOR
LANDER STREET WWTP

EXHIBIT 'A'

SHEET 1 OF 1
SAR 1004

Appendix B

Avimor Approved RIB Construction Plans

KELLER ASSOCIATES

9062-07

SunCor Idaho, INC.

Avimor Water Reclamation Facility Rapid Infiltration System

SunCor Idaho, INC
485 East Riverside Drive Suite 300
Eagle, Id 83616
208.939.0343

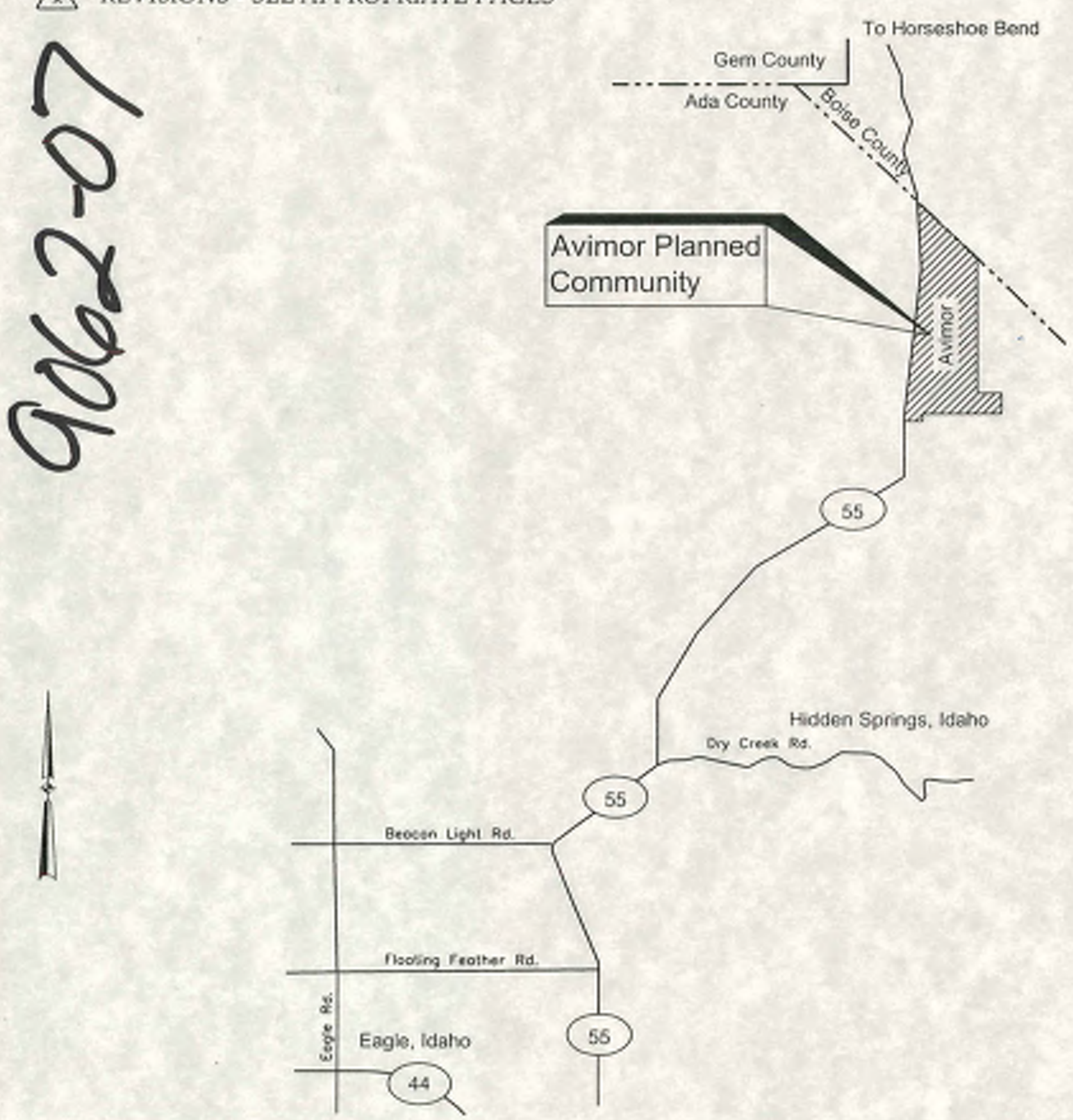
Record Dwgs
May, 2008

△x *REVISIONS - SEE APPROPRIATE PAGES*

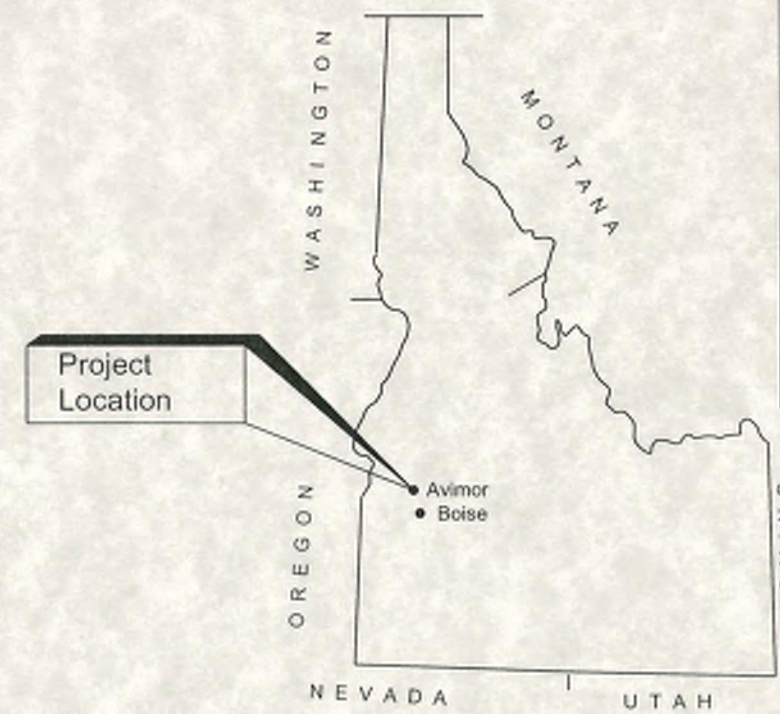
RECEIVED
MAY 30 2008
DEPARTMENT OF ENVIRONMENTAL QUALITY
BOISE REGIONAL OFFICE

AVIMOR™

9062-07



VICINITY MAP



LOCATION MAP

DRAWING INDEX

DRAWING NUMBER	DRAWING DESCRIPTION
Pharmer Engineering	
G0.1	COVER SHEET
C1.0	SITE PLAN
C1.1	BASINS PLAN AND PROFILE
C2.0	PIPE PLAN AND PROFILE
CD1.0	RI BASIN DETAILS
CD1.1	RI BASIN DETAILS
△2 ~~CD1.2~~	~~TYPICAL DIKE ENLARGED PROFILE~~
GM1.0	PIPE SCHEDULE AND SPECIFICATIONS
M1.0	RI TANK PLAN AND ELEVATIONS
M2.0	RI VAULT PLANS
M2.1	RI VAULT SECTIONS
MD1.0	MECHANICAL DETAILS
N1.0	FLOW SCHEMATIC
E1.0	ELECTRICAL SITE PLAN
WRG – Grading Plans	
C000	COVER SHEET
C001	GRADING NOTES AND DETAILS
C002	EXISTING CONDITIONS PLAN
C003	AWRF GRADING PLAND AND PROFILE
C004	B.HORN RES./PI RES. GRADING PLAN
C004A	PI RES. GRADING PLAN
C005	B. HORN RES. ACCESS PROFILE
C006	B. HORN RES. ACCESS PROFILE
WRG – Reuse Infiltration Ponds	
C000	COVER SHEET AND GENERAL NOTES
C001	EXISTING CONDITIONS PLAN
C002	RI POND PLAN, PROFILE & DETAILS

PROFESSIONAL ENGINEER
REGISTERED
8778
STATE OF IDAHO
BRADLEY S. BJERKE

Dig Line, Inc.
Call Before You Dig!
1-800-342-1585

DATE: 05-27-08

RECORD DRAWINGS

THESE RECORD DWGS. ARE BASED ON CONTR. FURNISHED INFORMATION. WHILE THE INFORMATION SUBMITTED BY THE CONTR. & INCORPORATED BY THE ENGINEER INTO THE RECORD DOCUMENTS IS BELIEVED TO BE RELIABLE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION, NOR FOR ERRORS OR OMISSIONS WHICH MAY APPEAR IN THE RECORD DOCUMENTS AS A RESULT.

For Additional Information Regarding This Project, Contact:

PE PHARMER ENGINEERING L.L.C.
1998 W. Judith Lane
Boise, ID 83705
208.433.1900

9062-07

811

SunCor Idaho, INC.

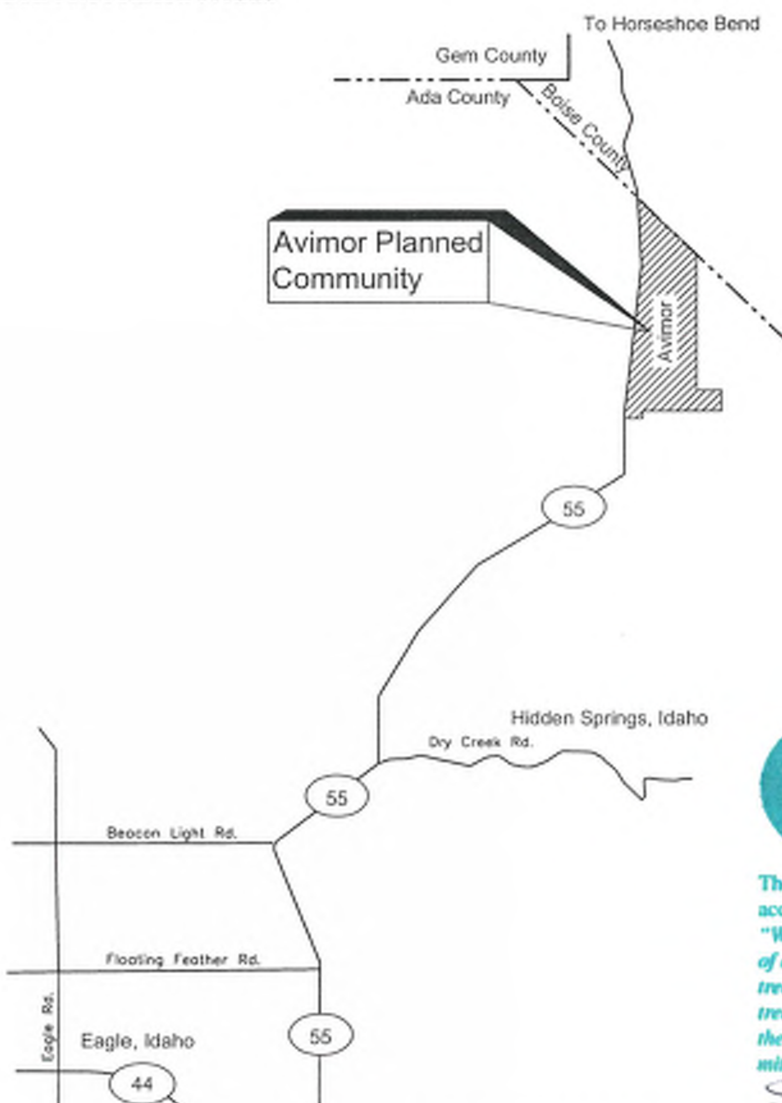
Avimor Water Reclamation Facility
Rapid Infiltration System

AVIMOR™

SunCor Idaho, INC
485 East Riverside Drive Suite 300
Eagle, Id 83616
208.939.0343

Record Dwgs
May, 2008

△x *REVISIONS - SEE APPROPRIATE PAGES*

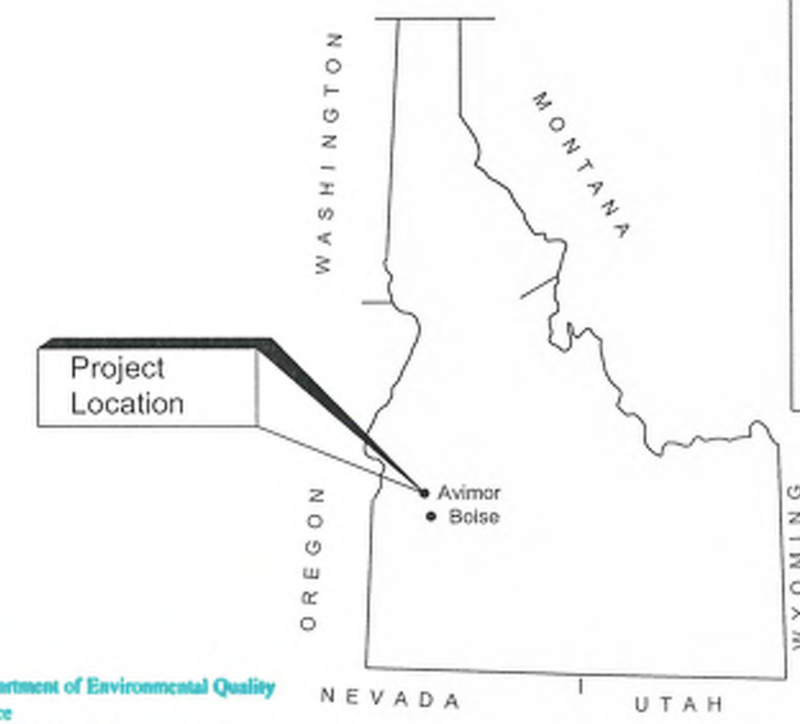


VICINITY MAP

State of Idaho • Department of Environmental Quality
Boise Regional Office
Acceptance of Record Drawings

The record drawings for this project have been reviewed. The drawings are accepted as meeting the requirement of Idaho Code 39-118 which states: *"Within 30 days of the completion of construction, alteration, or modification of any new sewage systems, sewage treatment plants or systems, other waste treatment or disposal facilities, public water supply systems or public water treatment systems, complete and accurate plans and specifications depicting the actual construction, alteration, or modification performed must be submitted to the director".*

Steve M. Ogle — Reviewing DEQ Engineer
6-25-08 — Acceptance Date



LOCATION MAP

DATE: 05-27-08

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C004A	PI RES. GRADING PLAN
C005	B. HORN RES. ACCESS PROFILE
C006	B. HORN RES. ACCESS PROFILE
WRG – Reuse Infiltration Ponds	
C000	COVER SHEET AND GENERAL NOTES
C001	EXISTING CONDITIONS PLAN
C002	RI POND PLAN, PROFILE & DETAILS

PROFESSIONAL ENGINEER — REGISTERED — 8776 — STATE OF IDAHO — BRADLEY S. BJERKE
05-27-08

Dig Line, Inc.
Call Before You Dig!
1-800-342-1585

For Additional Information Regarding This Project, Contact:

PE PHARMER ENGINEERING L.L.C.
1998 W. Judith Lane
Boise, ID 83705
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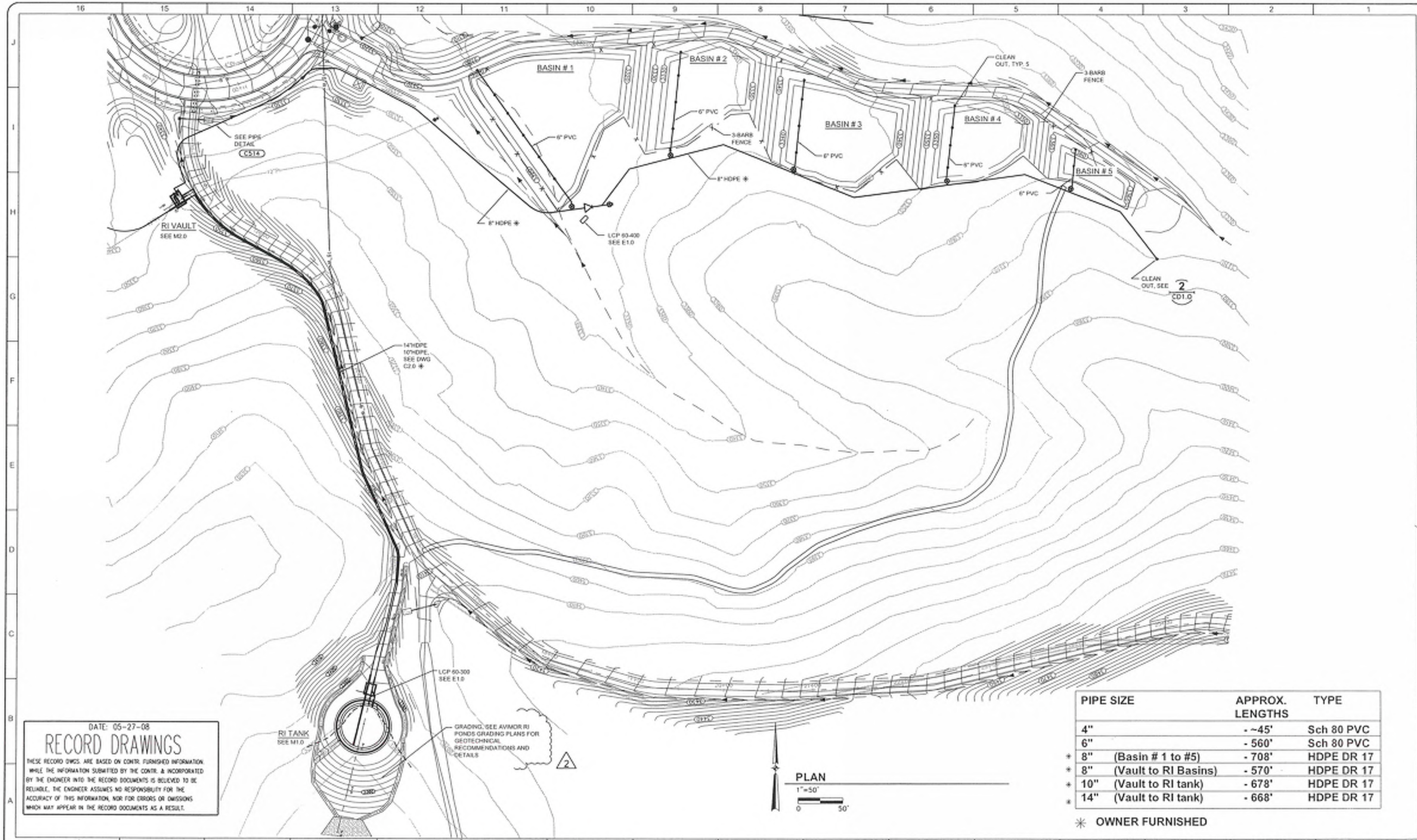

PIPE SIZE		APPROX. LENGTHS	TYPE
4"		- ~45'	Sch 80 PVC
6"		- 560'	Sch 80 PVC
✳ 8"	(Basin # 1 to #5)	- 708'	HDPE DR 17
✳ 8"	(Vault to RI Basins)	- 570'	HDPE DR 17
✳ 10"	(Vault to RI tank)	- 678'	HDPE DR 17
✳ 14"	(Vault to RI tank)	- 668'	HDPE DR 17

✳ OWNER FURNISHED

DATE: 05-27-08

RECORD DRAWINGS

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REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	REVISIONS	JRH	BSB	11/09/07
2	REVISIONS	JRH	BSB	11/15/07
-	RECORD DRAWINGS	MG	CWH	05/27/08

ATTENTION: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BSB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

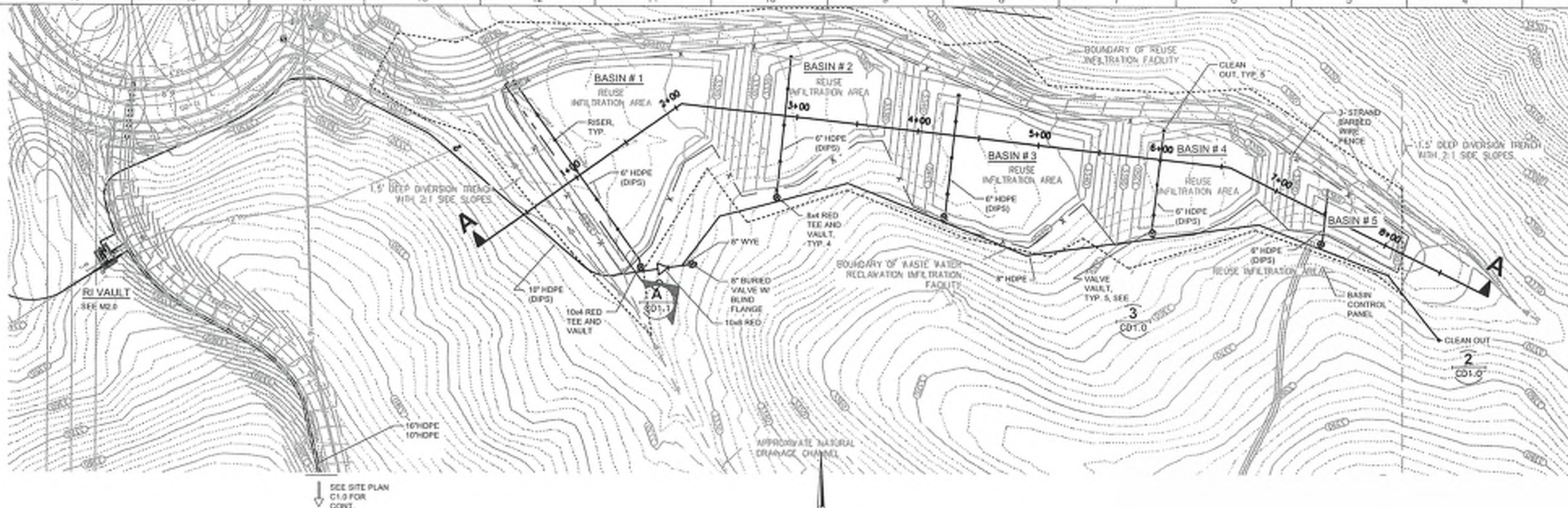
05-27-08

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County
SITE PLAN

DRAWING NUMBER C1.0

REV -

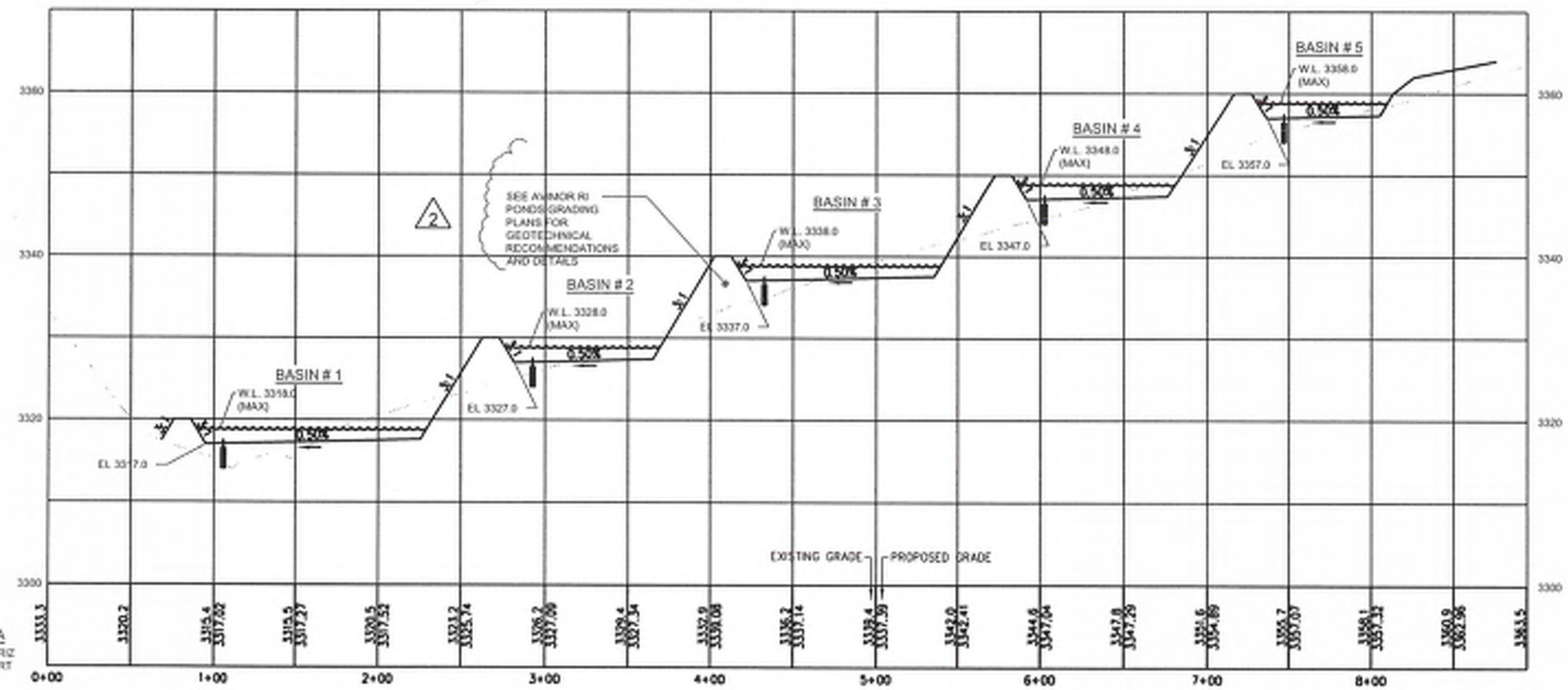
*****.DWG



PLAN
1"=50'

BASIN NO.	RISERS *
1	5 @ 20' & 50' & 80' & 110' & 135'
2	3 @ 15' & & 45' & 75'
3	3 @ 15' & 45' & 75'
4	3 @ 10' & 35' & 55'
5	1 @ 20'

* SEE DWG CD1.1



SECTION A - A
SCALE: 1"=50' HORIZ
1"=10' VERT

DATE: 05-27-08

RECORD DRAWINGS

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PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BSB
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APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

BASIN PLAN AND PROFILE

DRAWING NUMBER
C1.1
REV -

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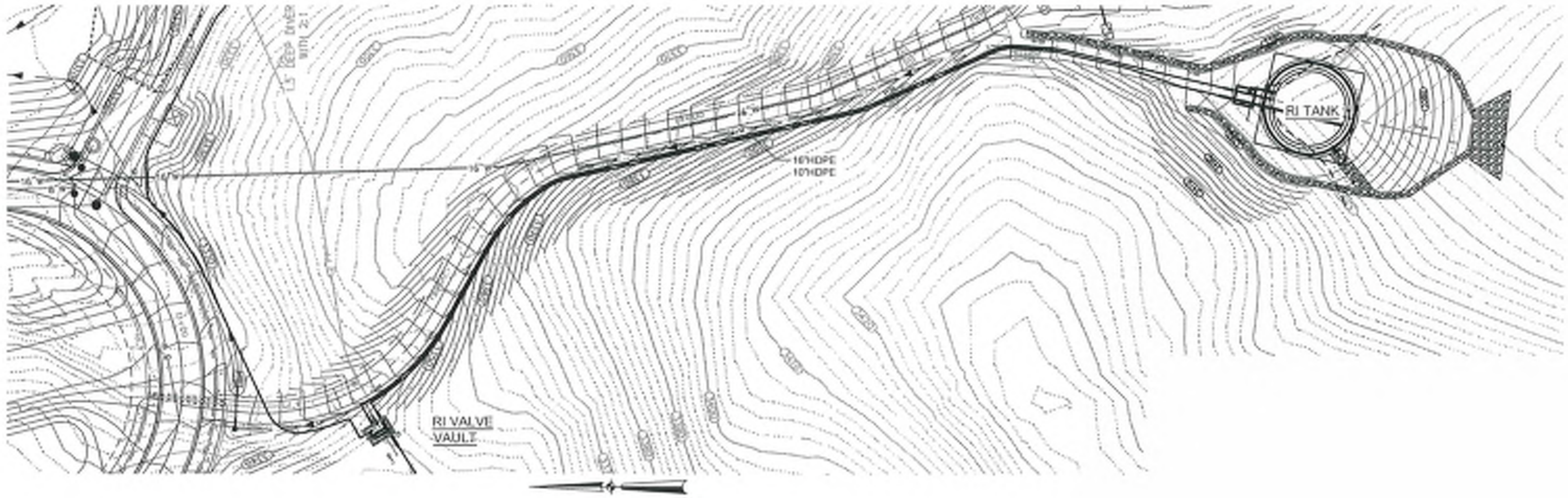
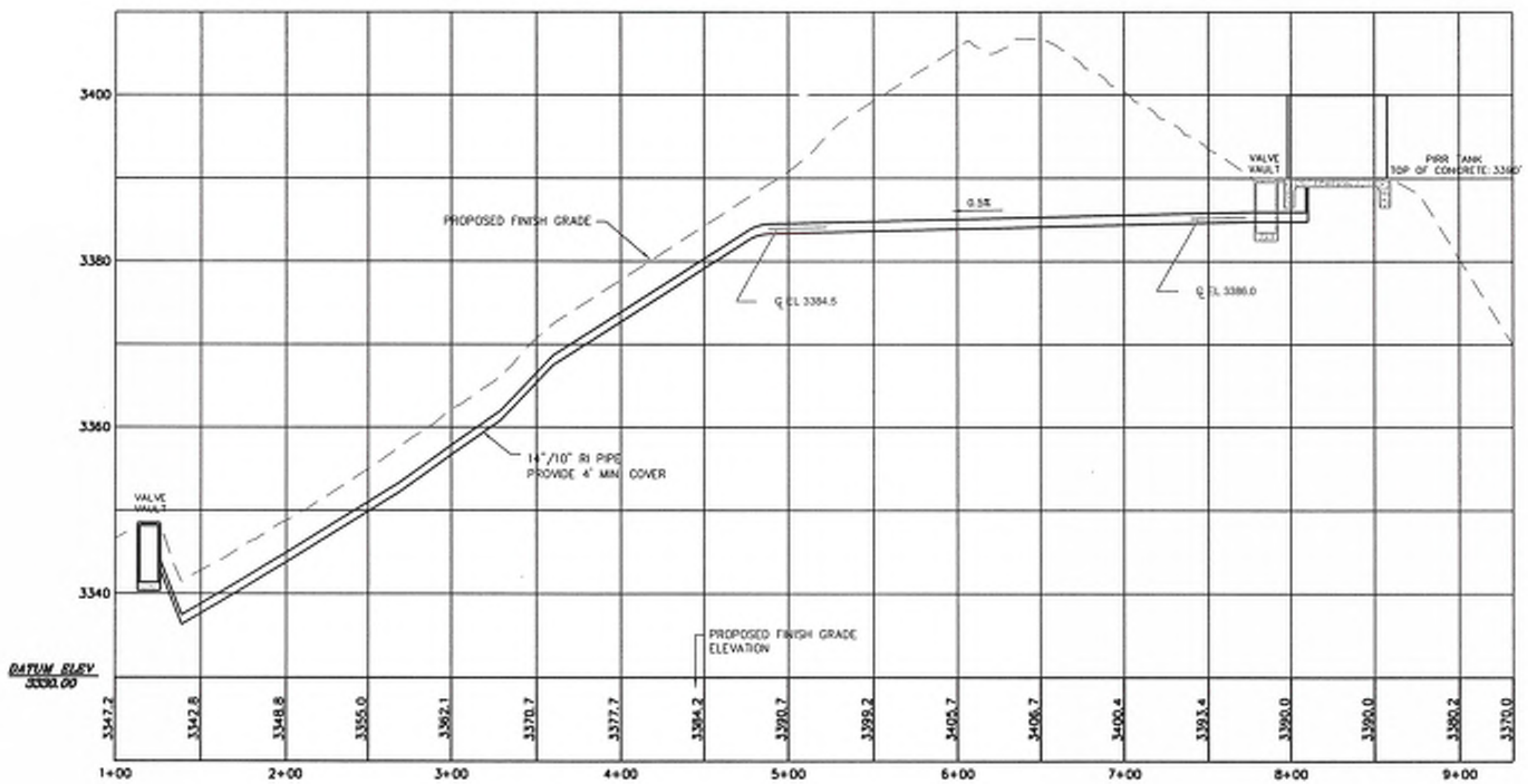


PLAN

1"=50'



PROFILE

SCALE: 1"=50' HORIZ
1"=10' VERT

DATE: 05-27-08

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	RECORD DRAWINGS	MG	BSB	05-27-08

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PHARMER ENGINEERING L.L.C.

AVIMOR

05-27-08

DESIGNED:	BSB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

PIPELINE
PLAN AND PROFILE

DRAWING NUMBER
C2.0

REV
-

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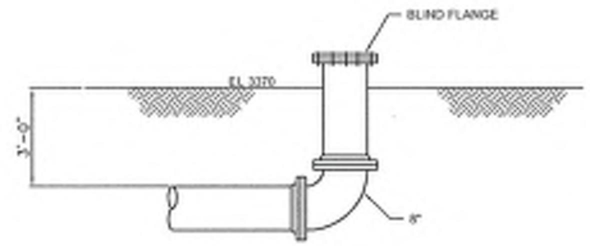
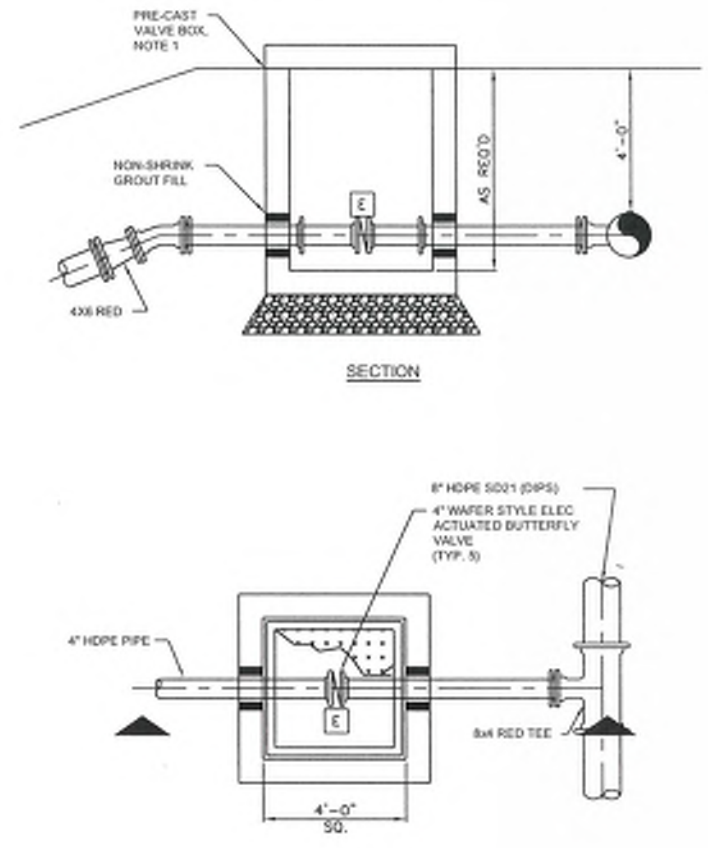


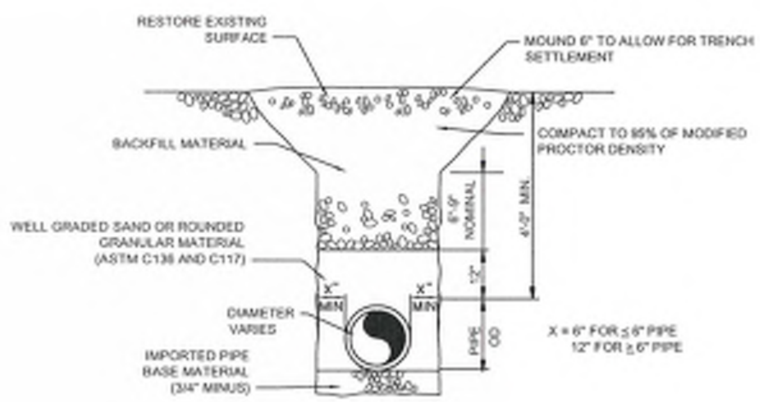
CLEAN-OUT DETAIL 2

NTS



DETAIL 3

NTS



PIPE BASE AND ZONE DETAIL C514

NTS

PRECAST VAULT:

1. PRECAST VAULT

A. SHOP DRAWINGS SHALL BE PROVIDED SHOWING PRECAST VAULT, FABRICATION DETAILS, CONCRETE MIX DESIGN, REINFORCEMENT, CONNECTION DETAILS INCLUDING FIELD INSTALLED ANCHOR SIZES AND LOCATIONS, IF REQUIRED, OPENINGS, LOOSE OR EMBEDDED ITEMS AND INSERTS, DIMENSIONS AND RELATIONSHIP TO ADJACENT MATERIALS IN SUFFICIENT DETAIL TO COVER MANUFACTURE, HANDLING, AND ERECTION. DRAWINGS SHALL BE SEALED BY AN IDAHO REGISTERED ENGINEER, CERTIFYING THAT THE SHOP DRAWINGS SUBMITTED MEETS ALL APPLICABLE DESIGN STANDARDS AND CODES (ACI 318 AND COMMITTEE 533/550).

B. CONCRETE IN CONTACT WITH SOILS OR LIQUIDS SHALL BE FORMULATED USING TYPE II OR TYPE V PORTLAND CEMENT CONFORMING TO ASTM C150. AGGREGATES FOR NORMAL WEIGHT CONCRETE SHALL CONFORM TO ASTM C33 WITH A MAXIMUM SIZE OF ¾ INCH. ADMIXTURE SHALL BE POZZOLITH 300-R MANUFACTURED BY MASTER BUILDERS, PLASTIMENT MANUFACTURED BY SIKA CHEMICAL CORP., OR EQUAL. ADMIXTURE SHALL BE USED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CALCIUM CHLORIDE OR ANY ADMIXTURE CONTAINING CALCIUM CHLORIDE SHALL NOT BE USED. REINFORCING STEEL SHALL CONFORM TO ASTM A615, INCLUDING SUPPLEMENTARY REQUIREMENTS, AND SHALL BE GRADE 60 EXCEPT THAT BARS TO BE WELDED SHALL BE GRADE 40 OR ASTM A706. ALL EMBEDDED ITEMS, INSERTS, AND ANCHORAGE DEVICES EXPOSED TO VIEW, MOISTURE OR WEATHER SHALL BE HOT DIPPED GALVANIZED STEEL. ANCHORAGE DEVICES SHALL BE FABRICATED FROM ASTM A36 STEEL. ALL REQUIRED PENETRATIONS AND OPENINGS LARGER THAN 6-INCHES IN DIAMETER OR 6-INCHES SQUARE SHALL BE FORMED IN PLACE AT THE TIME OF CASTING. ADDITIONAL REINFORCING SHALL BE ADDED WHERE REQUIRED TO MEET LOADING REQUIREMENTS. OPENINGS AND PENETRATIONS SMALLER THAN 6-INCHES MAY BE CORE DRILLED.

C. ALL PRECAST CONCRETE SHALL BE MANUFACTURED BY A PLANT THOROUGHLY EXPERIENCED IN THIS TYPE OF WORK. UNLESS SHOWN OTHERWISE AND EXCEPT AT CONCRETE FACES EXPOSED TO SOIL OR LIQUIDS, ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1 ½ INCH. AT CONCRETE FACES EXPOSED TO SOIL OR LIQUIDS, COVER SHALL BE 2 INCHES MINIMUM. EMBEDDED ITEMS SHALL BE ACCURATELY PLACED AND MAINTAINED IN THEIR PROPER LOCATION DURING THE CASING OPERATION. CASTING, BOWING, WARPAGE AND DIMENSIONAL TOLERANCES SHALL BE IN ACCORDANCE WITH MNL-116, THIRD EDITION. PRECAST ELEMENTS SHALL NOT BE REMOVED FROM MOLDS UNTIL CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3500 POUNDS PER SQUARE INCH. AFTER REMOVAL FROM THE FORMS, CURING BY STEAM OR FOG SPRAYING SHALL BE CONTINUED UNTIL CONCRETE HAS ATTAINED SPECIFIED STRENGTH AND CONFIRMED BY STANDARD TESTS. SEALANT AND PRIMER SHALL BE SUPPLIED BY THE SAME MANUFACTURER AND THE PRIMER, WHEN REQUIRED FOR JOINTS, AS RECOMMENDED BY THE MANUFACTURER.

D. ANY ERRORS OR MISALIGNMENT IN THE STRUCTURE WHICH WOULD PREVENT THE PROPER SETTING OF THE ELEMENTS SHALL CORRECTED BY THE GENERAL CONTRACTOR BEFORE THE ERECTION IS COMMENCED. ERECTION SHALL BE SUPERVISED AND PERFORMED BY WORKMEN SKILLED IN THIS TYPE OF WORK. PRECAST UNITS WITH CRACKS, SPALLS, AND OTHER DEFECTS SHALL BE SUBJECT TO REJECTION.

DATE: 05-27-08

RECORD DRAWINGS

THESE RECORD DWGS. ARE BASED ON CONTR. FURNISHED INFORMATION. WHILE THE INFORMATION SUBMITTED BY THE CONTR. & INCORPORATED BY THE ENGINEER INTO THE RECORD DOCUMENTS IS BELIEVED TO BE RELIABLE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION, NOR FOR ERRORS OR OMISSIONS WHICH MAY APPEAR IN THE RECORD DOCUMENTS AS A RESULT.

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
	RECORD DRAWINGS	MG	BSB	05-27-08

ATTENTION: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BJB
DRAWN:	TMB
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

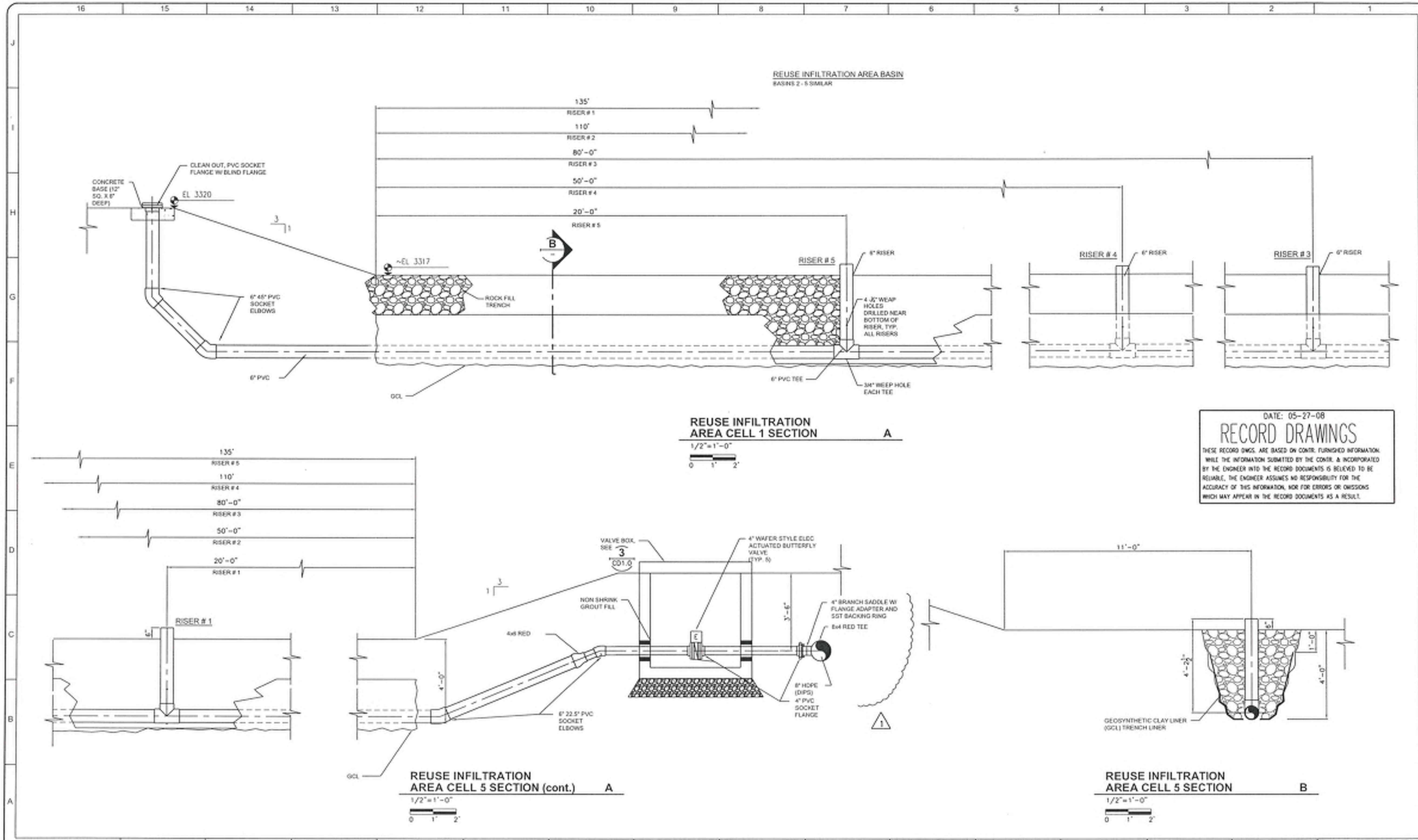
SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

RI BASIN DETAILS

DRAWING NUMBER: CD1.0

REV: -

***** DWG



REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	REVISIONS	JRH	BSB	11/09/07
	RECORD DRAWINGS	MG	BSB	05-27-08

ATTENTION:
0 1/2 1
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PE PHARMER ENGINEERING L.L.C.

AVIMOR

05-27-08

DESIGNED:	BJB
DRAWN:	TMB
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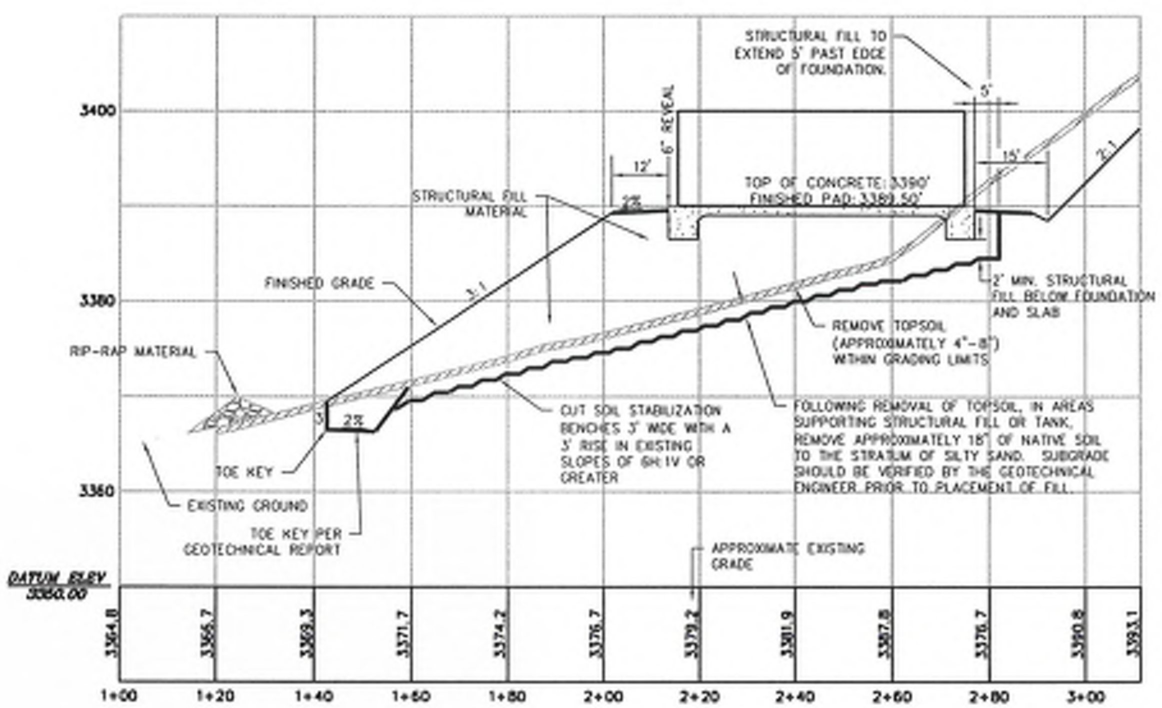
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County
RI BASIN DETAILS

DRAWING NUMBER
CD1.1
REV
-



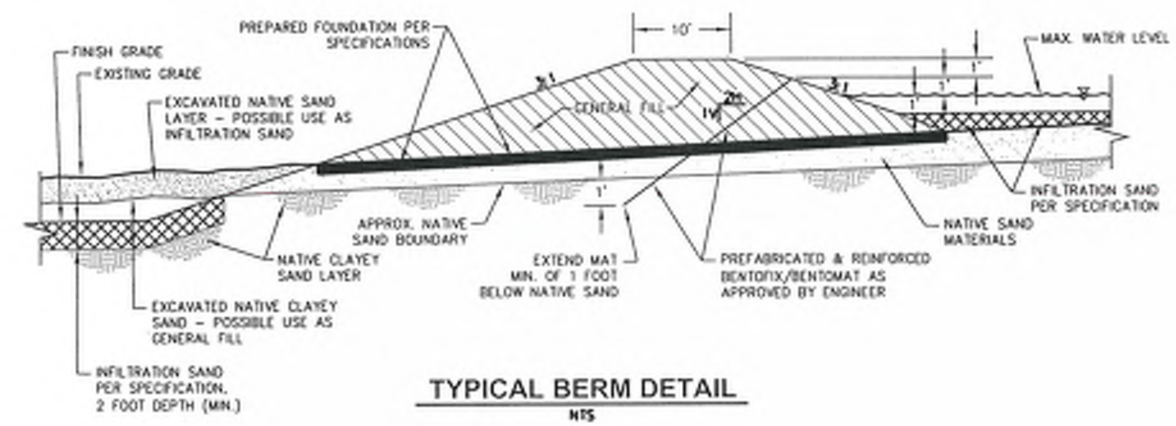
SITE PREPARATION/GEOTECHNICAL NOTES:

GENERAL – THE CONTRACTOR SHALL MINIMIZE THE POTENTIAL FOR COMPACTION OF IN-SITU MATERIALS WITHIN THE PERIMETERS OF THE BASINS. THE CONTRACTOR SHALL STAKE PERIMETER OF BASINS PRIOR TO BEGINNING WORK. COSTS ASSOCIATED WITH AVOIDING COMPACTION OF THESE AREAS SHOULD BE CONSIDERED INCIDENTAL AND BE INCLUDED WITHIN THE CONTRACTOR'S BID FOR COMPLETING THE WORK. THE CONTRACTOR SHALL COORDINATE ALL SITE WORK WITH THE GEOTECHNICAL ENGINEER IN ORDER TO ENSURE PROPER PLACEMENT, COMPACTION AND MATERIAL IDENTIFICATION.

PREPARED FOUNDATION – AREAS BENEATH PROPOSED BERMS AND ACCESS ROAD SHALL BE PREPARED PER THE FOLLOWING RECOMMENDATIONS: STRIP AREAS OF ALL DEBRIS AND VEGETATION. PRIOR TO PLACEMENT OF GENERAL FILL, THE EXPOSED SUBGRADE SHOULD BE UNIFORMLY SCARIFIED TO A MINIMUM DEPTH OF 8 INCHES, MOISTURE-CONDITIONED AS NECESSARY, AND COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D698. AFTER FOUNDATION PREPARATION IS COMPLETED FOR EACH AREA, A GEOTECHNICAL ENGINEER SHOULD OBSERVE THE PREPARED FOUNDATION CONDITIONS AND DOCUMENT THAT UNSUITABLE MATERIALS HAVE BEEN REMOVED AND THAT THE PREPARED SUBGRADE IS FIRM AND READY TO RECEIVE FILL.

GENERAL FILL – GENERAL FILL MAY BE OBTAINED FROM ON-SITE EXCAVATIONS OR APPROVED BORROW SOURCES. GENERAL FILL SHALL CLASSIFY ACCORDING TO ASTM D2487 AS GW, GP, GC, GM, SW, SP, SC, SM, ML, CL (OR COMBINATIONS OF THESE SUCH AS SP-SM) MATERIALS. IN ADDITION, THE GENERAL FILL MATERIAL SHALL HAVE A MAXIMUM PARTICLE SIZE LESS THAN 4 INCHES AND SHALL BE FREE OF EXCESS MOISTURE, ORGANIC MATTER AND DEBRIS. ALL GENERAL FILL SHOULD BE PLACED IN 8-INCH MAXIMUM LOOSE HORIZONTAL LIFTS AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM D698 – STANDARD PROCTOR COMPACTION TEST.

INFILTRATION SANDS – INFILTRATION SANDS MAY BE OBTAINED FROM ON-SITE EXCAVATIONS OR APPROVED BORROW SOURCES. INFILTRATION SANDS SHALL CLASSIFY ACCORDING TO ASTM D2487 AS GW, GP, GC, GM, SW, SP, SC, SM, (OR COMBINATIONS OF THESE SUCH AS SP-SM) MATERIALS. ALL OTHER MATERIALS SHALL BE CONSIDERED UNSATISFACTORY FOR USE AS INFILTRATION SANDS. IN ADDITION, AREAS RECEIVING INFILTRATION SANDS SHALL BE STRIPPED OF ALL DEBRIS AND VEGETATION IN A MANNER THAT WILL MINIMIZE COMPACTION OF THE IN-SITU MATERIALS. INFILTRATIONS SANDS SHALL NOT BE COMPACTED AND SHALL BE PLACED IN A MANNER AS TO MINIMIZE COMPACTION OF THE SUBGRADE MATERIALS BENEATH THE SAND.



TYPICAL BERM DETAIL
NTS

TYPICAL DIKE ENLARGED PROFILE
NTS

TYPICAL DIKE ENLARGED PROFILE DETAIL
NTS

DATE: 05-27-08

RECORD DRAWINGS

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REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	REVISIONS	JRH	BSB	11/09/07
	RECORD DRAWINGS	MG	BSB	05-27-08

ATTENTION: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PE PHARMER ENGINEERING L.L.C.

AVIMOR

05-27-08

DESIGNED:	BJB
DRAWN:	TMB
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

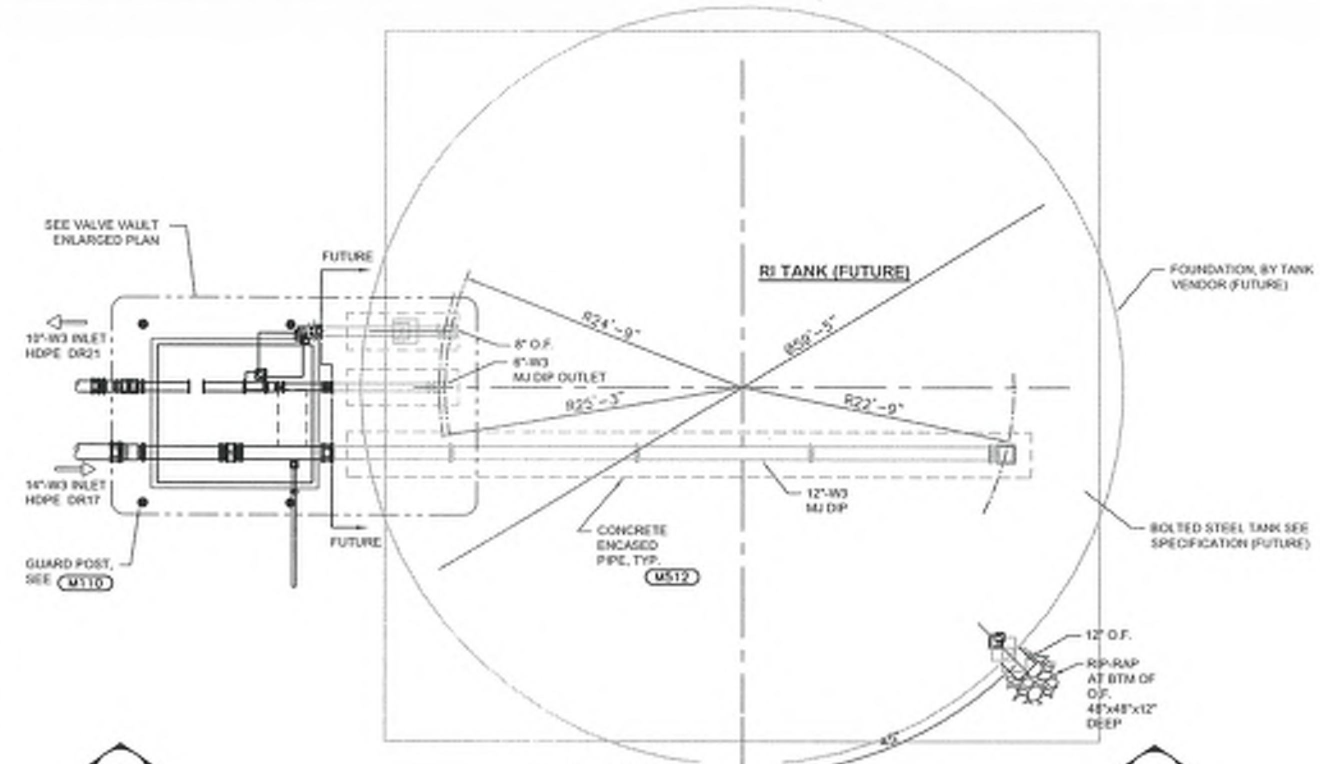
SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

TYPICAL DIKE ENLARGED PROFILE

DRAWING NUMBER CD1.2

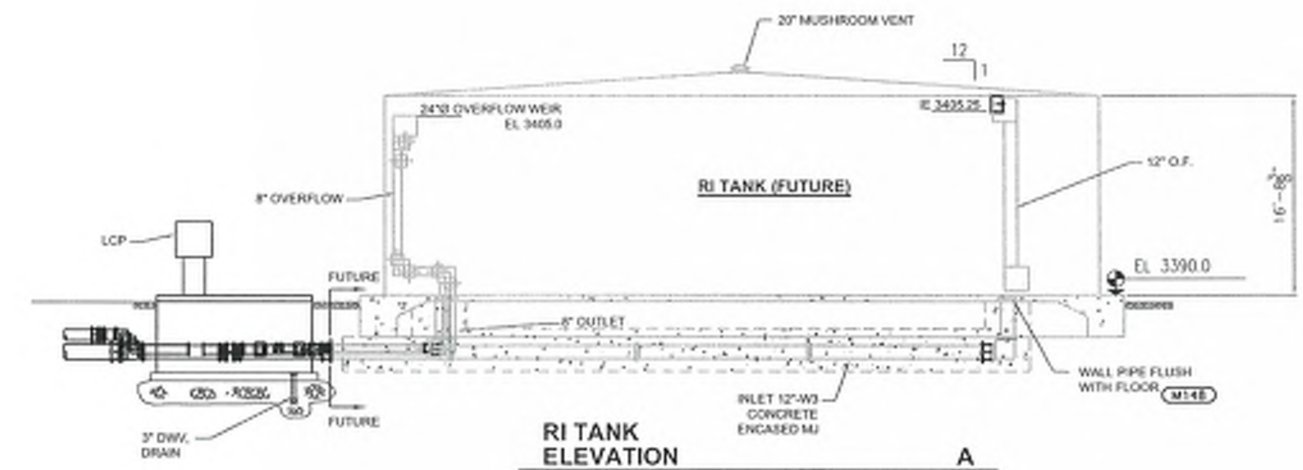
REV -

N:\10194-Avimor Rapid Infiltration Basin\DWG\REC DWGS 5-27-2008\CD1.2-10194R1.dwg, 5/28/2008 7:55:25 AM, P015-HP LaserJet 8150 11x17.pc3



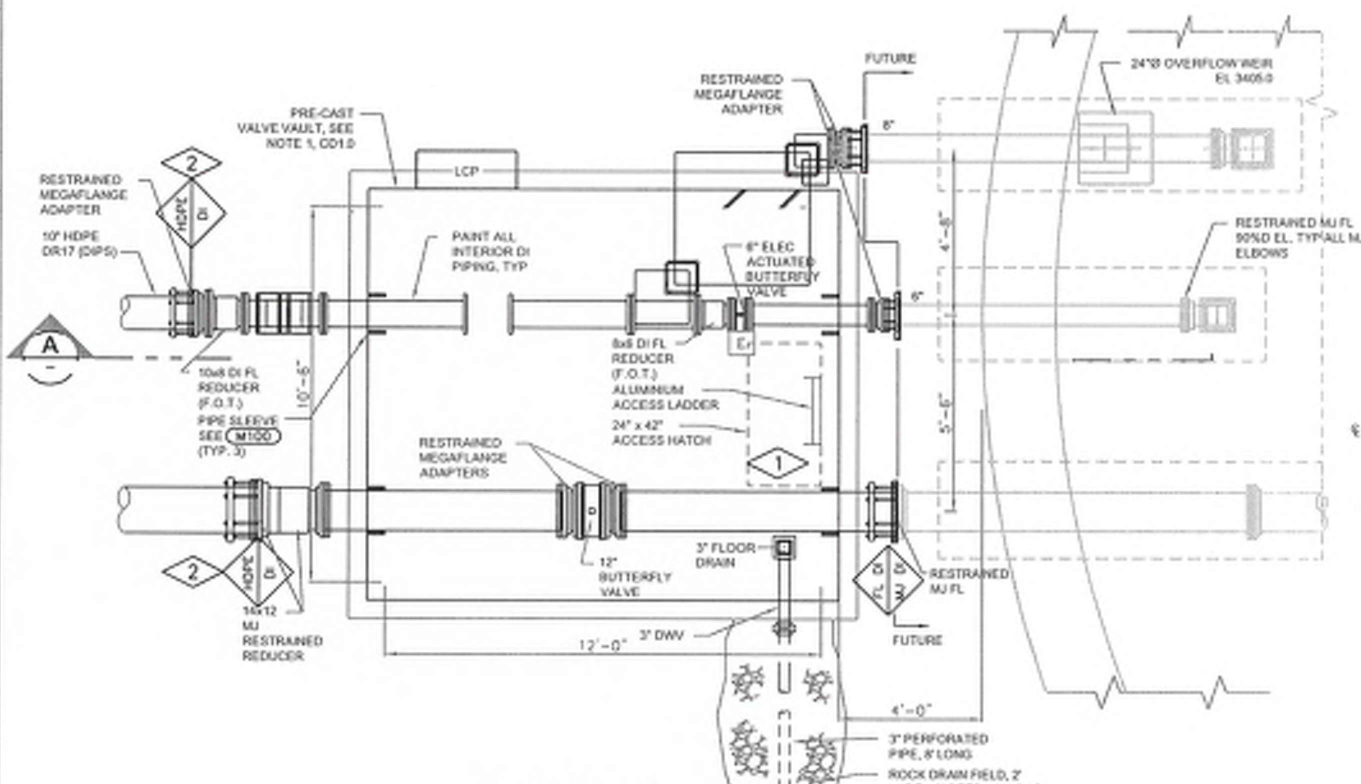
RI TANK
PLAN

SCALE: 1/8"=1'-0"



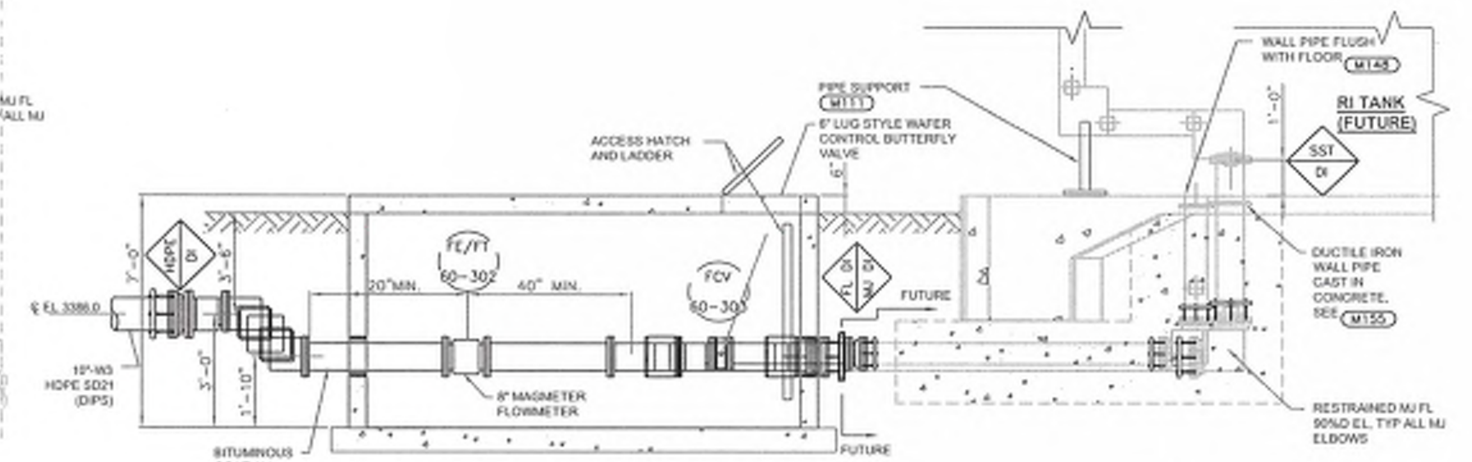
RI TANK
ELEVATION A

SCALE: 1/8"=1'-0"



VALVE VAULT
ENLARGED PLAN

SCALE: 3/8"=1'-0"



SECTION A

SCALE: 3/8"=1'-0"

DATE: 05-27-08

RECORD DRAWINGS

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PLAN NOTES:

1. ALUMINUM ACCESS HATCH, MODEL W1S2442 HALLIDAY PRODUCTS, 24"WIDEx42"LONG, 300 psf LOAD RATED, SST HARDWARE. PROVIDE PADLOCK BAR.
2. TRANSITION FROM HDPE D.I.P AS REQUIRED. REFER TO BURIED HDPE MANUFACTURER FOR RECOMMENDATIONS. ENGINEER TO APPROVE OTHER THAN SHOWN.

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
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PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BJB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

05-27-08

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

RI TANK
PLAN & ELEVATIONS

DRAWING NUMBER: M1.0

REV -

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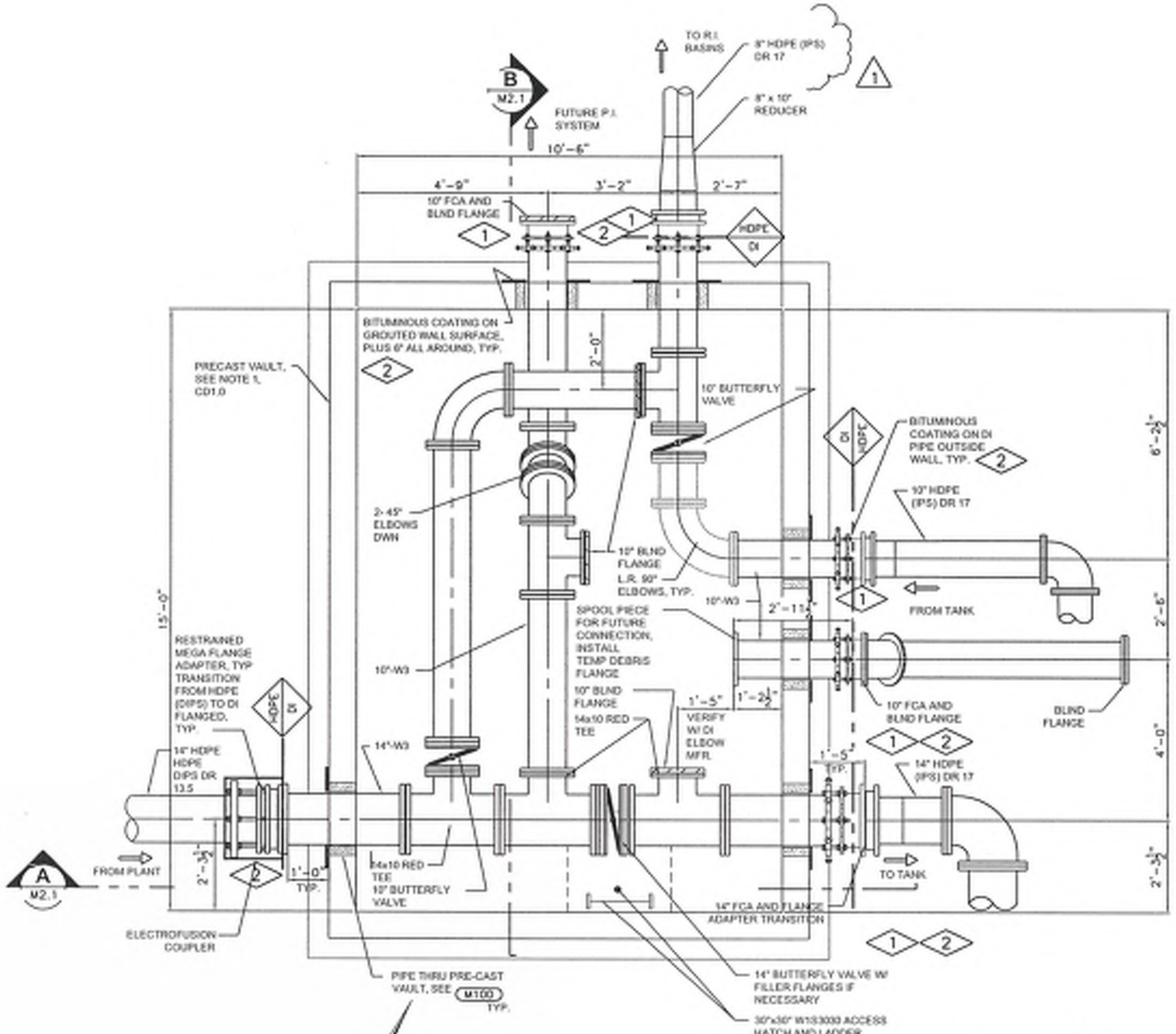
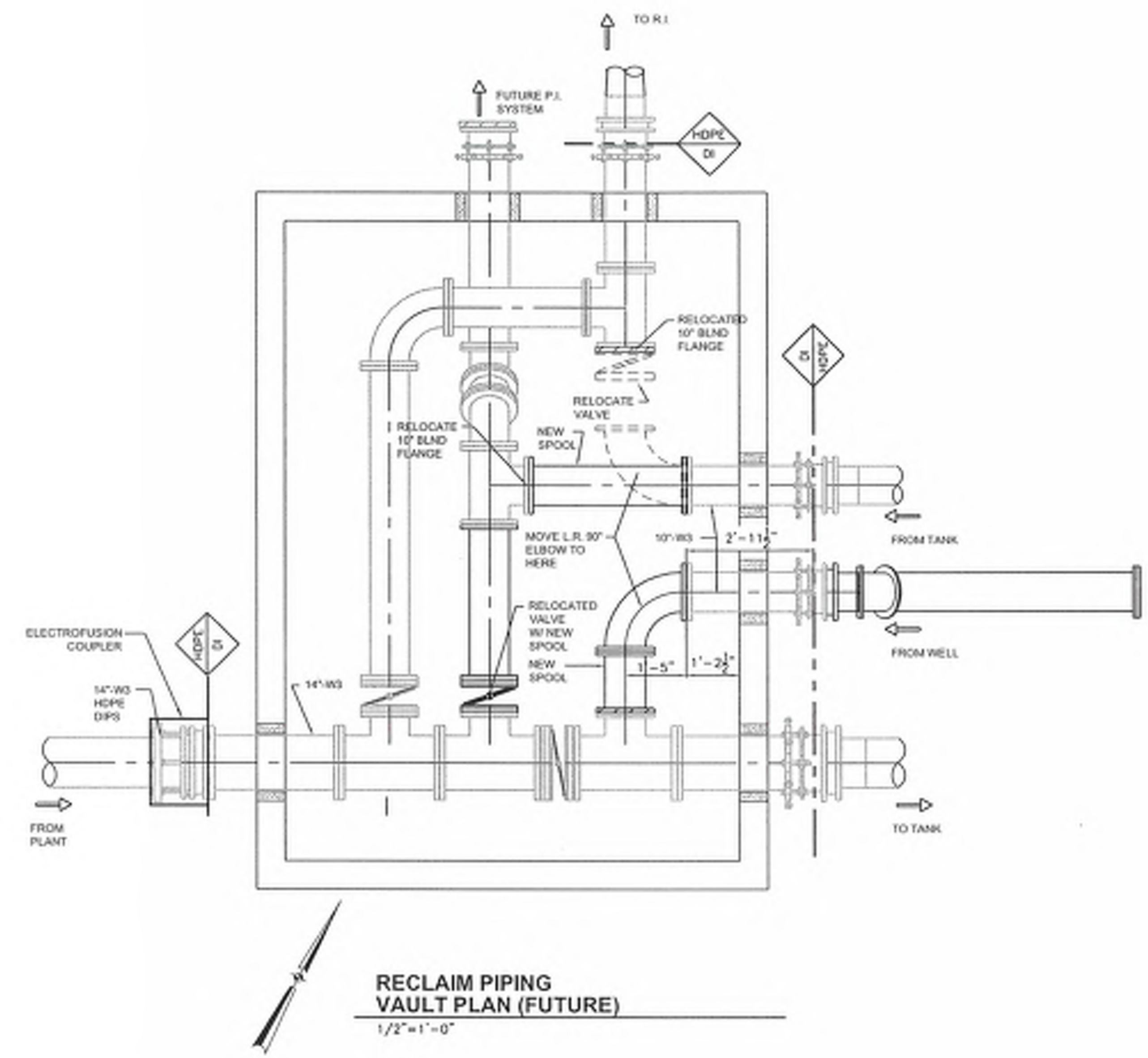


PLAN NOTES:

1. TRANSITION FROM HDPE IPS TO DI WITH HDPE FLANGE ADAPTER W/ SS BACKING RINGS AND ROMAC FCA501 OR APPROVED EQUAL.
2. BITUMINOUS COATING ON DI PIPE AND FCA'S OUTSIDE OF VALVE VAULT WALL.

RECLAIM PIPING VAULT PLAN (PHASE I)
1/2"=1'-0"



RECLAIM PIPING VAULT PLAN (FUTURE)
1/2"=1'-0"

DATE: 05-27-08

RECORD DRAWINGS

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	RECORD DRAWINGS	MG	BSB	05-27-08

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PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BJB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County
RI VAULT PLAN & ELEVATIONS

DRAWING NUMBER: M2.0
REV: -

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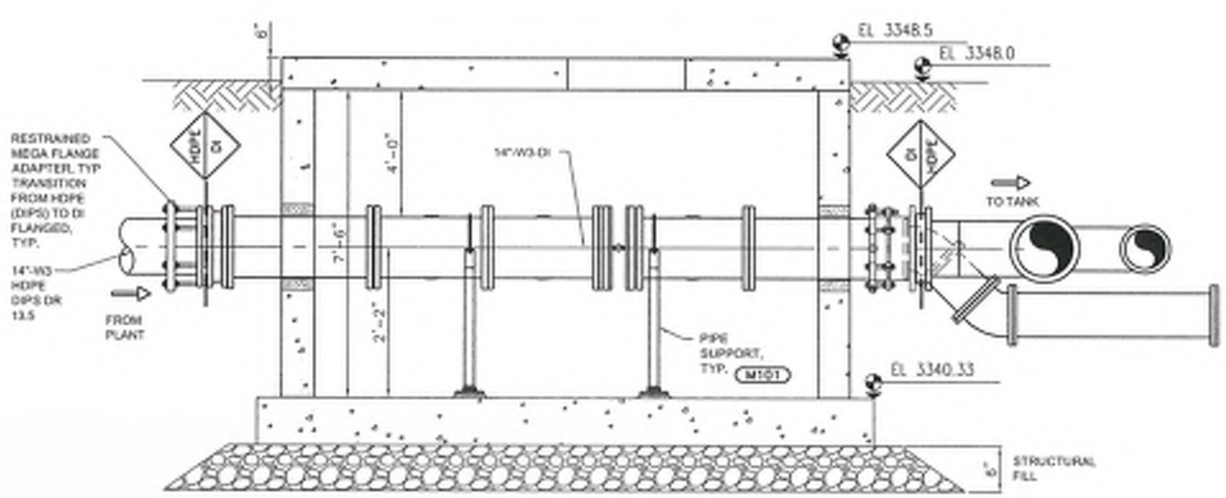
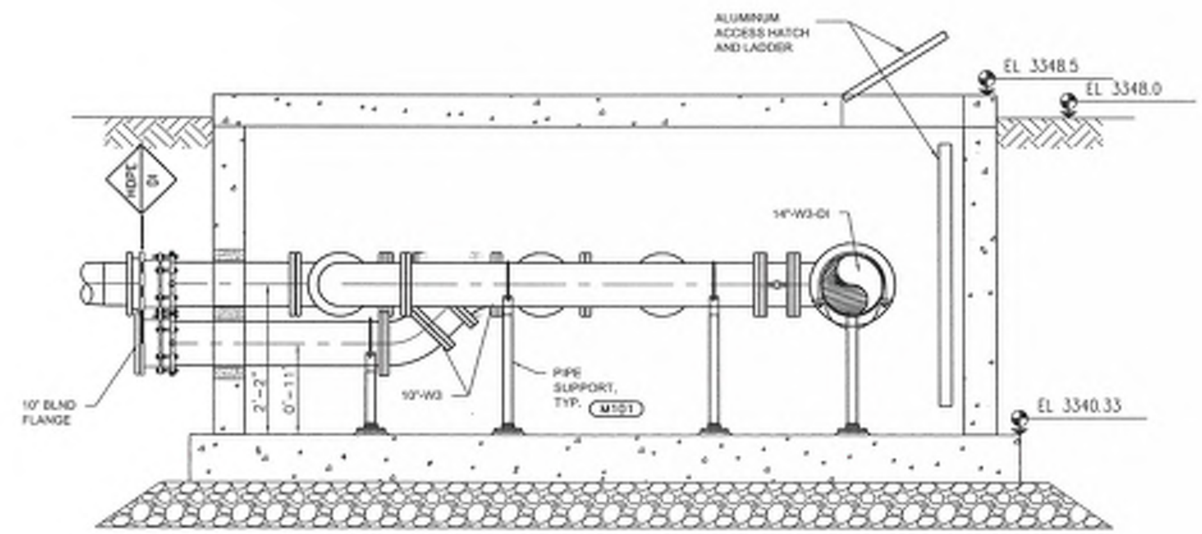


SECTION A

1/2"=1'-0"



SECTION B

1/2"=1'-0"

DATE: 05-27-08

RECORD DRAWINGS

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PHARMER ENGINEERING L.L.C.

AVIMOR

PROFESSIONAL ENGINEER REGISTERED — 05-27-08

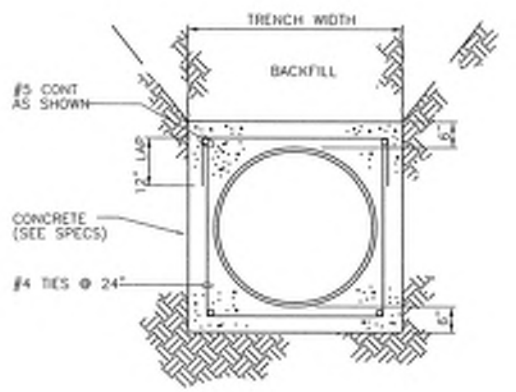
DESIGNED:	BJB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

RI VAULT SECTIONS

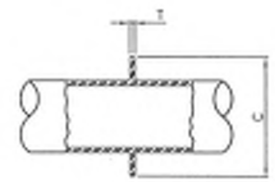
DRAWING NUMBER: M2.1

REV: -



CONCRETE ENCASEMENT M512

NTS

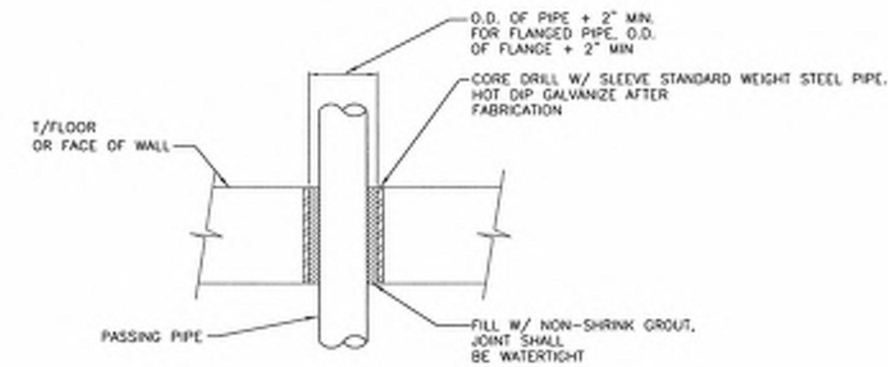


MINIMUM DIMENSIONS

NOMINAL PIPE DIA (INCHES)	T THICKNESS (INCHES)	C DIAMETER (INCHES)
4	0.50	8.00
6	0.50	10.00
8	0.50	12.50
10	0.50	14.50
12	0.50	16.50
14	0.75	19.50
16	0.75	21.75
18	0.75	23.75
20	0.75	25.75
24	0.75	30.25
30	1.00	36.50
36	1.00	43.00
42	1.25	49.50
48	1.25	56.50
54	1.50	63.00

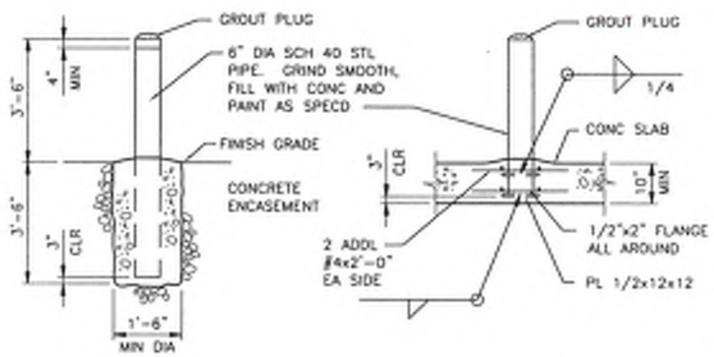
DUCTILE IRON WALL AND FLOOR PIPE COLLAR DIMENSIONS DETAIL M105

NTS



WALL SLEEVE DETAIL M100

NTS

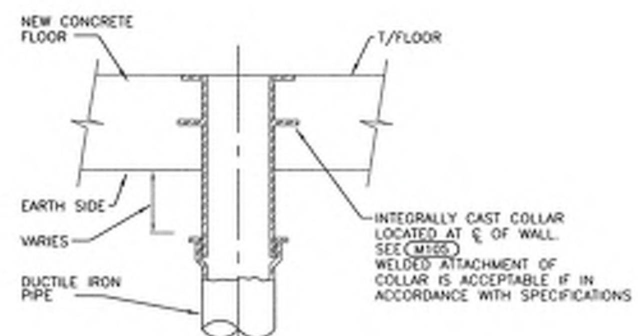


EXTERIOR

INTERIOR

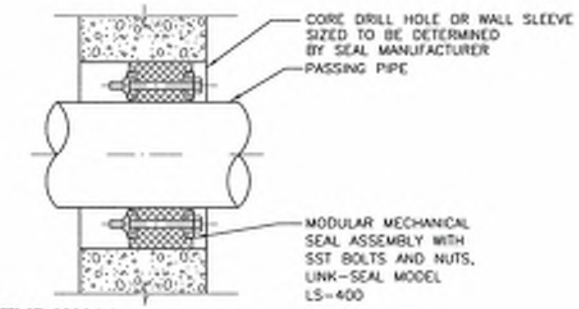
TYPICAL GUARD POST DETAIL M110

NTS



FLG / PLAIN END DUCTILE IRON FLOOR PIPE DETAIL M148

NTS



TYP WALL PENETRATION DETAIL M102

NTS

DATE: 05-27-08

RECORD DRAWINGS

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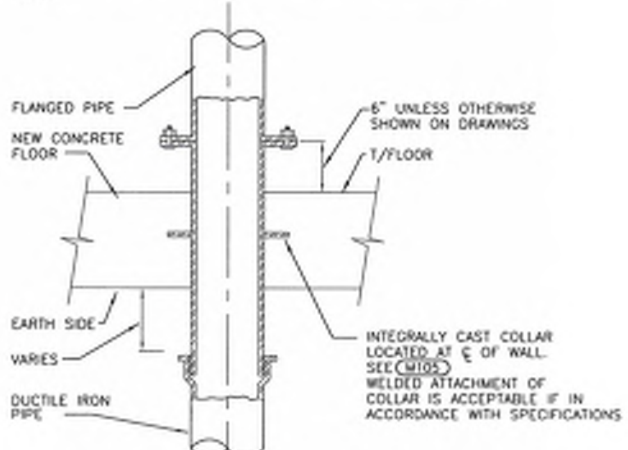
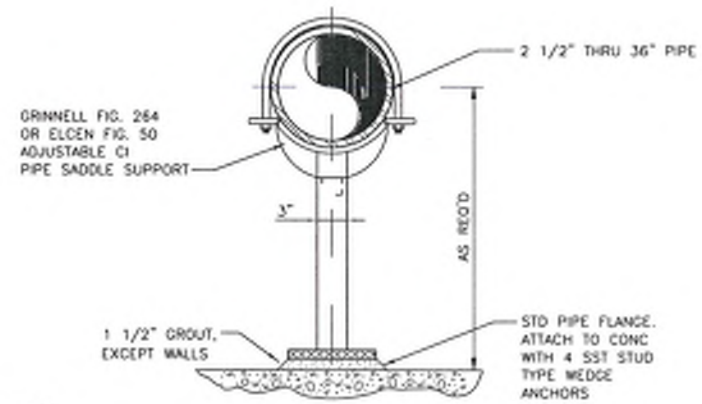


FLG / PLAIN END DUCTILE IRON FLOOR PIPE DETAIL M155

NTS



NOTES;

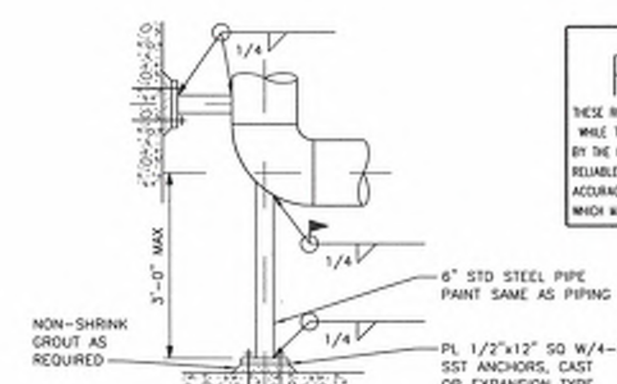
PROVIDE HALF ROUND RIGID INSULATION AND INSULATION PROTECTION SHIELD, SIMILAR TO GRINNELL FIGURE 167 OR ELCEN FIGURE 219, WHERE PIPING IS INSULATED.

PROVIDE NEOPRENE WAFFLE ISOLATION PAD, SIMILAR TO MASON TYPE 'W' OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT.

SUPPORTS OUTDOORS TO BE PAINTED.

TYP PIPE SUPPORT DETAIL M101

NTS



PIPE DIAMETER	SUPPORT DIAMETER	PLATE THICKNESS	ANCHOR BOLT DIAMETER
3"	2 1/2"	3/8"	3/8"
4" THRU 12"	3"	3/8"	1/2"
14" AND 16"	4"	3/8"	1/2"
18" AND 20"	6"	1/2"	5/8"

TYP PIPE ELBOW SUPPORT DETAIL M111

NTS

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
	RECORD DRAWINGS	MG	BSB	05-27-08

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PHARMER ENGINEERING L.L.C.

AVIMOR

DESIGNED:	BJB
DRAWN:	TMB
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

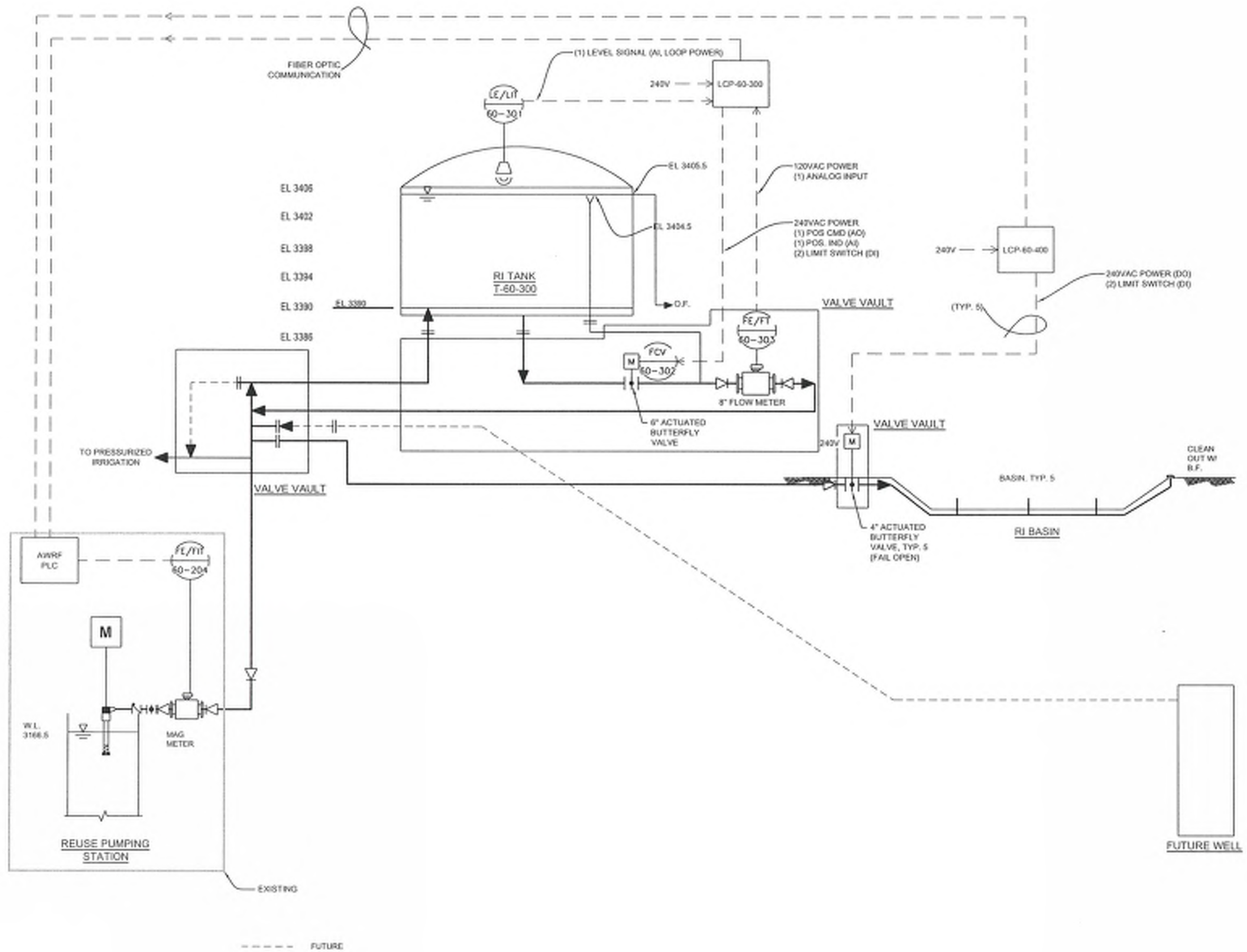
SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

MECHANICAL DETAILS

DRAWING NUMBER: MD1.0

REV: -

N:\10194-Avimor Rapid Infiltration Basin\DWG\REC DWGS 5-27-2008\MD1.0-1019480.dwg, 5/28/2008 8:47:14 AM, P015-HP LaserJet 8150 11x17.pc3



ELECTRICAL DESCRIPTIONS:

GENERAL CONTROL/LOGIC DESCRIPTION FOR RI OPERATION

- AWRF PUMPS WATER TO RI TANK WHICH MANTAINS PRESET LEVEL. EXCESS WATER IN RI TANK IS DISCHARGED TO RI AREA. RI TANK WATER LEVEL DRAWN DOWN FOR IRRIGATION OF REUSE AREAS DURING PERIODS OF PEAK DEMAND. IF FLOW IS SENSED BY METER FE/FIT 60-303, INLET VALVES TO RI BASINS FOR ONE OF THE THREE ZONES WIL BE ACTUATED TO THE "OPEN" POSITION.
  ZONE A: BASIN 1
  ZONE B: BASINS 2 AND 4
  ZONE C: BASINS 3 AND 5
- AWRF SENDS SIGNAL VIA FIBER OPTIC TO LCP60-400 TO OPEN OR CLOSE CONTROL VALVES FOR EACH RI ZONE. THREE ZONES A, B, C. ONE ZONE WILL BE OPERATED AT FLOW RATES BELOW 0.17 MGD (50% AVERAGE FLOW RATE OF 0.33 MGD). ADDITIONAL ZONE WILL BE ADDED WHEN FLOW EXCEED THIS RATE.
- OPEN/CLOSE LOGIC SEQUENCE (ADJUSTABLE) DETERMINES THE OPENING ORDER OF EACH ZONE, ALTERNATING BETWEEN AREA A, B, AND C. PRESET TARGET TOTAL CYCLE VOLUME (ADJUSTABLE) TO EACH ZONE FOR EACH SEQUENCE. VALVES AUTOMATICALLY SWITCH TO NEXT ZONE IN SEQUENCE WHEN A PRESET TOTAL FLOW IS ACHIEVED.
- AWRF MONITORS INSTANTANEOUS FLOW RATE TO EACH ZONE AND TOTAL FLOW FOR EACH OPEN SEQUENCE. EACH ZONE ALSO HAS A CUMMULATIVE TOTAL FOR EACH MONTH, RESET TO ZERO ON 1ST DAY OF EACH MONTH. TOTAL RI SYSTEM FLOW (FT 90-200) ALSO SHOWN ON SCREEN.
- WHEN RI BASINS RECEIVE WATER DIRECTLY FROM AWRF, CONTROLLER SHALL OPEN VALVES FOR A SPECIFIC ZONE. ALARM CONDITION IF ZONE VALVES ARE NOT INDICATING "OPEN" WHEN CALLED FOR.
- WHEN RI BASINS RECEIVE WATER FROM RI TANK, ELECTRIC ACTUATED VALVE AT RI TANK - WILL OPEN ONLY WHEN PERMISSIVE SIGNAL INDICATING RI VALVE(S) "OPEN" RECEIVED. WHEN OPEN, VALVE OPERATION TO OPEN POSITION PROVIDING SET POINT FLOW RATE (+/- 20%).

DATE: 05-27-08

RECORD DRAWINGS

THESE RECORD DWGS. ARE BASED ON CONTR. FURNISHED INFORMATION. WHILE THE INFORMATION SUBMITTED BY THE CONTR. & INCORPORATED BY THE ENGINEER INTO THE RECORD DOCUMENTS IS BELIEVED TO BE RELIABLE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION, NOR FOR ERRORS OR OMISSIONS WHICH MAY APPEAR IN THE RECORD DOCUMENTS AS A RESULT.

N:\10194-Avimor Rapid Infiltration Basin\DWG\REC DWGS 5-27-2008\N1.0-10194R0.dwg, 5/29/2008 4:03:13 PM, P015-HP LaserJet 8150 11x17.pc3

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
	RECORD DRAWINGS	MG	BSB	05-27-08

ATTENTION: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PE PHARMER ENGINEERING L.L.C.

AVIMOR

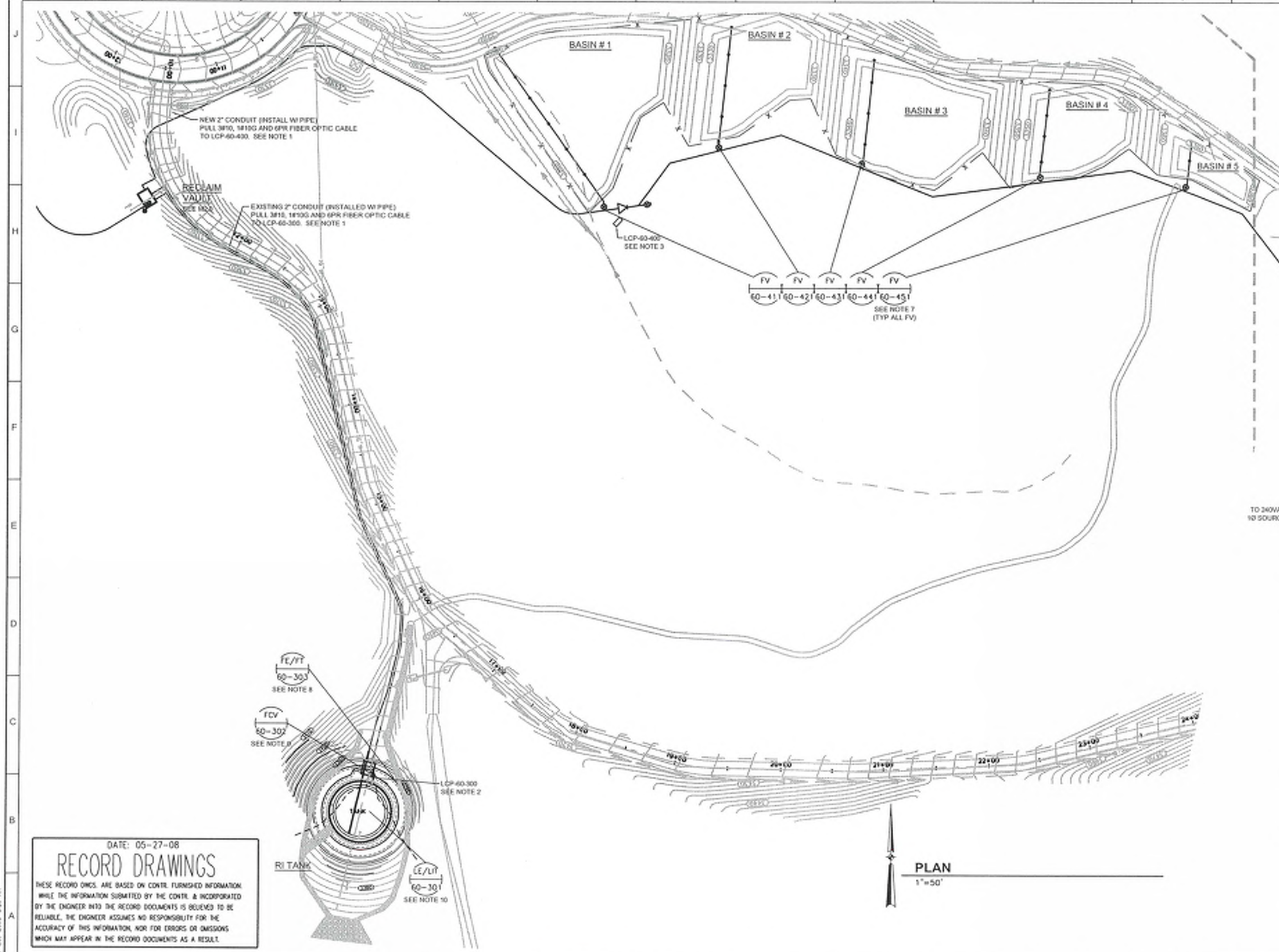
DESIGNED:	ACC
DRAWN:	ACC
CHECKED:	PCC
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

FLOW SCHEMATIC

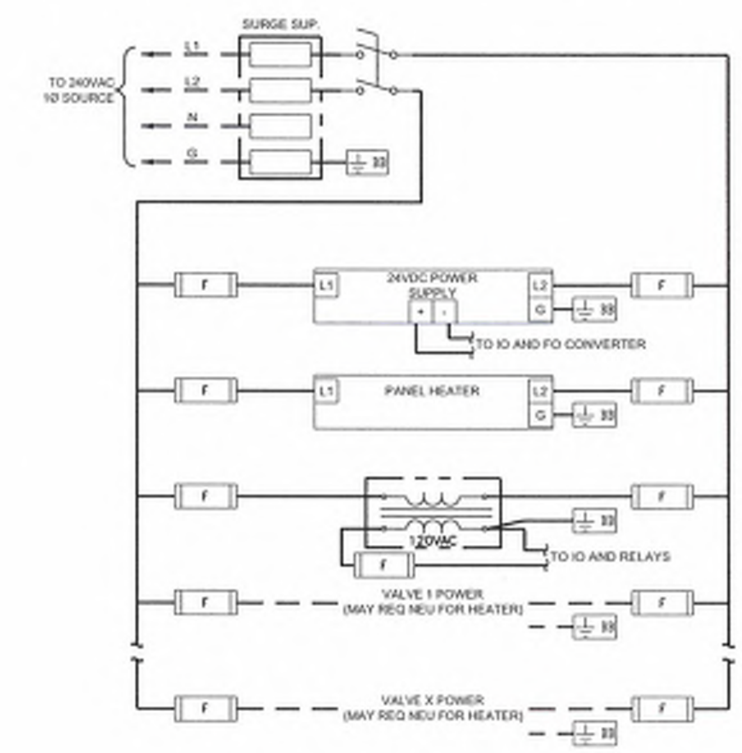
DRAWING NUMBER: N1.0

REV: -



ELECTRICAL NOTES:

1. REQUIRES 240VAC, 1Ø. ROUTE POWER CONDUCTORS TO PANELBOARD. ROUTE FIBER OPTIC CABLE TO PLC-90-001. REFER TO AWRF DWG E-3.1 FOR LOCATIONS. SEE NOTE 5 FOR FIBER OPTIC CABLE INFORMATION.
2. SEE NOTE 4 FOR GENERAL LCP REQUIREMENTS. LCP-60-300 SHALL CONTAIN ALLEN BRADLEY ETHERNET REMOTE IO. (1) IO ADAPTER: 1794-AENT, (1) ANALOG MODULE 1794-IE4XOE2 W/ TB3 BASE AND (1) 24VDC DIGITAL INPUT MODULE: 1794-IB8 W/ TB3 BASE. THE FRONT OF THE PANEL WILL HAVE LOCAL DISPLAYS FOR FLOW AND TANK LEVEL (SUCH AS THE RED LION CUB4I).
3. SEE NOTE 4 FOR GENERAL LCP REQUIREMENTS. LCP-60-400 SHALL CONTAIN ALLEN BRADLEY ETHERNET REMOTE IO. (1) IO ADAPTER: 1794-AENT, (1) 120VAC DIGITAL OUTPUT MODULE: 1794-OA16 W/ TB3 BASE AND (2) 120VAC DIGITAL INPUT MODULES: 1794-IA16 W /TB3 BASE. THE DIGITAL OUTPUT MODULE WILL ENERGIZE 120VAC RELAYS WITH HP RATED CONTACTS TO ACTUATE THE VALVES.
4. EACH LCP IS NEMA TYPE 4X. THE LCP WILL CONTAIN A SURGE SUPPRESSOR, 2 POLE INTERNAL MAIN DISCONNECT, 240VAC/24VDC (2.5 A) POWER SUPPLY, 240VAC HEATER, 240V/120V (250VA) CONTROL POWER TRANSFORMER, 24VDC FIBER/ETHERNET CONVERTER (SEE NOTE 5) AND ANY REQUIRED TERMINAL BLOCKS AND FUSES. ALL FIELD CONNECTIONS SHALL BE TO TERMINAL BLOCKS. THE LCP SHALL BE LOCKABLE AND UL508A LISTED.
5. FIBER OPTIC CABLE SHALL BE 6 PAIR, GLASS FIBER, MULTIMODE. (1) FIBER OPTIC/ETHERNET CONVERTER WILL BE INSTALLED IN EACH LCP AND AT THE AWRF PLC. THE THREE CONVERTERS SHALL BE FROM THE SAME MANUFACTURER AND COMPATIBLE WITH EACH OTHER. SUGGESTED CONVERTER IS BY PHOENIX CONTACT, PART #2891411.
6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING ALL CONDUIT, WIRE, LCPs, FIBER OPTIC CABLE AND TERMINATIONS, VALVE AND INSTRUMENT POWER AND SIGNAL TERMINATIONS.
7. (1) 3/4" PVC SCHEDULE 80 CONDUIT FROM EACH FV TO LCP 60-400 WITH 4#12, 1#12G (POWER) AND 3#16 (SIGNAL). (1)
8. (2) 3/4" PVC SCHEDULE 80 CONDUIT FROM FLOW METER TO LCP-60-300. ONE CONDUIT WITH 2#12, 1#12G (120VAC POWER) AND ONE CONDUIT WITH 1#18TSP (SIGNAL). FLOW METER SHALL BE SAME MANUFACTURER AND MODEL AS INSTALLED AT THE AWRF AND SHALL HAVE THE FOLLOWING CHARACTERISTICS: 120VAC POWER, NEMA 6 RATING, INTEGRAL TRANSMITTER (NO DISPLAY), GROUND RINGS AND (1) 4-20mA OUTPUT CALIBRATED FOR 0 TO 750 GPM.
9. (2) 3/4" PVC SCHEDULE 80 CONDUIT FROM FCV TO LCP 60-300. ONE CONDUIT WITH 3#12, 1#12G (POWER) AND ONE CONDUIT WITH 2#18TSP, 3#16 (SIGNAL).
10. (1) 3/4" PVC SCHEDULE 80 CONDUIT FROM LIT TO LCP 60-300 WITH 1#18TSP (SIGNAL). LIT SHALL BE FLANGE MOUNTED TO TOP OF TANK. LIT SHALL BE SIEMENS PROBE LU PART #7ML5221-1AA1.



SAMPLE LCP POWER SCHEMATIC

DATE: 05-27-08
RECORD DRAWINGS
THESE RECORD DWGS. ARE BASED ON CONTR. FURNISHED INFORMATION. WHILE THE INFORMATION SUBMITTED BY THE CONTR. & INCORPORATED BY THE ENGINEER INTO THE RECORD DOCUMENTS IS BELIEVED TO BE RELIABLE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION, NOR FOR ERRORS OR OMISSIONS WHICH MAY APPEAR IN THE RECORD DOCUMENTS AS A RESULT.

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	REVISIONS	JRH	BSB	11/09/07
	RECORD DRAWINGS	MG	BSB	05-27-08

ATTENTION: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PE PHARMER ENGINEERING L.L.C.

AVIMOR

05-27-08

DESIGNED:	ACC
DRAWN:	ACC
CHECKED:	PCC
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County
SITE PLAN

DRAWING NUMBER
E1.0
REV -

Appendix L

Product Literature for Wastewater Equipment

Vertical Screen
In-Channel Screen
Aerator
Decanter (Parkson)
Decanter (Aqua Turbo)

KELLER ASSOCIATES

Budgetary Proposal

HUBER Technology, Inc.
1009 Airlie Pkwy
Denver, NC 28037
Office 704-949-1010
Fax 704-949-1020

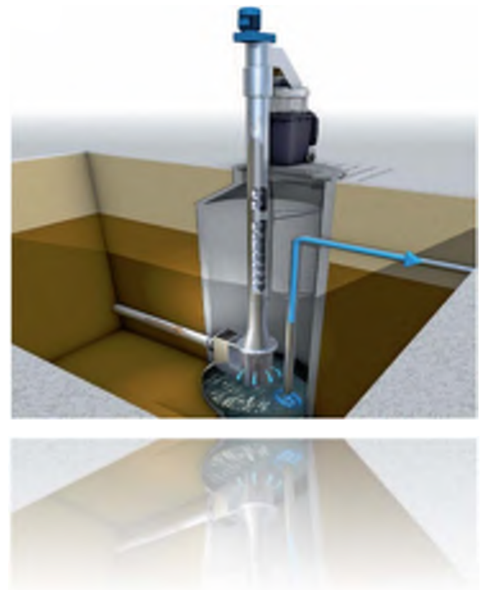
Project:	Eagle, ID
Equipment:	ROTAMAT® Rok4-500-6
Proposal Date:	29-Jan-21
Revision:	1

Scope of Supply

RoK4 Design Information

ROTAMAT® RoK4 Technical Data

Maximum Flow	**2.74 (120)**	*MGD (l/s)*
Plant Specific Flow	**1.76 (77)**	*MGD (l/s)*
Top of Well to Invert	**12 (2458)**	*Ft (mm)*
Total Length	**24 (7200)**	*Ft (mm)*
Vertical Screen Basket Diameter	**20 (500)**	*inches (mm)*
ANSI Inlet Diameter	**12 (300)**	*inches (mm)*



RoK4 Details

Model	***ROTAMAT® Rok4-500-6***
Quantity	
Screen Material	304L Stainless Steel Construction; picked and passivated in acid bath
	Vertical basket; Width: 20 inches (500 mm)
	Perforated plate circular opening size: 1/4 inches (6 mm)
Solenoid Valve	One (1) solenoid valves for compaction zone, 1-inch, 120 VAC, 2-way brass body, Class 1 Division 1
Level Sensor	Pressure probe
RoK4 Design	Fully shafted auger in vertical tube
Motor	2 HP, 460 VAC, 3ph, 60 Hz, S.F. 1.15, Class 1 Division 1
Supports	304L Stainless Steel Construction; picked and passivated in acid bath
Anchor Bolts	M12 316L, Included
Control Panel(s)	NEMA 4X Stainless Steel Enclosure, Allen Bradley PLC, Allen Bradley PanelView Plus OIU, HUBER Standard Components, Preprogrammed and Factory Tested
Warranty	1- Year Standard Warrenty Included
Other Items	none

Pricing

EQUIPMENT	MODEL	QUANTITY	PRICE
Complete ROTAMAT® Influent Screen RoK4	ROTAMAT® Rok4-500-6		Included
Standard Manufacturer's Services & Freight			Included

Thank you for your interest in HUBER Technology, Inc.'s ROTAMAT® RoK4 unit. If you have any questions, please do not hesitate to contact our Regional Sales Director or our local sales representative.

HUBER Sales

Name: John Lewis
Title: Regional Sales Director - West
Phone: 704-995-5451
Email: John@hhusa.net

Representative

Firm: Goble Sampson Associates
Name: Ryan Spanton
Phone: 801-558-6805
Email: rspanton@goblesampson.com

Technical Clarifications

1. Detailed Equipment Specification, Drawing, and Formalized Proposal are available upon request.
2. If there are site-specific hydraulic constraints that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system
3. Electrical disconnects required per local NEC code are not included in this proposal
4. HUBER Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment whichever occurs first
5. Budget estimate is based on HUBER Technology's standard Terms & Conditions and is quoted in US$ unless otherwise stated
6. HUBER has estimated the Control Panel cost based information provided with the RFQ. If control panel information is not provided with RFQ HUBER will use a cost and scope of supply based on our standard panel. HUBER reserves the right to change the price and scope at time of bid based on the final plans and specifications.
7. All items listed as "Available Options" are not included in the budgetary pricing.
8. Equipment that is broken out in "Pricing" tab are only valid when packaged together
9. HUBER recommends the lift in lift out device to facilitate removing the screen for any required maintenance.
10. HUBER's Cold Weather package if listed above includes heated motor windings, cold weather gearbox, heat tracing and insulation of the screens rising pipe and discharge chute. This can be had in C1D1 configuration
11. All of HUBER's standard machines and systems are manufactured from stainless steel. HUBER makes no representation or warranties concerning the service life of the equipment against such abrasion or corrosion. The concentration of chloride and hydrogen sulfide (H2S) in the equipment operating environment shall be kept below the following values:
    a. Chloride < 200 mg/l b. Hydrogen sulfide (H2S) <6 ppm

Budgetary Proposal

HUBER Technology, Inc.
1009 Airlie Pkwy
Denver, NC 28037
Office 704-949-1010
Fax 704-949-1020

Project: Eagle, ID
Equipment: ROTAMAT® Ro1-780-6
Proposal Date: January 29, 2021
Revision: 0

Scope of Supply

ROTAMAT® Ro1 Design Information

ROTAMAT® Ro1-780-6 Technical Data	
Bar spacing, inches	1/4" (6mm)
Maximum waste water flow per screen, MGD	1.76 MGD
Screen basket diameter	780 mm
Number of screens	2
Location rating	Class 1, Division 1

ROTAMAT® Ro1 Details

Model	*ROTAMAT® Ro1-780-6*
Quantity	
Material	304L Stainless Steel Construction; picked and passivated in acid bath
Mounted design	Channel Mounted design
Ro1 Design	Shafted screw with integrated maintenance free bearing and inclined auger tube
Basket Size	35° inclined screen basket; width: 31 inches (780) mm
Solenoid Valve	One (1) solenoid valves for screenings wash, 1-inch, 120 VAC, 2-way brass body, Class 1 Division 1
Solenoid Valve	One (1) solenoid valve for spray bar, 1 inch, 120 VAC, 2-way brass body, Class 1 Division 1
	One (1) solenoid valve for press zone, 1 inch, 120 VAC, 2-way brass body, Class 1 Division 1
Motor	2 HP, 460 VAC, 3ph, 60 Hz, S.F. 1.15, Class 1 Division 1
Supports	304L Stainless Steel
Anchor Bolts	M12 316L, Included
Control Panel(s)	NEMA 4X Stainless Steel Enclosure, Allen Bradley PLC, Allen Bradley PanelView, HUBER Standard Components, Preprogrammed and Factory Tested
Other Items	None

Pricing

EQUIPMENT	MODEL	QUANTITY	PRICE
ROTAMAT® Fine Screen Ro1	ROTAMAT® Ro1-780-6		Included
Standard Manufacturer's Services & Freight			Included

Thank you for your interest in HUBER Technology, Inc.'s ROTAMAT® Ro1 unit. If you have any questions, please do not hesitate to contact our Regional Sales Director or our local sales representative.

HUBER Sales

Name: John Lewis
Title: Regional Sales Director - West
Phone: 704-995-5451
Email: John@hhusa.net

Representative

Firm: Goble Sampson Associates
Name: Ryan Spanton
Phone: 801-558-6805
Email: rspanton@goblesampson.com

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4. HUBER Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment whichever occurs first
5. Budget estimate is based on HUBER Technology's standard Terms & Conditions and is quoted in US$ unless otherwise stated
6. HUBER has estimated the Control Panel cost based information provided with the RFQ. If control panel information is not provided with RFQ HUBER will use a cost and scope of supply based on our standard panel. HUBER reserves the right to change the price and scope at time of bid based on the final plans and specifications.
7. All items listed as "Available Options" are not included in the budgetary pricing.
8. Equipment that is broken out in "Pricing" tab are only valid when packaged together

Proposal # 60074

TO: Spring Valley

Eagle, Idaho
USA

ATN:

CC: Davidson Sales & Engineering,Paul Mora

PROJECT: SPRING VALLEY EAGLE ID
Eagle, ID
USA-MUN

PROPOSAL DATE: January 25, 2021

If billing and/or shipping address is different, please advise.

Qty	Description
	We are pleased to quote, for acceptance within (30) days of this date, prices and terms on equipment listed below. Shipment of equipment will be completed (8-10) weeks* after receipt of purchase order with mutually acceptable terms and conditions, subject to credit approval, or engineer approved submittals, if required. *Notes: Aqua-Aerobic Systems' proposal is based upon supply of equipment models as noted. Actual shipment is dependent on equipment availability at the time of receipt of order.
	- Equipment will be furnished by Aqua-Aerobic Systems, Inc. with civil work and installation by the purchaser.
8	20 HP Model FSS Endura® Series Aqua-Jet® Aerator. Float is fiber reinforced polyester skin (FRP), filled with closed cell polyurethane foam. Volute and intake cone are 304 stainless steel. Propeller is cast stainless steel. Diffusion head is monolithic casting of 304 stainless steel. Motor will be TEFC, premium efficient, 460 volt, 3 phase, 60 hertz, 1200 RPM with 1.15 Service Factor and Class F nonhygroscopic insulation. Motor shaft is one-piece 17-4 PH stainless steel.
8	Set(s) of Mooring Cable and Appurtenance
8	Set(s) of Electrical Cable and Appurtenance for 460V, 40HP operation

WARNING:
The Aqua-Jet® Aerator has a high velocity, upwardly directed hydraulic flow directly below the unit. In addition, horizontal surface velocities persist for some distance from the unit. These flow patterns may, in some instances, cause damage to basin bottoms or walls, creating leaking potential. In earthen or lined basins, Aqua-Aerobic Systems recommends the use of a concrete pad on the basin bottom directly below the aerator. If concrete is known to be nonresistant to the waste, other materials should be investigated. Riprapping, or similar means of bank protection can protect basin walls. If basin contains toxic wastes, user is advised to obtain engineering advice as to basin design and construction necessary to prevent possible erosion and leakage. Aqua-Aerobic Systems assumes no liability or responsibility for any damage to basin bottoms or walls, or for any injuries or damages resulting therefrom.

- Destination Control Statement These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-users(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

COMMERCIAL NOTES:

- Freight to jobsite is included, FOB Eagle, ID. 83616, as included in the Pricing Summary, below. If shipment is to be provided to another location, additional freight charges may apply.

- Start-up supervision is NOT included.

- Payable net 30 days from date of shipment subject to credit review; no retainage allowed.

- Unless specifically stated herein, state and/or local taxes are not included in the price but will be charged unless we receive a valid sales exemption certificate, direct pay permit, or other documentation required specifically by the taxing entity prior to shipment.

SCOPE / EQUIPMENT NOTES:

- The accessory prices quoted herein are only valid with the purchase of the complete units. If accessories are purchased independently, now or at a later date, pricing is void and must be obtained from the Aqua-Aerobic Systems' Aftermarket Sales Department.

- Unless specifically stated herein, control panels, junction boxes, anchors and eyebolts are not included in Aqua's scope of supply and shall be supplied by others. Accessories listed under available options are not included in the 'Total Job Price'.

- Based on the current instability in stainless steel pricing, Aqua-Aerobic Systems, Inc. reserves the right to re-evaluate the pricing quoted prior to order acceptance.

- Aqua-Aerobic Systems' offer is based upon the supply of Aqua-Aerobic Systems' standard equipment as described within this proposal, including the warranty as included within Terms and Conditions of Aqua-Aerobic Systems, Inc., and Aqua-Aerobic Systems' standard factory test(s) prior to shipment. Aqua-Aerobic Systems' scope of supply does not include any process or performance guarantees or warranties or process or performance testing unless specifically detailed within this proposal.

- Aqua-Aerobic Systems is providing this proposal without reviewing the process application requirements. Aqua-Aerobic Systems cannot take responsibility for these requirements. If the review of the application indicates that additional equipment is required, Aqua-Aerobic Systems reserves the right to revise our offering to meet the requirements

- TRADEMARKS: Aqua-Aerobic, Aqua-Jet, Aqua-Jet II, AquaDDM, ThermoFlo, Endura Series, OxyMix, Fold-a-Float, Aqua MixAir, AquaCAM-D, AquaSBR, Aqua MSBR, AquaPASS, Aqua BioMax, AquaEnsure, Aqua EnduraTube, Aqua EnduraDisc, Aqua CB-24, AquaDisk, AquaDiamond, AquaDrum, Aqua MiniDisk, Aqua MegaDisk, AquaPrime, OptiFiber, OptiFiber PES-13, OptiFiber PA2-13, OptiFiber ACR-13, OptiFiber PES-14, OptiFiber PF-14, Trust the Tag, AquaABF, Turbilite, AquaMB Process, Aqua-Aerobic MBR, Aqua UltraFiltration, Aqua MultiBore, Aqua MultiBore Series C, Aqua ElectrOzone, SpareCare, IntelliPro, Aqua Financing Solutions, and the Aqua-Aerobic logo are registered trademarks or pending trademarks of Aqua-Aerobic Systems, Inc. All other products and services mentioned are trademarks of their respective owners. Nereda® is a registered U.S. trademark of Royal HaskoningDHV.

SHIPPING NOTES:

To expedite your order, please provide the shipping instructions below:

Earliest acceptable equipment on site date: ________________________

Ship to address (including zip code):

Driver to provide 24 or 48 or _____ HOURS pre-delivery notice to:

Jobsite contact name: ___________________________________

@ telephone number: _______________________________

Deliveries are accepted on the following days of the week:

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

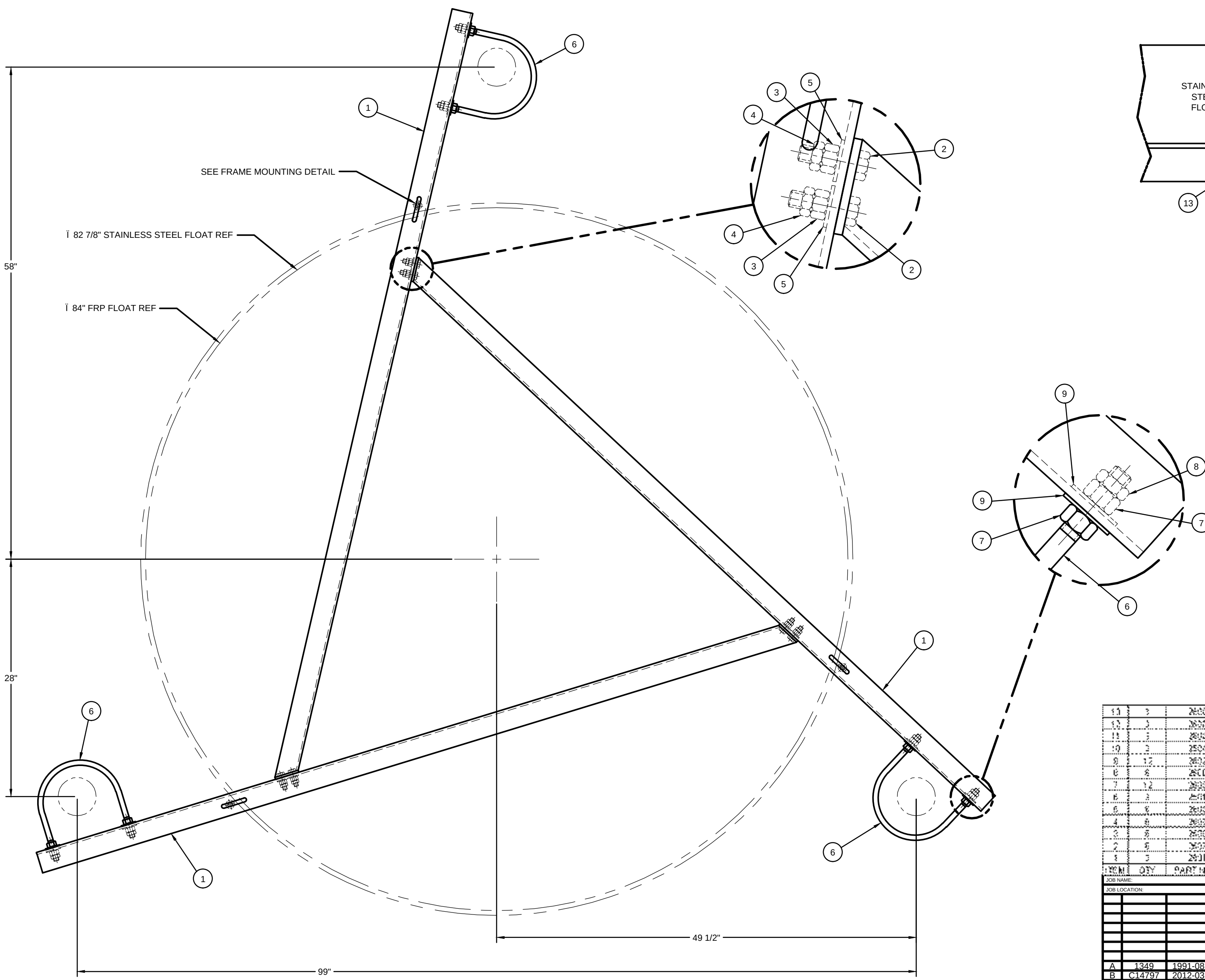
Acceptable hours of delivery ____:____ AM to ____:_____ PM

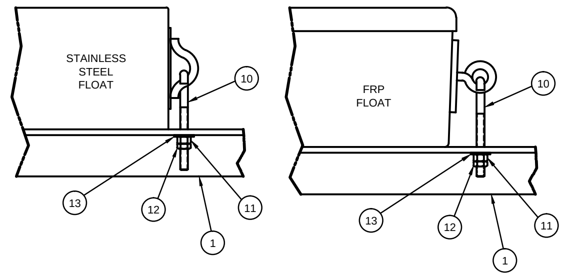
Special instructions to relay to the carrier and/or the driver:

____

BILLING NOTES:
Bill To Address:

Purchase Order #:





FRAME MOUNTING DETAIL

ASSEMBLY NOTES:

1. MOORING FRAME ASSEMBLY IS TO BE ATTACHED TO THE BOTTOM OF THE FLOAT.
2. ALL FASTENERS ARE TO BE SECURED WITH A FULL NUT AND A JAM NUT.
3. MOORING FRAME ASSEMBLY IS FOR USE WITH 4 1/2" MAXIMUM DIAMETER (4ôI.P.S. PIPE) MOORING POSTS.

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	DWG
13	3	2600301	WASHER, FLAT, 3/8" X 1" X .042"	316 SS	-
12	3	2602603	NUT, HEX, JAM, 3/8-16	316 SS	-
11	3	2602601	NUT, HEX, FULL, 3/8-16	316 SS	-
10	3	2504402	U-BOLT, 3/8-16 X 11 3/4"	304 SS	Y
9	12	2602489	WASHER, FLAT, 5/8" X 1 3/4"	316 SS	-
8	6	2600302	NUT, HEX, JAM, 5/8-11	316 SS	-
7	12	2603301	NUT, HEX, FULL, 5/8-11	316 SS	-
6	3	2501981	U-BOLT, 5/8-11 X 5"	304 SS	Y
5	6	2603476	WASHER, FLAT, 1/2" X 1 3/8"	316 SS	-
4	6	2603224	NUT, HEX, JAM, 1/2-13	316 SS	-
3	6	2603517	NUT, HEX, FULL, 1/2-13	316 SS	-
2	6	2603342	HHCS, 1/2-13 X 1 TS	316 SS	-
1	3	2901349	MOORING ARM WELDMENT, 2 1/2" X 99"	304 SS	Y

JOB NAME:
JOB LOCATION:

AQUA-AEROBIC SYSTEMS, INC.

DO NOT SCALE DRAWING

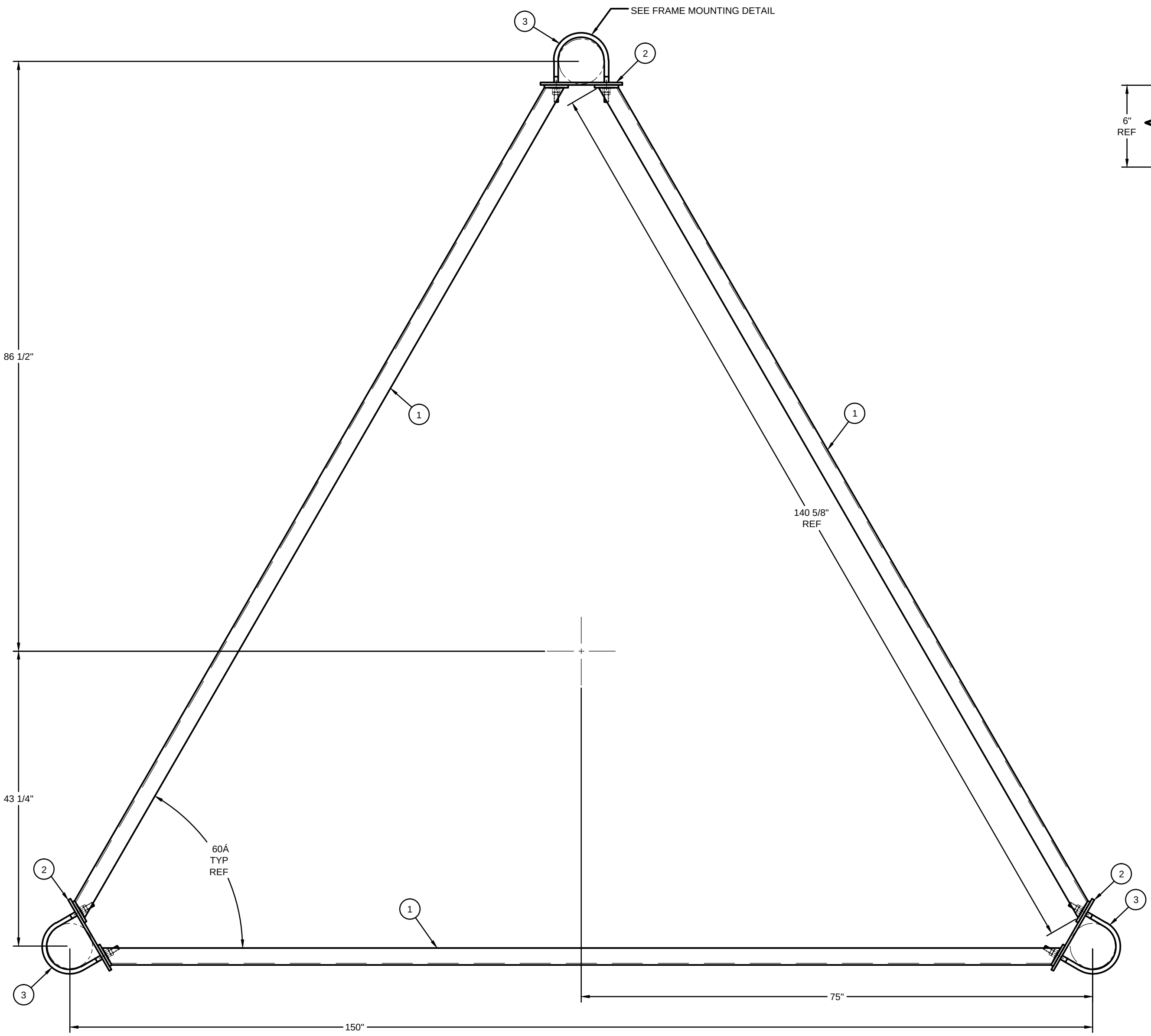
UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS +/- 1/16
ALL TWO PLACE DECIMALS +/- 0.010
ALL THREE PLACE DECIMALS +/- 0.005
ALL ANGLES +/- 1/2Â
ANSI

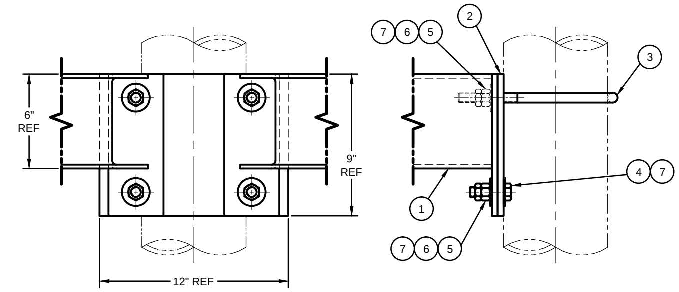
MATERIAL: 304 SS
SIMILAR TO:
TYPE: AERATOR , 20-25 HP

REV	ERN / ECO	DATE	BY	REVISION DESCRIPTION
A	1349	1991-08-07	MKP	REVISED QUANTITIES OF ITEMS #7 & #8
B	C14797	2012-03-23	JFM	ACAD REDRAWN & UPDATE

DRAWN BY: BCM DATE: 1988-04-29
CHECKED BY: DATE:
WEIGHT: SHEET: 1 OF 1

DRAWING NAME: MOORING FRAME FIELD ASSY, AER, 99", 3-P, 4"
DRAWING NUMBER: 2901348
SCALE: 1:6
SIZE: D





FRAME MOUNTING DETAIL

ASSEMBLY NOTES:

1. ALL FASTENERS ARE TO BE SECURED WITH A FULL NUT AND A JAM NUT.
2. STOP FRAME ASSEMBLY IS FOR USE WITH 6 5/8" MAXIMUM DIAMETER (6öI.P.S. PIPE) MOORING POSTS.

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	DWG
7	[illegible]	[illegible]	WASHER, FLAT, 5/8" X [illegible]	316 SS	-
6	12	[illegible]	NUT, HEX, JAM, 5/8-11	316 SS	-
5	12	[illegible]	NUT, HEX, FULL, 5/8-11	316 SS	-
4	[illegible]	[illegible]	HHCS, 5/8-11 X 2 1/4"	316 SS	-
3	3	[illegible]	U-BOLT, 5/8-11 X [illegible]	304 SS	Y
2	3	[illegible]	PLATE, POST SUPPORT, 6"	304 SS	Y
1	3	[illegible]	SUPPORT ARM WELDMENT, 1 1/2" X 3" X 140 5/8"	304 SS	Y

JOB NAME:
JOB LOCATION:

REV	ERN / ECO	DATE	BY	REVISION DESCRIPTION
A	C14833	2012-04-12	JFM	ACAD REDRAWN & UPDATE

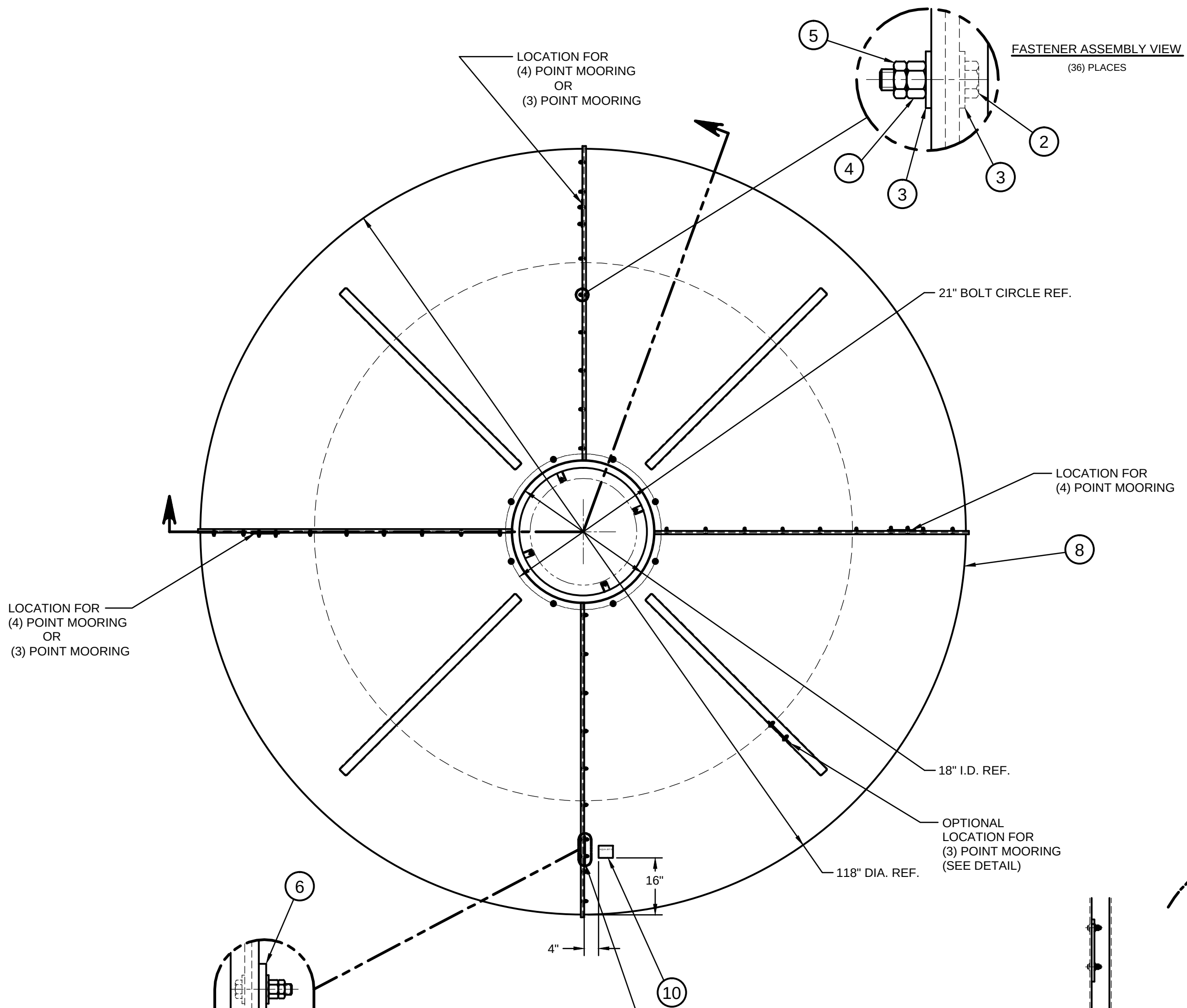
AQUA-AEROBIC SYSTEMS, INC.

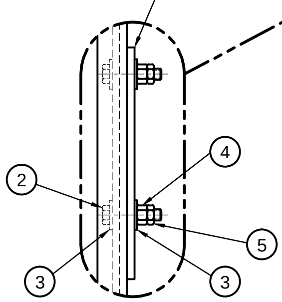
DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
FRACTIONAL DIMENSIONS +/- 1/16
ALL TWO PLACE DECIMALS +/- 0.010
ALL THREE PLACE DECIMALS +/- 0.005
ALL ANGLES +/- 1/2Â
ANSI

MATERIAL: 304 SS
SIMILAR TO:
TYPE: MIXER , AERATOR
DRAWN BY: GBM DATE: 2002-12-16
CHECKED BY: DATE:
WEIGHT: SHEET: 1 OF 1

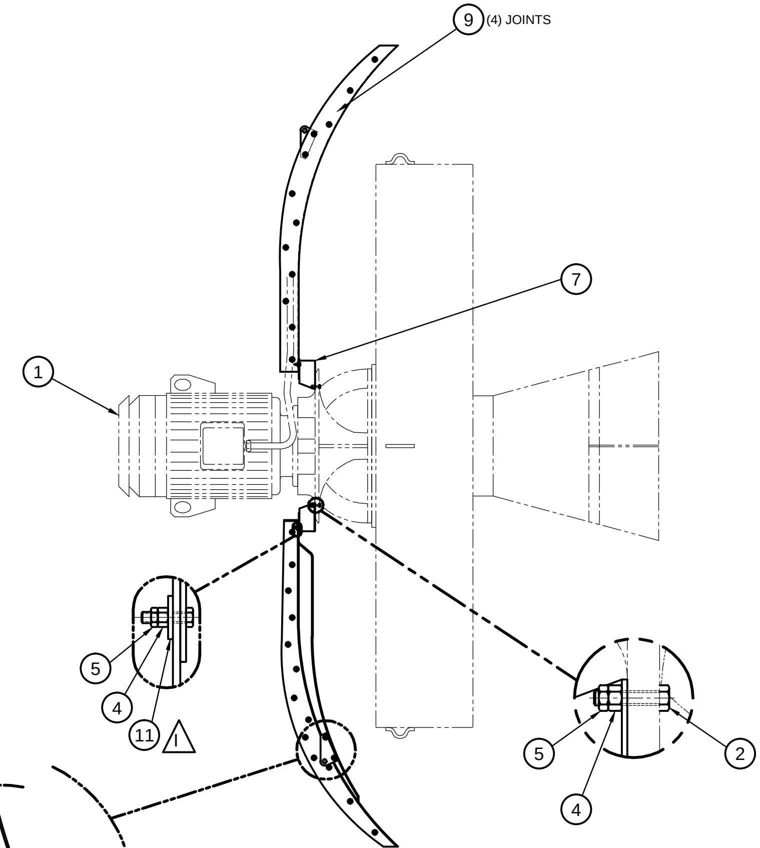
DRAWING NAME: MOORING STOP FRAME FIELD ASSY, 150", 6"
DRAWING NUMBER: 2962697
SCALE: 1:8
SIZE: D

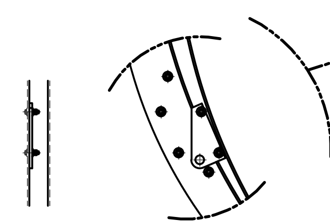




MOORING PLATE ASSEMBLY VIEW

(4) PLACES





OPTIONAL MOORING PLATE LOCATION
FOR 3 POINT MOORING

LOCATE AND DRILL (2) 3/8" DIA. HOLES IN THE RECESS OF THE COVER SECTION AND ASSEMBLE AS SHOWN.

NOTES:

1.) POWER CABLE TO BE ROUTED ABOVE THE COVER. DO NOT ROUTE CABLE BETWEEN COVER AND FLOAT.

2.) OPTIONAL COMPONENTS SUCH AS CABLE BRACKETS AND/OR WIRE MESH STRAIN RELIEF GRIPS MAY BE USED TO FACILITATE INSTALLATION.

I

ITEM	QTY.	PART NUMBER	DESCRIPTION		DWG
11	8	2610702	WASHER, FNDR, 1/2" X 2" O.D. X .09" THK.	316 SS	A
10	1	2608133	NAMEPLATE, AQUA-JET II		A
9	18 FT.	2607423	TAPE, GASKET 3/16" x 3"	NEOPRENE	-
8	4	2508217	COVER, SECTION, 3-7.5HP	FRP	C
7	1	2911656	BRACKET, MOUNTING, COVER, 3-7.5HP	304 SS	C
6	4	2508317	PLATE, MOORING	304 SS	A
5	56	2600403	NUT, HEX, JAM 3/8-16	316 SS	-
4	56	2600481	NUT, HEX, FULL 3/8-16	316 SS	-
3	88	2600381	WASHER, FLAT 3/8" x 1.00	316 SS	-
2	48	2607591	SCREW, CAP, HEX HD 3/8-16 x 2.00 LG. FULL THREAD	304 SS	-
1	1	REF	AERATOR ASSEMBLY 3-7.5HP		-

JOB NAME:

REF	ECO	DATE	BY	REVISION
I	C8182	7-30-03	DAL	ADDED ITEM 11
H	C7353	4-2-02	JFM	REDRAWN AND UPDATED

DO NOT SCALE DRAWING

DRN BY: JFM | DATE: 4-2-02

CKD BY: | ACT WT:

SCALE: NONE

SIMILAR:

REF: 2961073S1

UNLESS OTHERWISE SPECIFIED

FRACTIONAL DIMENSIONS	± 1/16
ALL TWO PLACE DECIMALS	±.010
ALL THREE PLACE DECIMALS	±.005
ALL ANGLES	± 1/2Á

AQUA-AEROBIC SYSTEMS, INC.
MANUFACTURERS OF WASTEWATER TREATMENT EQUIPMENT

NAME:
COVER ASSEMBLY
FRP COVER

HP/SIZE: 3 - 7.5 HP

TYPE: AQUA-JET II

SHEET 1 OF 1

DWG. NO.: 2961073

Parkson
Treating Water Right

DynaCanter™
Effluent Decanter

The Parkson DynaCanter™ is a floating style decanter used to remove treated effluent from the upper portion of the basin. The decanter utilizes a flex joint to allow vertical articulation as water levels move between high and low water levels. The decanter collects treated effluent from below the water surface to preclude foam, scum, or other floatables from the effluent. A series of check valves are provided in the decanter draw tube to isolate the effluent piping from the mixed liquor during mixing and aeration steps. A standard open / close valve is used in the effluent piping to control flow rate through the decanter. No electromechanical components are used inside the basin making operation and maintenance convenient for the operator.

The basic principle behind the design of the decanter is to utilize spring loaded check valves to isolate the effluent piping from the surrounding mixed liquor when the tank is aerated and / or mixed. The hydraulic profile is configured to allow head pressure to open the spring loaded check valves when the effluent valve is opened. A typical design will require 3-4 feet of head differential between low water level in the decanted tank and high water elevation at the decanter discharge water elevation. Actual head requirements are reviewed and verified for each specific application. Utilizing this approach allows the Parkson design to eliminate motors, gears, drive units, and other electromechanical components from inside the basin. A simple open / close valve is used to control flow through the decanter. In basin components are primarily stainless steel and fiberglass reinforced plastic (FRP). No in basin components require routine maintenance or scheduled replacement.

A cast in place wall spool (or supported spool for steel tanks or link seal designs) is located a few feet below minimum water level. The lower mitered elbow is bolted to the spool and is used to support the lower knee brace assembly. A wire reinforced flex hose is used to allow the decanter assembly to move up and down with changing water levels. An upper knee brace assembly is connected to the decanter drain tube and is pinned to the lower knee brace assembly to allow only vertical movement of the assembly. The draw tube (lower parallel pipe) houses the spring loaded check valves and is typically located 1-2 feet below the water surface to prevent vortexing and entrainment of floating materials. The upper parallel pipe is the foam filled float which provides buoyancy to the unit. Decanter rests are anchored to the tank floor and are designed to support the decanter when the tank is dewatered (and during initial installation). The supports also act as an emergency stop in the event that the effluent valve remains open after the decanter reaches bottom water level (this prevents the decanter from entering the sludge blanket).

The standard materials of construction are outlined in the following table. Other materials of construction are also available depending on specific project requirements.

Float	ASTM D2996 FRP filled with closed cell foam
Draw tube	ASTM D2996 FRP
Drain tube	ASTM D2996 FRP
Flex connector	Natural Rubber / Neoprene (wire re-enforced)
Knee joint assembly	304 stainless steel
Lower mitered elbow	304 stainless steel
Decanter rests	304 stainless steel

Parkson™ Treating Water Right

50 YEARS 2010

Fort Lauderdale
Chicago
Montreal
Kansas City
Dubai

1.888.PARKSON
technology@parkson.com
www.parkson.com

1754 Ford Avenue, Springdale, AR 72764
Phone: 479-927-1300
Email: ATS@aquaturbo.com
Web: www.aquaturbo.com

Quotation

Quote #	Q-21-6579
Date	2/8/2021

Customer:

Aquapro
Brandon Smith
1106 W Park St.
Ste. 20 #197
Livingston, MT 59047

Item	Description	Qty	U/M	Price Each	Total
	Standard floating gravity decanter				
104-00080	AD-300-G Floating Decanter Rectangular 304 1320GPM DN 250	1	ea		
120-00150	Vertical Mooring posts - 304 3" Sch. 10 13/FT set of 2	1	ft		
	Standard floating gravity decanter with mechanical closed weir.				
104-00210	AD-300-MC-R-G Floating Decanter Rectangular 304 1320GPM DN 250	1	ea		
104-01530	Electrical Control Panel w/ PLC	1	ea		
120-00150	Vertical Mooring posts - 304 3" Sch. 10 13/FT set of 2	1	ft		
	Discharge options:				
	Option 1:				
104-01190	AD-Hinged Arm 304 DN250	1	ea		
	Option 2:				
104-01060	AD-Collector 304 3 x DN 150 -> DN 250	1	ea		

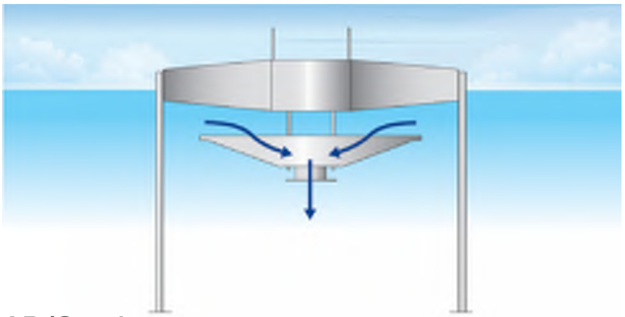
Payment Terms	Net 30 Days
Incoterms	EXW-Springdale, AR
Lead Time:6-7 weeks	

Total

Validity: Prices quoted are in USD and are valid for 30 days
Warranty: 36 months
Note: Aquaturbo Systems, Inc. does not provide process guarantee.

Aqua Turbo®

The AQUA DECANT® Floating Decanter Systems discharge the subsurface laminar layer of clean water without disturbing the sludge blanket or floatables. Gravity and pump options are available with mechanical actuation to close the weir during aeration and mixing phases, preventing wastewater or activated sludge entering the discharge pipe.

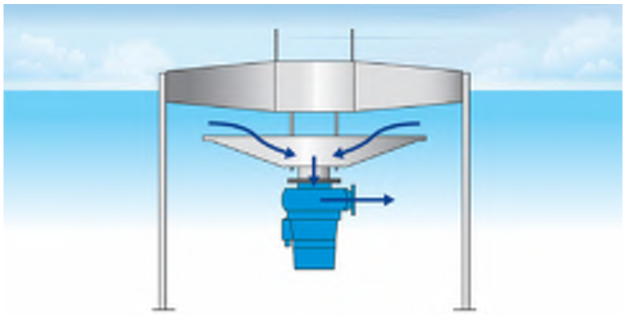


AD/Gravity

Floating Weir + Permanently Open + Gravity Discharge

FEATURES

- Minimal sludge blanket disruption, preserves sediment
- Adjustable flow
- Avoids discharge of floatables
- Simple design + installation
- Manufactured in stainless steel
- Floating execution
- Designed to work with water level variations
- Discharges the clear supernatant after the settling cycle

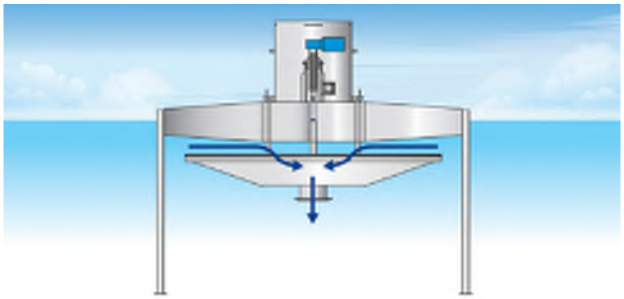


AD/Pump

Floating Weir + Permanently Open + Pump Discharge

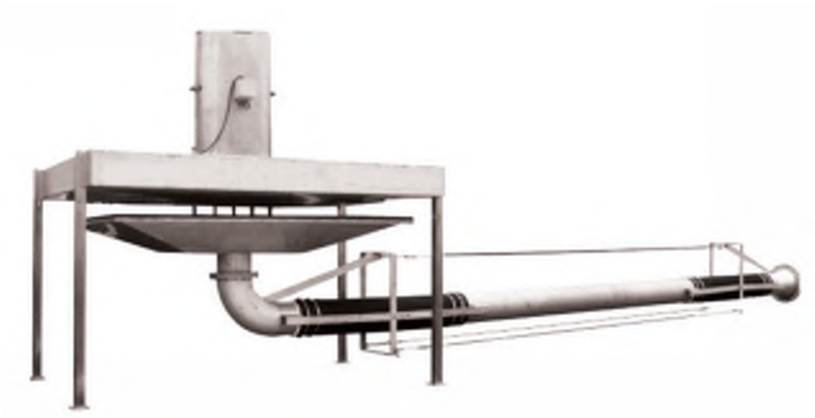
CONFIGURATION

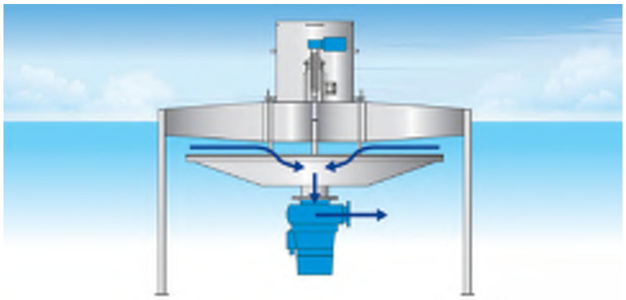
- Flexible hose + mooring cables with springs
- Flexible hose + guide rails
- Hinged discharge pipe
- Telescopic discharge pipe



AD-MC/Gravity

Floating Weir + Mechanically Closing + Gravity Discharge





AD-MC/Pump

Floating Weir + Mechanically Closing + Pump Discharge

Aqua Decant, Floating Decanter Systems

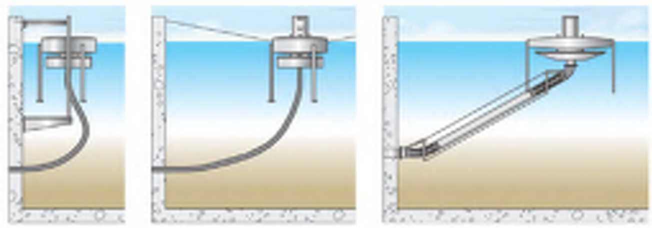
RANGE

- Circular - 45 to 660 GPM
- Rectangular - 660 to 13,200 GPM
- Custom manufacture
- AISI 304/316 or special SS

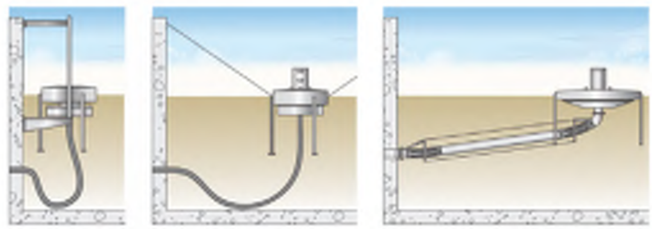
APPLICATIONS

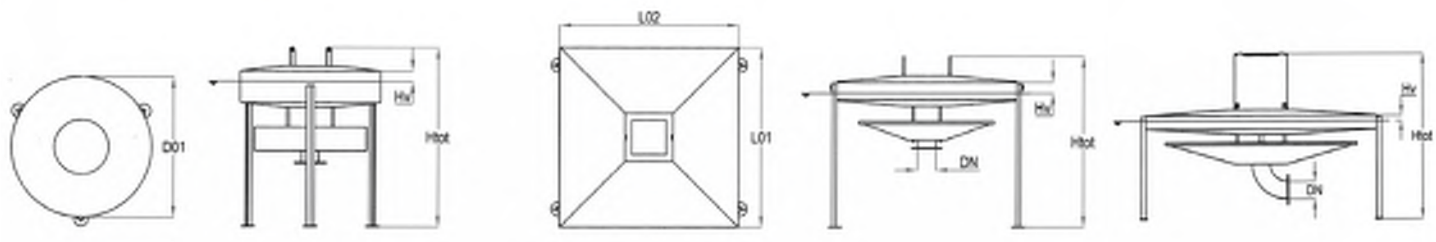
- Sequential Batch Reactors
- Sludge settling tanks
- Sludge thickeners
- General decanting

Configuration Options at High Water Level



Configuration Options at Low Water Level





Type AD	Flange Connection	D01 (in.)	L01 (in.)	L02 (in.)	Hv (in.)	Htotal (in.)	Mass (lb.)
AD/Gravity							
AD 50-G	1.5" - 3"	30	-	-	3.9	51	176
AD 150-G	3" - 6"	49	-	-	4.7	63	330
AD 300-G	6" - 10"	-	79	79	4.7	79	946
AD 800-G	10" - 14"	-	91	91	4.7	79	1,276
AD 1500-G	12" -	-	90	138	7.1	98	1,804
AD/Pump							
AD 50-3/6	1.5" - 3"	30	-	-	2.4	59*	374**
AD 150-3/6	3" - 6"	49	-	-	3.1	71*	660**
AD 300-3/6	6" - 10"	-	79	79	3.1	98*	2,486**
AD 800-3/6	10" - 14"	-	91	91	3.1	98*	2,816**
AD 1500-3/6	12" -	-	90	138	3.9	110*	5,060**
AD-MC/Gravity							
ADMC-A 150-G	3" - 6"	49	-	-	4.7	83	418
ADMC-A 300-G	6" - 12"	-	79	79	5.1	98	1,342
ADMC-A 800-G	12" - 14"	-	91	91	5.5	102	1,628
ADMC-A 1500-G	14" - 16"	-	90	138	5.9	122	1,837
AD-MC/Pump							
ADMC-A 150-3/6	3" - 6"	49	-	-	4.7	83*	748**
ADMC-A 300-3/6	6" - 8"	-	79	79	5.1	98*	1,892**
ADMC-A 800-3/6	8" - 10"	-	91	91	5.5	102*	3,168**
ADMC-A 1500-3/6	10" - 12"	-	90	138	5.9	122*	3,817**

All values are indicative. Aquasystems International NV reserves the right to adjust these values at any time.
* Depends on the type of discharge system. Extended supports are possible to stand on the basin floor at minimum water level.
* Depends on the type of pump.

Tel: 479-927-1300 • Fax: 479-927-0700 • Email: ats@aquaturbo.com
1754 Ford Avenue, Springdale, Arkansas 72764 • www.aquaturbousa.com

Appendix M

Operator Classification Worksheet, Preliminary

KELLER
ASSOCIATES

IDAHO PUBLIC WASTEWATER TREATMENT PLANT CLASSIFICATION WORKSHEET

OFFICE USE
DO NOT WRITE HERE

System Class __________

Upgrade ___ STD 5 Yr ___

Approved by __________

Date________________

Name of System: Spring Valley WWTP

Legal Owner of Treatment System Eagle Sewer District

System Address: ____________________

City: Eagle **State:** Id **Zip Code:** __________

Contact Person: __________ **Title:** __________

Business Phone Number: (____)__________ **Email** __________

Treatment System - Design Flow/Actual Flow 0.44 / 0
(MGD) (MGD)

Treatment Plant Classification Worksheet is (Check one):

■ **Initial System Rating** ☐ **System Upgrade** ☐ **Standard 5 Year Rating**

Date of last system classification rating (if applicable) _____

☐ **Attach a flow schematic or hydraulic flow diagram of the treatment facility to this treatment plant classification worksheet when submitting to DEQ.**

Instructions:

Use this rating form for all types of public wastewater treatment plants, facilities, or systems[D-16] that treat domestic and/or industrial wastewater including, but not limited to traditional biological and mechanical treatment processes, large soil absorption systems, community drainfields, and wastewater lagoon systems. Fill out ONE form for the wastewater treatment facility including all sequential, parallel or multiple treatment processes for both effluent and solids that provide treatment of all wastewater introduced into the system.

How to Assign Points:

Evaluate each item listed in the table below and place the specified point value next to each item selected. ***Each unit process should have points assigned only once*** **.Add the total number of points selected to determine the class of the treatment system. Definitions describing all configurations, names, and/or reasons why rating points are or are not assigned to a particular item are provided for those items with a small D-number behind the item, i.e. D-1. Check the definition if unsure whether a particular treatment plant process qualifies for the point value shown.**

Treatment facilities will be classified as VSWW, Class I, Class II, Class III or Class IV with IV being the largest and most complex. ***Mail the completed, signed form to the Department of Environmental Quality 1410 N. Hilton, Boise, ID 83706 Attention: Adam Bussan. Keep a photocopy of the original form for your files.***

Item	Points	Your System
System Size (2 to 20 points)		
Number of Connections (for information only)	(not scored)	2200
Maximum population served, peak day (1 point minimum to 10 point maximum) 4,400	1 point/10,000 or part	1
Design flow (average/day) or peak months (average/day) Whichever is larger (1 point min to 10 point max) 0.44 Avg Day	1 point/MGD or part	1

Item	Points	Your System
Variation in Raw Wastewater (0 to 6 points) [1]		
Variations do not exceed those normally or typically expected	0 points	0
Recurring deviations/excessive variations of 100% to 200% in strength/flow	2 points	0
Recurring deviations/excessive variations of more than 200% in strength/flow	4 points	0
Raw wastewater subject to toxic waste discharges	6 points	0
Impact of septage or truck-hauled wastewater (0 to 4 points)	0-4 points	0
Preliminary Treatment Process		
Plant pumping of main flow	3 points	3
Screening, comminution	3 points	3
Grit removal	3 points	0
Equalization	1 point	0
Primary Treatment Process		
Primary clarifiers	5 points	0
Imhoff tanks, septic tanks, or similar (combined sedimentation/digestion)[D-8]	5 points	0
Secondary Treatment Process		
Fixed-film reactor[D-7]	10 points	0
Activated sludge[D-1]	15 points	0
Stabilization ponds or lagoon without aeration	5 points	
Stabilization ponds or lagoon with aeration	8 points	8
Membrane Biological Reactor (MBR) – Basic MBR which combines activated sludge (minus secondary clarification) and membrane filtration.[D-17]	15 points	0
Tertiary Treatment Process		
Polishing ponds for advanced wastewater treatment	2 points	0
Chemical/physical advanced wastewater treatment w/o secondary[D-5]	15 points	0
Chemical/physical advanced wastewater treatment following secondary[D-4]	10 points	0
Biological or chemical/biological advanced wastewater treatment[D-2]	12 points	0
Nitrification by designed extended aeration only	2 points	0
Ion exchange for advanced wastewater treatment	10 points	0
Reverse osmosis, electrodialysis and other membrane filtration techniques for advanced wastewater treatment	15 points	0
Advanced wastewater treatment chemical recovery, carbon regeneration	4 points	0
Media filtration (removal of solids by sand or other media*)* [D-13]	5 points	0
Additional Treatment Processes		
Chemical additions (2 points each for a max of 6 points)[D-3]	0-6 points	0
Dissolved air floatation (for other than sludge thickening)	8 points	0
Intermittent sand filter	2 points	0
Recirculating intermittent sand filter	3 points	0
Microscreens	5 points	0
Generation of oxygen	5 points	0

Solids Handling		
Solids stabilization (used to reduce pathogens, volatile organic chemicals & odors include lime or similar treatment and thermal conditioning)[D-15]	5 points	0
Gravity thickening	2 points	0
Mechanical dewatering of solids[D-11]	8 points	0
Anaerobic digestion of solids	10 points	0
Aerobic digestion of solids	6 points	0
Evaporative sludge drying	2 points	0
Solids reduction (including incineration, wet oxidation)	12 points	0
On-site landfill for solids	2 points	0
Solids composting[D-14]	10 points	0
Land application of biosolids by contractor [D-9]	2 points	0
Land application of biosolids by facility operator in responsible charge	10 points	0
Disinfection (0 to 10 points maximum)		
No disinfection	0 points	0
Chlorination (including chlorine dioxide or chloramines) or ultraviolet irradiation	5 points	5
Ozonation	10 points	0
Effluent Discharge (0 to 10 points maximum)		
No discharge	0 points	0
Discharge to surface water receiving stream[D-6]	0 points	0
Mechanical post aeration[D-12]	2 points	0
Land treatment with surface disposal or land treatment with subsurface disposal [D-10]	4 points	4
Direct recycle and reuse	6 points	0
Instrumentation (0 to 6 point maximum)		
SCADA or similar instrumentation systems to provide data with no process operation	0 points	0
SCADA or similar instrumentation systems to provide data with limited process operation	2 points	0
SCADA or similar instrumentation systems to provide data with moderate process operation	4 points	0
SCADA or similar instrumentation systems to provide data with extensive or total process operation	6 points	0
Laboratory Control (0 to 15 point maximum) [2]		
Bacteriological/Biological Laboratory Control (0 to 5 point maximum)		
Lab work done outside the treatment plant	0 points	0
Membrane filter procedures	3 points	0
Use of fermentation tubes or any dilution method; fecal coliform determination	5 points	0
Chemical/Physical Laboratory Control (0 to 10 point maximum)		
Lab work done outside the treatment plant	0 points	0
Push-button or visual (colorimetric) methods for simple tests such as pH, settleable solids	3 points	0
Additional procedures such as DO, COD, BOD, gas analysis, titrations,		

solids, volatile content	5 points	0
More advanced determinations such as specific constituents; nutrients, total oils, phenols	7 points	0
Highly sophisticated instrumentation such as atomic absorption, gas chromatography	10 points	0
TOTAL POINTS FOR YOUR SYSTEM		25

System Classification Key	Classification
A system comprised of only one of the following wastewater treatment processes: aerated lagoon (s), non-aerated lagoons, primary treatment, or LSAS; and associated collection system also meets the definition of a very small wastewater system (VSWWS).	☐ VSWWS
0-30 points	■ Class I
31-55 points	☐ Class II
56-75 points	☐ Class III
76 or greater	☐ Class IV

Footnote [1] The key concept is frequency and/or intensity of deviation or excessive variation from normal or typical fluctuations; such deviation can be in terms of strength, toxicity, shock loads, I/I, with points from 0-6.

Footnote [2] The key concept is to credit laboratory analyses done on-site by plant personnel under the direction of the operator in direct responsible charge with points from 0-15.

____/___________

Signature of Legal Owner or Owner's Representative Date

Wastewater Treatment Definitions

D-1. **Activated Sludge** - Wastewater treatment by aeration of suspended organisms followed by secondary clarification, including extended aeration, oxidation ditches, Intermittent Cycle Extended Aeration system (ICEAS), and other similar processes. A sequencing batch reactor with the purpose of providing this form of treatment would be rated under this category.

D-2. **Biological or chemical/biological advanced wastewater treatment** - The advanced treatment of wastewater for nutrient removal including nitrification, denitrification, or phosphorus removal utilizing biological or chemical processes or a combination. If the facility is designed to nitrify based solely on detention time in an extended aeration system, only the points for nitrification by designed extended aeration should be given.

D-3. **Chemical addition** - The addition of a chemical to wastewater at an application point for the purposes of adjusting pH or alkalinity, improving solids removal, dechlorinating, removing odors, providing nutrients, or otherwise enhancing treatment, excluding chlorination for disinfection of effluent and the addition of enzymes or any process included in the Tertiary Chemical/Physical Processes. The capability to add a chemical at different application points for the same purpose should be rated as one application; the capability to add a chemical(s) to dual units should be rated as one application; and the capability to add a chemical at different application points for different purposes should be rated as separate applications.

D-4. **Chemical/physical advanced treatment following secondary** - The use of chemical or physical advanced treatment processes following (or in conjunction with) a secondary treatment process. This would include processes such as carbon adsorption, air stripping, chemical coagulation, and precipitation, etc.

D-5. **Chemical/physical advanced treatment without secondary** - The use of chemical or physical advanced treatment processes without the use of a secondary treatment process. This would include processes such as carbon adsorption, air stripping, chemical coagulation, precipitation, etc.

D-6. **Discharge to Receiving Water** - Treatment processes present at the facility are designed to achieve NPDES permit limitations that have already factored in the sensitivity of the receiving stream. Consequently, no additional points are assigned to rate the receiving stream separately from the facility treatment processes.

D-7. **Fixed-film reactor** - Biofiltration by trickling filters or rotating biological contactors followed by secondary clarification.

D-8. **Imhoff tanks (or similar)** - Imhoff tanks, septic tanks, spirogester, clarigester, or other single unit for combined sedimentation and digestion.

D-9. **Land application of biosolids by contractor** - The land application or beneficial reuse of biosolids by a contractor outside of the control of the operator in direct responsible charge of the wastewater treatment facility.

D-10. **Land treatment and disposal (surface or subsurface)** - The ultimate treatment and disposal of the effluent onto the surface of the ground by rapid infiltration or rotary distributor or by spray irrigation. Subsurface treatment and disposal would be accomplished by infiltration gallery, injection, or gravity or pressurized drainfield.

D-11. **Mechanical dewatering** - The removal of water from sludge by any of the following processes and including the addition of polymers in any of the following: vacuum filtration; frame, belt, or plate filter presses; centrifuge; or dissolved air floatation.

D-12. **Mechanical post-aeration** - The introduction of air into the effluent by mechanical means such as diffused or mechanical aeration. Cascade aeration would not be assigned points.

D-13. **Media Filtration** - The advanced treatment of wastewater for removal of solids by sand or other media or mixed media filtration.

D-14. **Solids composting** - The biological decomposition process producing carbon dioxide, water, and heat. Typical methods are windrow, forced air-static pile, and mechanical.

D--15. **Solids stabilization** - The processes to oxidize or reduce the organic matter in the sludge to a more stable form. These processes reduce pathogens or reduce the volatile organic chemicals and thereby reduce the potential for odor. These processes would include lime (or similar) treatment and thermal conditioning. Other stabilization processes such as aerobic or anaerobic digestion and composting are listed individually.

D-16 **Wastewater Treatment Facility**. Any physical facility or land area for the purpose of collecting, treating, neutralizing or stabilizing pollutants including treatment plants, the necessary intercepting, outfall and outlet sewers, pumping stations integral to such plants or sewers, equipment and furnishing thereof and their appurtenances. A treatment facility may also be known as a treatment system, wastewater treatment system, wastewater treatment facility, or wastewater treatment plant (IDAPA 58.01.16.010).

D-17 **Membrane Biological Reactor (MBR) Point Factoring -** The points assigned to the basic MBR unit does not include points for any additional treatment processes such as phosphorus removal, nitrification, denitrification, land application, rapid infiltration basins, lagoons, etc. Points must be assigned separately to each additional treatment process beyond the basic MBR unit. Additional treatment processes may vary on a case-by-case basis.