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Caldwell Housing Authority Wastewater Facility Plan WWG-337-2011-3

PHARMER ENGINEERING

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Caldwell Housing Authority

WWG 337-2011-3

Wastewater Facility Plan

Wastewater Treatment Plant
Caldwell, Idaho

Prepared for:

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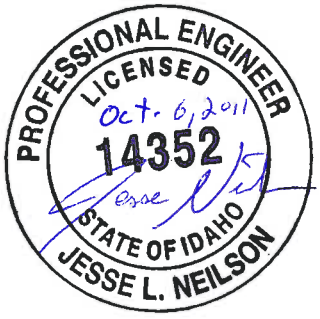

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Abbreviations, Acronyms, and Units of Measure

µg/L	micrograms per liter
µm	micrometer
AC	alternating current
ACOE	Army Corps of Engineers
ADD	average day demand
ANC	acid neutralizing capacity
BRS	backflush recovery system
CAS	Compliance Agreement Schedule
CDPH	California Department of Public Health
cfm	cubic feet per minute
cfs	cubic feet per second
CIP	clean-in-place
CMU	concrete masonry unit
CT	contact time
DEQ	Idaho Department of Environmental Quality
DR	dimension ratio
EFM	enhanced flux maintenance
EPA	Environmental Protection Agency
EPDM	ethylene propylene diene monomer
EQ	equalization
FBRR	Filter Backflush Recycling Rule
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FL	feed flush

fps	feet per second
GAC	granulated activated carbon
gfd	gallons per foot per day
gpcd	gallons per capita per day
gpd	gallons per foot per day
gpm	gallons per minute
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HMI	human machine interface
hp	horsepower
IAPMO	International Association of Plumbing and Mechanical Officials
ID	inside diameter
IDAPA	Idaho Administrative Procedures Act
IDWR	Idaho Department of Water Resources
IEC	International Energy Code
IFC	International Fire Code
IMC	International Mechanical Code
ISRB	Idaho Surveying and Rating Bureau
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LSI	Langelier Index
MCL	maximum contaminant level
MDD	maximum day demand
MF	microfiltration

MG	million gallons
mg/L	milligrams per liter
mgd	million gallons per day
mm	millimeter
MMA	maximum monthly average
NTU	Nephelometric Turbidity Units
O&M	operations and maintenance
P&ID	process and instrumentation diagrams
PAC	powdered activated carbon
PACl	polyaluminum chloride
pCi/L	picocuries per liter
PFD	process flow diagrams
PHD	peak-hour demand
PLC	programmable logic controller
ppm	parts per million
PRV	pressure reducing valve
psi	pounds per square inch
PVC	polyvinyl chloride
RF	reverse filtration
SCADA	supervisory control and data acquisition
scfm	standard cubic feet per minute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SRTP	Snake River Treatment Plant
SST	stainless steel
SWD	side water depth

SWTRs	Surface Water Treatment Rules
TDS	total dissolved solids
TMP	trans-membrane pressure
TOC	total organic carbon
TSS	total suspended solids
UPC	Uniform Plumbing Code
UPS	uninterrupted power supplies
USCS	United Soil Classification System
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UV	ultraviolet
VFD	variable frequency drive

Chemical Formulas

$Ca(OH)_2$	hydrated lime
$CaCO_3$	calcium carbonate
ClO_2	chlorine dioxide
HCO_3	bicarbonate
$Mg(OH)_2$	magnesium hydroxide
NaOCl	sodium hypochlorite
NaOH	caustic soda

Introduction

The Caldwell Housing Authority (CHA) is located in western Canyon County Idaho and owns and operates a wastewater treatment facility (WWTF) and collection system. The CHA WWTF receives domestic sewage from approximately 1,600 residents living in the housing complex and discharges year-round to the Sebree Canal.

The treatment facility operates under National Pollutant Discharge Elimination System (NPDES) ID-002545-3 located in Appendix A. The treatment plant has satisfactorily met the current administratively extended NPDES permit limits in the past, but future discharge limitations are likely to be more stringent and the receiving stream may not be an economically feasible option in the future.

Seepage testing of the treatment lagoons was performed by Pharmer Engineering in 2010 to determine if the lagoon liners were within State requirements. It was found during testing the two of the lagoon liners were within tolerance, but the largest lagoon is seeping excessively.

The WWTF has been in operation since the 1940's and was improved in 1992. It is a facultative lagoon system comprised of three separate partially aerated treatment lagoons. A screening building and lift station are located in the common area of the housing complex which screens and pumps wastewater to a Parshall Flume located at the WWTF. Wastewater then flows by gravity to Cell 1. The wastewater passes through Cell 2 and Cell 3 prior to entering the serpentine concrete chlorine contact chamber. Liquid sodium hypochlorite is provided for disinfection and effluent flow is monitored via an ultrasonic meter mounted over a v-notch weir. After treatment the wastewater is discharged to the adjacent canal. Sludge is stored at the bottom of the ponds.

The purpose of the Facility Plan (Plan) is to establish alternatives for future improvements related to the wastewater treatment facilities and the associated collection system for a 20-year planning period. This Plan is organized to follow the format provided by the Idaho Department of Environmental Quality (DEQ) checklist for wastewater facility plan located in Appendix B, and is intended to meet the State Revolving Loan Program requirements. Specifically, the Plan has the following objectives:

- Evaluate the state of the existing water facilities to accommodate wastewater treatment through 2031
- Develop alternatives for providing adequate treatment and disposal through 2031
- Develop preliminary cost opinions for improvement alternatives

Existing Conditions

The existing conditions section of the Plan will detail the current condition of the treatment system in regards to both the mechanical status of the equipment as well as the current environmental, cultural, and social background of the facilities.

CHA is located approximately30 miles west of Boise and three (3) miles outside of the City of Caldwell. Figure 1 shows the general location of the community. The CHA has been operating the housing facility since the early 1940s after it was constructed with funds under the "New Deal" enacted by President Franklin Roosevelt.

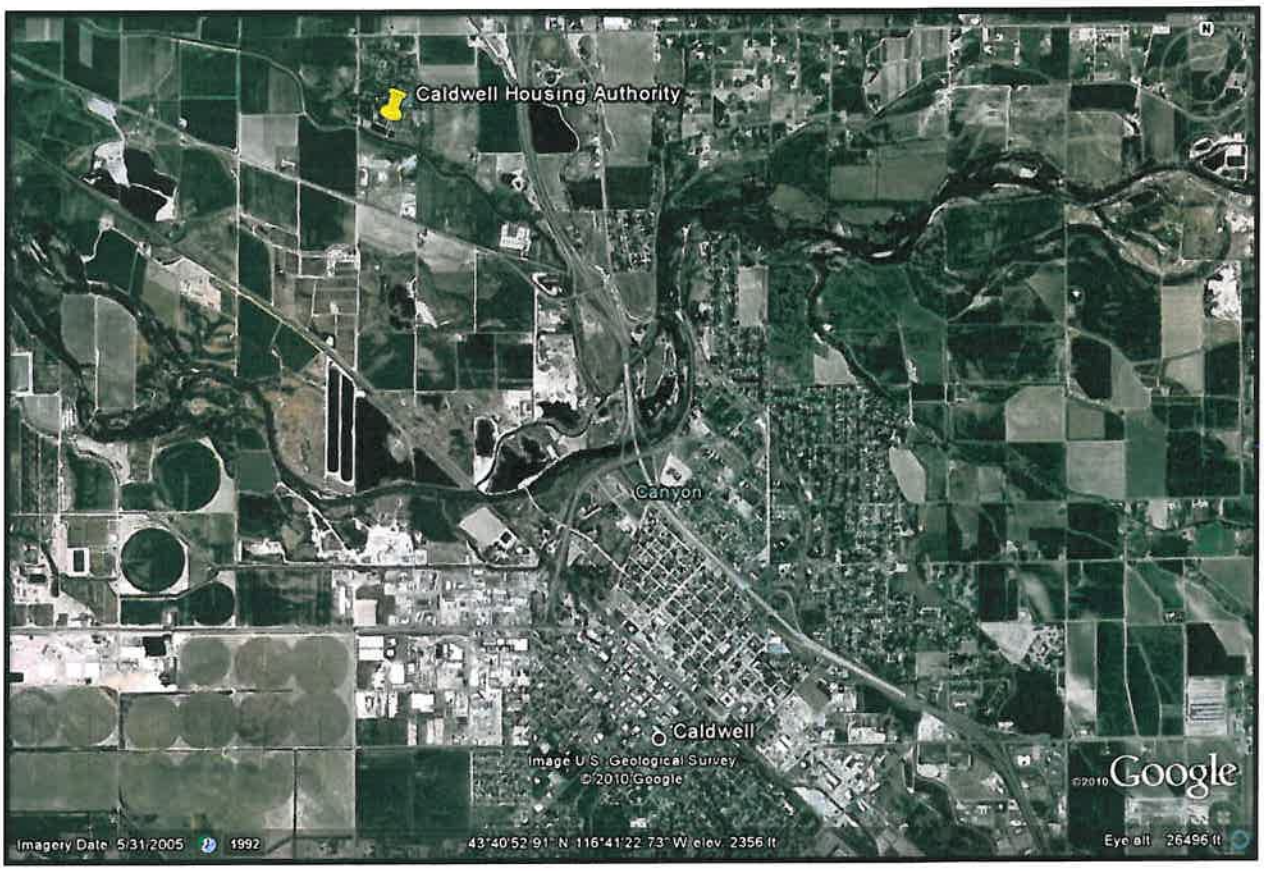

Figure 1 General Location of CHA

During this time the CHA has operated the water and wastewater systems for the community. The water system originally consisted of five (5) groundwater wells. At this time two (2) wells are currently in operation and the other three (3) have been taken out of service.

Wastewater is collected from throughout the system and pumped to the treatment lagoons. Treatment consists of primary screening, lagoon treatment through three (3) ponds and chlorination.

Figure 2 shows the extents of the CHA complex which represents the planning area.

Figure 2 Proposed Project Planning Area

Environmental Conditions

Physiography, Topography, Geology, and Soils

The Caldwell Housing Authority is located in Canyon County, 1.5 miles north of the Boise River and 0.5 miles west of the Interstate 84 (See Figure 1). The elevation of the complex is highest to the north with very gentle slope towards Sebree Canal to the south. The southern edge of the complex is the upper edge of a terrace above the Sebree Canal and the Boise River floodplain. A topographic map of the area is shown in Figure 3.

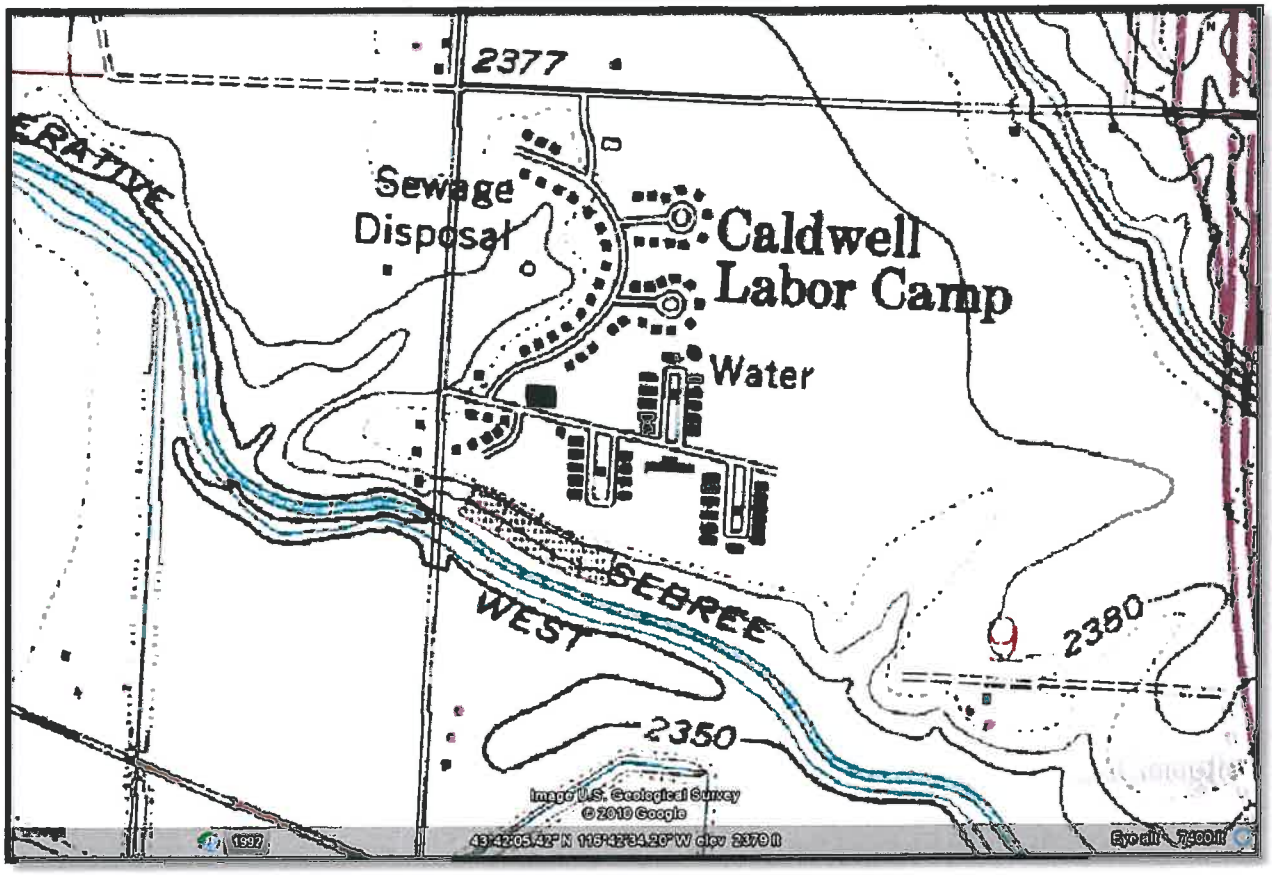

Figure 3 Topography of CHA

The elevation of the entire site is approximately 2,377 feet above sea level. As previously discussed the site slopes from North to South. The system uses this natural slope to pipe all of the sewer connections to a small pump house and wet well located on the west side of the facility before pumping the wastewater to the treatment lagoons on the south side complex.

The geology of the site consists of sedimentary Sandy Silt of Bonneville Flood Slack Water from the Pleistocene period of the Quaternary epoch. This material consists of thin-bedded tan silt, silty sand, and fine sand 10-120 feet thick which was deposited by Bonneville Flood slack water that flooded valleys to 2,450 feet (Geologic Map of Boise Valley and Adjoining Area, Idaho Geologic Survey). This lies atop the gavel of Whitney terrace. A geologic map of the area is located in Appendix C.

The soils of the planning area are comprised of Greenleaf-Owyhee silt loams and Terrace escarpments (NRCS Web Soil Survey located in Appendix C). The image located in Figure 4 is a sample for the NRCS soil survey.

Figure 4 Soil survey map

The soils at the site are considered to be well drained with a typical profile of 0 to 8 inches as a silt loam, 8 to 17 inches as a silty clay loam, and 17 to 60 inches as silt. The parent material for the site is a mixed alluvium and lacustrine deposits.

Surface and Groundwater Hydrology

The closest surface water to the site is Sebree Canal which runs along the southern property line of the complex. During the irrigation season the canal receives water from the Boise River. The canal flows in a North West direction for 4.5 miles before discharging into Conway Gulch which is a tributary of the Boise River.

During times of irrigation flows within the canal fluctuates between a low of 13 cfs to a high of 355 cfs (8.4 mgd to 230 mgd). Since the average flow rate discharged from the WWTF is approximately 0.2 mgd the ratio of canal flow to effluent varies from 42:1 to 1150:1. After the irrigation season ends storm water runoff and the discharge are the only flows into the canal.

Under State water quality standards, since the canal flows into the Conway Gulch and finally into the Boise River, the discharge water cannot adversely affect these water bodies. The Boise River is protected for cold water biota, primary and secondary contact recreation, agricultural water supply, industrial water supply, wildlife habitat and aesthetics.

In addition to these protections, Section 303(d) of the Clean Water Act requires DEQ to develop total maximum daily load (TMDL) management plans for water bodies which are determined to be water quality limited. The section of the Boise River which Conway Gulch flows into is one of these water bodies and is limited for nutrients, sediment, temperature, and bacteria.

Groundwater on the property flows from north to south and follows the topography of the site. The depth to groundwater is anticipated to be greater than 80 inches (6 feet 8 inches) below the surface. Since CHA currently provides drinking water to the residents from the local aquifer future alternatives will need to account for any possibility of possible groundwater contamination and should be addressed accordingly when discussing alternatives for final discharge of effluent and disposal of waste solids.

Fauna, Flora, and Natural Communities

The CHA is located among farm fields north west of the City of Caldwell. The fields can be valuable habitat for many different native species of plants and animals including field mice, and song birds. The endangered species act of 1973 requires that each Federal agency consult with the Fish and Wildlife service to insure that any action authorized, funded, or carried out by an agency is not likely to jeopardize the existence of any endangered or threatened species or result in destruction or adverse modification of habitat.

At this time an endangered species search has been completed through the US Department of Fish and Wildlife website for Canyon County. The results listed two bird species, two mammal and one plant species. These species include the arctic peregrine falcon, the yellow billed cuckoo, grey wolf, wolverine, and slickspot peppergrass. Since the fields near the CHA are actively farmed and the complex has been developed since the 1940's it is not anticipated that any alternatives will likely adversely affect the local wildlife.

However, during the completion of the environmental information document the US Fish and Wildlife agency will be consulted to verify that the site will not affect any of the endangered

species discussed previously.

Housing, Industrial and Commercial Development

The CHA has over 1,600 residents living in the complex at any time. In addition to the 245 residential apartments ranging in size from one bedroom to 6 bedroom units, the site also contains offices, laundry unit, meeting areas and a general store. Due to the nature of the complex a significant increase in units is not likely. Additionally, there is not expected to be any industrial of commercial development on the site or in the general area of the complex at this time.

Cultural Resources

In the past the area where the current complex was located was the land of the Shoshone-Bannock Tribes, Shoshone-Paiute Tribes, and the Burns-Paiute General Council. Although the complex has been in continuous operation for the last 70 years it is necessary to consult each of these tribes to determine the effects if any of the treatment alternatives which will be discussed in the plan.

In addition to consulting with the Native American tribes it will also be necessary to consult with the State Historical Preservation Society to determine if any of the buildings will be considered historic and require special protection. However, since the CHA has received several different housing upgrades throughout its history, at this time it is not expected to be considered a historic location.

Utility Use

Both water and sewer services are provided by the CHA to the residents. Electricity is provided by Idaho Power. Currently water and sewer fees are not separated from the rental fees and residents pay a flat rate independent of usage. Recently the CHA has passed a resolution such that residents will be charged a separate rate for water usage. The rate increase has not been initiated at this time. A summary of the fee structure is listed in Table 1.

Table 1 CHA Rental and Utility Summary

Rental Unit	Cost per Month
1 Room	$280
2 Rooms	$410
3 Rooms	$460
3 Large Rooms	$500
4 Rooms	$500
6 Rooms	$600

Floodplains and Wetlands

Based on the FEMA flood insurance maps the CHA complex is not located within the floodplain. From the information located in Appendix D, it is not expected that the flooding will be an issue with any future treatment alternatives. However, the Idaho Department of Water Resources will be contacted during completion of the EID to verify that no flooding issues will need to be addressed.

Wetlands are not expected to be located near the CHA complex. However, an EID consultation letter will be submitted to the Army Corps of Engineers to determine if the alternatives will adversely affect any wetlands which may be located within the area.

Wild and Scenic Rivers

The Sebree Canal, Conway Gulch, and the Boise River are not listed on the Wild and Scenic Rivers list. Therefore, any improvements will not adversely affect any wild and scenic rivers.

Existing Drinking Water Systems and Public Health

The existing water system for the CHA consists to two (2) drinking water wells which are maintained and operated by CHA staff. Any improvements will need to account for the current water system and cannot affect the groundwater which serves as the source for CHA water system.

In addition to adverse affects on the drinking water system any improvements will need to limit affects to public health. All of the alternatives will improve the current wastewater collection and treatments systems and should be expected to improve public health and are not anticipated to affect the health of the public in the CHA.

Prime Agricultural Land

The CHA is surrounded by agricultural fields and therefore survey of the affects on prime farmland will be important during the EID process.

Land Use and Development

The CHA complex is a residential community. At this time there are no plans to further expand the community and add any additional residential structures or commercial or industrial businesses to the site. However, CHA staff fee there is a future possibility that additional residences may be added in the future and that the planning document should reflect this fact.

Environmental Justice

The CHA exercises environmental justice in providing utilities to its residents. It maintains the same level of service to all residents regardless of race, color, national origin, or income. CHA maintains this commitment to environmental justice with the implementation and enforcement of all pertinent environmental laws, regulations, and policies.

Existing Collection and Treatment Facilities

The WWTF has been in operation since the 1940's and was most recently improved in 1992. It is a facultative lagoon system comprised of three separate partially aerated treatment lagoons. A screening building and lift station are located in the common area of the housing complex which screens and pumps wastewater to a Parshall Flume located at the WWTF. Wastewater then flows by gravity to Cell 1. The wastewater passes through Cell 2 and Cell 3 prior to entering the serpentine concrete chlorine contact chamber. Liquid sodium hypochlorite is provided for disinfection and effluent flow is monitored via an ultrasonic meter mounted over a v-notch weir. After treatment the wastewater is discharged to the adjacent canal. Sludge is stored at the bottom of the ponds. A plan view of the treatment lagoon layout is shown in Figure 5.

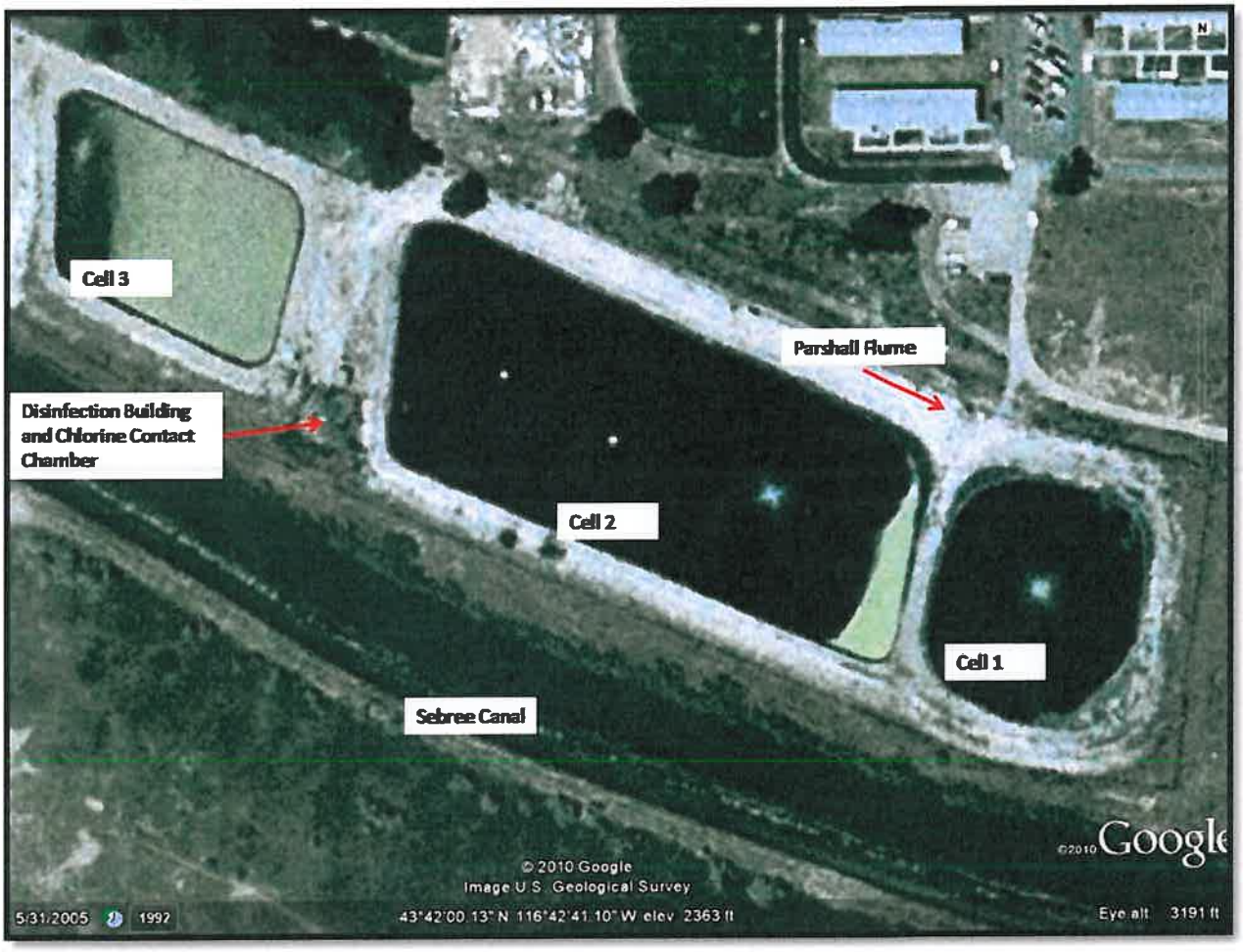

Figure 5 Cell layout

Treatment System

The first part of the treatment system consists of a microstrainer mechanical screening system and wet well. Recently the microstrainer was removed from service to the issues with grease. It has been replaced by three stainless steel punch screens which are cleaned daily to prevent fowling from grease. The screenings building and wet well are located at a low spot on the CHA property and are the collection point for all of the gravity sewer lines throughout the complex. After the wastewater has been screened two (110 gpm) pumps convey the wastewater to the lagoon treatment cells. A picture of the wet well and screenings building is located in Figures 6 and 7.

Figure 6 Screenings Building

The wet well contains two (2) submersible pumps. Each pump is designed to operate at a flow rate of 110 gpm and at a total head of 5 feet. The pumps have constant speed motors and cycle on and off to pump influent to the wastewater lagoons. The pumps were installed in 2007 and are not provided with backup power. It is suspected that one of the pumps does not pump the full design flow. There is no SCADA system currently installed at the plant and no additional controls on the pumps are available.

The pumps send the wastewater through a Parshall flume that is not currently monitored with an ultrasonic meter and then discharges into Cell 1.

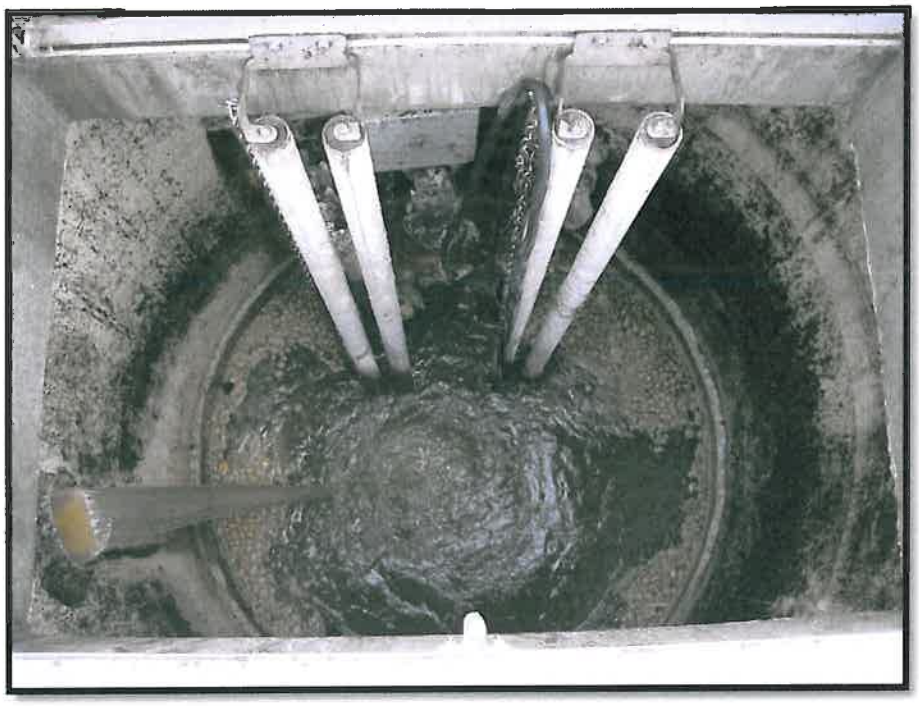

Figure 7 Lift Station

The treatment component of the system is made up of three lagoons. Cell 1 has one (1) 5 hp aerator while Cell 2 has three (3) 3 hp aerators to provide oxygen for the lagoon. The aerated lagoons shown in Figure 8 provide the treatment for the wastewater produced by the complex.

A first order kinetic model was conducted to determine the biological treatment capacity of the lagoon system. The Model uses the systems hydraulic capacity, flow, and BOD influent and effluent concentrations to determine overall BOD removal rates (k_d values). Several different empirical equations are available for modeling purpose. The Ten State Standards equation for modeling aerated treatment ponds is defined below (Ten State Standards, 2004).

$$t = \frac{E}{2.3k_1(100 - E)}$$

- t = detention time (days)
- E = percent of BOD5 to be removed in an aerated pond
- k_1 = reaction coefficient, aerated lagoon, base 10.

Influent and effluent BOD values were taken from monitoring reports required by the National Pollutant Discharge Elimination System (NPDES) permit (Jan. 2008 – Sept. 2009). The average monthly concentrations were used for the model. This load data is located in Appendix E.

Appendix F shows the first order kinetic modeling results. The average k_1 value under current average flow and BOD loading for the three ponds is 0.16. The hydraulic retention time is estimated to be 23 days using lagoon capacities provided on 1986 as-built drawings (2.81 MG)

and influent flows of (0.12 MGD). However, inconsistency of liner elevations and large sludge quantities provide additional uncertainty when calculating hydraulic retention time. The ponds process on average 251 lbs of BOD per day under average conditions. Assuming that all of the four aerators (combined 14 horsepower) are running continuously and each of the surface aerators put out 2 lbs O_2/hp-hr, aeration system typically requires 1.6 lbs of O_2 to treat 1 lbs of BOD.

Seepage testing was required to fulfill the DEQ requirements in which all lagoons need to be tested before 2014. Testing was completed and approved by DEQ in September of 2010 (see Appendix G). Cell 1 and Cell 3 passed the test however, Cell 2 failed.

DEQ recommended four options to address Cell 2. Option 1 is to repair the leak and retest for compliance, Option 2 is to re-line the lagoon and retest for compliance, option 3 is to drain the lagoon and stop using it, and option 4 is to determine the impact of the leaking lagoon on the environment based on ground water sampling and modeling based on the procedures approved by the DEQ.

Figure 8 Aerated Lagoon

After the wastewater has been treated through the treatment lagoon it is sent to a serpentine chlorination based located on the south side of the WWTF. The disinfection building and chlorine contact chamber is located in Figure 9. Disinfection is completed using a sodium hypochlorite system. Before the effluent is discharged it passes through a V notch weir which is monitored by a hydro ranger to provide effluent flow measurement.

Figure 9 Chlorination Building and Contact Chamber

Collection System

The collection system is made up of over 10,000 feet of pipe. Pipe sizes range from 4 inch to 8 inches in diameter and are made of both asbestos coated cement and PVC as repairs have been made over the last 70 years. The operations staff at CHA has access to a hydro jet unit and complete cleaning of the entire collection system quarterly to prevent the buildup of fats oils and greases (FOG) within the collection system. The buildup is typically excessive and without quarterly cleaning lines would backup regularly.

The collection system has many sections of piping with substandard diameters (4-6 inches). These pipe sections do not meet the minimum size requirements listed in Ten State Standards 33.1, "No public gravity sewer conveying raw wastewater shall be less than 8 inches in diameter."

The source of FOG is primarily from the diet of the CHA residents. Residents need to be educated on what types of waste or household items should or should not be disposed of in the sewer system and the potential consequences of doing so (i.e. clogged pipes and sewer failures). Prevention and regular maintenance would prove most beneficial to CHA regarding FOG.

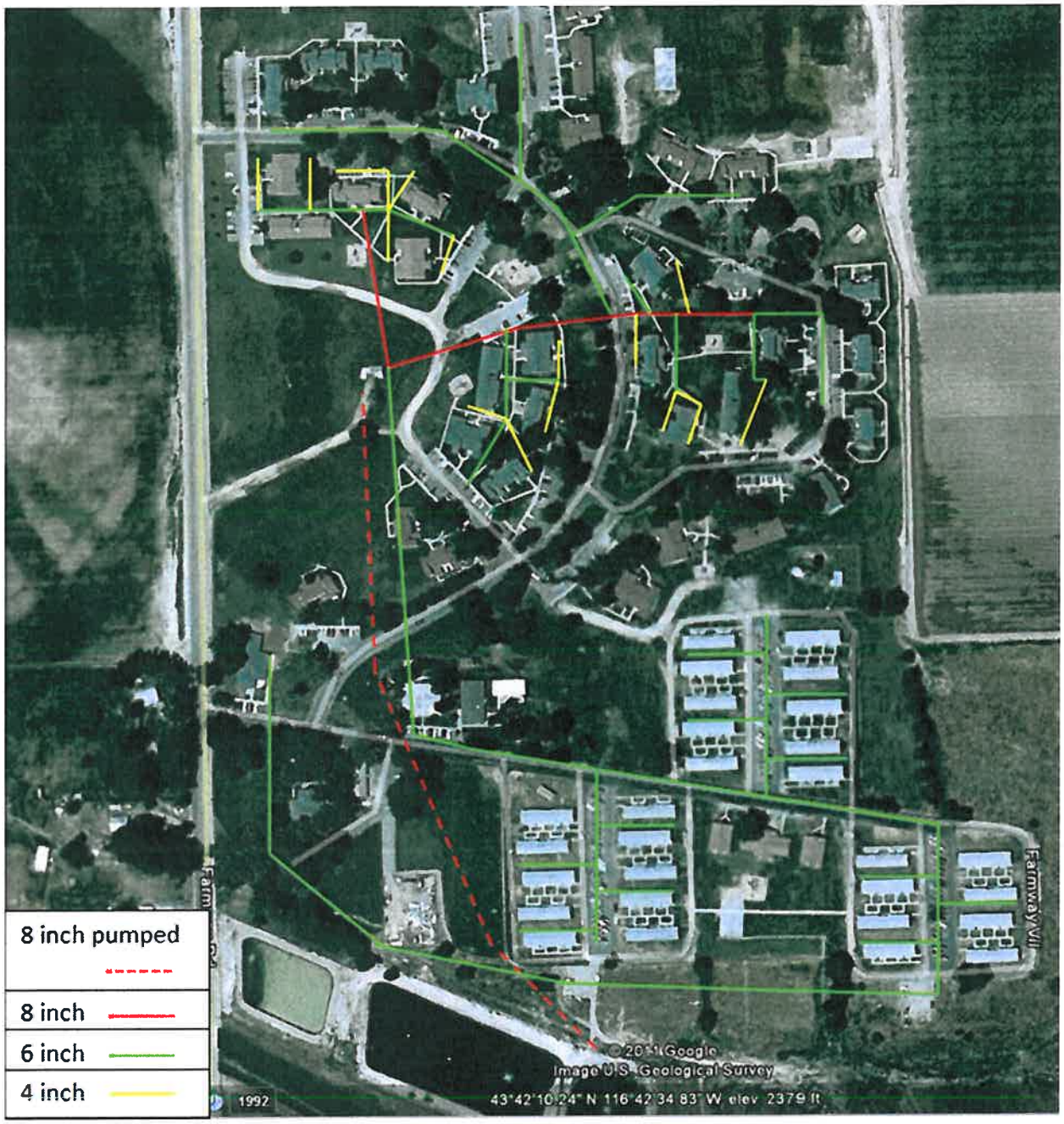

Figure 10 Collection System Map

Wastewater Flows and Loads

CHA currently has an average wastewater flow of 120,000 gpd (0.12 MGD). The average flow was calculated based on flow data compiled from January 2008 to September of 2009. The flow and load sample data is located in Appendix E.

Wastewater load data was compiled from January of 2008 to September of 2009 to provide information on the nature of typical constituents. The monthly loading averages for each of the

21 sample months is located in Appendix E and a sample of the calculated average is shown in Table 2. Based on the information in Table 2, it is assumed that the wastewater influent to the lagoon system is a medium strength municipal wastewater.

Table 2 Typical Wastewater Loading Data

Constituent	Minimum	Average	Maximum
Influent BOD (mg/L)	179.50	280.19	388.50
Effluent BOD (mg/L)	15.50	29.81	51.00
Effluent SS (mg/L)	16.00	37.64	73.50
Effluent Fecal Coliform (cfu/ 100 mL)	2.00	35.37	268.63
Total phosphorous (mg/L)	3.54	4.74	6.00
Chlorine Residual (mg/L)	0.49	1.22	1.69

NPDES Permit Limits

The NPDES permit for the CHA become effective in November 1999 and was officially expired in November of 2004. The wastewater facility is currently operating under the 1999 permit until EPA makes a determination on whether to provide a new permit. The NPDES permit is located in Appendix A and a summary is provide in Table 3.

Table 3 NPDES Effluent Limits Summary

Parameter	Average Monthly Limit	Average Weekly Limit
BOD	44 mg/L	65 mg/L
	77.3 lb/day	111.7 lb/day
TSS	70 mg/L	105 mg/L
Fecal Coliform		200/100 mL

Based on conversations with the EPA it is not anticipated that a new NPDES permit will be issued within the next few years to the CHA due to a backlog of NPDES permit applications which are marked as a higher priority to the EPA.

Infiltration and Inflow Conditions

Infiltration is groundwater that enters the system through cracks and leaks through the collection system. Inflow is storm water that enters into the sewer system from points of direct connection to the system. The infiltration and inflow into a wastewater treatment plant from high groundwater depths or storm water limits the hydraulic capacity of the treatment system and is a waste of WWTF capacity.

Effluent data was analyzed to determine if any major seasonal flows changes can been seen. Typically infiltration and inflow is the lowest in the fall and highest in the late spring when rainfall and irrigation flows are the highest. The effluent data showed minimal seasonal variance. Little seasonal variance would indicate that the WWTF is not experiencing high levels of infiltration or inflow.

It is assumed that this minimal seasonal variance is caused by several factors which include a separate storm water collection system and deep ground water (based on NRCS data).

User Chargers and Rates

Both water and sewer services are provided by the CHA to the residents. Currently water and sewer fees are not separated from the rental fees and residents pay a flat rate independent of usage. Recently the CHA has passed a resolution such that residents will be charged a separate rate for water usage but this has not been initiated at this time. A summary of the fee structure is listed in Table 1 located on page 7.

Operations and Maintenance Budget

The operations budget for the WWTF is $50,000 per year. This is collected from the users rent and pays for chemical, power, sampling, and labor costs to operate the WWTF. The maintenance budget to make repairs as needed for both the collection system and WWTF is $25,000 per year. The total operations and maintenance budget for the facility is approximately $75,000.

System Deficiencies Summary

An NPDES compliance inspection was completed in 2008 and is located in Appendix A. The inspection did not note any NPDES deficiencies. However, a summary of the WWTF deficiencies outlined by the operational staff is provided below. Each of the deficiencies within the system will need to be addressed appropriately by the alternatives described within this Plan.

- Fats, oils, and grease issues within the collection system
- System is reaching end of its design cycle
- Cell 2 failed a DEQ seepage test
- Electrical issues in the lift station
- Hydraulic issues in the lift station
- No hydraulic bypass around Cell 2

Future Conditions

Future Growth

The CHA is different from a typical municipal wastewater plant in that it does not serve a City. The only growth which can take place is controlled and implemented by the CHA. Since this facility planning document is designed to provide information over a 20 year period it is difficult to model the 2031 population using the typical population growth model techniques.

Due to the issues with the developing a reliable growth model the estimates for the future build out population is based on conversations with the housing authority staff. The current maximum population is 1,600 residents (248 units) based occupancy rates and the number of residents/unit. According to the CHA Director, it is predicted that future growth may add an additional 60 units over the next twenty years. Assuming each unit holds 4 new residents, the additional residents will total 240 people.

To account for any additional units or increased growth which is not anticipated this report uses a 10 percent factor of safety to leave the final estimate at 2,000 residents. Table 4 summarizes the population estimates developed within this Plan.

Table 4 Population Estimates

Parameter	Population (residents)
Current Population. (2011)	1,600
Future Population. (2031)	1,840
Future Population. (2031) w/ additional 10%	2,000

Future Flows and Loads

The design flows for the future conditions were estimated from the population estimate of 2,000 future residents with an average influent flow of 100 gallons per capita day (gpcd). The peak hourly flow rate was calculated from the 10 State Standard method using the following equation:

$$\frac{Q\ peak\ Hourly}{Q\ Design\ Ave} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

- P = population in thousands

The peaking factor based on this equation and a population of 2,000 residents is 3.586.The estimated flows based upon the build out population total, assumed 100 gpcd wastewater values, and the peak hour design value developed from the above equation are provided below in Table 5.

Table 5 2009 & 2031 Estimated Flows

Parameter	Flow (gpd)	Flow (gpm)
2009 Current		
Average Daily Flow	120,000	84
Peak Hour Flow*	439,200	305
2031 Future		
Average Daily Flow	200,000	139
Peak Hour Flow*	717,200	498

*2009 peaking factor of 3.66, 2031 peaking factor of 3.586

After the population and flows were developed the estimated future loads were calculated. The future loads were developed from the average of typical medium strength wastewater values and typical high strength wastewater values found in Metcalf and Eddy (Wastewater Engineering Treatment and Reuse, 2003). This strategy was implemented for the CHA load development based on influent BOD data recorded by the CHA between January 2008 and September of 2009. The average influent BOD during this period was 280 mg/L which was close to the average between the medium and high strength wastewater numbers found in the text.

The calculated values are shown in Table 6 below.

Table 6 2031 Estimated Loads

Constituent	mg/L	lbs/day
BOD (mg/L)	280	467
TSS (mg/L)	305	509
NH3 as N (mg/L)	35	58
TP (mg/L)	9.5	16
TKN (mg/L)	55	92

A first order kinetic model was completed to determine the biological treatment capacity of the lagoon system under future conditions. The model uses the systems hydraulic capacity, flow, and BOD influent and effluent concentrations to determine overall BOD removal rates (k_d values). Several different empirical equations are available for modeling purpose. The Ten State Standards equation for modeling aerated treatment ponds is defined below.

$$t = \frac{E}{2.3k_1(100 - E)}$$

- t = detention time (days)
- E = percent of BOD5 to be removed in an aerated pond
- k_1 = reaction coefficient, aerated lagoon, base 10.

Appendix F shows the first order kinetic modeling results under the future conditions. The average k_1 value under normal flow and BOD loading for the three ponds is 0.26. The hydraulic retention time is estimated to be 14.1 days using lagoon capacities provided on 1986 as-built drawings (2.81 MG) and influent flows of (0.20 MGD). However, inconsistency of liner elevations and large sludge quantities provide additional uncertainty when calculating hydraulic retention time.

The ponds are estimated to process 417 lbs of BOD per day under average conditions. Assuming that all of the four aerators (combined 14 horsepower) are running continuously and each of the surface aerators put out 2 lbs O_2/hp-hr, the lagoons are capable of meeting the future BOD demands under the current permit conditions. The current aerators are capable of producing and transferring to the lagoon system 672 lbs of O_2 per day.

Development and Screening of Alternatives

System Deficiencies Summary

A summary of the deficiencies outlined in the existing system section is provided below. Each of the deficiencies within the system will need to be addressed appropriately by the alternatives described within this Plan.

- Fats, oils, and grease issues within the collection system
- Cell 2 failed a DEQ seepage test
- Electrical issues in the lift station
- Hydraulic issues in the lift station
- No hydraulic bypass around Cell 2

Another issue which is related to system deficiencies is the anticipated future limits for nutrients. The major nutrients that are found in municipal wastewater are nitrogen and phosphorous. The EPA has been requiring state regulatory agencies to develop total maximum daily load limits for specific water bodies. One of these water bodies has been the Boise River which is the final discharge point for the Sebree Canal.

It is anticipated that future nitrogen limits will be much lower (based on the City of Kuna's current permit) and will likely be limited to an average monthly limit of approximately 2 mg/L. This limit will not be possible to meet with the current lagoon system and will require a conventional mechanical plant to consistently meet.

Besides nitrogen, the other important nutrient in municipal wastewater is phosphorous. Future total phosphorous levels will be limited to 0.07 mg/L also based on the City of Kuna's current permit.

While the information about future nutrient levels is not currently an issue for the CHA WWTF it is important to account for the anticipated future treatment levels which will be required of the CHA.

The Farmers Cooperative has had discussions with the CHA to present its concerns with the CHA discharging wastewater into the Sebree Canal. The CHA is authorized by the EPA to discharge into the canal and the Farmers Cooperative concerns will need to be addressed by the EPA. However, it is recommended that the Cooperative's concerns be given the appropriate weight during the selection process.

Sludge Handling and Disposal

If the recommended alternative includes the abandonment or rehabilitation of the solids accumulated in the wastewater ponds, the removal and disposal must meet both State and Federal regulations. The solids can be incinerated, landfilled, or reused as a soil amendment. Since CHA is surrounded by agricultural land, land application will be the most cost effective. Per IDAPA 58.01.16, Section 650, requires soil augmentation to be done in accordance with the

sludge disposal plan.

IDAPA 58.01.16.650 regulates the use of sludge for soil augmentation and requires a DEQ-approved sludge disposal plan—a biosolids management plan. IDAPA 58.01.17, "Recycled Water Rules" authorizes DEQ to permit biosolids land application sites. In most situations, a permit is not necessary as long as IDAPA 58.01.16.650 is followed. DEQ reserves the right to require a permit under IDAPA 58.01.17 on a case-by-case basis. The sludge disposal will also need to be coordinated and approved by the EPA by at a minimum submitting EPA Form 3510-2S and corresponding documentation per 40 CFR Part 503. CHA can refer to the Draft *Guidance for Land Application of Municipal Biosolids* for assistance in the disposal process.

Development of Alternatives

Five alternatives were developed no action, improve current facilities, regionalize the treatment facility and send the water to city of Caldwell, build storage lagoon for the winter and land apply during the growing season and discharge during winter months and land apply during the growing season.

Collection System

Each of the following alternatives will need to account for the collection system. The collection system is made up of over 10,000 feet of pipe with sizes that range from 4 inch to 8 inches in diameter and are made of both asbestos coated cement and PVC. Alternatives should also account for the WWTF staff work to complete cleaning of the entire collection system quarterly to prevent the buildup of fats oils and greases within the collection system.

To help with the grease collection system it may be beneficial to add grease traps throughout the system to capture grease before it is able to reach the collection system.

The CHA staff indicated that a pipe located within the wet well was an overflow pipe. However, standard engineering practice would not provide an overflow on a lift station. If a gravity overflow line is possible than a pump station would not be required and the additional costs of redundant pumps and backup power would not be needed.

Based on this information Pharmer Engineering completed a survey on the pump discharge line leading from the wet well to determine if a gravity overflow was possible. A Survey of the discharge line at the wet well to the manhole before the influent Parshall flume is shown below in Figure 10.

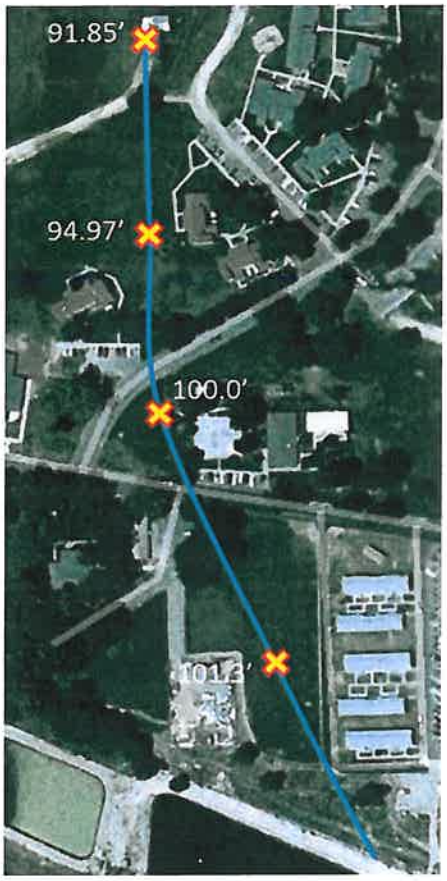

Figure 10 Wet Well Discharge Survey

Based on the survey data shown in Figure 10 there is a 9.45 foot rise from the discharge pipeline with the wet well and the manhole located before the Parshall flume. Based on this information an overflow pipe from the wet well is not feasible. The line which was described as an overflow line is a bypass to allow the wet well to be pumped for cleaning and maintenance purposes. Therefore any alternatives which retain the use of the wet well will need to provide backup power to prevent overflow of wastewater in the case of a power outage.

Emergency Operation

IDAPA 58.01.16 are the state rules which govern the operation and design of wastewater treatment plants within the State and section 07 specifically covers the requirements of emergency operation. The objective of the requirements is to prevent the unintended discharge of raw or partially treated wastewater to any water or land surface. This requires that either a gravity overflow or emergency backup power be present to prevent unintended discharges.

Based on the information provided in system deficiencies summary the current head works and lift station does not have available backup power and due to the hydraulic grade of the system a gravity overflow system is not feasible. To eliminate this issue and prevent further complications due to power failures each of the provided alternatives except the no action alternative fully

complies with Section 07 requirements.

Alternative 1.No Action Alternative

The no action alternative is required as part of the facility planning process. It involves developing an alternative in which the WWTF would not make any changes and would look to operate the plant under the current conditions.

The WWTF has several issues which have been previously discussed which adversely affect daily operations. These include no available backup power for the head works and wet well pumps. During power outages raw wastewater floods the wet well and overflows onto the surface. This is a public health concern and the area must be dosed with lime. If no action alternative is selected this will continue to be an issue for WWTF staff.

In addition to the absence of standby power, there is no bypass available around Cell 2. During September of 2009 Cell 2 overflowed and almost had a catastrophic failure. As no bypass was available wastewater could not be diverted around Cell 2 to provide additional aid during the crisis.

As noted, the existing wastewater facility treatment Cell 2 is currently leaking and does not meet DEQ seepage limits. In addition, the facilities NPDES permit is currently under review by the EPA and the future discharge requirements are not known. If the future requirements are more stringent than the current levels the plant will not be able to operate within the permit limits. Due to both of these concerns, a "No Action" alternative is not an available solution for the CHA.

Alternative 2. Maintain Current Discharge and Upgrade Plant

Alternative 2 is to upgrade the current treatment facilities and retain the NPDES permit to continue to discharge into Sebree Canal. NPDES permits are difficult to obtain and when a facility has a previous permit they are a valuable asset to the facility and offer flexibility in design alternatives.

The CHA has submitted an application for renewal of its NPDES permit on July 22nd, 2004 and is currently operating under an administratively extended permit. This allows the CHA WWTF to continue to discharge and operate under the 1999 permit conditions. The EPA permit priority list for 2010 to 2012 lists the permits which are priorities for the EPA to complete. The CHA permit is not on the priority list and it is assumed that the permit will not be reviewed in the near future. The permit priority list is located in Appendix A.

Under these conditions this alternative should proceed in two separate phases. Phase 1 would improve the WWTF with the current permit as the discharge basis and the improvements should focus on meeting the system deficiencies defined in the previous section. Phase 2 will then be used to upgrade the plant again to meet the anticipated new loading limits which could be part of the new permit. For this planning document phase 1 will be detailed and used for the cost estimate comparisons. The phase two concept will be discussed and the pros and cons for the

plan will be listed to provide a basis for future design.

Implementation of phase 1 will eliminate the current deficiencies at the plant and provide additional resources to facilitate maintenance and provide additional capacity to meet the future design flow and loads under the current permit limits. The current head works and pump station will be retained but improved. The current coarse screened used at the WWTF will be rehabilitated and hot water will be made available to aid in cleaning any FOG which may cause clogging of the screen. Underground power will be provide from the roadway and the over head power lines shown in Figure 11 will be eliminated. Underground power was requested by CHA staff to make field maintenance easier and provide more usable space for CHA residences.

Figure 11 Overhead power lines

In addition to removing the overhead power lines a backup generator will be provided. The generator should be designed to operate the wet well pumps, lagoon aerators, and disinfection equipment to provide full redundancy in case of a power grid failure.

The wet well pumps transfer the raw screened wastewater to the lagoon system. The current pumps are sized for 110 gpm at 5 ft of total dynamic head. These pumps will not be able to provide adequate flow at the future conditions and do not meet the current estimated peak hour flow or the redundancy requirements listed in IDAPA. Pumps will be installed to meet current wastewater flows shown in Table 5. As additional apartments units are constructed larger pumps can be installed in place of the smaller pumps to meet the estimated future demand also shown in Table 5.

The new pumps can be configured in multiple ways to meet flow, head, and redundancy requirements. Pump station design will also need to account for current average and peak demands, pump start and stop cycling, and the capacity to meet estimated future average and peak demands. For the basis of the cost estimate for this alternative it is assumed that three (3) pumps would be used to meet the future demands of the system.

A concrete Parshall flume which is currently installed at the head of the lagoon facilities will be eliminated and a valve box with 8 inch magnetic flow meter will be installed in its place. The elimination of the old Parshall flume will improve influent flow measurement. It will eliminate the Parshall flume which is made of concrete and has been in place for over twenty years. The Flume may have settled over this time period and the surface has also weathered. Both of these factors can negatively impact the accuracy of the flume. In addition to the physical condition of the flume it has been reported by CHA staff that children from the community have been known to throw rocks into the flume. The installation of a flow meter eliminates all of these issues. In addition to the elimination of the Parshall flume the current cover and electrical control system for the aerators will be removed from the current electrical shelter is shown below in Figure 12 and installed within a new electrical building located onsite.

Figure 12 Electrical cover

The new electrical building will house the electrical equipment for the aerators and be the location which houses the new SCADA system for the WWTF. The SCADA system will provide additional control for the WWTF operators to optimize the operation of the plant. Through the SCADA system the staff will be able to control any VFDs on the pump motors and determine the correct amount of aeration in the lagoons to meet the oxygen demands of the treatment lagoons. The new SCADA system will also provide an alarm system which will alert staff to problems within the WWTF such as pump failures, power outages, and flow surges. An additional benefit of advanced facility controls is the energy savings which can be converted to user rate savings.

After the electrical system improvements the current lagoons will also need to be updated and improved. The aerators currently installed will be replaced with updated but similar models. No additional oxygen is required to meet the future design loads however, current aerators in are in need of replacement due to normal wear.

The lagoons themselves also need to be dredged and relined. At this time Cell 2 has failed a leak test and does not meet the current DEQ seepage requirements so the liner will need to be replaced. The lagoon dredging process could damage the current liners and it is therefore recommended that all of the lagoons be relined. Besides relining the lagoons the southern slope

of the lagoon facility should be improved to add additional erosion control and stability to the facility.

Another plant deficiency which needs to be addressed is the lack of a bypass around Cell 2. This alternative recommends that a new 8 inch line be installed in addition to a valve box to provide a route from Cell 1 to Cell 3.

The final aspects of the phase 1 improvements are the upgrades to the chlorine disinfection building and contact chamber. The chlorine disinfection system will be integrated with the new SCADA system to provide easier monitoring for the WWTF staff and the current hydro ranger will be replaced. A new roof will be added to the chlorine contact chamber. Currently the chamber is uncovered which allows windblown debris to settle and clog the structure.

The phase 1 improvements will provide the CHA with improved modern facilities which will improve efficiency while providing redundancy. All of the upgrades and improvements provide solutions to the current facility deficiencies and would provide adequate treatment for the wastewater under the current permit conditions.

Although the phase 1 improvements will meet the current permit limits under future influent conditions it is anticipated that the future permit conditions will be more stringent. Based on current permit limits from discharges such as the City of Kuna it is anticipated that future nutrient limits will be extremely low. Nitrogen limits will be limited to 2 mg/L or less while total phosphorous will be as low as 0.07 mg/L. Under these conditions a lagoon treatment system will not be able to reach these discharge limits. To account for these extremely low limits it is recommended that under phase 2 a new membrane bioreactor (MBR) plant be constructed.

The MBR system combines a bioreactor and microfiltration into one step which replaces a secondary clarifier and allows the system to operate a higher mixed liquor suspended solids (MLSS) concentration in the bioreactor. A higher MLSS concentration allows higher loading rates which limits the foot print of the bioreactor and the longer sludge retention times reduces sludge production. Although MBR systems have many benefits they do have some disadvantages which include higher energy costs, increased operator training requirements, high capital costs, and higher maintenance costs to replace and maintain the membrane systems.

Typically, submerged membrane systems are utilized in wastewater treatment as they are more robust than pressure membrane units. Membranes filters are a thin layer of material capable of separating substances due to a driving force generated either by a pump "pushing" or "pulling" water across the membranes. Membrane filters are commonly employed for removal of bacteria and other microorganisms, particulate matter and natural organic matter (NOM).

Membrane filters are classified in three main categories based on the pore size of the membranes. These categories are Microfiltration (MF) pore size: 0.03 to 10 microns, Ultrafiltration (UF) pore size: 0.002 to 0.1 microns and Nanofiltration (NF) pore size: 0.001 to 0.008 microns. Membrane filtration in either the MF or UF pore size range is most commonly used for wastewater treatment. Nanofiltration is not as commonly used for typical filtration needs, due to the higher operating pressures required to drive water through the narrow pores.

Membranes are incredibly robust and they are also designed in a modular configuration. This

makes them easy to expand if future water demands change. Maintenance for membranes is typically automated and is comprised of air scouring, backwashing and chemical addition. Air scouring and backwashing are used to remove particles which begin to coat the membranes and reduce to trans-membrane pressure.

To clean the membranes air scouring or backwashing are typically used. If this treatment is not sufficient, chemicals can be added to remove any buildup on the membranes. Although membrane maintenance is very similar to other filter technology, membranes do require additional operator training.

Chemical precipitation of phosphorous can provide very consistent removal however the chemical volumes increase dramatically as the effluent limit is lowered. In a typically municipal wastewater the influent concentration is approximately 8 mg/L and jar testing is typically used to determine which chemical agent will precipitate the phosphorous most efficiently for each facilities unique wastewater. To reduce the concentration from 8 mg/L to approximately 1 mg/L requires a ratio of 1.5:1 as parts chemical precipitant to parts phosphorous. However, to treat that same wastewater from 1 mg/L to .0.4 mg/L will require a ratio of approximately 3:1. To consistently reach even lower phosphorous limits from 0.4 to 0.07 will require a ratio of 7: 1.

The MBR plant would require the elimination of the current lagoon system and would be a large investment for the CHA. In addition to the MBR system phase 2 would also require the construction of the necessary facilities to remove total phosphorous from the system through chemical precipitation. As discussed in previous section phosphorus removal to extremely low levels would be costly.

Alternative 3. Connection to Caldwell Sewer System

Alternative 3 is to regionalize the treatment capacity of the WWTF and transfer all of the wastewater to the City of Caldwell. This can be completed by adding a gravity sewer line from the WWTF to a pump station which would then pump the wastewater to manhole within the Caldwell collection system.

This alternative would eliminate the WWTF lagoons, head works, and wet well. It would also help ease demands on current CHA operational staff. Since additional maintenance and monitoring would not be required CHA staff would be able to address the needs associated with managing the CHA more quickly. It is anticipated that the collection system and new pump house would be maintained and operated by the City of Caldwell.

A preliminary forcemain alignment is located below in Figure 13.

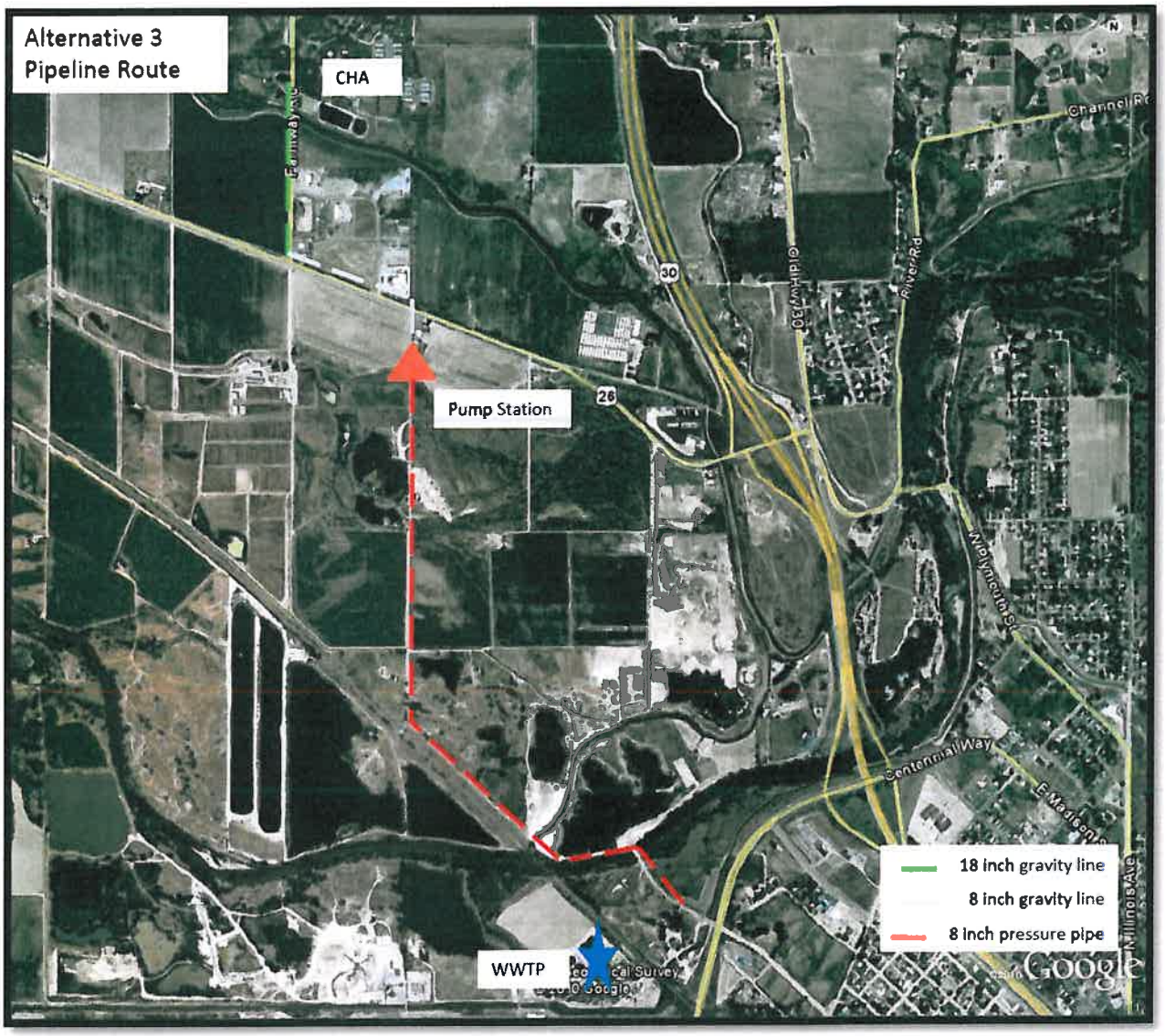

Figure 13 Preliminary Pipeline Route

The preliminary pipeline route would traverse from the current head works building at the CHA and connect into an 18 inch gravity sewer line. An 18 inch line was chosen for the section of pipeline based on the City of Caldwell 2008 North Area Master Plan. The Master Plan details that the line along Farm Way Road will eventually be an 18 inch gravity line. If the CHA implements this plan and up sizes the line, they are eligible to be reimbursed for the additional cost of the pipe material and would be helping to regionalize the area and provide future infrastructure for the City of Caldwell. The 18 inch line will be installed until Hwy 20/26 at which point it will downsize into an 8 inch gravity line leading to a wet well pump station.

The installation of the larger 18 inch line will allow the CHA to be reimbursed for material costs for the additional pipe diameters over a 20 year period if more growth is experienced. However, if additional growth does not take place the CHA will not be reimbursed for the additional pipe material costs.

The preliminary location of the pump station is on state property on Pond Road. The pump station would be a submersible station with three (3) pumps to provide redundancy and the needed capacity for both the average and peak hour flows. The pumps to be initially installed would be designed around the current flow demands shown in Table 5. If additional apartments are constructed large pumps can be purchased and installed within the wet well to meet future flow estimates in Table 5. The wet well would be designed to function under both current and future flow conditions. The pump station would also require backup power. After the pump station would be last section of the pipeline which will be an 8 inch forcemain line to a manhole of the Caldwell Collection system.

Using the preliminary forcemain alignment in Figure 13, the estimated future liftstation design conditions are listed in Table 7. The pump sizing calculations used to develop this table are located in Appendix F.

Table 7 Assumed and Calculated Parameters for the Lift Station

8 inch Pressure Pipeline Parameters		2031 Average Flow	2031 Peak Hour Flow
Flow (0.2 MGD)		139 gpm	498 gpm
Pipe Diameter (SDR 17)	7.570-inch		
Peaking Factor	3.6		
Velocity		1.0 fps	3.6 fps
Static Lift	20		
Hazen Williams Coefficient*	120		
Pipe Length	9,125 ft		
Friction Loss		7 ft (3 psi)	71 ft (31 psi)
Local Losses*	10 ft (4.3 psi)		
Pump TDH		37 ft (16 psi)	101 ft (44 psi)
Pump Efficiency*	50%		
Motor Efficiency*	91%		
VFD / Starter Efficiency*	97%		
Break Horsepower		2.6 BHP	25.2 BHP
Total Input Power		3 BHP	28 BHP

*Assumed values

Per IDAPA 58.01.16.440.02.e.i, the pump units shall have the capacity to handle the design peak hour flow. Table 8 shows the velocities and horsepower requirements for an 8-inch HDPE SDR 17 pipe at the average flow and peak hour flow.

In addition to the design of the lift station and pipeline it will be important to look at the additional costs including hookup fees which may be required by the City of Caldwell before the CHA can begin implementing this alternative.

Alternative 4. Class C Reuse on Adjacent Farm Land with Winter Storage

Alternative 4 is to make the improvements discussed in Alternative 2 but instead of discharging the treated wastewater to the Sebree Canal the water would be stored and later land applied to eliminate discharging. In the future as water prices increase it will be beneficial to have a ready source of irrigation water. Land application of wastewater is a natural way of recycling by which wastewater is applied to land for irrigation and is absorbed by the crop or assimilated into the soil structure.

If adjacent farmland was used as the site for application Class C wastewater could be used. Class C water requires only disinfection with total coliform levels of less than 23 / 100 mL. This level of treatment could be met with the current treatment technology.

The treated effluent can be reused during a 7 month growing season (April – October). Effluent must be stored during the five month, non-growing season (November – March). As a result, the land application site and the irrigation system must be capable of properly distributing and treating the stored wastewater plus all of the effluent during the growing season (GS). The total volume of water produced by the CHA under future average flow conditions is estimated at 72 million gallons per year. Any crop grown on the site will need to be harvested from the reuse site and selected crops must be capable of extracting constituents to protect groundwater sources.

Typically alfalfa is used because of its high water demand and ability to remove large amounts of phosphorus and nitrogen from the soil. Alfalfa will effectively use 49.2 inches of water / GS. Effective precipitation averages 10.5 inches of water / GS. The resulting difference is 38.7 inches of water / GS, which can be provided by the treated effluent. Data on the alfalfa water requirements was taken from evapotranspiration data provided by the University of Idaho Kimberly Research and Extension Center. Assuming an irrigation system has an efficiency of 65% (hand lines / wheel lines), 59.6 inches of treated effluent / GS can be applied. Assuming the application of 59.6 inches and a reuse water volume of 72 million gallons, the land requirement for the hydraulic loading is 45 acres (no buffer included).

The reuse wastewater must not overwhelm the site with constituents that cannot be readily assimilated by the crop or soil structure. Alfalfa will remove 50.4 lbs N / harvested ton and 4.72 lbs P / harvested ton. Alfalfa production will vary by location, management practices, seeding time. The estimated values shown in Table 8 assume a harvest of 6 tons / acre which would be representative of a well managed field that has been replanted within the last few years.

Table 8 Land Needed for Alt 4. Constituent Loading

	Nitrogen
Average Loading from effluent*	9,666 lbs/year
Calculated Constituent Uptake*	13,465 lbs/year
Uptake – Applied Loading	3,798 lbs/year
Additional Irrigable Acreage Required for Constituent Loading	0 acres

*Assuming an applied volume of 72MG and 6 tons/acre harvested (45 acres) and 100% crop consumption.

As seen in Table 8, additional acreage is not needed to treat nitrogen. However, a baseline soil analysis of any future land application site will better determine the land requirements for proper disposal of any constituent that could possibly degrade surface or ground water. The calculations used to develop Table 8 are located in Appendix H.

This area does not include buffer distances with are required by the IDEQ. Required buffer distances are as follows:

- Public water supply wells 1,000 ft
- Private potable water wells 500 ft
- Residential dwellings 300 ft
- Permanent or intermittent surface water 100 ft
- Irrigation canals or ditches 50 ft

Alternative 4 will eliminate the current deficiencies at the plant and provide additional resources to aid in maintenance provide the needed hydraulic and load capacity to meet the future design flow and loads. This alternative will also require the CHA to obtain a Land Application Permit through the DEQ. It will also eliminate the need for an NPDES permit through the EPA.

The current head works and pump station will be retained but improved. The current coarse screened used at the WWTF will be rehabilitated and hot water will be made available to aid in cleaning any FOG which may cause clogging of the screen. Underground power will be provide from the roadway and the over head power lines will be eliminated.

In addition to removing the overhead power lines a backup generator will be provided. The generator should be designed to operate the wet well pumps, lagoon aerators, disinfection equipment, and reuse water booster pumps to provide full redundancy in case of a power grid failure.

As with alternative 2, the wet well pumps are currently undersized to meet future demands and lack adequate equipment redundancy and backup power. This option will replace the pumps with new equipment and provide a wet well sized to meet peak hour and average day demands. The pumps will initially be sized to meet current flow demands. In the future if flows increase larger pumps will be purchased and installed to meet future flows. Current and future design flows are located in Table 5. For the cost estimates associated with this alternative it is assumed three pumps will be installed under future demand sizing conditions.

The Parshall flume which is currently installed at the head of the lagoon facilities will be eliminated and a valve box with 8 inch magnetic flow meter will be installed in its place. Additionally, the current cover and electrical control system for the aerators will be removed and housed inside a new electrical building.

The new electrical building will house the electrical equipment for the aerators and be the location which houses the new SCADA system for the WWTF. The SCADA system will provide additional control for the WWTF operators to optimize the operation of the plant. Through the SCADA system the staff will be able to control the VFD on the pump motors and determine the correct amount of aeration in the lagoons to meet the current oxygen demands of the treatment lagoons. An additional benefit of advanced facility controls is the additional energy savings which can be converted to user rate savings.

After the electrical system improvements the current lagoons will also need to be updated and improved. The aerators currently installed will be replaced with updated but similar models. No additional oxygen is required to meet the future design loads however, current aerators in are in need or replacement due to normal wear. The lagoons themselves also need to be dredged and relined. At this time Cell 2 has failed a leak test and does not meet the current DEQ seepage requirements so the liner will need to be replaced. The lagoon dredging process could damage the current liners and it is therefore recommended that all of the lagoons be relined. Besides relining the lagoons, the southern slope of the lagoon facility should be improved to add additional erosion control and stability to the facility.

Another plant deficiency which needs to be addressed is the lack of a bypass around Cell 2. This alternative recommends that a new 8 inch line be installed in addition to a valve box to provide a route from Cell 1 to Cell 3.

Chlorine will be required to disinfect the treated effluent for reuse. Downstream of the chlorine building, a pump station would be added to move the water from the end of the treatment system to the new storage lagoon. In addition to this pump station an additional pump station will be required to pump the water from the storage lagoon to the land application site.

The treated effluent will need to be stored during the 5 month non-growing season (NGS). At an average flow rate of 200,000 gpd, a storage lagoon of 30.0 million gallons would be necessary. The figure below shows an approximate location of the storage lagoon. Calculation used to determine the details of the storage lagoon are located in Appendix H. A possible location for the storage lagoon is shown in Figure 14.

Figure 14 Storage Lagoon Location

Alternative 5. Class C Reuse (Summer) with Winter Discharge

The final alternative presented within this document is to land apply the wastewater during the growing season but instead of storing the water during the winter within a 30 million gallon lagoon, the CHA will continue to use the NPDES permit and discharge within the winter when nutrient loading requirements are less stringent.

With alternative 5 the current head works and pump station will be retained but improved. The current coarse screened used at the WWTF will be rehabilitated and hot water will be made available to aid in cleaning any FOG which may cause clogging of the screen. Underground power will be provide from the roadway and the over head power lines will be eliminated.

In addition to removing the overhead power lines a backup generator will be provided. The generator should be designed to operate the wet well pumps, lagoon aerators, and disinfection equipment to provide full redundancy in case of a power grid failure.

The wet well pumps transfer the raw screened wastewater to the lagoon system. This alternative would follow a similar design basis as alternative 2, 3, and 4. The wet well pumps will be initially sized under current flow conditions in Table 5. As additional housing units are added to the CHA the pumps will be removed and replaced with larger pumps which meet the future flow requirements also listed in Table 5.

The Parshall flume which is currently installed at the head of the lagoon facilities will be eliminated and a valve box with 8 inch magnetic flow meter will be installed in its place. In addition to the elimination of the Parshall flume the current cover and electrical control system for the aerators will be installed within a new electrical building.

The new electrical building will house the electrical equipment for the aerators and be the location which houses the new SCADA system for the WWTF. The new SCADA system will provide additional control for the WWTF operators to optimize the operation of the plant. Through the SCADA system the staff will be able to control the VFD on the pump motors and determine the correct amount of aeration in the lagoons to meet the current oxygen demands of the treatment lagoons. An additional benefit of advanced facility controls is the additional energy savings which can be converted to user rate savings.

After the electrical system improvements the current lagoons will also need to be updated and improved. The aerators currently installed will be replaced with updated but similar models. No additional oxygen is required to meet the future design loads however, current aerators in are in need or replacement due to normal wear. The lagoons themselves also need to be dredged and relined. At this time Cell 2 has failed a leak test and does not meet the current DEQ seepage requirements so the liner will need to be replaced. The lagoon dredging process could damage the current liners and it is therefore recommended that all of the lagoons be relined. Besides relining the lagoons the southern slope of the lagoon facility should be improved to add additional erosion control and stability to the facility.

Another plant deficiency which needs to be addressed is the lack of a bypass around Cell 2. This alternative recommends that a new 8 inch line be installed in addition to a valve box to provide a

route from Cell 1 to Cell 3.

Under alternative 5 a new booster station and chlorine disinfection building will be constructed. The current transfer structure will be retained and used to gravity flow the treated wastewater from cell three to a sump located under the new building. This will allow the CHA staff to divert the wastewater to either booster pumps for the reuse water irrigation system during the summer months or to the covered existing chlorine contact chamber to be discharged into the Sebree canal.

Using similar calculations developed in the previous section and assuming the application limit of 59.6 inches and a reuse water volume of 42 million gallons, the land requirement for the hydraulic loading is 26 acres (no buffer included).

The reuse wastewater must not overwhelm the site with constituents that cannot be readily assimilated by the crop or soil structure. Alfalfa will remove 50.4 lbs N / harvested ton and 4.72 lbs P / harvested ton. Alfalfa production will vary by location, management practices, seeding time etc. These calculations assumed 6 tons / acre which would be representative of a well managed field that has been replanted within the last few years.

Table 9 Land Needed for Alt 5. Constituent Loading

	Nitrogen
Average Loading from effluent*	5,639 lbs/year
Calculated Constituent Uptake*	7,854 lbs/year
Uptake – Applied Loading	2,216 lbs/year
Additional Irrigable Acreage Required for Constituent Loading	0 acres

* Assuming an applied volume of 42MG and 6 tons/acre harvested (26 acres) and 100% crop consumption.

As seen in Table 9, additional acreage is not needed to treat the nitrogen. Appendix H shows the calculation process to size the reuse site.

This area does not include buffer distances with are required by the IDEQ. Required buffer distances were discussed in the previous section and are restated below:

- Public water supply wells 1,000 ft
- Private potable water wells 500 ft
- Residential dwellings 300 ft
- Permanent or intermittent surface water 100 ft
- Irrigation canals or ditches 50 ft

This alternative does offer the CHA great flexibility however; it will also require additional management and monitoring to meet the requirements of both the land application permit through the DEQ and the NPDES permit through EPA region 10.

Final Screening of Alternatives

The previous section defined 5 different alternatives which can be used to meet the future requirements of the CHA. These included Alternate 1 No Action, Alternative 2 Maintain current discharge and upgrade the plant, Alternative 3 Connect to the City of Caldwell, Alternative 4 Land Apply with Winter Storage, and Alternative 5 Land Apply with Winter Discharge. Each of these alternatives will be discussed in the following section to identify the alternative that best meets the future needs of the CHA.

Each of the selected alternatives will improve the reliability of the system. All the alternatives provide backup power for the electrical systems in case of power loss and all of the alternatives which continue to maintain the lagoons provide for a new bypass line around Cell 2.

Energy use is also an important parameter to compare between the alternatives. All of the highlighted alternatives require larger pumps than are currently operated. In addition, Alternatives 4 and 5 require additional pumps to transfer treated wastewater and land apply. Alternative 2 has a low initial energy usage, however, as phase 2 is considered the addition of an MBR system and the additional chemical energy costs to remove phosphorous will have a major impact on future energy requirements. Alternative 3 has the lowest long term energy costs because if the CHA plans on giving or selling the pump station to the City of Caldwell no additional costs will be passed on to the CHA.

Feasibility of the project to proceed is another parameter to discuss. Each alternative can be completed by the CHA. However, alternatives 2 and 4 have issues which make them less feasible over the life of the project. Alternative 2 requires the construction of a MBR plant if NPDES permit limits decrease significantly and Alternative 4 requires the construction of a 30 million gallon storage lagoon and close to 80 acres of land for irrigation.

Evaluation of Costs

The costs associated with each of the alternatives are summarized below. Alternative 2 costs only represent the costs associated with upgrading the plant to meet the phase 1 objectives. Alternative 3 also assumes a $245,000 hookup fee from the City of Caldwell to connect to the City. Alternatives 4 and 5 assume that the land required to irrigate does not need to be purchased and can be addressed through agreements with local farmers.

O&M costs represent the total present worth of the annual O&M values based on a 4% interest rate over 20 years. Alternative 3 assumes that the CHA will be maintaining the new pump station.

A breakdown of the cost estimates used to develop Table 10 is located in Appendix I.

Table 10 Summary of Costs

Alternative	Description	Capital Cost	Present Worth O&M Costs	Total Present Worth
1	No action	$0	$1,019,250	$1,019,250
2	Plant upgrades	$2,111,497	$1,329,654	$3,441,151
3	Connect to Caldwell	$2,770,283	$509,740	$3,280,023
4	Land apply w/ storage	$5,564,310	$1,526,231	$7,090,541
5	Land apply w/ winter discharge	$2,695,146	$1,509,034	$4,204,180

Based on the Table 10 Alternative 3 is the low cost alternative for the CHA based on a total present worth value excluding Alternative 1. Alternative 4 is the high cost alternative based on the combined costs of making improvements to the plant in addition to construction of a new storage lagoon.

Public Input

Public hearings are required before an alternative can be selected. The hearing must meet DEQ guidelines such as providing notice to the community before the meeting and accepting comments for at least 30 days after the initial meeting before an alternative can officially be selected. At this time two meetings have been held for the CHA governing body to explain the alternative discussed in this document. One was held on April 21st 2011, and another was held on June 28th 2011. These meetings were held with the CHA governing body and used as workshops to discuss the development of the facility plan. However, the public hearing to explain the alternatives in fulfillment of DEQ requirements has currently not been held.

A public meeting will be held after the draft facility plan has been approved for public comment by the Department of Environmental Quality. This section will be updated with the details of the public comment period including questions, answers, and present parties, before the final submittal of the Plan.

Recommended Plan Description and Implementation

It is recommended that Alternative 3 be the selected by the CHA. Alternative 3 regionalizes the treatment system with the City of Caldwell. It addresses the Farmers Cooperatives concerns with the discharge into the Canal. This alternative also is the lowest cost alternative and allows CHA to regionalize its treatment process with the City of Caldwell. Regionalization will eliminate a point source discharger and will provide additional infrastructure for future growth in the area.

Alternative 3 is designed to regionalize the treatment capacity of the WWTF and transfer all of the wastewater to the City of Caldwell. This can be completed by adding a gravity sewer line from the WWTF to a pump station which would then pump the wastewater to manhole within the Caldwell collection system.

This alternative would eliminate the WWTF lagoons, head works, and wet well. It would also eliminate the CHA wastewater operation staff as it is anticipated that the collection system and new pump house would be maintained and operated by the City of Caldwell.

A preliminary forcemain alignment is located below in Figure 15.

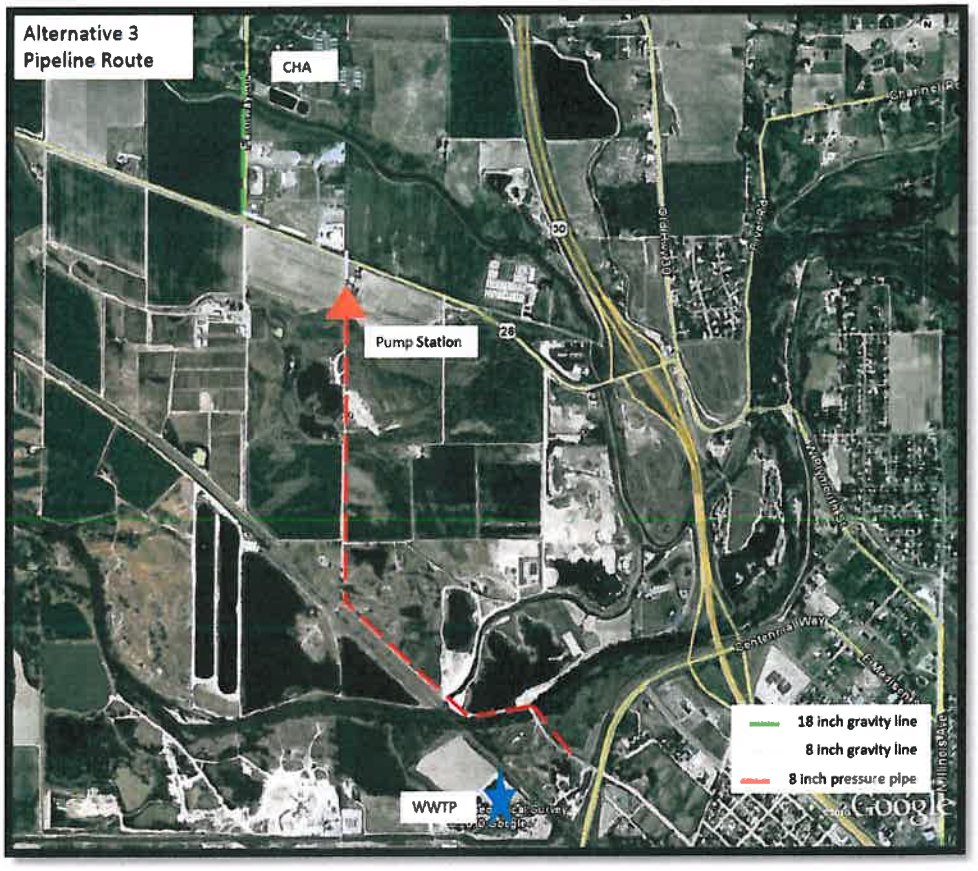

Figure 15 Preliminary pipeline route

The preliminary pipeline route/alignment would traverse from the current head works building at the CHA and connect into an 18 inch gravity sewer line. An 18 inch line was chosen for the section of pipeline based on the City of Caldwell 2008 North Area Master Plan. The Master Plan details that the line along Farm way Road will eventually be an 18 inch gravity line. If the CHA implements this plan and upsize the line they are eligible to be reimbursed for the additional cost of the pipe material and would be helping to regionalize the area and provide future infrastructure for the City of Caldwell.

The preliminary location of the pump station is on state property on Pond Road. The pump station would be a submersible station with 3 pumps to provide redundancy and the needed capacity for both the average and peak hour flows. The pump station would also require backup power to prevent any loss of surface for the housing authority. Pump station design would account for the large variance in flows from average to peak day requirements (139 gpm to 498 gpm respectively). The station design will also need to account for pump start and stop cycling, and additional capacity to account for possible future growth in the surrounding area. After the pump station would be last section of the pipeline which will be an 8 inch forcemain line to a manhole of the Caldwell Collection system.

Using the preliminary forcemain alignment in Figure 15, the estimated liftstation design conditions are listed in Table 7.

In addition to the design of the pipeline and pump station the CHA will need to work closely with the City of Caldwell to implement this alternative. Currently the City of Caldwell has been very receptive to the idea of accepting the waste from the CHA. The CHA will have to enter into an agreement with the City which will include the estimated user chargers and hookup fees for the CHA. In addition to the costs associated with the connection the agreement will need to detail the ownership of the collection system, pipeline, pump station, and maintenance responsibility associated with all of the equipment.

Based on the Caldwell adopted user rates document it is anticipated that the connection fee for the CHA will be approximately $245,000 ($1,000 per connection x 245current connections). In addition to this fee each resident will be charged a base rate of $20 per month per connection. The base rate was calculated based on the Caldwell user rates document assuming that base rate ($8.00) + residential sewer new hookup fee ($9.73) for non-City potable water usage (no metered usage fee).

Since the old user rate structure is developed around the cost for the rental of a unit and is not divided into separate utility rates it is not possible to determine the amount that the rent will need to increase at this time. However, based on a capital cost of $2,770,283(includes the $245,000 connection fee) each connection will be required to pay $54 per month. The additional cost per connection is calculated based on a 1.25% 20 year loan provided by the DEQ SRF funding program. This estimate also assumes that no O&M fees would be required to operate the pumps station as these costs would be assumed by the City of Caldwell.

Implementation Schedule

Table 11 Implementation schedule of proposed alternative

Milestone Description	Date
Start of Public Comment Period	November 2011
Submit LOI for Construction Loan	December 2011
Agency Consultation Letters	January 2011
EID Approval from IDEQ	June 30, 2012
Complete Predesign	September 2012
Complete Design	January 2013
Finalize Easements	January 2013
Bid Project	February 2013

Funding Resources

The cost estimates contained in this report are in 2011 dollars and may need to be adjusted if implementing the recommended improvements occurs later. The volatility of the market and pricing of construction materials makes estimating future construction costs difficult.

There are a number of potential sources are available for funding of water system improvements. The following section provides a review and analysis for some of these potential funding sources. The primary intent of this plan is to provide funding for the project through the State Revolving Loan Fund (SRF).

State Revolving Loan Fund

IDEQ administers the State Revolving Loan Fund (SRF) that provides below-market-rate interest loans to help repair or build new wastewater facilities. The interest rate for loans is currently 1.75% (FY 2012). The interest rate is established annually by policy decision made by the Director of IDEQ. Some applicants may qualify as "disadvantaged" and be eligible for lower interest rates with longer repayment schedules and under certain criteria partial loan principal forgiveness.

Community Development Block Grant (CDBG)

This program is administered by the Idaho Department of Commerce (IDOC). These grants mainly are designed to fund local housing, wastewater, water, and economic development projects for moderate to low income communities. The CHA can possibly receive a grant from this source. Applications are due in November each year, and recipients are notified the following spring. The maximum amount for a single grant currently is $500,000.

Rural Development (RD)

The U.S. Department of Agriculture Rural Development's Rural Utilities Program administers a water and wastewater loan and grant program for communities of 20,000 residents or less. RD uses a number of factors, such as water rates and percent of household income in debt service, to determine whether a community is eligible for a grant. In 2003, RD was allocated approximately $3 million in loan money and approximately $1.5 million in grant money. RD can typically provide a grant match of up to 25 percent of their participation in the project.

Applications may be submitted at any time. An interest rate of 4.75 percent is expected for a loan. A revenue bond ordinance is required with repayment via utility rates.

Consulted Documents

Idaho Rules for Wastewater Systems, Idaho Administrative Procedures Act 58.01.16

Ten State Standards.Recommended Standards for Wastewater Facilities. Great Lakes – Upper Mississippi River.: Health Education Services Division, 2004.

Metcalf & Eddy.Wastewater Engineering Treatment and Reuse. New York.:McGraw Hill, 2003.

Kuna Wastewater NPDES Permit ID 002835-5. Environmental Protection Agency. 2009.

Allen, Richard G. and Clarence W. Robison, 2009. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2008, Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID.

JUB Engineers.2008 North Area Sewer Master Plan.The City of Caldwell, 2008.

US Census Bureau, Canyon County, Idaho Demographic Characteristics, 2000 Census.

Geologic Map of the Boise Valley and Adjoining Area, Western Snake River Plain, Idaho; Othberg and Stanford, Idaho Geological Survey, 1992).

Appendix A. NPDES Permit & Compliance Inspection& Priority List

Appendix B. DEQ Facility Plan Checklist

Appendix C. Geologic Survey Data

Appendix D. FEMA Flood Map

Appendix E. Wastewater Flow and Load Data

Appendix F. Lagoon Kinetic Models& Pump Sizing Calculations

Appendix G. Seepage Testing Results

Appendix H. Storage Lagoon Sizing Calculations& Land Application Calculations

Appendix I. Capital & Operation and Maintenance Cost Estimates

Appendix J. Letter Sent to CHA Regarding Sebree Canal Data

Appendix K. FONSI & Environmental Information Document

EID will be completed as a separate document and attached after approval

Joshua Reed

From: Domingo.David@epamail.epa.gov
Sent: Wednesday, March 23, 2011 3:34 PM
To: Joshua Reed
Subject: Caldwell Housing Authority (ID-002545-3)

Josh,

as I stated in our phone conversation today, according to EPA's records, we received the permit reapplication for the Housing Authority on July 22, 2004. Our national database, the Integrated Compliance Information System (ICIS), indicates that the permit has been administratively extended. Therefore, the facility should continue to follow their current permit until a new one is reissued.

In terms of the lagoon overflow that occurred in September 2009, EPA did not send any correspondence to the permittee in regards to this situation.

If you need additional information, please don't hesitate to contact me.

David Domingo
NPDES Compliance Unit
US EPA Region 10
Suite 900, OCE-133
Seattle, Washington 98101
(206) 553-0531
domingo.david@epa.gov

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act",

The Housing Authority of the City of Caldwell, Idaho, Farmway Village
22730 Farmway Road
Caldwell, Idaho 83605

is authorized to discharge from a wastewater treatment facility located near Caldwell, Idaho.

to receiving waters named Sebree Canal,

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective November 2, 1999

This permit and the authorization to discharge shall expire at midnight, November 2, 2004

Signed this 30th day of September

/s/ Randall F. Smith
Randall F. Smith
Director
Office of Water, Region 10
U.S. Environmental Protection Agency

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I. SPECIFIC LIMITATIONS AND MONITORING REQUIREMENTS

A. Effluent Limitations and Monitoring Requirements

1. During the period beginning on the effective date of this permit the permittee is authorized to discharge wastewater to Sebree Canal from Outfall 001 provided the discharge meets the limitations and monitoring requirements set forth herein.

This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application.

PARAMETER	EFFLUENT LIMITATIONS		MONITORING REQUIREMENTS		
	Average Monthly Limit	Average Weekly Limit	Sample Location	Sample Frequency	Sample Type[2]
Flow, MGD	---	---	Effluent	Continuous	Recording
Biological Oxygen Demand (BOD_5)	45 mg/l	65 mg/l	Influent and Effluent	2/month	8-hour composite
	77.3 lb/day	111.7 lb/day			
Total Suspended Solids (TSS)	70 mg/l	105 mg/l	Effluent	2/month	8-hour composite
Fecal Coliform Bacteria[1]	---	200/100 ml	Effluent	5/week	grab
E. Coli Bacteria[3]	---	---	Effluent	5/week	grab
Chlorine[4], mg/L	---	---	Effluent	2/month	grab
Temperature, • C	---	---	Effluent	2/month	grab
Total Ammonia as N[4], mg/L	---	---	Effluent	1/month	8-hour composite
Total Kjeldahl Nitrogen[4], mg/L	---	---	Effluent	1/month	8-hour composite
Nitrate-Nitrite[4], mg/L	---	---	Effluent	1/month	8-hour composite
Total Phosphorus[4], mg/L	---	---	Effluent	1/month	8-hour composite
Ortho-Phosphate[4], mg/L	---	---	Effluent	1/month	8-hour composite

1. The average weekly fecal coliform count must not exceed a geometric mean of 200/100 ml based on no more than one week's data and a minimum of five (5) samples.
2. 8 hour composite samples shall consist of three discrete aliquots collected over an eight hour period. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in *Standard Methods for the Examination of Water and Wastewater,* 18th Edition.
3. Monitoring for E. Coli shall start four (4) years from the effective date of the permit and continue for one year. Analytical results do not need to be reported on the DMR, but shall be retained on site. Sampling results for the first six months of monitoring shall be submitted to EPA with the Permittee's next permit application which is due 180 days prior to the expiration date of this permit..
4. Monitoring for these parameters shall start 120 days after the effective date of the permit, and shall continue for two years.

2. The pH range shall be between 6.5 - 9.0 standard units. The permittee shall monitor for pH once (2) per month. Sample analysis shall be conducted on a grab sample from the effluent.

3. 65% Removal Requirements for BOD_5 : For any month, the monthly average effluent concentration shall not exceed 35 percent of the monthly average influent concentration.

   Percent removal of BOD_5 shall be reported on the Discharge Monitoring Reports (DMRs). The monthly average percent removal shall be calculated from the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month. Influent and effluent samples shall be taken over approximately the same time period.

4. The permittee shall determine the fate of the effluent discharged to Sebree Canal during the non-irrigation season. If the effluent reaches Conway Gulch, the volume of effluent entering Conway Gulch shall be determined. The study shall be conducted during the first, second and third years of the permit. The report shall be submitted to EPA with the June 2004 DMR.

B. Sludge Management Requirements:

1. The permittee shall handle and dispose of sewage sludge such that the public health and the environment are protected from any reasonably anticipated adverse effects due to any toxic pollutants that may be present.

2. The permittee shall comply with all existing federal and state laws and regulations that apply to its sewage sludge use or disposal practice, and with all future standards promulgated under Section 405(d) of the Clean Water Act of 1987.

3. The permittee shall ensure that the requirements of 40 CFR 503 Subparts A, C, and D are met when its sewage sludge is handled and disposed.

C. Quality Assurance Requirements

1. The permittee shall develop a Quality Assurance Plan. The primary purpose of the Quality Assurance Plan shall be to assist in planning for the collection and analysis of samples in support of the permit and in explaining data anomalies when they occur.

2. Throughout all sample collection and analysis activities, the permittee shall use the EPA approved quality assurance, quality control, and chain-of-custody procedures described in:

1. *Requirements for Quality Assurance Project Plans,* EPA QA/R-5 EPA, and
2. *Guidance on Quality Assurance Project Plans*, EPA QA/G-5

The following reference may be helpful in preparing the Quality Assurance Plan for this permit: *The Volunteer Monitors Guide to Quality Assurance Project Plans* EPA 841-B-96-003, September 1996.

3. The plan shall be submitted to EPA for review within 60 days of the effective date of this NPDES permit. The permittee may consider the plan approved if there is no response from EPA within 60 days of receipt of the plan.

4. At a minimum the plan shall include the following:

- Sampling techniques (field blanks, replicates, duplicates, control samples, etc).
- Sampling preservation methods.
- Sampling shipment procedures.
- Instrument calibration procedures and preventive maintenance (frequency, standard, spare parts).
- Qualification and training of personnel.
- Analytical methods (including quality control checks, quantification/detection levels).

D. Definitions.

1. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

2. "Average weekly discharge limitation" means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

3. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

4. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily

discharge" is calculated as the average measurement of the pollutant over the day.

5. An "eight hour composite" sample shall consist of three discrete aliquots collected over an eight hour period. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in *Standard Methods for the Examination of Water and Wastewater,* 18th Edition.

6. A "Grab" sample is a single sample or measurement taken at a specific time or over as short a period of time as is feasible.

7. "Maximum daily discharge limitation" means the highest allowable "daily discharge."

8. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

9. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. **Representative Sampling**. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. **Monitoring Procedures**. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

C. **Reporting of Monitoring Results**. Monitoring results shall be summarized each month on the Discharge Monitoring Report (DMR) form (EPA No. 3320-1). The reports shall be submitted monthly and are to be postmarked by the 10th day of the following month. Legible copies of these, and all other reports, shall be signed and certified in accordance with the requirements of Part IV.J., Signatory Requirements, and submitted to the Director, Office of Water and the State agency at the following addresses:

original to: United States Environmental Protection Agency (EPA) Region 10

1200 Sixth Avenue, OW-133
Seattle, Washington 98101

copy to: Idaho Division of Environmental Quality (IDEQ)
1435 North Orchard
Boise, Idaho 83706

D. **Additional Monitoring by the Permittee**. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

E. **Records Contents**. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;

2. The individual(s) who performed the sampling or measurements;

3. The date(s) analyses were performed;

4. The individual(s) who performed the analyses;

5. The analytical techniques or methods used; and

6. The results of such analyses.

F. **Retention of Records**. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. Data collected on-site, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on-site.

G. **Twenty-four Hour Notice of Noncompliance Reporting**.

1. The following occurrences of noncompliance shall be reported by telephone, to the EPA NPDES hotline at 206-553-1846, within 24 hours from the time the permittee becomes aware of the circumstances:

a. Any noncompliance which may endanger health or the environment;

b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G., Bypass of Treatment Facilities.);

c. Any upset which exceeds any effluent limitation in the permit (See Part III.H., Upset Conditions.); or

d. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times;

c. The estimated time noncompliance is expected to continue if it has not been corrected; and

d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Compliance Section in Seattle, Washington.

4. Reports shall be submitted to the addresses in Part II.C., Reporting of Monitoring Results.

H. **Other Noncompliance Reporting**. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.C. are submitted. The reports shall contain the information listed in Part II.G.2.

I. **Inspection and Entry**. The permittee shall allow the Director or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

J. **Compliance Schedules**. Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit (Part I) shall be submitted no later than 10 days following each schedule date.

III. COMPLIANCE RESPONSIBILITIES

A. **Duty to Comply**. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. **Penalties for Violations of Permit Conditions**.

1. Civil and Administrative Penalties. Any person who violates a permit condition implementing Sections Penalty. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be subject to a civil or administrative penalty, not to exceed the maximum amounts specified in Sections 309(d) and 309(g) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S. C. § 2461 note) as amended by the Debt collection Improvement Act (31 U.S.C. § 3701 note).

2. Criminal Penalties:

a. Negligent Violations. The Act provides that any person who negligently violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act; or negligently introduces into a sewer system or into a publicly owned treatment works any pollutant or hazardous substance which such person knew or reasonably should have known could cause personal injury or property damage or, other than in compliance with all applicable federal, state, or local requirements or permits, which causes such treatment works to violate any effluent limitation or condition in a permit issued to the treatment works under Section 402 of this Act; shall be punished by a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or by both.

b. Knowing Violations. The Act provides that any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act; or knowingly introduces into a sewer system or into a publicly owned treatment works any pollutant or hazardous substance which such person knew or reasonably should have known could cause personal injury or property damage or, other than in compliance with all applicable federal, state, or local requirements or permits, which causes such treatment works to violate any effluent limitation or condition in a permit issued to the treatment works under Section 402 of this Act; shall be punished by a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or by both.

c. Knowing Endangerment. The Act provides that any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. A person which is an organization shall, upon conviction of violating this subparagraph, be subject to a fine of not more than $1,000,000.

d. False Statements. The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this Act, shall upon conviction, be punished by a fine of not more that $10,000, or by imprisonment for not more than 2 years, or by both.

Except as provided in permit conditions in Part III.G., Bypass of Treatment Facilities and Part III.H., Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. **Need to Halt or Reduce Activity not a Defense**. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. **Duty to Mitigate**. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. **Proper Operation and Maintenance**. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. **Removed Substances**. Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

G. **Bypass of Treatment Facilities**.

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential

maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.G., Twenty-four Hour Notice of Noncompliance Reporting.

3. Prohibition of bypass.

   a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

      (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      (3) The permittee submitted notices as required under paragraph 2 of this section.

   b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determine that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. **Upset Conditions**.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed,

contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the cause(s) of the upset;

b. The permitted facility was at the time being properly operated;

c. The permittee submitted notice of the upset as required under Part II.G., Twenty-four Hour Notice of Noncompliance Reporting; and

d. The permittee complied with any remedial measures required under Part III.D., Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

IV. GENERAL REQUIREMENTS

A. **Notice of New Introduction of Pollutants**. The permittee shall provide adequate notice to the Director, Office of Water of:

1. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 or 306 of the Act if it were directly discharging those pollutants; and

2. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

3. For the purposes of this section, adequate notice shall include information on:

a. The quality and quantity of effluent to be introduced into such treatment works; and

b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from such publicly owned treatment works.

B. **Control of Undesirable Pollutants**. Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

1. Wastes which will create a fire or explosion hazard in the treatment works;

2. Wastes which will cause corrosive structural damage to the treatment works, but in no case, wastes with a pH lower than 5.0, unless the works is designed to accommodate such wastes;

3. Solid or viscous substances in amounts which cause obstructions to the flow in sewers, or interference with the proper operation of the treatment works;

4. Wastewaters at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency; and

5. Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge of such volume or strength as to cause interference in the treatment works.

C. **Requirements for Industrial Users**. The permittee shall require any industrial user of these treatment works to comply with any applicable requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.

D. **Planned Changes**. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit.

E. **Anticipated Noncompliance**. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

F. **Permit Actions**. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

G. **Duty to Reapply**. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

H. **Duty to Provide Information**. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

I. **Other Information**. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

J. **Signatory Requirements**. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to authorization. If an authorization under paragraph IV.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.J.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

K. **Availability of Reports**. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

L. **Oil and Hazardous Substance Liability**. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

M. **Property Rights**. The issuance of this permit does not convey any property rights of any sort, or

any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

N. **Severability**. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

O. **Transfers**. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

P. **State Laws**. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1445 North Orchard • Boise, Idaho 83706 • (208) 373-0550

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

September 8, 2008

Michael Dittenber
Executive Director
Caldwell Housing Authority Farmway Village
22730 Farmway Rd
Caldwell, ID 83605

RE: NPDES Permit Inspection (Permit No. ID002545-3)
Farmway Village Municipal Wastewater Treatment Plant

Dear Mr. Dittenber:

On September 2, 2008, The Department of Environmental Quality (DEQ) conducted a National Pollutant Discharge Elimination System (NPDES) compliance inspection of the Caldwell Housing Authority Municipal Wastewater Treatment Plant. Deficiencies noted during the inspection and items that must be addressed are listed below.

Deficiencies Noted:

- **No NPDES deficiencies were noted during the inspection.**

Recommendations:

- **During the inspection it was recommended that the facility ensure that the contracted lab fully fill out the chain of custody reports.**
- **It is recommended that the facility increase the housekeeping efforts at the plant. This included wash down at the grit removal chamber, and weed removal at the lagoons.**
- **Holes were discovered in the lagoon liner (above high water line) these holes must to be repaired. It is recommended that the entire liner be inspected and any additional defects also repaired.**

A detailed description of the inspection and noted deficiencies and recommendations is provided in the enclosed NPDES Compliance Inspection Report.

We appreciate your assistance with completing the facility inspection. Thanks to you and your staff for sharing details about plant operations and your NPDES permit. Please call me at 373-0550 if you have any questions or comments regarding this report.

Sincerely,

R. Todd Crutcher, P.E.
Staff Engineer

RTC:vee: I:\NPDES\FY08\Caldwell Housing Authority\NPDES Inspection Report - August 7 2008.rtf

Enclosures: EPA Form 3560-3 (copy)
NPDES Compliance Inspection Report (copy)

c: Mark Mason, P.E., DEQ-Boise Regional Office (With Inspection Report)
Rick Huddleston, P.E., DEQ-State Office (With Inspection Report & Form 3560-3)
Kim Ogle, EPA-Region 10 Seattle (With Original Enclosures & Photo log)
Maria Lopez, EPA-Boise Field Office (With Enclosures & Photo log)
File 5 (With Enclosures & Photo log), Reading File

NPDES Compliance Inspection Report

FACILITY:	Caldwell Housing Authority Wastewater Treatment Plant ID002545-3
ADDRESS:	22730 Farmway Rd Caldwell, ID 83605
FACILITY CONTACTS:	Michael Dittenber Phone: 208-459-2232 Fax: 208-455-2816
RESPONSIBLE OFFICIAL:	Michael Dittenber, Executive Director
INSPECTION DATE:	September 2, 2008
REPORT DATE:	September 8, 2008
INSPECTOR:	R. Todd Crutcher, Idaho DEQ

Entry:

At 10:00 on September 2, 2008 I arrived at the Caldwell Housing Authority Wastewater Treatment Plant. I met with Mr. Michael Dittenber, Executive Director and presented my credentials. I explained to Mr. Dittenber that I was there to conduct a follow up to the March 12, 2007 inspection conducted by EPA. We discussed plant operations, and any changes, upgrades, upsets, or violations in the last 18 months. I also check the plants record keeping, and conducted a walkthrough of the plant.

Inspection Findings:

I asked Mr. Dittenber to show me the facilities Quality Assurance Plan (QAP), Operation and Maintenance Manual (OMM), DMR's, and lab reports. Mr. Dittenber quickly produced these items (Figures 1-5). The OMM and QAP appear to be complete and meet the NPDES Permit requirements. The DMR's appear to be accurately filled out and reflect the information that was contained in the lab reports.

The Facility has entered into a contract with Analytical Laboratories Inc. (ALI) in Boise to conduct sampling and analysis. A representative from ALI is on site daily to take samples and then transports them back to the lab for analysis. The ALI representative does utilize a chain of custody report; however, it is not always completely filled out (Figure 7). I told Mr. Dittenber that although the same company samples, transports, and analyzes, he should ensure that they still fully fill out the chain of custody reports.

I discussed with Mr. Dittenber the status of sludge in the lagoons. Mr. Dittenber stated that they had the lagoons inspected, and sludge moved from cell one to cell two in the Spring of 2007. He stated that they had contacted EPA prior to transferring the sludge,

and that they conducted the transfer as instructed by EPA. The facility suspended discharge during the time of sludge transfer and for 5 days after the transfer to ensure solids would settle.

I conducted a plant tour with Mr. Dittenber. We looked at the screw press grit removal (Figures 9-12), the influent lift station (Figure 13). The three treatment lagoons (Figures 16-25) the chlorination building (Figures 26-30), the influent and effluent composite samplers (Figures 8 & 31), and the onsite test equipment and log books (Figures 32-35).

Exit:

I reiterated to Mr. Dittenber the recommendations that I had made during the inspection, thanked him for his time and left the Caldwell Housing Authority Wastewater Treatment Plant at 12:45.

Attachments: EPA Form 3560-3

R. Todd Crutcher

9-8-08
Date

EPA

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

Section A: National Data System Coding (i.e. PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 I D 0 0 2 5 4 5 3 11	12 0 8 0 9 0 2 17	18 C	19 S	20 1

Remarks

21 66

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	BI	QA	Reserved
67 2 5 69	70 4	71 N	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*	Entry Time/Date	Permit Effective Date
Caldwell Housing Authority **Farmway Village WWTP** **22730 Farmway Rd** **Caldwell, ID 83605**	**1000 / 09-02-08**	**11/2/1999**
	Exit Time/Date **1245 / 09-02-08**	Permit Expiration Date **11/2/2004**

Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Numbers	Other Facility Data (e.g., SIC, NAICS, and other descriptive information)
Mike Dittenber - Exicutive Director **(V) 208-459-2232, (C) 208-899-1593, (F) 208-455-2816**	

Name, Address of Responsible Official/Title/Phone and Fax Number	Contacted
Same	[X] Yes [ ] No

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)

X	Permit	X	Self-Monitoring Program		Pretreatment		MS4
X	**Records/Reports**		Compliance Schedule		Pollution Prevention		
X	Facility Site Review		Laboratory		Storm Water		
X	Effluent/Receiving Waters	X	Operations & Maintenance		Combined Sewer Overflow		
X	Flow Measurement	X	Sludge Handling/Disposal		Sanitary Sewer Overflow		

Section D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

SEV Codes	SEV Description

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
R. Todd Cravatt	Idaho DEQ/ Boise Regional Office/ 208-373-0550/ 208-373-02	9-8-08
Signature of Management QA Reviewer	**Agency/Office/Phone and Fax Numbers**	**Date**

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ALASKA								
AK0022942	Golden Valley Electric Assn	Golden Valley Electric Assn	Major	10/12/2004	3/1/2000	3/1/2005	Admin Cont; wait for state cert	Electric Services
AK0043354	Conoco Phillips Alaska Inc	Kuparuk	Major	11/29/2004	4/24/2000	4/24/2005	Admin Cont draft 2010	Waterflood filter backwash
AK0029840	BP Exploration Ak Inc	Prudhoe Bay	Major	10/21/2004	4/24/2000	4/24/2005	Admin Continued	Waterflood filter backwash
AK0022551	City of Anchorage (301 h facility)	John Asplund POTW	Major	2/1/2005	8/2/2000	8/2/2005	Admin Continued	Sewerage Systems
AKG520067 (Tribal)	Annette Isl. Packing Faciity	(Metlakatla Seafood Facility)	Minor		7/27/2001	7/27/2006		Fish Hatchery & Preserves
AK0020010	Skagway 301 (H)		Major	5/15/2001	10/1/2002	9/30/2007	Expired	Sewerage Systems
AK0053333	Aurora Energy Llc	Aurora Energy Llc	Minor	11/15/2000	10/1/2003	9/30/2008	Expired; seeking variance/MZ	Electric Services
AK0053341	Teck-Pogo Inc	Teck-Pogo Inc	Major	8/2/2000	4/16/2004	3/31/2009	Expired	Gold Ores
AKG571014 (Tribal)	Metlakatla WWTP					7/20/2009		Sewerage Systems
AK0023248	Alyeska Pipeline Service Co	Marine Terminal	Major	11/23/2001	8/1/2004	7/31/2009	Admin Continued	Ballast, bilge, and Operational wastewater
AKG370000	Placer Mine GP	Mechanical Placer Mining			10/4/2005	10/4/2010	Draft cert 1 st Q 2010	Gold Ores
AKG371000	Placer Mine GP	Med-size section dredge Placer Mining			10/4/2005	10/4/2010	Draft cert 1 st Q 2010	Gold Ores
AKG 315000	Cook Inlet GP Just Fed Waters	General Permit			7/1/2007	7/1/2012	Effective	Oil & Gas Exploration, Development, and Production
AKG 330000	North Slope GP Exploration	General Permit						Crude Petroleum & Natural Gas
AK0046876 Tribal	Metlakatla Water Treatment		Minor	12/22/86			Pending	Water Supply

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
AKG280000	Arctic GP- Beaufort Sea (Exploration)	General Permit					Summer 2011	Oil & gas Exploration
AKG 280000	Arctic GP - Chukchi Sea (Exploration)	General Permit					Summer 2011	Oil & gas Exploration
AKG315000	Cook Inlet GP - Re-proposal						PN 10/1/10; Final 2011	Oil & gas Exploration/Development & Production
ADG xx xxxx	N. Aleutian Basin	General Permit		MMS 2010 - 2015 Lease Plan			Pending	Oil & Gas Exploration
AK0028525 Tribal	Tamgass Crk Salmon Hatchery	Metlakatla Indian Comm.	Minor	11/8/76			Pending	Fish Hatchery & Preserves
AKG	Pesticide GP	Under development					Pending	Pesticide Application to waters
IDAHO								
ID0000230	Amalgamated Sugar Co Llc	Amalgamated Sugar Company Llc	Minor	6/14/1982	8/19/1977	6/30/1982	Admin Cont.	Beet Sugar
IDG01000	**CAFO GP**				**5/27/1997**	**5/27/2002**	**Admin Cont**	**Confined Animal Feeding Operations**
ID0021504	**Caldwell, City of**	**Caldwell, City of**	**Major**	**6/10/2003**	**2/1/1999**	**2/2/2004**	**Admin Cont**	**Sewerage Systems**
ID0022063	**Nampa, City of**	**Nampa, City of**	**Major**	**7/31/2003**	**2/1/1999**	**2/2/2004**	**Admin Cont**	**Sewerage Systems**
ID0020168	**Jerome, City of**	**Jerome, City of**	**Major**	**3/10/2009**	**8/31/1999**	**8/31/2004**	**Admin Cont**	**Sewerage Systems**
ID0021784	**Pocatello, City of**	**Pocatello, City of**	**Major**	**3/11/2004**	**9/7/1999**	**9/7/2004**	**Admin Conti**	**Sewerage Systems**
ID0020192	**Meridian, City of**	**Meridian, City of**	**Major**	**4/19/2004**	**11/2/1999**	**11/2/2004**	**Admin Cont**	**Sewerage Systems**

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ID0025852	Post Falls, City of	Post Falls, City of	Major	6/24/2004	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0021016	Notus, City of	Notus, City of	Minor	12/2/2008	11/2/1999	11/2/2004	Expired	Sewerage Systems
ID0022853	Coeur D' Alene, City of	Coeur D'Alene, City of	Major	4/30/2004	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0026590	Hayden Area Regional Sewer Board	Hayden	Major	10/28/2004	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0023981	Boise, City of	Boise, City of	Major	4/29/2004	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0020443	Boise, City of-Lander	Boise, City of	Major	4/29/2004	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0024422	The Meadows Llc (Stp)	The Meadows Llc	Minor	5/23/2007	11/30/1999	11/30/2004	Expired	Sewerage Systems
IDS027561	Boise Ms4, City of - Phase 1	Boise Ms4, City of	Major	12/13/2004	11/29/2000	11/29/2005	Admin Cont	Municipal Storm water system
ID0021261	Idaho Falls, City of	Idaho Falls, City of	Major	11/29/2005	5/21/2001	5/22/2006	Admin Cont	Sewerage Systems
ID0020281	City of Ketchum	Ketchum, City of	Major	6/7/2006	6/11/2001	6/12/2006	Admin Cont	Sewerage Systems
ID0020303	Hailey, City of	Hailey, City of	Major	8/3/2006	6/11/2001	6/12/2006	Admin Cont	Sewerage Systems
ID0020290	Weiser, City of	Weiser, City of	Major	2/2/2006	8/1/2001	8/1/2006	Admin Cont	Sewerage Systems
ID0023710	Ashton, City of	Ashton, City of	Minor	8/4/2000	8/9/2001	8/9/2006	Expired	Sewerage Systems
ID0020141	Driggs, City of	Driggs, City of	Minor	9/11/2006	9/11/2001	9/11/2006	Admin Cont	Sewerage Systems
ID0027600	Jerome Cheese Co	Jerome Cheese Company	Minor	5/11/2006	10/1/2001	10/2/2006	Admin Cont	Cheese Natural & Processed
ID0020672	Payette, City of	Payette, City of	Major	9/21/2006	12/31/2001	1/2/2007	Admin Cont	Sewerage Systems

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ID0021199	Fruitland, City of	Fruitland, City of (WWTP)	Minor	9/13/2006	12/31/2001	1/2/2007	Admin Cont	Sewerage Systems
ID0020338	Fruitland, City of	Fruitland, City of	Minor	9/13/2006	12/31/2001	1/2/2007	Admin Cont	Sewerage Systems
ID0020842	City of Sandpoint	City of Sandpoint	Major	9/25/2006	11/30/2001	1/5/2007	Admin. Cont	Sewerage Systems
ID0020800	Priest River, City of	Priest River, City of	Minor	11/8/2006	1/5/2002	1/5/2007	Admin Cont	Sewerage Systems
ID0020753	American Falls, City of	American Falls, City of	Minor	9/29/2006	1/7/2002	1/8/2007	Admin Cont	Sewerage Systems
ID0026824	Interior, Reclamation	Minidoka Power Plant/ Walcott Park	Minor	3/15/1994	1/7/2002	1/8/2007	Expired	Sewerage Systems
ID0026468	Hecla Mining Co	Grouse Creek	Major	8/14/2006	4/28/2002	1/29/2007	Admin Cont	Gold Ores
ID0025402	Thompson Creek Mining Company	Thompson Creek Mining Company	Major	7/31/2006	1/28/2002	1/29/2007	Admin Cont	Ferroalloy Ores, Except Vanadium
ID0028002 (Tribal)	Kamiah, City of	Kamiah, City of	Minor	4/30/2007	8/1/2002	7/31/2007	Admin Cont	Sewerage Systems
ID0020699	Agriculture U.S. Forest Service	Red River Ranger District	Minor	4/5/2007	10/1/2002	9/30/2007	Admin Cont	Sewerage Systems
ID0022012	Elk City Water & Sewer Assoc	Elk City Water & Sewer Didst.	Minor	12/4/2007	10/1/2002	9/30/2007	Admin Cont	Sewerage Systems
ID0027022	Meridian Beartrack Company	Meridian Beartrack Company	Major	4/29/2008	12/1/2003	10/31/2008	Admin Cont	Gold Ores
ID0022004	Glenns Ferry, City of	Glenns Ferry, City of	Minor	11/21/2008	11/24/2003	11/24/2008	Admin Cont	Sewerage Systems
ID0020150 (Tribal)	Orofino, City of	Orofino, City of	Minor	5/30/2008	11/24/2003	11/24/2008	Admin Cont	Sewerage Systems
ID0020931	Riggins, City of	Riggins, City of	Minor	11/22/1989	11/24/2003	11/24/2008	Expired	Sewerage Systems
ID0025071	Clarkia Water & Sewer Dist.	Clarkia Water & Sewer Dist.	Minor	5/5/2008	11/24/2003	11/24/2008	Admin Cont	Sewerage Systems

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ID0022713 (Tribal)	Worley, City of	Worley, City of	Minor	7/20/1992	12/1/2003	12/1/2008	Expired	Sewerage Systems
ID0020711	Agriculture, US Forest Service	Fenn Ranger Station	Minor	6/27/1978	1/1/2004	1/1/2009	Expired	WWTF
ID0020737	Agriculture, Forest Service	Slate Creek Ranger Station	Minor	6/16/1978	1/1/2004	1/1/2009	Expired	WWTF
ID0025224	Ahsahka Water & Sewer Dist.	Ahsahka Water & Sewer Dist.	Minor	3/9/2009	1/1/2004	1/1/2009	Admin Cont	Sewerage Systems
ID0020184	Winchester, City of	Winchester, City of	Minor		4/1/2004	3/31/2009	Admin Cont	Sewerage Systems
ID0020427	Homedale, City of	Homedale, City of	Minor	3/26/1990	5/1/2004	4/30/2009	Expired	Sewerage Systems
ID0021202	Marsing, City of	Marsing, City of	Minor	12/23/2008	5/1/2004	4/30/2009	Admin Cont	Sewerage Systems
ID0023159	New Meadows, City of	New Meadows, City of	Minor	10/8/1985	5/1/2004	4/30/2009	Expired	Sewerage Systems
ID0024503	Riverside Water & Sewer Dist.	Riverside Sewer & Water District	Minor	3/13/2008	5/1/2004	4/30/2009	Admin Cont	Sewerage Systems
ID0021776	Parma, City of	Parma, City of	Minor	4/24/2009	5/1/2004	4/30/2009	Admin Cont	Sewerage Systems
ID0020222	Bonners Ferry	Bonners Ferry	Minor	8/28/2008	4/6/2004	4/30/2009	Admin Cont	Sewer Lagoon Facility
ID0023027	Mackay, City of	Mackay, City of	Minor	4/13/2009	6/1/2004	5/31/2009	Admin Cont	Sewerage Systems
ID0020133	**E. Idaho Regional Wastewater Authority**	**Shelley**	**Minor**	**4/7/2008**	**8/1/2004**	**7/31/2009**	**Admin Cont**	**Sewerage Systems**
ID0020117	**Smelterville, City of**	**Smelterville WWTP**	**Minor**	**10/30/1989**	**8/1/2004**	**8/1/2009**	**Admin Cont**	**Sewerage Systems**
ID0021296	**South Fork Coeur D' Alene River Sewer District**	**Mullan**	**Minor**	**2/20/1990**	**8/1/2004**	**8/1/2009**	**Admin Cont**	**Sewerage Systems**

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ID0021300	**South Fork Coeur D' Alene River Sewer District**	**Page**	**Major**	**1/25/1999**	**8/1/2004**	**8/1/2009**	**Admin Cont**	**Sewerage Systems**
ID0021822	Lava Hot Springs, City of	Lava Hot Springs, City of	Minor	9/11/1989		5/31/2010		Sewerage Systems
ID0028037	**Sorrento Lactalis Inc**	**Sorrento Lactalis Inc**	**Minor**	**12/23/2002**		**10/31/2010**	**Effective**	**Cheese Natural & Processed**
IDG370000	**ID Small Placer Mine GP**						**Pending**	**Gold Ores**
ID0025143	Georgetown, City of	Georgetown, City of		3/23/2005			Pending	Sewerage Systems
ID0028347 - Tribal	Nez Perce Tribe Water Resources Division	Lapwai Valley WWTP		7/18/2006			Pending	Sewerage Systems
ID (Tribal)	City of Plummer New	To Replace Existing Lagoon					Pending	Sewerage Systems
ID0028304	Greenleaf, City of	per BN email of 2/12		*2/9/2005*			Pending	Sewerage Systems
IDS028061	Lewiston MS4, City of	Lewiston Ms4, City		3/10/2003			Pending	Municipal Storm water system
IDS028258	Idaho Transportation Dept MS4	District 2 (Lewiston)		3/10/2003			Pending	Municipal Storm water system
IDS	MS4 Idaho State University (Pocatello)						New	Municipal Storm water system
IDG	Pesticide GP						New	Pesticide Application to Water
ID	mine place-holder							
IDG	new mine by P4						New	MSGP
ID xxxxxxxx	Avimore						Pending	Sewerage Systems

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
IDG130000	**Aqua-Culture GP**	**GP w/ WLA**	**Minor**	**4/8/2002**	**12/1 2007**	**11/30/2012**	**Effective**	**Fish Hatcheries & Preserves**
WASHINGTON								
WA0037320 (Tribal)	Squaxin Island Tribe	Harstene Oyster Company	Minor	4/24/1987	7/29/1974	7/1/1979		Fresh or Frozen Prepared Fish
WA0001902	Interior, Fish & Wildlife	Leavenworth Natl Fish Hatchery	Minor	11/25/1980	1/30/1975	8/31/1979		Fish Hatchiers & Preserves
WA0022101	Defense, Army COE	Little Goose Dam	Minor	8/11/1980	12/30/1974	10/31/1979		Sewerage system
WA0002062	Defense, Navy	Puget Sound Naval Shipyard	Major	10/2/1998	4/1/1994	4/1/1999		Ship Bldg & repair
WA0003468	Defense, Navy	Naval Airstation Whidbey Island	Minor	11/2/2006	1/12/1998	1/13/2003		National Security
WA0050229 (Tribal)	Wapato, City of	Wapato Wwtp (Tribal Land)	Minor	11/18/2002	4/29/1998	4/29/2003		Sewerage system
WA0037168 (on tribal lands)	Puyallup, City of	Puyallup	Major	9/29/1988	8/1/2003	6/24/2008		Sewerage system
WA0021954	Defense, Army	Ft Lewis Water Pollution Cntl	Major	4/28/1998	2/1/2004	2/1/2009		Sewerage system
WA0025666 (Tribal)	Lummi Indian Business Council	Gooseberry Point Wwtp	Minor	5/9/2003	6/1/2004	5/31/2009		Wastewater treatment plant
WA0025658 (Tribal)	Lummi Indian Business Council	Sandy Point Wwtp	Minor	7/15/2003	6/1/2004	5/31/2009		Wastewater treatment plant
WA0024422 (Tribal)	Swinomish Reservation Swr Dist	Shelter Bay Comm Inc	Minor	7/6/2004	2/1/2006	1/31/2011		Sewerage system
WA0025704 (Tribal)	Spokane Tribe of Indians	Tribal Community Center - Wellpinit	Minor	2/26/1982			Pending	Sewerage system
WA0026328	Columbia River Fish Farms Llc	Net Pen	Minor	9/4/1997				Fresh or Frozen Prepared Fish
WA0026336	Columbia River Fish Farms Llc	Net Pen	Minor	9/4/1997				Fresh or Frozen Prepared Fish

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
WA0026379	Faith Frontier Ministries	Net Pen	Minor	10/17/1997				Fresh or Frozen Prepared Fish
WA0026573	Defense, Navy	Naval Radio Station Jim Creek	Minor	8/5/1999				National Security
WA0025577	Defense, Navy	Naval Base Kitsap Bangor	Minor	12/9/2008				National Security
WA0025062 (Tribal)	Swinomish Indian Tribal Comm	Wwtp to Replace Lagoon	Minor	9/9/2009				Sewerage system
	Pesticde GP							Application of Pesticides to Water
WA	Joint Ft Lewis/McCord AB MS4						Pending	Municipal Storm water system
WA	Bangor Sub Base						Pending	Municipal Storm water system
WA	Everett Naval Station						Pending	Municipal Storm water system
WA (Tribal)	Tulalip Tribe						Pending	Municipal Storm water system
WA (Tribal)	Quinault Pride Seafood			Will be submitting application in July 2010 in response to NOV per SW				Seafood Processing Plant
WA (tribal)	Quinault Net Pen							Net Pen
OREGON								
OR0034096 (Tribal)	Cow Creek Gaming Center	Cow Creek Gaming Center		3/12/2004	3/15/1999	3/15/2004	Admin Cont	Seweage treatment system
OR0033723	Grand Ronde Housing Authority	Grand Ronde Housing Authority		12/8/2004			Pending	

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 1: Priority Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
OR0033553 (Tribal)	Grand Ronde Housing Authority	Grand Ronde Housing Authority		4/28/2005			Pending	

Key: Bold = Idaho Conservation League (ICL) facilities

Total: 119 Permits **Count by State:** AK: 21 Permits; ID: 70 Permits; WA: 25 Permits; OR: 3 Permits. **Total Tribal Permits:** 22 **Tribal Permits by State:** AK: 4 Permits; ID: 4 Permits; WA: 11 Permits; OR: 3 Permits.

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 2: Tier 2 Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major/Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ALASKA								
AK0000396	Cook Inlet Pipeline Co.	Drift River Terminal	Major	12/12/2008	2/1/2004	2/1/2009	Admin Continued	
AK0001058	Tesoro Ak Petro Co	Kenai Pipeline Facility	Minor	9/15/1994	11/1/2006	10/31/2011	Effective	Ballast & tank bottom water
AK0001155	Conoco Phillips Alaska Inc	Kenai LNG	Minor	9/12/2006	6/14/1974	3/28/1979	Admin Cont	Noncontact cooling water, boiler blowdown, process drain
AK0021385	Haines Borough	301 h facility				12/26/2006		
AK0021440	Ketchikan	301 h facility				1/29/2006		
AK0021458	Petersburg 301(h)					12/26/2006		
AK0021474	Sitka 301 (h)					1/2/2007		
AK0022616	Wrangell, city of	301 h facility				1/8/2007		
AK0025402	Whittier	301 h facility				12/27/1988		
AK0040550	City of Unalaska	Electric Utility Powerhouse		11/14/1983			Pending	
AK0043532	Pelican 301(h)					10/28/1990		
AKG 315000	Cook Inlet GP just State waters	General Permit			7/1/2007	7/1/2012	Effective	
IDAHO								
ID	Monsanto Blackfoot Bridge Mine	Phosphate mine					Expect appl in next 2-3 years	
ID0000060	SterlingG MIining CO/Sunshine mine E							New owners as of 5/2010 per LO
ID0000159	SterlingG MIining CO/Sunshine mine E	Sunshine Mine East	Minor	3/25/1993	9/29/1988	9/28/1993	Admin Continued	New owners as of 5/2010 per LO
ID0020028	Gooding, City of	Gooding, City of	Major	6/6/2005	5/1/2000	5/1/2005	Admin Conti	Sewerage Systems

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 2: Tier 2 Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major/Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
ID0020044	Blackfoot, City of	Blackfoot, City of	Major	10/6/2006	11/28/2000	11/28/2005	Admin Cont	Sewerage Systems
ID0020940	Heyburn, City of	Heyburn, City of	Minor	3/15/2007	1/7/2002	1/8/2007	Admin Cont	Sewerage Systems
ID0021831	Middleton, City of	Middleton, City of	Minor	5/18/2006	11/2/1999	11/2/2004	Admin Cont	Sewerage Systems
ID0023591	Star Water & Sewer District	Star Water & Sewer District	Minor	8/2/2005	11/2/1999	11/2/2004	Expired	Sewerage Systems
ID0024988	Firth, City of	Firth	Minor	7/24/1992	8/1/2004	7/31/2009	Admin Cont	Sewer System
ID0027154	University of Idaho	University of Idaho	Minor	10/14/2003	4/14/1999	4/14/2004	Admin Cont	Non Commercial Research Center
WASHINGTON								
WA	Dawn Mine	Spokane Indian Reservation						Mine
WA (new)	Bonneville Dam	Per Sharon Wilson, applications submitted and calling						Drinking Water backwash
WA (new)	Dalle Dam	Per Sharon Wilson, applications submitted and calling						Operations
WA0025950	Olympic Fish Co		Minor	12/1/1993				Fresh or Frozen Prepared Fish
WA0026255	Finkbonner Shellfish		Minor	1/19/1997				Fresh or Frozen Prepared Fish
WA0026557	Dugualla Bay	Naval Airsta Whidbey Island	Minor	8/6/1998	Jdrabek heard they will submit revised permit as of 6/21/10			National Security
WA0025101	DOD Air Force	McChord AFB	Minor	9/5/1979	3/13/1975	11/30/1979		National Security
WA0021997	Defense, Navy	Naval Magazine Indian Island	Minor	10/17/1989	4/17/1985	4/16/1990		Sewerage System
WA0002780	DOD Navy - Puget Sound Naval	Fleet & Industrial Supply Cntr	Minor	12/1/1992	1/8/1996	1/8/2001		

EPA REGION 10 NPDES PERMITS WORKPLAN FOR 2010 - 2012

TABLE 2: Tier 2 Permits **revised 7/15/10**

NPDES ID	Permit Name	Facility Name	Major/Minor Status	Application Received Date	Effective Date	Expiration Date	Permit Status Description	Type of Facility
WA0026123 (Tribal)	Toppenish, City of	Toppenish Wwtp (Tribal Land)	Minor	7/25/2008	11/25/2003	11/25/2008		Sewerage system

STATE OF IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY

WASTEWATER PLANNING GRANT

FACILITY PLAN OUTLINE AND CHECKLIST

GENERAL INFORMATION

Name of Wastewater System	
Wastewater System Number	Date
Name of Project	

INTRODUCTION

	The introduction should include the following:
☐	A discussion of the purpose and need of the project and a brief description of the plan of study.
☐	A discussion of the report organization (table of contents, figures, and tables can be included).

EXISTING CONDITIONS

	The report should adequately describe existing conditions for the proposed project area:
☐	Are the boundaries of the planning areas identified?
☐	Are the existing environmental conditions in the planning area described? Include the following topics (include maps, site plans, schematics, tables, and letters from consulted agencies as needed):
☐	• Physiography, Topography, Geology, and Soils
☐	• Surface and Ground Water Hydrology
☐	• Fauna, Flora, and Natural Communities
☐	• Housing, Industrial, and Commercial Development
☐	• Cultural Resources (including tribal consultation)
☐	• Utility Use
☐	• Floodplains/Wetlands
☐	• Wild/Scenic Rivers

☐	• Existing Drinking Water Systems in Proposed Project Area
☐	• Public Health Considerations
☐	• Prime Agricultural Land Protection (Include maps)
☐	• Proximity to Sole Source Aquifer
☐	• Land Use and Development
☐	• Environmental Justice
☐	Are existing collection and treatment facilities described? Topics that should be discussed in the section include:
☐	• Treatment facility description, condition, and operation/maintenance considerations
☐	• Sewer system description, condition, and operation/maintenance considerations
☐	• Wastewater flows at existing facilities
☐	• Wasteload allocation and NPDES permit limits
☐	• Sewer use/user charge ordinance
☐	• Infiltration/inflow conditions
☐	• Any violations of the Clean Water Act and the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02)
☐	• User charges and operation and maintenance budget
☐	• List and status of defects or deficiencies
☐	• Other information as seems appropriate

FUTURE CONDITIONS

	The report should discuss the following topics relating to future conditions. Maps, site plans, figures, and tables can be used to complete this section.
☐	Future growth (20-year population projection)
☐	Forecast of flows and wasteload (20-year period)
☐	Wastewater facilities needed for a 20-year period
☐	Future conditions without the proposed project(s)
☐	Land use plans for the area served by existing and future sewer facilities

DEVELOPMENT AND INITIAL SCREENING OF ALTERNATIVES

	Topics related to development and screening of alternatives that should be included in the engineering report include:
☐	Description of problems/deficiencies with the existing wastewater system to be corrected by the project.
☐	Development of alternatives
☐	"No Action" alternative
☐	Optimum operation of existing facilities
☐	Regionalization

☐	How unsewered areas in and around the community will be dealt with
☐	Conventional collection systems
☐	Alternative conveyance systems
☐	Evaluation of sewer alignments
☐	Wastewater management options:
☐	• Conventional technologies
☐	• Innovative and alternative technologies
☐	• Low-cost alternatives for smaller communities
☐	• Municipal treatment wastes from industrial and federal facilities
☐	• Staged construction
☐	• Multiple purpose projects
☐	• Other technologies

FINAL SCREENING OF PRINCIPAL ALTERNATIVES AND PLAN ADOPTION

	Final screening of alternatives and plan adoption should include the following areas of evaluation:
☐	Evaluation of costs:
☐	• Present worth analysis
☐	• Capital costs and financing plan
☐	• Operation and maintenance costs
☐	• Salvage value
☐	• Reliability of alternatives
☐	• Implementability
☐	• Cost escalation factors for energy use
☐	• Comparison of costs of alternatives
☐	Final Public Input

SELECTED PLAN DESCRIPTION AND IMPLEMENTATION ARRANGEMENTS

	This section should include activities that normally follow selection of the best alternative. As a minimum this section should include:
☐	Justification and description of selected plan.
☐	Preliminary design of selected plan (include maps and site plans). Include computer model of flows.
☐	Cost estimates for the selected plan including monthly charges. What will be the added cost to the customer?
☐	Environmental impacts of the selected plan. An Environmental Information Document (EID) must be prepared for the project. The environmental impacts of most wastewater projects will be minimal and can be covered under a Categorical Exclusion. However, in those cases where more substantive environmental issues are identified, a more thorough review will be necessary.

☐	Any of the following elements for implementation that are applicable need to be included:
☐	• Intermunicipal service agreements
☐	• Financing arrangements
☐	• Operation and maintenance requirements
☐	• Project Schedule
☐	• Certification of operator(s)

APPENDICES

	Any of the following items that are applicable need to be appended to the engineering report.
☐	Relevant engineering data.
☐	User charge ordinance and latest operations and maintenance budget.
☐	Environmental information document and decision notice (FONSI, Categorical Exclusion)
☐	Additional maps, charts, figures, and tables as needed.
☐	Mailing list and correspondence relevant to the facility plan and environmental document (such as letters and documented contacts from agencies regarding impacts on fauna and flora, wetlands, floodplains).
☐	Public participation information.
☐	List of documents consulted.
☐	Water quality test results.
☐	Infiltration/inflow analysis results

C

USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Canyon Area, Idaho

CHA

December 21, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

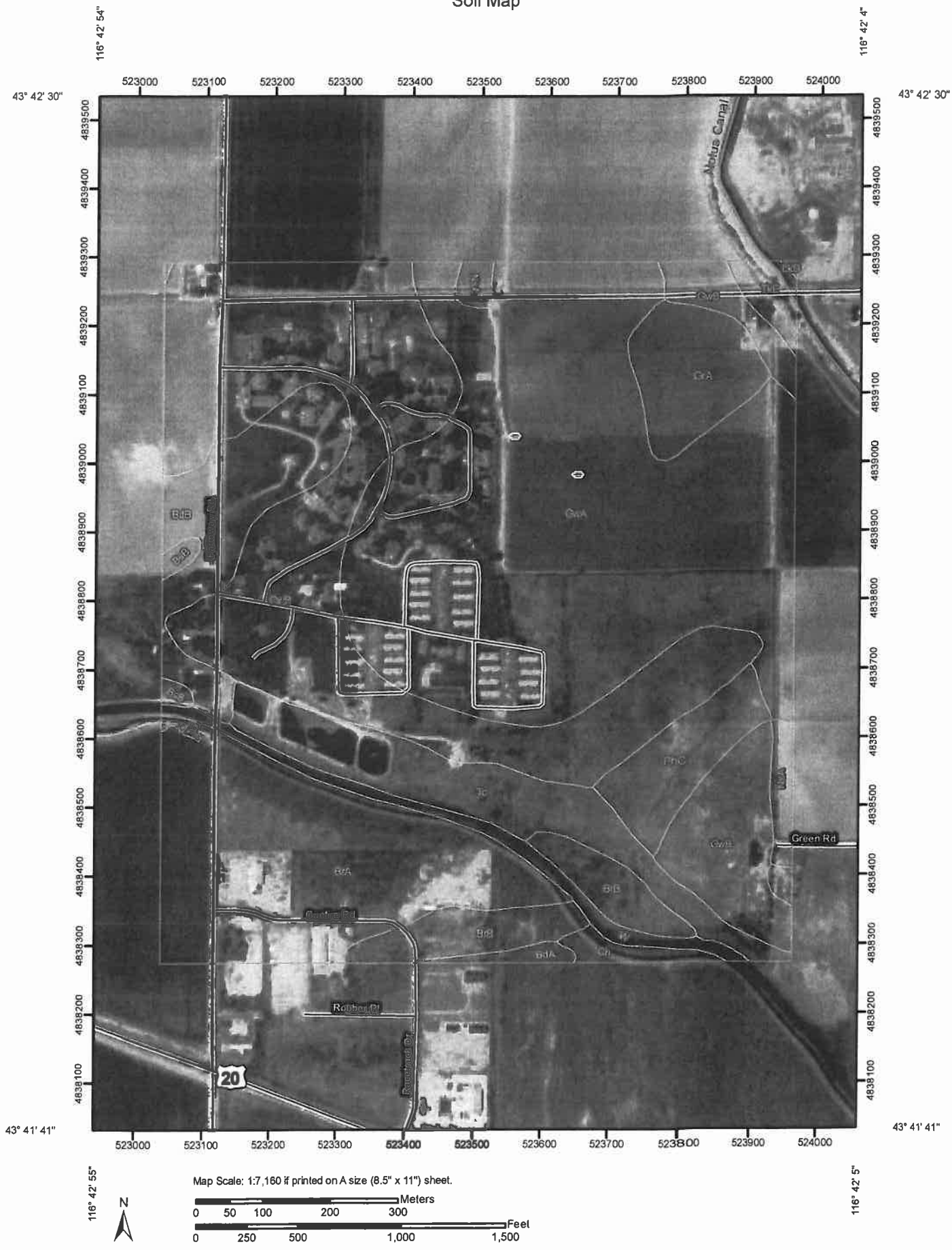
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:7,160 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Canyon Area, Idaho
Survey Area Data: Version 8, Jun 25, 2008

Date(s) aerial images were photographed: 6/21/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Canyon Area, Idaho (ID665)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BdA	Baldock loam, 0 to 1 percent slopes	0.9	0.4%
BdB	Baldock loam, 1 to 3 percent slopes	12.5	5.4%
BrA	Bram silt loam, 0 to 1 percent slopes	30.7	13.2%
BrB	Bram silt loam, 1 to 3 percent slopes	8.3	3.6%
BsB	Bram silt loam, saline-alkali, 1 to 3 percent slopes	1.2	0.5%
Ch	Chance fine sandy loam	1.4	0.6%
GrA	Greenleaf silty clay loam, 0 to 1 percent slopes	7.7	3.3%
GwA	Greenleaf-Owyhee silt loams, 0 to 1 percent slopes	77.3	33.2%
GwB	Greenleaf-Owyhee silt loams, 1 to 3 percent slopes	64.0	27.5%
LkD	Lankbush-Elijah-Vickery silt loams, 7 to 12 percent slopes	0.1	0.0%
NsA	Nyssaton silt loam, 0 to 1 percent slopes	2.4	1.0%
PhC	Power silt loam, 3 to 7 percent slopes	6.4	2.8%
Tc	Terrace escarpments	14.0	6.0%
TkE	Trevino-Rock outcrop complex, 0 to 20 percent slopes	1.9	0.8%
W	Water	4.0	1.7%
Totals for Area of Interest		232.8	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Canyon Area, Idaho

BdA—Baldock loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 110 to 160 days

Map Unit Composition

Baldock and similar soils: 85 percent

Description of Baldock

Setting

Landform: Stream terraces, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 3w

Typical profile

0 to 16 inches: Loam
16 to 27 inches: Loam
27 to 60 inches: Fine sandy loam

BdB—Baldock loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 6 to 12 inches
Mean annual air temperature: 46 to 54 degrees F
Frost-free period: 110 to 160 days

Map Unit Composition
Baldock and similar soils: 85 percent

Description of Baldock

Setting
Landform: Drainageways, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities
Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.1 inches)

Interpretive groups
Land capability classification (irrigated): 3w
Land capability (nonirrigated): 3w

Typical profile
0 to 16 inches: Loam
16 to 27 inches: Loam
27 to 60 inches: Fine sandy loam

BrA—Bram silt loam, 0 to 1 percent slopes

Map Unit Setting
Elevation: 2,000 to 4,800 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days

Map Unit Composition
Bram and similar soils: 85 percent

Description of Bram

Setting
Landform: Fan remnants, flood plains, lakebeds, river valleys
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 8.0
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 6s

Typical profile

0 to 17 inches: Silt loam
17 to 52 inches: Silt loam
52 to 65 inches: Fine sandy loam

BrB—Bram silt loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,800 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days

Map Unit Composition

Bram and similar soils: 85 percent

Description of Bram

Setting

Landform: Drainageways, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent

Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 8.0
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 6s

Typical profile

0 to 17 inches: Silt loam
17 to 52 inches: Silt loam
52 to 65 inches: Fine sandy loam

BsB—Bram silt loam, saline-alkali, 1 to 3 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,800 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days

Map Unit Composition

Bram, saline-alkali, and similar soils: 90 percent

Description of Bram, Saline-alkali

Setting

Landform: Drainageways, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 6s

Typical profile

0 to 17 inches: Silt loam
17 to 52 inches: Silt loam

52 to 65 inches: Fine sandy loam

Ch—Chance fine sandy loam

Map Unit Setting

Elevation: 2,000 to 4,000 feet
Mean annual precipitation: 8 to 13 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 160 days

Map Unit Composition

Chance and similar soils: 85 percent
Minor components: 5 percent

Description of Chance

Setting

Landform: Depressions, swales, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 5w

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 14 inches: Fine sandy loam
14 to 25 inches: Sandy loam
25 to 62 inches: Sand, gravel

Minor Components

Riverwash

Percent of map unit: 5 percent
Landform: Flood plains

GrA—Greenleaf silty clay loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 2,100 to 3,200 feet
Mean annual precipitation: 7 to 12 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 170 days

Map Unit Composition

Greenleaf and similar soils: 90 percent

Description of Greenleaf

Setting

Landform: Fan remnants, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits and/or loess

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability (nonirrigated): 6c

Typical profile

0 to 8 inches: Silty clay loam
8 to 17 inches: Silty clay loam
17 to 60 inches: Silt

GwA—Greenleaf-Owyhee silt loams, 0 to 1 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 7 to 12 inches

Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 110 to 170 days

Map Unit Composition
Greenleaf and similar soils: 65 percent
Owyhee and similar soils: 25 percent

Description of Greenleaf

Setting
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits and/or loess

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 11.8 inches)

Interpretive groups
Land capability classification (irrigated): 1
Land capability (nonirrigated): 6c

Typical profile
0 to 8 inches: Silt loam
8 to 17 inches: Silty clay loam
17 to 60 inches: Silt

Description of Owyhee

Setting
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits and/or loess and/or silty alluvium

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability (nonirrigated): 6c

Typical profile

0 to 10 inches: Silt loam
10 to 22 inches: Silt loam
22 to 60 inches: Silt loam

GwB—Greenleaf-Owyhee silt loams, 1 to 3 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 7 to 12 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 110 to 170 days

Map Unit Composition

Greenleaf and similar soils: 65 percent
Owyhee and similar soils: 25 percent

Description of Greenleaf

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits and/or loess

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 6c

Typical profile

0 to 8 inches: Silt loam
8 to 17 inches: Silty clay loam
17 to 60 inches: Silt

Description of Owyhee

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits and/or loess and/or silty alluvium

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 6c

Typical profile

0 to 10 inches: Silt loam
10 to 22 inches: Silt loam
22 to 60 inches: Silt loam

LkD—Lankbush-Elijah-Vickery silt loams, 7 to 12 percent slopes

Map Unit Setting

Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 8 to 12 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 100 to 160 days

Map Unit Composition

Lankbush and similar soils: 55 percent
Vickery and similar soils: 20 percent
Elijah and similar soils: 20 percent

Description of Lankbush

Setting

Landform: Fan remnants, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or lacustrine deposits and/or loess

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6e

Typical profile

0 to 14 inches: Silt loam
14 to 50 inches: Sandy clay loam
50 to 60 inches: Sand

Description of Elijah

Setting

Landform: Fan remnants, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits and/or loess and/or alluvium

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6e

Typical profile

0 to 9 inches: Silt loam
9 to 19 inches: Silty clay loam
19 to 22 inches: Silt loam
22 to 40 inches: Cemented material
40 to 60 inches: Very gravelly sand

Description of Vickery

Setting

Landform: Fan remnants, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and/or volcanic ash and/or alluvium derived from igneous rock

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6e

Typical profile

0 to 4 inches: Silt loam
4 to 17 inches: Silt loam
17 to 34 inches: Loam
34 to 47 inches: Cemented material
47 to 60 inches: Coarse sand

NsA—Nyssaton silt loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,700 feet
Mean annual precipitation: 7 to 12 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 170 days

Map Unit Composition

Nyssaton and similar soils: 95 percent

Description of Nyssaton

Setting

Landform: Terraces
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Lacustrine deposits and/or loess and/or silty alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability (nonirrigated): 6c

Typical profile

0 to 11 inches: Silt loam
11 to 60 inches: Silt loam

PhC—Power silt loam, 3 to 7 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,600 feet
Mean annual precipitation: 8 to 12 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 170 days

Map Unit Composition

Power and similar soils: 95 percent

Description of Power

Setting

Landform: Terraces, drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or loess

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.6 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability (nonirrigated): 6e

Typical profile
0 to 9 inches: Silt loam
9 to 17 inches: Silt loam
17 to 60 inches: Silt loam

Tc—Terrace escarpments

Map Unit Setting
Elevation: 2,250 to 4,400 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 100 to 150 days

Map Unit Composition
Terrace escarpments: 100 percent

Description of Terrace Escarpments

Interpretive groups
Land capability (nonirrigated): 7e

Typical profile
0 to 5 inches: Fine sandy loam
5 to 60 inches: Fine sandy loam

TkE—Trevino-Rock outcrop complex, 0 to 20 percent slopes

Map Unit Setting
Elevation: 2,000 to 5,000 feet
Mean annual precipitation: 8 to 11 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 160 days

Map Unit Composition
Trevino and similar soils: 70 percent
Rock outcrop: 20 percent

Description of Trevino

Setting
Landform: Lava plains
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Mixed alluvium and/or loess over bedrock derived from basalt

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6e

Typical profile

0 to 5 inches: Stony loam
5 to 8 inches: Silt loam
8 to 18 inches: Loam
18 to 28 inches: Unweathered bedrock

Description of Rock Outcrop

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 60 inches: Unweathered bedrock

W—Water

Map Unit Composition

Water: 100 percent

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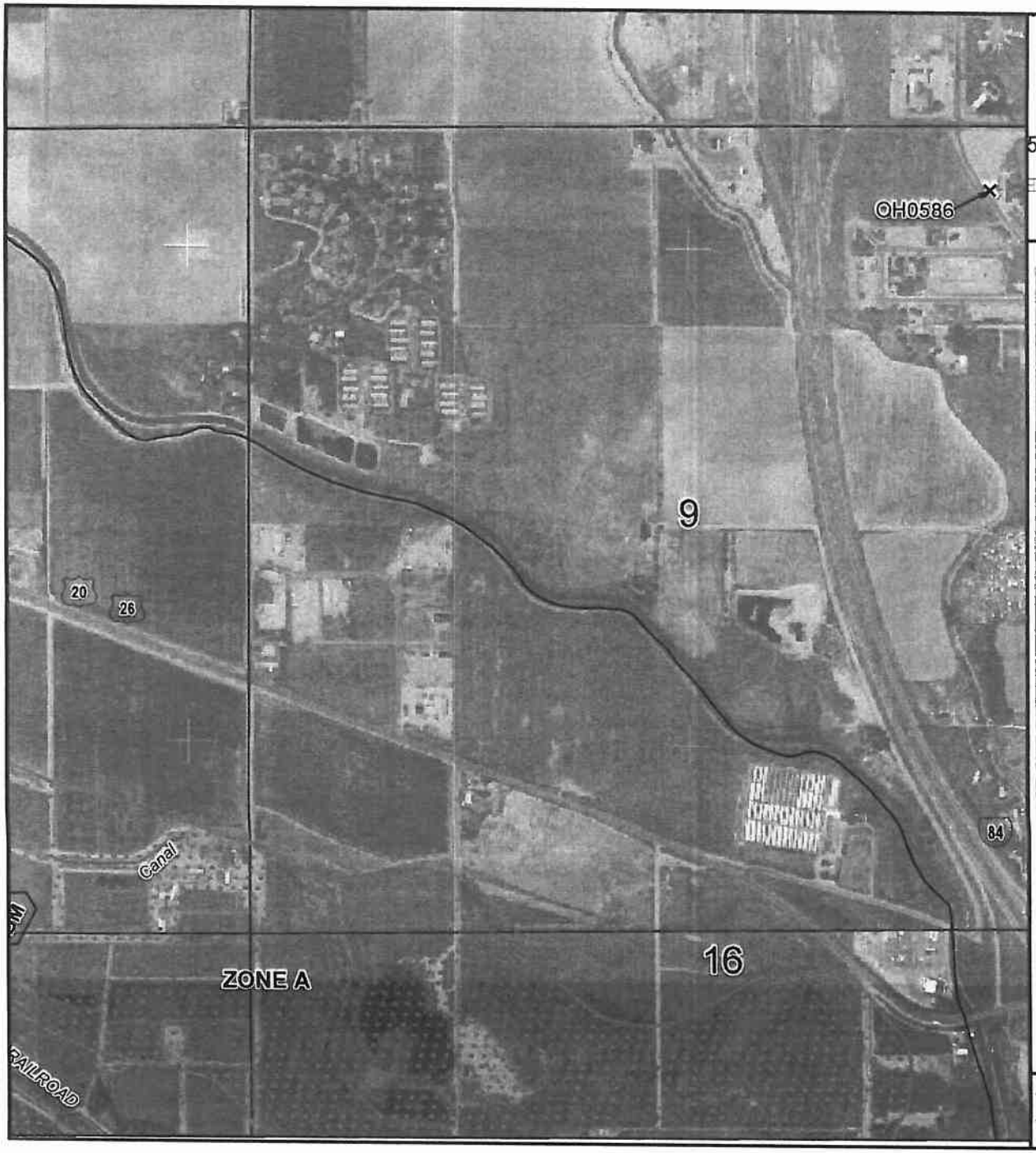
D



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0230F

FIRM

FLOOD INSURANCE RATE MAP

CANYON COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 230 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CANYON COUNTY	160208	0230	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

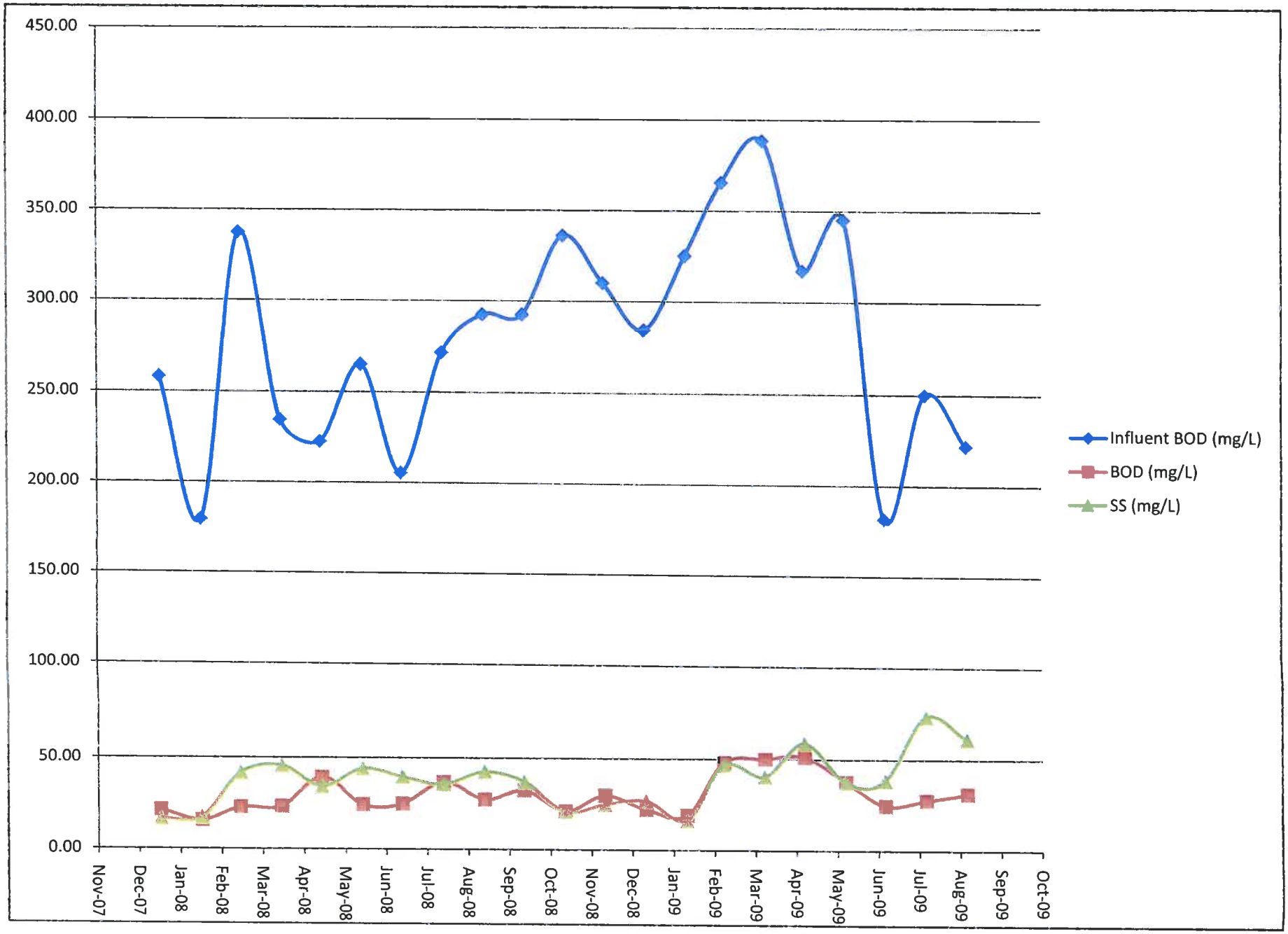
MAP NUMBER
16027C0230F

EFFECTIVE DATE
MAY 24, 2011

Federal Emergency Management Agency

E

Date	Cl2 Total (mg/L)	DO (mg/L)	Fecal Coliform (cfu / 100 mL)	Temp (deg C)	BOD (mg/L)	NH4 (mg/L	NO3 NO2 (mg/L)	O-P (mg/L)	pH (S.U.)	SS (mg/L)	T-P (mg/L)	TKN (mg/L)	Influent BOD (mg/L)
1/2008	1.55	11.75	4.73	2.00	21.00	12.90	4.80	4.30	7.95	16.00	4.77	15.70	258.00
2/2008	1.28	10.00	2.35	5.50	15.50	12.90	1.46	5.00	8.00	17.00	5.20	23.90	179.50
3/2008	0.49	10.50	76.42	9.00	22.50	11.80	1.64	5.49	8.55	41.00	5.60	16.80	337.00
4/2008	1.31	12.00	13.41	9.00	23.00	5.10	1.86	4.26	8.65	45.00	4.80	9.90	234.50
5/2008	0.63	5.75	47.52	16.00	39.00	4.90	1.28	2.87	8.45	33.50	4.14	10.60	222.50
6/2008	1.33	5.00	2.00	19.00	24.00	7.40	0.38	5.23	8.15	43.50	6.00	10.30	265.00
7/2008	1.29	5.50	2.00	22.00	24.50	8.10	0.34	4.09	8.00	39.00	4.50	10.10	205.50
8/2008	0.86	4.00	88.48	21.00	36.50	3.23	0.44	1.90	7.90	35.00	4.50	6.30	271.50
9/2008	1.56	6.00	3.23	16.25	27.00	0.50	0.57	3.65	7.85	42.00	4.20	8.00	292.50
10/2008	1.10	7.25	2.74	11.50	32.00	0.41	0.48	2.49	8.00	36.50	3.54	6.40	292.50
11/2008	1.45	9.50	2.30	7.25	21.00	5.65	1.09	3.18	7.80	20.50	3.93	13.30	336.00
12/2008	1.47	9.50	268.63	4.00	29.50	12.70	1.14	4.27	7.75	24.50	4.78	24.30	310.00
1/2009	1.32	8.00	3.70	3.35	22.00	24.30	0.95	5.84	7.70	26.50	5.60	26.50	284.50
2/2009	1.15	6.50	2.00	4.75	19.00	38.20	0.19	5.05	7.60	16.00	5.26	25.40	325.00
3/2009	1.18	11.50	5.57	7.00	48.00	20.60	1.42	5.03	8.25	46.50	5.20	30.80	365.50
4/2009	0.91	7.25	3.82	13.75	50.00	13.80	1.04	4.51	8.20	40.00	5.03	17.20	388.50
5/2009	1.47	7.50	2.62	15.00	51.00	8.83	1.06	3.65	8.00	58.50	4.86	21.40	317.00
6/2009	1.29	7.00	2.36	20.00	37.50	4.60	0.41	4.66	7.60	37.00	4.68	10.30	345.00
7/2009	1.57	5.50	23.65	22.50	24.50	4.33	0.41	4.27	8.25	38.00	4.45	9.63	182.00
8/2009	1.69	6.00	2.00	23.00	27.50	3.08	0.34	3.80	8.05	73.50	4.33	10.30	250.00
9/2009	0.82	5.50	183.35	17.00	31.00	-	1.41	3.52	7.90	61.00	4.10	8.21	222.00
Max	1.69	12.00	268.63	23.00	51.00	38.20	4.80	5.84	8.65	73.50	6.00	30.80	388.50
Average	1.22	7.69	35.37	12.80	29.81	10.17	1.08	4.15	8.03	37.64	4.74	15.02	280.19
Min	0.49	4.00	2.00	2.00	15.50	0.41	0.19	1.90	7.60	16.00	3.54	6.30	179.50
Count	21	21	21	21	21	20	21	21	21	21	21	21	21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Jul-09
Aug-09
Sep-09
Oct-09
Influent BOD (mg/L)
BOD (mg/L)
SS (mg/L)

F

Current Conditions Ten State Standard Model

2.68 lbs of O2 treat 1 lbs of BOD
Mechanical surface aerators produce 2.0 - 2.5 lbs O2/hp-hour

No. of Aerators =	3	1
Aerator Horsepower (hp) =	3	5
hours of operation/day =	24	24
hp-hours /day =	216	120
lbs O2/hp-hour =	2	2
lbs O2 per day =	**432**	**240**
lbs BOD treated per day =	**161**	**90**

Total lbs BOD treated per day = **251**

4.3 lbs of O2 nitrify 1 lbs of ammonia
Mechanical surface aerators produce 2.0 - 2.5 lbs O2/hp-hour

No. of Aerators =	3	1
hp/aerator =	3	5
hours of operation/day =	24	24
hp-hours/day =	216	120
lbs O2/hp-hour =	2	2
lbs O2 per day =	**432**	**240**
lbs Ammonia Nitrified per day =	**100**	**56**

Total lbs Ammonia Nitrified per day = **156**

Ave. Temp =	12.8 °C	
Ave. Temp =	55.04 °F	
Q_{ave} =	0.12 MGD	
Vol. reduction factor =	1	
Lagoon Volume =	2.81 MG	23.41667
HRT (t) =	23.4 days	
Ave Influent BOD_5 =	280.19 mg/L	(1/2008 - 9/2009)
Ave effluent BOD_5 =	29.81 mg/L	(1/2008 - 9/2009)
% BOD_5 removed =	89.4 %	
BOD_5 removed =	250.38 mg/L	
BOD_5 removed =	251 lbs/d	

$$t = \frac{E}{2.3k_1(100 - E)}$$

k_1 = 0.16 (0.12/d @ 68°F and 0.06/d @ 34°F)

Future Conditions Ten State Standard Model

1.60 lbs of O2 treat 1 lbs of BOD
Mechanical surface aerators produce 2.0 - 2.5 lbs O2/hp-hour

No. of Aerators =	3	1
Aerator Horsepower (hp) =	3	5
hours of operation/day =	24	24
hp-hours /day =	216	120
lbs O2/hp-hour =	2	2
lbs O2 per day =	**432**	**240**
lbs BOD treated per day =	**270**	**150**

Total lbs BOD treated per day = 420

4.3 lbs of O2 nitrify 1 lbs of ammonia
Mechanical surface aerators produce 2.0 - 2.5 lbs O2/hp-hour

No. of Aerators =	3	1
hp/aerator =	3	5
hours of operation/day =	24	24
hp-hours/day =	216	120
lbs O2/hp-hour =	2	2
lbs O2 per day =	**432**	**240**
lbs Ammonia Nitrified per day =	**100**	**56**

Total lbs Ammonia Nitrified per day = 156

Ave. Temp =	12.8 °C	
Ave. Temp =	55.04 °F	
Q_{ave} =	0.20 MGD	
Vol. reduction factor =	1	
Lagoon Volume =	2.81 MG	23.41667
HRT (t) =	14.1 days	
Ave Influent BOD_5 =	280.00 mg/L	
Ave effluent BOD_5 =	30.00 mg/L	
% BOD_5 removed =	89.3 %	
BOD_5 removed =	250.00 mg/L	
BOD_5 removed =	417 lbs/d	

$$t = \frac{E}{2.3k_1(100 - E)}$$

k_1 = 0.26 (0.12/d @ 68°F and 0.06/d @ 34°F)

PHARMER ENGINEERING
1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: CHA
Prepared By: JN
Description: Lift Station Pump Size
Date & Time: 8/5/2011 10:03

Horsepower Requirements

z1 (Pump station) =	2,350 ft	ground elevation (Facility plan)	
z2 (WWTF) =	2,355 ft	ground elevation (google earth = 2354)	
ΔZ =	20 ft		
Pipe Diameter =	5.814 in	5.814 in	
Qave =	200,000 gpd		
Qave =	139 gpm		
Peaking Factor =		3.6	
Qmax =		498 gpm	
Velocity =	1.7 fps	6.0 fps	
Hazen Williams C =	120	120	
Pipe Length =	9,125 ft	9,125 ft	
h_f per 100 ft =	0.3 ft	2.8 ft	friction loss/100 ft
Total h_f =	24 ft	256 ft	total friction loss
h_L (assumed) =	10.0 ft	10.0 ft	local loss
TDH =	54.0 ft		average
TDH =		285.9 ft	max

$$h_f = \frac{0.2083\left(\frac{100}{C}\right)^{1.852} Q^{1.852}}{d_h^{4.8655}}$$

$$Hp = \frac{Sg \cdot Q \cdot TDH}{3960(e_P \cdot e_M)}$$

$$TDH = h_f + h_L + \Delta z$$

6-inch SDR 17 ID =	5.814
8-inch SDR 17 ID =	7.570

PHARMER ENGINEERING LLC
1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: CHA
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Description: Lift Station Pump Size
Date & Time: 8/5/2011 10:03

Horsepower Requirements

z1 (Pump station) =	2,350 ft	ground elevation (Facility plan)	
z2 (WWTF) =	2,355 ft	ground elevation (google earth = 2354)	
ΔZ =	20 ft		
Pipe Diameter =	7.570 in	7.570 in	
Qave =	200,000 gpd		
Qave =	139 gpm		
Peaking Factor =		3.6	
Qmax =		498 gpm	
Velocity =	1.0 fps	3.6 fps	
Hazen Williams C =	120	120	
Pipe Length =	9,125 ft	9,125 ft	
h_f per 100 ft =	0.1 ft	0.8 ft	friction loss/100 ft
Total h_f =	7 ft	71 ft	total friction loss
h_L (assumed) =	10.0 ft	10.0 ft	local loss
TDH =	36.7 ft		average
TDH =		100.9 ft	max

$$h_f = \frac{0.2083\left(\frac{100}{C}\right)^{1.852} Q^{1.852}}{d_h^{4.8655}}$$

$$Hp = \frac{Sg \cdot Q \cdot TDH}{3960(e_P \cdot e_M)}$$

$$TDH = h_f + h_L + \Delta z$$

6-inch SDR 17 ID =	5.814
8-inch SDR 17 ID =	7.570

Project: CHA Lift Station and Force Main

Pump Hp Required

Item	Equipment	Total No Units	Design Capacity	Design TDH or Discharge Pressure	Pump Efficiency @ Design Duty Point	Input Power at Design Capacity (break horse power)	Pipeline Size	No. Units Operating	Operating Capacity	Operating TDH or Discharge Pressure	Pump Efficiency @ Operating Duty Point	Input Power at Operating Capacity (break horse power)	Motor Efficiency	VFD / Starter Efficiency	Total Input horsepower
	LS to WWTP														
	6-inch forcemain	1	498 USgpm	286.00 ft	50.0%	71.9 BHP	6-inch forcemain	1	139 USgpm	54.00 ft	50.0%	3.8 BHP	91.0%	97.0%	4 hp
	8-inch forcemain	1	498 USgpm	100.00 ft	50.0%	25.2 BHP	6-inch forcemain	1	498 USgpm	286.00 ft	50.0%	71.9 BHP	91.0%	97.0%	81 hp
							8-inch forcemain	1	139 USgpm	36.70 ft	50.0%	2.6 BHP	91.0%	97.0%	3 hp
							8-inch forcemain	1	498 USgpm	100.00 ft	50.0%	25.2 BHP	91.0%	97.0%	28 hp

G

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

TSP&S-175/2009

September 18, 2009

Mike Dittenber
Caldwell Housing Authority
22730 Farmway Road
Caldwell, Idaho 83607

RE: Caldwell Housing Authority – Ponds 1 through 3 *(Caldwell, Canyon County)*
Lagoon Seepage Testing Procedures

Dear Mr. Dittenber:

The Wastewater Rules (IDAPA 58.01.16) require the procedure for performing a seepage test be approved by DEQ prior to commencement of testing. In accordance with §493.02 of the Wastewater Rules, the proposed testing procedures were submitted to DEQ for review. This procedure appears to meet the state of Idaho standards, and is approved based on the conditions listed below.

I. STANDARD CONDITIONS:

A. All conditions of this letter must be met. Supporting reports or documents are considered to be part of the approved documents.

B. No work may begin until a copy of this approval letter and the seepage testing procedure bearing the DEQ approval stamp are delivered to and kept on the job site. The system owner must ensure that the contractor, the inspector, and/or the certifying engineer are aware of the approval conditions.

C. This approval will be voided if testing is not completed by September 18, 2010. Furthermore this test procedure may not be utilized for other lagoons or other locations without DEQ's prior written approval.

D. No deviations can be made from the approved seepage testing procedure without DEQ's prior written approval.

II. PROJECT SPECIFIC CONDITIONS:

A. The tests must be performed for a minimum of 15 days and must be continued until a consistent pattern is evident. A consistent pattern is established when the calculated seepage for one day (using the average of the readings for the test period) is within 20% of the calculated seepage for the four other test periods.

B. The procedure states that hydraulic operating level of the lagoons will be lowered to below the level of the liner such that leakage out of unlined areas is not a factor for consideration in the leak testing. As such, the maximum allowable operating level for each of the lagoons will be the hydraulic operating level during the seepage test. The tests will not demonstrate that the lagoons are able to pass a seepage test above that operating level.

Memo

1998 W. Judith Lane
Boise, Idaho 83705
Phone (208) 433-1900
Fax (208) 433-1901
www.pharmereng.com

To: Mark Mason
Idaho DEQ
1445 N. Orchard
Boise, ID 83706

CC: Mike Dittenber – Caldwell Housing Authority

From: Carl Hipwell – Pharmer Engineering

Date: September 16, 2009

Re: Caldwell Housing Authority – Ponds 1 thru 3 Lagoon Seepage Test Procedure Submittal

APPROVED
By: _____
IDAHO DEQ
Boise Regional Office
Date: 9/17/09

PROFESSIONAL ENGINEER REGISTERED 10816 9-16-09 STATE OF IDAHO CARL W. HIPWELL

Introduction

The Caldwell Housing Authority (CHA) currently has 3 wastewater lagoons that need to be tested per IDEQ regulation. The Caldwell Housing Authority has been working with Pharmer Engineering on a plan to complete lagoon testing prior to the State mandated seepage test deadline. Recently, the testing schedule has become critical due to potential leakage observed in the lagoon system.

The following describes the proposed hydrostatic leak testing procedure for the existing ponds. We understand that the allowable seepage rate for existing municipal lagoons constructed prior to April 15, 2007 is ¼- inch per day or less (IDAPA 58.01.16.493). Lagoons constructed after this date are allowed one-half this seepage. Therefore, the existing ponds will be required to pass the allowable leakage criteria of less than ¼ – inch per day.

The procedure for leak testing is to eliminate inflow and outflow of the respective pond prior to testing to alleviate flow measurement inaccuracies from skewing the results. Due to the hydraulics

of the facility, only pond #1 and #3 can be isolated. Ponds 1 and 3 will be leak tested simultaneously. Pond #2 will require flow measurement to calculate seepage.

If the following equipment and procedures are acceptable to IDEQ then Pharmer Engineering and the Caldwell Housing Authority requests approval to proceed with the hydrostatic leak testing as described below.

Protocol

The CHA lagoons have two issues that appear to be related. The first concern is that lagoon #1 and #2 has a hypalon liner that does not extend above the water surface in certain areas (see Figure 3 and 4) due to the hydraulic operating level of the lagoon treatment system. Secondly, there appears to be water leaking from the lagoons into the adjacent canal (see Figures 1 and 2), which may be attributed to operating level and/or leakage thru the liner walls and bottom. Individual seepage tests will provide an estimate of the flow escaping through the lagoon wall and help further assess the risk of deteriorating the integrity of the lagoon wall. The hydraulic operating level of the lagoons will be lowered to below the level of the liner such that leakage out of unlined areas is not a factor for consideration in the leak testing.

Ponds #1 and #3 will be hydraulically isolated from the system and be tested simultaneously. Influent flow into pond #2 will be measured by an existing Parshall flume, which is perhaps the most commonly used open-channel flow measuring device. The flume has a 3-inch throat diameter and operates in non-submerged flow conditions. Flow will be calculated using standard Parshall flume equations by measuring the water depth upstream of the critical depth in the flume. Head on the flume will be measured by installing a HydroRanger 200 ultrasonic transducer with an accuracy of 0.25%. Effluent will be measured by the existing V-notch weir. Upstream head on the weir is recorded by an American Sigma, ultrasonic transducer, model 4030-01, with an accuracy of 0.20% of range or 0.12", whichever is greater. Most academic publications recognize V-notch weirs among the most accurate open channel constrictions for measuring flow.

Pressure transmitters, evaporation pans and other equipment will be located onsite as shown in Figure 6. Pressure transducers will be installed on the pond embankment in a secured in angled stilling wells. The stilling well will be fasted to several 8" x 8" x 16" cinderblocks which will lay on the embankment from the top of the pond wall down into the water. This will allow the stilling well and pressure transmitter to not be effected by the thermal expansions/contractions of the liner. The stilling well and pressure transmitter cable will also be secured at the top of the embankment to a 6' studded T-post. The stilling well will be marked in reference to the cinderblocks to ensure no movement of the stilling well or pressure transmitter. Non-vertical installation of the pressure transmitters being used by Pharmer Engineering does not introduce an additional margin of error in relative water depth readings. The manufacturer has confirmed that the transmitter will maintain the published accuracy of ±0.25% in non-vertical installations when used for relative water depth readings.

CHA Lagoons:

Cell 1

Surface Dimensions:	~ 170' x 150'
Area:	0.585 acres (25,500 sf)
Estimated Volume:	0.68 M gallons (full)

Cell 2	
Surface Dimensions:	~ 395' x 170'
Area:	1.542 acres (67,150 sf)
Estimated Volume:	1.4 M gallons (full)
Cell 3	
Surface Dimensions:	~ 175' x 130'
Area:	0.522 acres (22,750 sf)
Estimated Volume:	0.73 M gallons (full)

General

This seepage testing plan is based on the requirements of IDAPA 58.01.16.493 and as defined in the January 22, 2002 IDEQ memorandum entitled ***"Procedure for Evaluating Wastewater Treatment Lagoon Seepage Rates"*** and the April 16, 2007 draft revision to the referenced procedures.

IDAPA 58.01.16.493 requires the following:

- That leak test results be stamped by an Idaho licensed professional engineer unless otherwise specified.
- Allowable leakage shall be equal to or less than 0.25 inches per day.

Seepage Testing Procedures

One (1) class A evaporation pan, one (1) rain gauge and one (1) temperature recorder will be used to monitor onsite ambient conditions. The data recorder can connect to four (4) pressure transducers, thus enabling Pharmer Engineering to test several lagoons at once.

Lagoon #1:

The influent flow will be diverted into pond 2, hydraulically isolating pond 1.

Lagoons #2 and #3:

Flow cannot be diverted around lagoons #2 and #3. As such, flow measurement provided as described in the Protocol.

Lagoon Testing

Lagoon level measurements will be recorded every day over a fifteen day period (days 0, 3, 6, 9, 12, 15) or longer until a consistent pattern is evident. One individual will be responsible for all measurements and the measurements will be taken at the same hour of each day. Pond level measurements will be taken over the testing period until a consistent pattern is evident. The measurements will be taken and recorded by a pressure transducer level measurement. The pressure transducer will be located in a prefabricated stilling well which will be inserted into the lagoon as described in the protocol.

Equipment

1. Precipitation gauge (manual) accurate to 0.01 inches –Normal site visits will occur every three days. If precipitation occurs in the area of the test, the site will be visited daily.

2. Air temperature recording will be done Hobotemp weatherproof data logger. The temperature recorder will be located at the treatment pond and placed in a radiant heat shield to reduce the impacts from direct sunlight on the temperature probe. The heat shield will be constructed of two sections of PVC, (2-inch and 4-inch diameters). The pipes will have holes drilled in them and will be mounted concentrically with the temperature prob mounted on the middle.

3. Class A evaporation pan and pan stilling well supported six inches above existing ground. The evaporation pan will be located on a level area as close to Pond No. 1 as possible. The evaporation pan will be set level and put on a wooden pallet to allow for ventilation under the pan. The pan will be placed in position and not moved during the test period.

   The initial water level in the evaporation pan will be 2-inches below the lip. The water level in the pan will be maintained between 2 to 3 inches below the lip. Water surface elevation in the evaporation pan will be measured with a hook gauge stilling well. The hook gauge will be read every third day until the test has been concluded. Seven measurements will be made with the hook gauge and numerically averaged at each of the three day measurement intervals.

4. Liquid surface measuring equipment to measure lagoon surface elevation

   - A PMC VL2000 pressure transmitter with 0.1% FS accuracy and a 0-10" water column range will be used to measure the lagoon surface elevation. The manufacturer's equipment specification sheet is included with this procedure. The 0-10"WC VL2000 offers accuracy of .000833 ft. The VL2000 is equipped with a vented cable, and therefore does not require barometric pressure correction. The sensor will be checked for a zero reading prior to deployment and will be recalibrated using the associated software if necessary. Data collection will be performed by a Dynotek Data Manager 2000. The data logger will be configured to collect a burst of measurements every day at the same time. The burst of measurements will occur for two minutes with a logging rate of 1 per second for a total of 120 measurements.
   - The sensor will be placed in a stilling well to prevent results from being skewed by wind and wave action and the stilling well will secured in a prefabricated stilling well and installed in the lagoon. The installation will be marked to ensure than the sensor does not move during the test. Any potential movement of the sensor will be visible manually and will be visible in the data by a step change in sensor pressure reading.

Additional Description

The precipitation gauge will be monitored daily.

The evaporation pan will be located adjacent to the corresponding lagoon system. The evaporation pan will be set level and put on a wooden pallet to allow for ventilation under the pan. The pan will be placed in position and not moved during the test period.

The VL2000 pressure transmitter will be placed in the respective pond with the cable being secured at the perimeter of the lagoon. The level will be recorded at the same time every day for 15 days. The data logger will be configured to take 120 measurements over a two minute period, and then turn off for the remaining portion of the 24 hour period. An average of the 120 measurements will be used as the

measurement data point to eliminate measurement errors caused by wave action. All electronic data will be submitted with the testing report.

The manual hook gauge reading in the evaporation pan will be taken daily until a consistent pattern is evident. The 20% definition of a consistent pattern will be used to determine when to stop the test.

The test will be conducted for five, 3-day measurement intervals or until a consistent pattern is evident. The 20% definition of a consistent pattern will be used to determine when to stop the test.

All raw data will be submitted to DEQ along with results calculated using the electronic **"Standard Format Calculation Spreadsheet"** provided by DEQ.

Definitions

C	Correction factor for excessive rainfall
S_{r1}	Seepage rate in inches per day.
S_{r2}	Seepage rate in gallons per acre per day.
E_{s0}	Lagoon surface elevation, day 0 in inches.
E_{sn}	Lagoon surface elevation, day n in inches.
ES	Lagoon surface elevation change in inches (E_{s0} - E_{sn}). Positive if the n day surface is lower than day 0; negative if the n day surface is higher than day 0.
I_L	Net lagoon evaporation which is calculated from the net corrected pan evaporation in inches (may be a positive or negative number).
Q	Net effluent flow in inches. May be positive (effluent > the influent flow) or negative (effluent < than influent flow). Value is zero if influent and effluent flows are blocked. (See equation on the next page).
n	Time in days.
P	Pan coefficient from Table 1.
E_{pan0}	Evaporation pan surface elevation, day 0 in inches.
$E_{pan\,n}$	Evaporation pan surface elevation, day n in inches.
Qinf	Totalized Flow into lagoon
Qeff	Totalized Flow out of lagoon
DIF	Differential flow (Qinf-Qeff)/7.48/LA/12
LA	Lagoon surface area in square feet

At a minimum, the following information should be recorded each time measurements are taken: date, time, air temperature, lagoon surface elevation (E_s), pan surface elevation (E_{pan}), precipitation, influent flow, and effluent flow. Then, the overall seepage rate for the testing period can be calculated using the following equations:

Seepage Rate Calculations

Seepage Equation 1: $$S_{r1} = \text{Precipitation} + \frac{ES - I_L}{n} + DIF = \frac{\text{inches}}{\text{day}}$$

Where: $ES = E_{s0} - E_{sn} = \text{inches}$

$I_L = C \times P[\text{precipitation} + E_{pan0} - E_{pan\,n}]$

$$Q = \frac{(\text{effluent flow - influent flow in gallons})\,(ft.^3)\,(12\ in)}{(\text{lagoon surface area } ft.^2)\,(7.48\ gals.)\,(ft.)} = \text{inches}$$

$$C = \frac{n \text{ (hours)} - \text{precipitation (hours)}}{n \text{ (hours)}}$$

= 1 unless precipitation event > 4 hours

Table 1

Evaporation Pan Coefficient, P

Mean Air Temp F	Pan Coeff P
30	1.0000
31	0.9906
32	0.9812
33	0.9718
34	0.9624
35	0.9530
36	0.9438
37	0.9346
38	0.9254
39	0.9162
40	0.9070
41	0.8976
42	0.8882
43	0.8788
44	0.8694
45	0.8600
46	0.8508
47	0.8416
48	0.8324
49	0.8232
50	0.8140
51	0.8046
52	0.7952
53	0.7858
54	0.7764
55	0.7670
56	0.7578
57	0.7486

Mean Air Temp F	Pan Coeff P
60	0.7210
61	0.7116
62	0.7022
63	0.6928
64	0.6834
65	0.6740
66	0.6648
67	0.6556
68	0.6464
69	0.6372
70	0.6280
71	0.6186
72	0.6092
73	0.5998
74	0.5904
75	0.5810
76	0.5720
77	0.5630
78	0.5540
79	0.5450
80	0.5360
81	0.5264
82	0.5168
83	0.5072
84	0.4976
85	0.4880

Figure 1: Potential seepage in canal bank from CHA lagoons.

Figure 2: Potential seepage in canal bank from CHA lagoons.

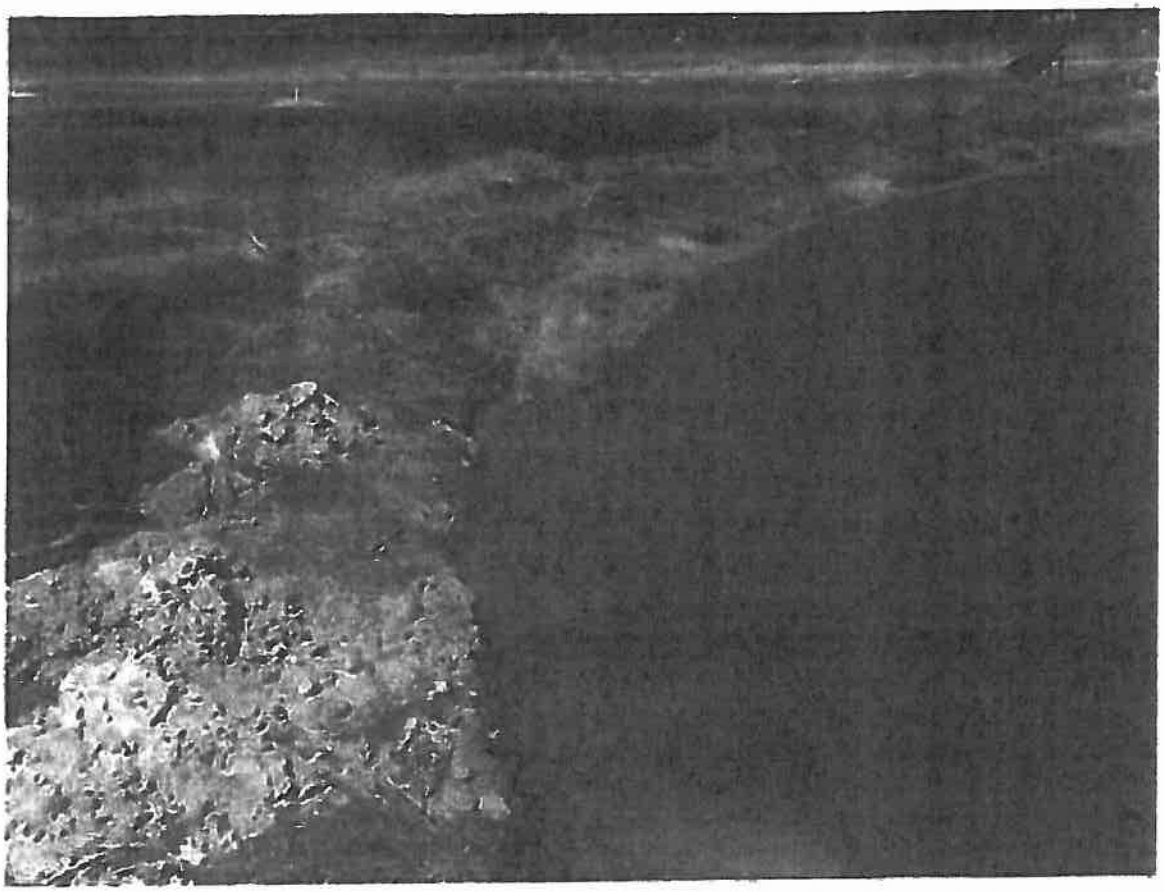


Figure 3: water surface above liner in pond 1

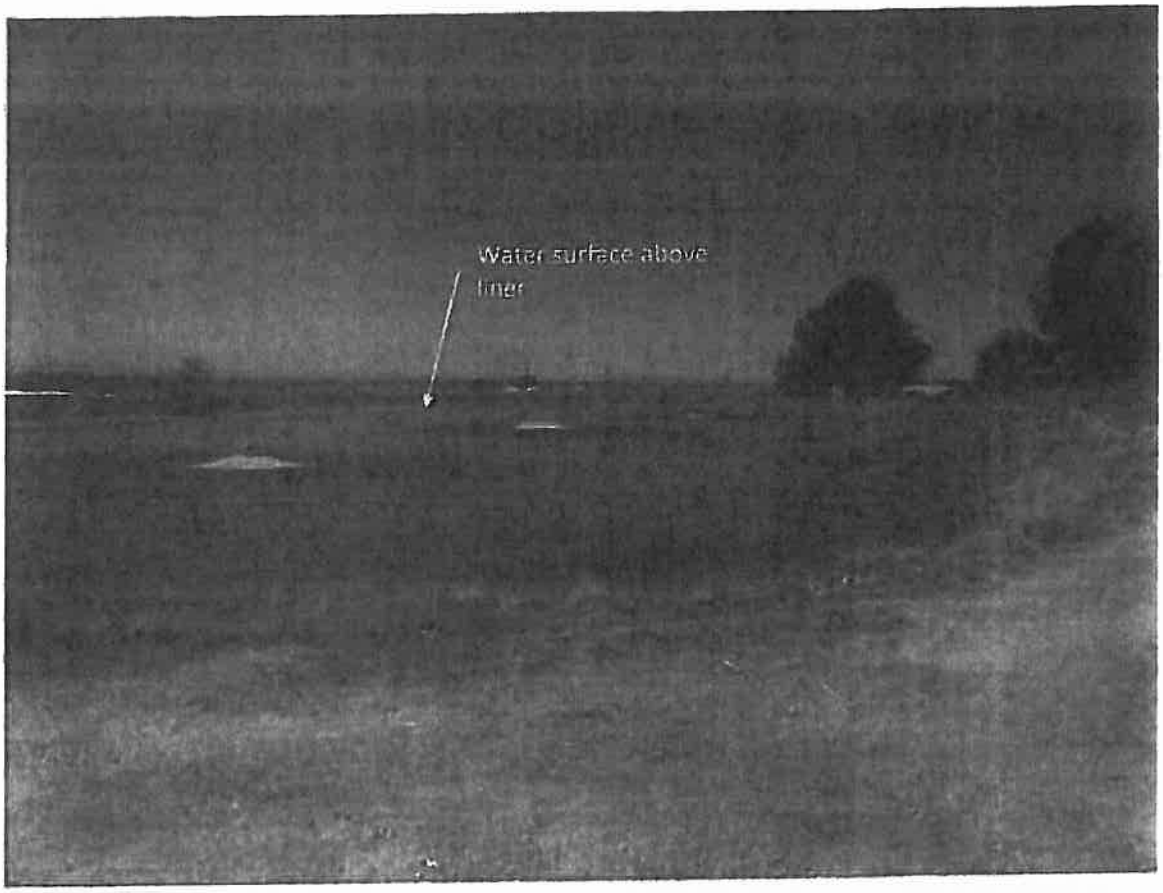


Figure 4: Lagoon #2

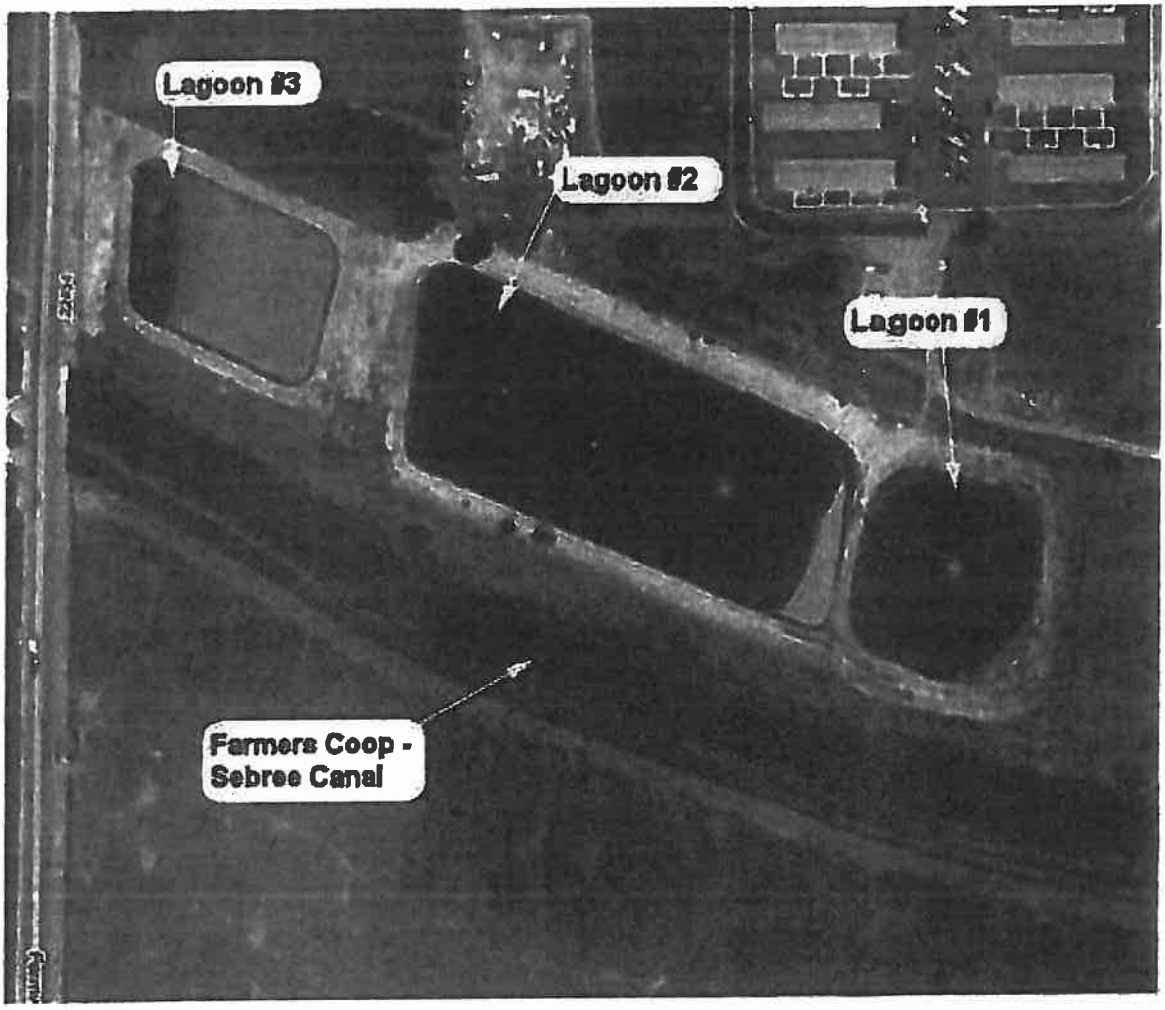


Figure 5: Lagoon configuration

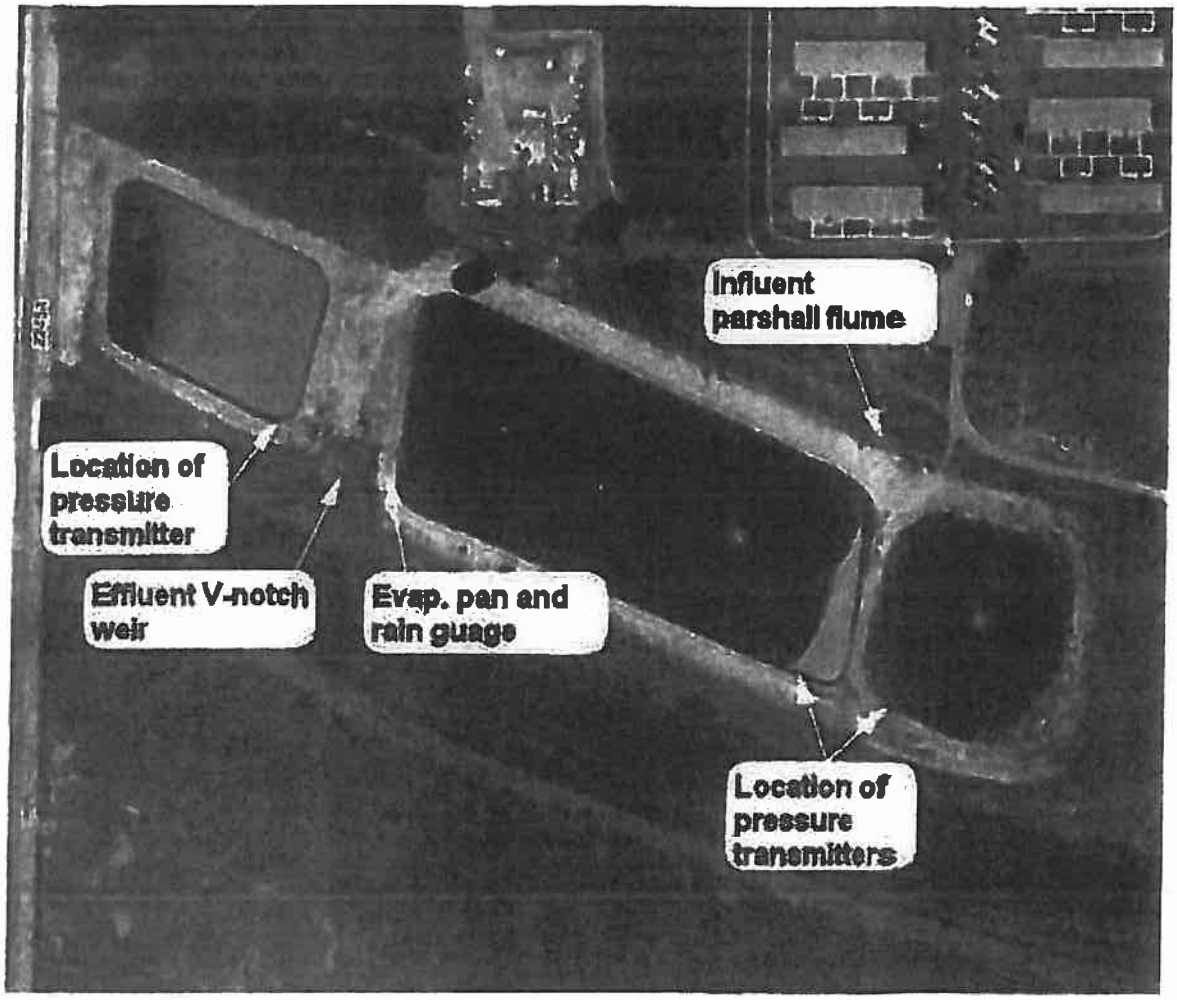


Figure 6: Location of instrumentation

H

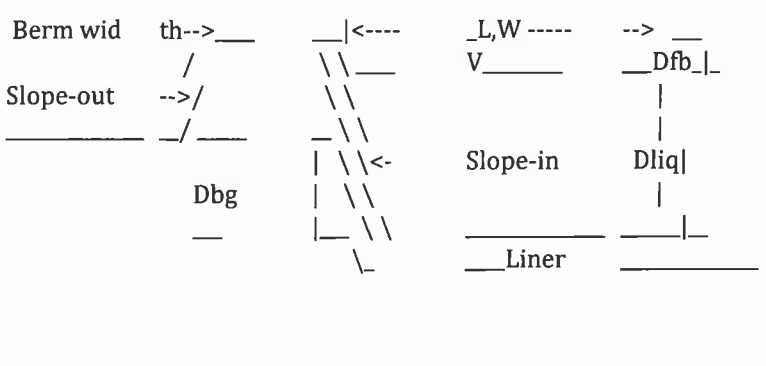
LAGOON SIZING CALCULATIONS

Project: CHA Winter Storage Lagoon
No.: SAMPLE CALCULATION
Case:

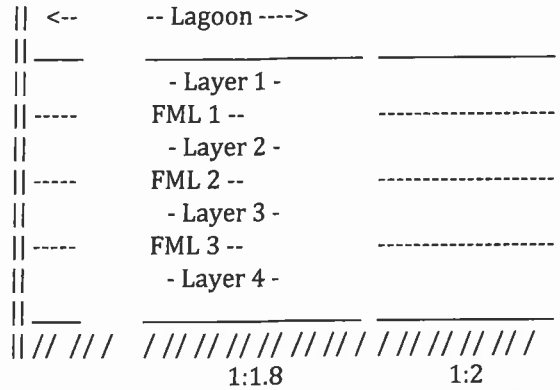
2 months Summer Q = 200,000 gpd
Required Volume = 30.00 MG

INPUT SECTION

LAGOON CROSS-SECTION



LINER DETAILS



Length at Top Rim	(Inside)	Lt =	770	ft.	630 700
Width at Top Rim	(Inside)	Wt =	350	ft.	
Depth of liquid (Max)		Dliq =	20.00	ft.	Aver Grade Elv. 100
Depth of liquid (Min)		Dmin =	6.00	ft.	Top of lagoon 103.00
Depth of free-board		Dfb =	3.00	ft.	Top of lagoon 3.00
Depth below existing grade		Dbg =	10.64	ft.	
Slope - Inside Lagoon: 1 Vertical to			2.50	Horizontal	
- Outside Berm: 1 Vertical to			3.00	Horizontal	
Berm top width		Wb =	10.0	ft.	
Flow rate into lagoon		Q =	139	gpm =	0.200 MGD

LINER SPECIFICATION:

Thickness of First layer	T1 =	0.00	ft.
First Flex. Memb. Liner (Y/N)		1	<-- (Yes = 1, No = 0)
Thickness of Second layer	T2 =	0.00	ft.
Second Flex. Memb. Liner (Y/N)		1	<-- (Yes = 1, No = 0)
Thickness of Third layer	T3 =	0.00	ft.
Third Flex. Memb. Liner (Y/N)		0	<-- (Yes = 1, No = 0)
Thickness of Fourth layer	T4 =	0.00	ft.
Total Liner System Thickness =		0.00	ft.

LAGOON SIZING CALCULATIONS

Project: CHA Winter Storage Lagoon
No.: SAMPLE CALCULATION
Case:

2 months Summer Q = 200,000 gpd
Required Volume = 30.00 MG

DESIGN CALCULATIONS

Volume (Max. Liq)	Vmax =	30.183	MG =	4,035.2	1000 ft3	
			=	92.63	acre-ft	
Vertical Wall Height (liquid)		0	ft (Add freeboard height to			
Volume in Vertical Wall Zone		0.000	MG this number)			
Total Lagoon Volume		**30.18**	**MG**			
Volume (Min. Pool)	Vmin =	7.5208	MG =	1,005.45	1000 ft3	
Hydraulic Residence Time	HRT =	150.915	days			
- A Min. Depth	HRTmin =	37.604	days			
Working Freeboard Height	=	3.00	ft			
Berm Height	=	12.36	ft			
Berm Top Total Length	=	2,260	ft			
Berm Top Surface Area	=	2,511	sq yds			
Inside Slope Area (RipRap)	=	13,831	sq yds			
Total Excavation	=	70,371	cu yds	70,371		
Berm Fill (UnCorrect for liner)	=	46,216	cu yds			
Berm Fill (Corrected for liner)	=	46,216	cu yds	55,459	**Compaction Factor**	
Total Liner Fill	=	0	cu yds			
Total Fill	=	46,216	cu yds		**20%**	
			Excess Fill	14,912	cy	

LINER:

First Layer Fill	L1 =	-	cu yds	**Top Soil (cy)**	**7,108**	
Second Layer Fill	L2 =	0	cu yds			
Third Layer Fill	L3 =	0	cu yds			
Fourth Layer Fill	L4 =	0	cu yds			
FML 1 Area	FML1 =	0	sq yds	-	ft2	
FML 2 Area	FML2 =	0	sq yds	-	ft2	
FML 3 Area	FML3 =	None	sq yds			
Cover Area		31,200	sq yds	280,800	ft2	

LAGOON SIZING CALCULATIONS

Project: CHA Winter Storage Lagoon
No.: SAMPLE CALCULATION
Case:

2 months Summer Q = 200,000 gpd
Required Volume = 30.00 MG

DIMENSIONS

FINISHED DIMENSIONS:				
Berm Toe:	Length	=	864	ft
	Width	=	444	ft
	Area	=	383,812	sq ft
		=	8.811	acres
Top Edge:	Length	=	790	ft
(Outside)	Width	=	370	ft
	Area	=	292,300	sq ft
Top Edge:	Length	=	770	ft
(Inside)	Width	=	350	ft
	Area	=	269,500	sq ft
At Grade:	Length	=	708	ft
	Width	=	288	ft
	Area	=	204,111	sq ft
Bottom:	Length	=	655	ft
	Width	=	235	ft
	Area	=	153,925	sq ft
LIQUID POOL:				
Liq Surf:	Length	=	755	ft
	Width	=	335	ft
	Area	=	252,925	sq ft
Min Pool:	Length	=	685	ft
	Width	=	265	ft
	Area	=	181,525	sq ft
EXCAVATION:				
Excav Top:	: Length	=	708	ft
	Width	=	288	ft
	Area	=	204,111	sq ft
Excav Bot:	: Length	=	655.0	ft
	Width	=	235.0	ft
	Area	=	153,925	sq ft
	Depth (B. Gr) =		10.641654	ft

Alternative 4

		Alfalfa ET	Effective Precip.
	inches / day	Monthly Average (in.)	Monthly Average (in.)
April	0.21	6.3	1.59
May	0.24	7.2	2.06
June	0.29	8.7	2.30
July	0.28	8.4	0.93
August	0.24	7.2	0.88
September	0.20	6	1.22
October	0.18	5.4	1.51
	Σ Total =	**49.2 in/season**	
	Σ Total =		**10.5 in/season**
Consuption - Effective Precip =		**38.7 in/season**	
Irrigation Water Required (IWR) =		**59.6 in/season**	

Irr. Land requirement =	**44.5**	**acres**
Field size =	1,939,556	ft^2
Square Dimensions (l = w) =	1,393	ft
Field Buffer =	0	ft (Class A effluent)
Field Dimension =	1,393	ft
Hydraulic Land Requirement =	45	acres

Alternative 4

Storage Volume =	30	MG
Summer Q =	200,000	GPD
Land Application Period =	7	months
Σ Land App. Water Volume =	72	MG
Σ Land App. Water Volume =	9,625,668	ft^3
Σ Land App. Water Volume =	221	acre-ft
Ave. Irrigation Q =	238	gpm

Irrigation Efficiency = 65%

Buffer Zones

1,000 ft	public water supply wells
500 ft	private potable water wells
300 ft	inhabited dwellings
100 ft	permanent or intermittent surface water
50 ft	irrigation canals / ditches

Alfalfa Production =	6	ton / acre
Irrigable Acreage =	45	acres
Water Volume Applied =	72	MG

I. Nitrogen

Alfalfa Nitrogen Uptake =	50.4	lbs N / ton
Calculated Nitrogen Uptake =	13,465	lbs / year
Annual Nitogen Permit Limit (150% crop uptake)	20,197	lbs / year
Average Nitrogen Loading =	16.10	(mg/L) $-NO_2^- + NO_3^- + TKN$
Nitrogen Applied =	9,666	lbs/year
Allowable - Applied =	10,531	lbs/year
Additional Irrigable Acreage Required for Nitrogen =	**0**	**acres**

II. Total P

Alfalfa Total P Uptake =	4.72	lbs P / ton
Calculated Total P Uptake =	1,261	lbs / year
Average Total P Loading =	4.74	mg/L
Total P Applied =	2,844	lbs/year
Allowable - Applied =	-1,583	lbs/year
Additional Irrigable Acreage Required for Total P =	**55.9**	**acres**

III. COD

Max COD Loading Rate =	50	lbs/acre/day
Average COD Concentration =	67	mg/L *Assumes COD = 2.25 x BOD_5
Average COD Loading =	40,275	lbs/year
Average COD Loading =	4.3	lbs/acre/day
COD Check =	OK	
Constituent Land Requirement =	100.4	acres
Field size =	4,373,303	ft^2
Square Dimensions (l = w) =	2,091	ft
Field Buffer =	0	ft
Field Dimension =	2,091	ft
Land Requirement =	100	acres

Alternative 5

		Alfalfa ET	Effective Precip.
	inches / day	Monthly Average (in.)	Monthly Average (in.)
April	0.21	6.3	1.59
May	0.24	7.2	2.06
June	0.29	8.7	2.30
July	0.28	8.4	0.93
August	0.24	7.2	0.88
September	0.20	6	1.22
October	0.18	5.4	1.51
	Σ Total =	**49.2 in/season**	
	Σ Total =		**10.5 in/season**
Consuption - Effective Precip =		**38.7 in/season**	
Irrigation Water Required (IWR) =		**59.6 in/season**	

Irr. Land requirement =	**26.0 acres**
Field size =	1,131,408 ft^2
Square Dimensions (l = w) =	1,064 ft
Field Buffer =	0 ft (Class A effluent)
Field Dimension =	1,064 ft
Hydraulic Land Requirement =	26 acres

Alternative 5

Storage Volume =	0	MG
Summer Q =	200,000	GPD
Land Application Period =	7	months
Σ Land App. Water Volume =	42	MG
Σ Land App. Water Volume =	5,614,973	ft^3
Σ Land App. Water Volume =	129	acre-ft
Ave. Irrigation Q =	139	gpm

Irrigation Efficiency = 65%

Buffer Zones

1,000 ft	public water supply wells
500 ft	private potable water wells
300 ft	inhabited dwellings
100 ft	permanent or intermittent surface water
50 ft	irrigation canals / ditches

Alfalfa Production =	6	ton / acre
Irrigable Acreage =	26	acres
Water Volume Applied =	42	MG

I. Nitrogen

Alfalfa Nitrogen Uptake =	50.4	lbs N / ton
Calculated Nitrogen Uptake =	7,854	lbs / year
Annual Nitogen Permit Limit (150% crop uptake)	11,782	lbs / year
Average Nitrogen Loading =	16.10	(mg/L) $-NO_2^- + NO_3^- + TKN$
Nitrogen Applied =	5,639	lbs/year
Allowable - Applied =	6,143	lbs/year
Additional Irrigable Acreage Required for Nitrogen =	**0**	**acres**

II. Total P

Alfalfa Total P Uptake =	4.72	lbs P / ton
Calculated Total P Uptake =	736	lbs / year
Average Total P Loading =	4.74	mg/L
Total P Applied =	1,659	lbs/year
Allowable - Applied =	-923	lbs/year
Additional Irrigable Acreage Required for Total P =	**32.6**	**acres**

III. COD

Max COD Loading Rate =	50	lbs/acre/day
Average COD Concentration =	67	mg/L *Assumes COD = 2.25 x BOD_5
Average COD Loading =	23,494	lbs/year
Average COD Loading =	4.3	lbs/acre/day
COD Check =	OK	
Constituent Land Requirement =	58.6	acres
Field size =	2,551,094	ft^2
Square Dimensions (l = w) =	1,597	ft
Field Buffer =	0	ft
Field Dimension =	1,597	ft
Land Requirement =	59	acres

RECAP OF ALTERNATE TOTALS

		Material	Labor & Equip	Material & Labor Total	Total w/ allowance
ALT 1	No Action	$0.00	$0.00	$0.00	$0.00
ALT 2	Plant Improvements w/ Current Discharge	$891,880.00	$497,262.50	$1,389,142.50	$2,111,496.60
ALT 3	Gravity Line To Caldwell WWTP Eliminating Lagoons	$1,060,605.00	$600,765.00	$1,661,370.00	$2,525,282.40
ALT 4	Class "C" Land App. With Winter Storage Lagoon	$2,590,963.10	$1,069,766.85	$3,660,729.95	$5,564,309.53
ALT 5	Class "C" Summer Land App. With Winter Discharge	$1,192,235.00	$580,887.50	$1,773,122.50	$2,695,146.20

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Alt 2. Plant Improvements w/ Current Discharge
Date & Time: 8/5/2011 9:57

Item No.	Description	Quantity	Unit	Total Unit Price Unit Price		Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
			Lift Station					
	Retain Course Screens (rehab & rebuild)	1	ea	$2,500	**$2,500**		$2,500	**$5,000**
	Update SCADA System	1	syst.	$15,000	**$15,000**		$0	**$15,000**
								$0
	Replace Pumps -Submersible Chopper	3	ea	$12,000	**$36,000**	$2,500	**$7,500**	**$43,500**
	Hot Water System on Hose Taps - For Hot Water Clean Up.	1	syst.	$5,000.00	**$5,000**	$1,000.00	$1,000	**$6,000**
	Underground Power (from Road)	310	lf	$50	**$15,500**		**$0**	**$15,500**
	Backup Propane Generator & Concrete Pad - 50kw	1	syst.	$27,400	**$27,400**	$5,000	**$5,000**	**$32,400**
			Lagoons					
	Eliminate Parshall Flume	1	ea	$1,500	**$1,500**	$1,500	$1,500	**$3,000**
	Add 8" Mag Meter w/ Valve Box for Access	1	ea	$2,500	**$2,500**	$500	$500	**$3,000**
	Construct New 12' x 12' CMU Electrical Building	144	sf	$100	**$14,400**		$0	**$14,400**
	Replace All Surface Mechanical Aerators:							**$0**
	5 Horsepower	1	ea	$10,000	**$10,000**		$0	**$10,000**
	3 Horsepower	3	ea	$8,000	**$24,000**		$0	**$24,000**
	Clorine Station Connect to SCADA	1	ea	$1,500	**$1,500**		$0	**$1,500**
	Clorine Contact Basin - Install Roof	400	sf	$60	**$24,000**		$0	**$24,000**
	Replace Discharge Hydro Ranger	1	swag	$5,000	**$5,000**		$0	**$5,000**
	Lagoon Subtotal from Attached Sheet	1	subtotal	$710,080	**$710,080**	$481,763	**$481,763**	**$1,191,843**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$891,880		**$497,263**	**$1,389,143**

ALT. 1 SUBTOTAL	$1,389,143
Allowance @ 20%	$277,829
Contingency @ 15%	$208,371
Engineering & SDC @ 15%	$208,371
Legal and Admin @ 2%	$27,783
TOTAL	**$2,111,497**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Lagoon Dredging and Liner Replacement
Date & Time: 6/28/2011 7:47

Item No.	Description	Quantity	Unit	Unit Price	Total Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	Lagoon Dredging and Liner Replacement							
	Lagoon #1 (685,000 gal. 28,800 s.f.)	28800	sf		$0			$0
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	685000	gal			0.15	$102,750	$102,750
	Remove Liner	31680	sf	1.00	$31,680		$0	$31,680
	Grade Lagoon	36000	sf	2.00	$72,000		$0	$72,000
	Replace Liner	36000	sf	2.00	$72,000		$0	$72,000
							$0	$0
	Lagoon #2 (1,401,750 gal. 64,000 s.f.)	64000	sf		$0		$0	$0
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	1401750	gal			0.15	$210,263	$210,263
	Remove Liner	70400	sf	1.00	$70,400		$0	$70,400
	Grade Lagoon	36000	sf	2.00	$72,000		$0	$72,000
	Replace Liner	80000	sf	2.00	$160,000		$0	$160,000
							$0	$0
	Lagoon #3 (730,000 gal. 32,000 s.f.)	32000	sf		$0		$0	$0
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	730000	gal			0.15	$109,500	$109,500
	Remove Liner	35200	sf	1.00	$35,200		$0	$35,200
	Grade Lagoon	36000	sf	2.00	$72,000		$0	$72,000
	Replace Liner	40,000	sf	2.00	$80,000		$0	$80,000
							$0	$0
	Increase South Lagoon Slope Erosion Control & Stability	60,000	sf	0.50	$30,000	0.75	$45,000	$75,000
							$0	$0
	8" PVC Bypass Pipeline From Lagoon #1 to Lagoon #3	550	lf	18.00		12.00	$6,600	$6,600
	Valve Box for Plug Valve	1	ea	1,500.00	$1,500	1,000.00	$1,000	$2,500
	8" PVC Pipeline	550	lf	22.00	$12,100	11.00	$6,050	$18,150
	8" Plug Valve	1	ea	1,200.00	$1,200	600.00	$600	$1,800
							$0	$0
							$0	$0
					$710,080		$481,763	$1,191,843

LAGOON SUBTOTAL	**$1,191,843**
Allowance @ 20%	$238,369
Contingency @ 15%	$178,776
Engineering & SDC @ 15%	$178,776
Legal and Admin @ 2%	$23,837
TOTAL	**$1,811,601**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: ALT. 3 - Gravity Line To Caldwell WWTP Eliminating Lagoons
Date & Time: 8/5/2011 9:57

Item No.	Description	Quantity	Unit	Unit Price	Total Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	ALT. 3 - Gravity Line To Caldwell WWTP Eliminating Lagoons							
	Plant Work							
	Pressure Sewer Pipe, 8-inch (SDR 17)	310	lf	$14	$4,340	$6	$1,860	$6,200
	Decommision Existing Pump Station & Headworks	1	ls	$12,000	$12,000	$12,000	$12,000	$24,000
	Eliminate Lagoon System (See Attached Sheet)	1	job	$299,280	$299,280	$293,125	$293,125	$592,405
	Demo Chlorine Building	1	ea	$10,000	$10,000	$5,000	$5,000	$15,000
	Demo Chlorine Contact Chamber	1	ea	$10,000	$10,000	$5,000	$5,000	$15,000
					$0		$0	$0
	Gravity Sewer Line							
	Gravity Sewer Line - 18" PVC	2,890	lf	$24	$67,915	$31	$88,145	$156,060
	Gravity Sewer Line - 8" PVC	1,985	lf	$22	$43,670	$11	$21,835	$65,505
	Man Holes @ 400' oc	12	ea	$2,400	$28,800	$1,800	$21,600	$50,400
					$0		$0	$0
	Pump Station at River Crossing				$0		$0	$0
	Lift Station Wetwell (10' Φ, 15' deep Manhole)	1	EA	$18,000	$18,000	$5,000	$5,000	$23,000
	Dewatering	1	LS	$2,500	$2,500	$500	$500	$3,000
	Soil Stabilization	1	LS	$5,000	$5,000		$0	$5,000
	Excavation, Gravel & Backfill	50	CY	$20	$1,000	$20	$1,000	$2,000
	Wetwall Acess Hatch	1	EA	$1,200	$1,200	$300	$300	$1,500
	Duplex Grinder Pump Units w/rails	3	EA	$12,000	$36,000	$2,000	$6,000	$42,000
	Pump Run Counter	2	EA	$500	$1,000	$100	$200	$1,200
	Pump Starters and VFDs	3	EA	$10,000	$30,000	$1,000	$3,000	$33,000
	Discharge Pipe Fittings	1	LS	$9,000	$9,000	$1,000	$1,000	$10,000
	Idaho Power Services (engineering and transformer)	1	LS	$5,000	$5,000		$0	$5,000
	Valve Vault	1	EA	$3,000	$3,000		$0	$3,000
	Valve Vault Access Hatch	1	EA	$1,200	$1,200		$0	$1,200
	Check, Plug & Bypass Valves	5	EA	$1,100	$5,500	$400	$2,000	$7,500
	Flow Meter (located in Valve Vault)	1	EA	$2,200	$2,200	$400	$400	$2,600
	Backup Propane Generator & Concrete Pad - 50kw	1	LS	$27,400	$27,400	$5,000	$5,000	$32,400
	Dialer	1	EA	$800	$800		$0	$800
	Pipeline to River Crossing				$0		$0	$0
	8" Pressure Pipeline	8,775	lf	$22	$193,050	$12	$105,300	$298,350
	River Crossing				$0		$0	
	Prepare Jacking Pits / Remove & Demobe	2	ea	$10,000	$20,000	$5,000	$10,000	$30,000
	Dewater Jacking Pit Areas	1	ls	$25,000	$25,000	$12,500	$12,500	$37,500
	Horizontal Bore Under Boise River	350	lf	$565	$197,750		$0	$197,750
					$0		$0	$0
					$0		$0	$0
					$0		$0	$0
					$0		$0	$0
					$0		$0	$0
					$1,060,605		$600,765	$1,661,370

PROJECT SUBTOTAL	$1,661,370
Allowance @ 20%	$332,274
Contingency @ 15%	$249,206
Engineering & SDC @ 15%	$249,206
Legal and Admin @ 2%	$33,227
TOTAL	**$2,525,282**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Lagoon Dredging and Removal
Date & Time: 6/28/2011 7:47

Item No.	Description	Quantity	Unit	Total Unit Price Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	Lagoon Dredging and Removal						
	Lagoon #1 (685,000 gal. 28,800 s.f.)	28800	sf	**$0**			**$0**
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	114	tons	**$0**	625.00	**$71,250**	**$71,250**
	Remove Liner	31680	sf	$1 **$31,680**		$0	
	Fill and Grade Lagoon Area	36000	sf	$2 **$54,000**		**$0**	
				$0		**$0**	
				$0		**$0**	
	Lagoon #2 (1,401,750 gal. 64,000 s.f.)	64000	sf	**$0**		**$0**	**$0**
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	234	tons	**$0**	625.00	**$146,250**	**$146,250**
	Remove Liner	70400	sf	$1 **$70,400**		**$0**	
	Fill and Grade Lagoon Area	36000	sf	$2 **$54,000**		**$0**	
				$0		**$0**	
				$0		**$0**	
	Lagoon #3 (730,000 gal. 32,000 s.f.)	32000	sf	**$0**		**$0**	**$0**
	Remove Contents (Dredging, Pumping, Dewater & Dispose)	121	tons	**$0**	625.00	**$75,625**	**$75,625**
	Remove Liner	35200	sf	$1 $35,200		**$0**	
	Fill and Grade Lagoon Area	36000	sf	$2 **$54,000**		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$0		**$0**	
				$299,280		**$293,125**	**$592,405**

PROJECT SUBTOTAL	**$592,405**
Allowance @ 20%	$118,481
Contingency @ 15%	$88,861
Engineering & SDC @ 15%	$88,861
Legal and Admin @ 2%	$11,848
TOTAL	**$900,456**

PHARMER ENGINEERING LLC
1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Alt 4 - Class "C" Land App. With Winter Storage Lagoon
Date & Time: 10/6/2011 13:01

Item No	Description	Quantity	Unit	Unit Price	Total Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	Alt 4 - Class "C" Land App. With Winter Storage Lagoon							
	Retain Coarse Screens (rehab & rebuild)	1	ea	$2,500	$2,500		$2,500	**$5,000**
	Update SCADA System	1	syst.	$15,000	$15,000		$0	**$15,000**
								$0
	Replace Pumps -Submersible Chopper	3	ea	$12,000	$36,000	$2,500	$7,500	**$43,500**
	Hot Water System on Hose Taps - For Hot Water Clean Up.	1	syst.	$5,000.00	$5,000	$1,000.00	$1,000	**$6,000**
	Underground Power (from Road)	310	lf	$50	$15,500		$0	**$15,500**
	Backup Propane Generator & Concrete Pad	1	syst.	$27,400	$27,400	$5,000	$5,000	**$32,400**
			Lagoons					
	Eliminate Parshall Flume	1	ea	$1,500	$1,500	$1,500	$1,500	**$3,000**
	Add 8" Mag Meter w/ Valve Box for Access	1	ea	$2,500	$2,500	$500	$500	**$3,000**
	Construct New 12' x 12' CMU Electrical Building	144	sf	$100	$14,400		$0	**$14,400**
	Replace All Surface Mechanical Aerators:							**$0**
	5 Horsepower	1	ea	$10,000	$10,000		$0	**$10,000**
	3 Horsepower	3	ea	$8,000	$24,000		$0	**$24,000**
	Rehab Chlorine Building	1	ea	$10,000	$10,000	$5,000	$5,000	**$15,000**
	Rehab Chlorine Contact Chamber	1	ea	$10,000	$10,000	$5,000	$5,000	**$15,000**
	Replace Discharge Hydro Ranger	1	swag	$5,000	$5,000		$0	**$5,000**
					$0		$0	**$0**
					$0		$0	**$0**
					$0		$0	**$0**
	Lagoon Dredging and Replacement (See Alt. 1 Breakdown)	1	job	$710,080	$710,080	$481,763	$481,763	**$1,191,843**
					$0		$0	**$0**
	Storage Lagoon	1	job	$1,276,083	$1,276,083	$489,504	$489,504	**$1,765,587**
					$0		$0	**$0**
	Land Application Pump Station (See Separate Sheet)	1	job	$88,500	$88,500	$70,500	$70,500	**$159,000**
	45 Acre Land Application Site	45	Acres	$7,500	$337,500		$0	**$337,500**
					$0		$0	**$0**
					$2,590,963		$1,069,767	**$3,660,730**

PROJECT SUBTOTAL	**$3,660,730**
Allowance @ 20%	$732,146
Contingency @ 15%	$549,109
Engineering & SDC @ 15%	$549,109
Legal and Admin @ 2%	$73,215
TOTAL	**$5,564,310**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Alt 5 - Class "C" Summer Land App. With Winter Discharge
Date & Time: 10/6/2011 13:03

Item No	Description	Quantity	Unit	Unit Price	Total Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	Alt 5 - Class "C" Summer Land App. With Winter Discharge							
	Retain Coarse Screens (rehab & rebuild)	1	ea	$2,500	$2,500		$2,500	$5,000
	Update SCADA System	1	syst.	$15,000	$15,000		$0	$15,000
								$0
	Replace Pumps -Submersible Chopper	3	ea	$12,000	$36,000	$2,500	$7,500	$43,500
	Hot Water System on Hose Taps - For Hot Water C lean Up.	1	syst.	$5,000.00	$5,000	$1,000.00	$1,000	$6,000
	Underground Power (from Road)	310	lf	$50	$15,500		$0	$15,500
	Backup Propane Generator & Concrete Pad	1	syst.	$27,400	$27,400	$5,000	$5,000	$32,400
			Lagoons					
	Eliminate Parshall Flume	1	ea	$1,500	$1,500	$1,500	$1,500	$3,000
	Add 8" Flow Meter w/ Valve Box for Access	1	ea	$2,500	$2,500	$500	$500	$3,000
	Construct New 12' x 12' C MU Electrical Building	144	sf	$100	$14,400		$0	$14,400
	Replace All Surface Mechanical Aerators:							$0
	5 Horsepower	1	ea	$10,000	$10,000		$0	$10,000
	3 Horsepower	3	ea	$8,000	$24,000		$0	$24,000
	Clorine Station Connect to SCADA	1	ea	$1,500	$1,500		$0	$1,500
	Rehab Existing Chlorine Building	1	ls	$5,000	$5,000	$5,000	$5,000	$10,000
	Clorine Contact Basin - Install Roof	400	sf	$60	$24,000		$0	$24,000
	Replace Discharge Hydro Ranger	1	swag	$5,000	$5,000	$1,000	$1,000	$6,000
					$0		$0	$0
	Lagoon Dredging and Replac ement (See Alt. 1 Breakdown)	1	ea	$710,080	$710,080	$481,763	$481,763	$1,191,843
	Lagoon Bypass From Lagoon #1 to Lagoon #3						$0	$0
	Valve Box for Plug Valve	1	ea	1,500.00	$1,500	1,000.00	$1,000	$2,500
	8" PVC Pipeline	550	lf	7.60	$4,180	4.00	$2,200	$6,380
	Pipeline Excavation & Backfill	550	lf	4.50	$2,475	1.50	$825	$3,300
	8" Plug Valve	1	ea	1,200.00	$1,200	600.00	$600	$1,800
	Land Application Pump Station (See Separate Sheet)	1	job	$88,500	$88,500	$70,500	$70,500	$159,000
	45 Acre Land Application Site	26	Acres	$7,500	$195,000		$0	$195,000
					$0		$0	$0
					$1,192,235		**$580,888**	**$1,773,123**

PROJECT SUBTOTAL	**$1,773,123**
Allowance @ 20%	$354,625
Contingency @ 15%	$265,968
Engineering & SDC @ 15%	$265,968
Legal and Admin @ 2%	$35,462
TOTAL	**$2,695,146**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By: JN
Description: New Winter Storage Lagoon
Date & Time: 6/28/2011 7:47

Item No.	Description	Quantity	Unit	Material Unit Price	Total Material Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	New Winter Storage Lagoon							
	Clear and Grub	8.9	Acres	$1,550	**$13,795**	$2,150	**$19,135**	**$32,930**
	Total Excavation	70,371	CY	$4	**$280,077**	$2	**$105,557**	**$385,633**
	Berm Fill	46,216	CY	$3	**$124,321**	$1	**$46,216**	**$170,537**
	Geotextile Liner Pad	280,800	SQ FT	$1	**$280,800**	$1	**$140,400**	**$421,200**
	Lagoon Liner	280,800	SQ FT	$1.50	**$421,200**	$0.50	**$140,400**	**$561,600**
	3/4" gravel road around lagoon	312	CY	$16	**$4,985**	$20	**$6,232**	**$11,217**
	Diversion Structure	2	LS	$25,000	**$50,000**	$10,000	**$20,000**	**$70,000**
	Diversion Pipe (from Pond #3 to Storage Pond)	1,100	LF	$18	**$19,800**	$20	**$22,000**	**$41,800**
	Manholes	6	EA	$3,000	**$18,000**	$750	**$4,500**	**$22,500**
	Idaho Power Services (engineering and transformer)	1	LS	$5,000	**$5,000**		**$0**	**$5,000**
	Valve Vault	1	EA	$3,000	**$3,000**	$1,500	**$1,500**	**$4,500**
	Valve Vault Access Hatch	1	EA	$1,200	**$1,200**	$300	**$300**	**$1,500**
	Check Valve	2	EA	$1,100	**$2,200**	$400	**$800**	**$3,000**
	Plug Valve	2	EA	$1,100	**$2,200**	$400	**$800**	**$3,000**
	Bypass Valve	1	EA	$1,100	**$1,100**	$400	**$400**	**$1,500**
	Flow Meter (located in Valve Vault)	1	EA	$2,200	**$2,200**	$400	**$400**	**$2,600**
	6' Tall Chain Link Security Fence	3,000	lf	$20	**$60,000**		**$0**	**$60,000**
	WINTER STORAGE LAGOON SUBTOTAL				**$1,276,083**		**$489,504**	**$1,765,587**

PROJECT SUBTOTAL	**$1,765,587**
Allowance @ 20%	$353,117
Contingency @ 15%	$264,838
Engineering & SDC @ 15%	$264,838
Legal and Admin @ 2%	$35,312
TOTAL	**$2,683,693**

1998 W. Judith Lane, Boise, ID 83705
Phone: 208.433.1900

Project No: 10262
Client: Caldwell Housing Authority
Prepared By:
Description: Land Application Pump House
Date & Time: 6/28/2011 7:47

Item No.	Description	Quantity	Unit	Unit Price	Total Unit Price	Unit Equip & Labor Cost	Total Equip & Labor Cost	Total Amount
	Land Application Pump House							
	PVC Pipe, 6 -inch (Lagoon / Pump Station)	1000	lf	$18	**$18,000**	$20	**$18,000**	**$36,000**
	Pump House (20' X 20' CMU)	400	sf	$100	**$40,000**		**$40,000**	**$80,000**
	Booster Pumps	3	ea	$6,000	**$18,000**		**$18,000**	**$36,000**
	SCADA	1	swag	$5,000	**$5,000**	$2,000	**$5,000**	**$10,000**
	Electrical	1	swag	$5,000	**$5,000**	$2,000	**$5,000**	**$10,000**
	Connect to Current Irrigation System	1	job	$2,500	**$2,500**	$2,500	**$2,500**	**$5,000**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$0		**$0**	**$0**
					$88,500		**$70,500**	**$159,000**

PROJECT SUBTOTAL	$159,000
Allowance @ 10%	$15,900
Contingency @ 10%	$15,900
Engineering & SDC @ 15%	$23,850
Legal and Admin @ 2%	$3,180
TOTAL	**$217,830**

Project O&M Cost Opinion
Alt. 2 Plant Improvements with Current Discharge Design Flows
(June 26, 2011)

DESCRIPTION	QTY	Units	Each $	Total ($US)	Comments
Plant Labor, full time staff	2	1/2 time	$44,000	$44,000	Two staff with 1/3 time dedicated to plant operation
Licensed Operator	1	monthly	$500.00	$6,000	Responsible Charge Operator
Subtotal				**$50,000**	
Electricity					
Aerators	365	day	$31.29	$11,421	14 HP Aerator Total
Raw Water Chopper Pumps	365	day	$1.46	$533	200,000 gallons per day 2 HP pump at 170 gpm
Subtotal				**$11,954**	
Chemical Cost					
Sodium Hypochlorite	100	gallons / month	$1.66	$1,992.00	Twelve months at $1.66 per month
Maintenance					
Routine Maintenance	1	LS	$ 25,000	$25,000	
SUBTOTAL, rounded to $10k				$88,946	
Additional allowances	10%			$8,895	
Total O&M Cost Estimate, rounded to $10k				**$97,841**	

Total Present Worth O&M $1,329,654 20 year period 4% interest rate 1

Project O&M Cost Opinion
Alt 3. Waste to Caldwell eliminate Lagoons
Design Flows
(June 26, 2011)

DESCRIPTION	QTY	Units	Each $	Total ($US)	Comments
Electricity					
Service Pumps	365	day	$13.12	$9,099	717,000 gallons per day 28 HP pump at 500 gpm
Maintenance					
Pump station maintenace	1	LS	$ 25,000	$25,000	
SUBTOTAL, rounded to $10k				$34,099	
Additional allowances	10%			$3,410	
Total O&M Cost Estimate, rounded to $10k				**$37,508**	

Total Present Worth O&M $509,740 20 year period 4% interest rate 13.59 factor

Project O&M Cost Opinion
Alt 4. Class "C" Land App with Winter Storage
Design Flows
(June 26, 2011)

DESCRIPTION	QTY	Units	Each $	Total ($US)	Comments
Plant Labor, full time staff	2	1/2 time	$44,000	$44,000	Two staff with 1/3 time dedicated to water plant operation
Licensed Operator	1	monthly	$500.00	$6,000	
Subtotal				**$50,000**	
Electricity					
Aerators	365	day	$31.29	$11,421	14 HP Aerator Total
Raw Water Pumps	365	day	$1.46	$533	200,000 gallons per day 2 HP pump at 170 gpm
Storage Lagoon Service Pumps	365	day	$5.48	$1,999	200,000 gallons per day 7.5 HP pump at 170 gpm
Reuse Application Pumps	210	day	$5.48	$1,150	200,000 gallons per day 7.5 HP pump at 170 gpm
Subtotal				**$15,104**	
Chemical Cost					
Sodium Hypochlorite	100	gallons / month	$1.66	$1,992.00	Twelve months at $1.66 per month
Maintenance					
Routine Maintenance	1	LS	$ 35,000	$35,000	
SUBTOTAL, rounded to $10k				$102,096	
Additional allowances	10%			$10,210	
Total O&M Cost Estimate, rounded to $10k				**$112,305**	
Total Present Worth O&M				$1,526,231	20 year period 4% interest rate 13.59 factor

Project O&M Cost Opinion
Alt 5. Class "C" Land App with Winter Discharge
Design Flows
(June 26, 2011)

DESCRIPTION	QTY	Units	Each $	Total ($US)	Comments
Plant Labor, full time staff	2	1/2 time	$44,000	$44,000	Two staff with 1/3 time dedicated to water plant operation
Licensed Operator	1	monthly	$500.00	$6,000	
Subtotal				**$50,000**	
Electricity					
Aerators	365	day	$31.29	$11,421	14 HP Aerator Total
Raw Water Pumps	365	day	$1.46	$533	200,000 gallons per day 2 HP pump at 170 gpm
Reuse Service Pumps	365	day	$5.48	$1,999	200,000 gallons per day 7.5 HP pump at 170 gpm
Subtotal				**$13,953**	
Chemical Cost					
Sodium Hypochlorite	100	gallons / month	$1.66	$1,992.00	Twelve months at $1.66 per month
Maintenance					
Routine Maintenance	1	LS	$ 25,000	$35,000	
SUBTOTAL, rounded to $10k				$100,945	
Additional allowances	10%			$10,095	
Total O&M Cost Estimate, rounded to $10k				**$111,040**	

Total Present Worth O&M $1,509,034 20 year period 4% interest rate 13.59 factor

J

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Memo

To: Mike Dittenber

CC: Josh Reed

From: Jesse Neilson, PE

Date: September 20, 2011

Re: Review of Caldwell Housing Authority Effluent and Sebree Canal Water Samples

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Pharmer Engineering has reviewed the Sebree Canal data which was collected by the Caldwell Housing Authority (CHA). As part of the review, Pharmer Engineering has made the following assumptions:

- The provided canal flow rate of 181 ft^3/s (117 MDG) is an average flow rate.
- Grab samples were taken out of the canal
- Testing was done by Analytical Laboratories of Boise, ID.
- CHA continues to discharge under an existing NPDES permit issued by EPA Region 10.
- CHA continues to treat the water to the levels required by the existing NPDES permit.

An accurate analysis with statistically defendable results of the level of water quality impact, if any, experienced in the Sebree Canal due to the treated effluent from CHA is difficult to develop. The difficulty comes from issues which affect the quantification of the level of impairment to the water body. These issues include: the high dilution rate, testing resolution, mixing variability and undefined analysis parameters. However, the data provided can be used for a comparison of general concentrations and loadings of specific constituents.

As seen in the Table 1 below, with the exception of suspended solids, the canal carries very low concentrations of the constituents measured. However, due to an average flow rate that is approximately 1,000 times greater than the loading contributions of CHA, the existing loadings carried in the canal on a lbs/day basis are much more significant.

Idaho establishes designated beneficial uses for all surface waters of the State (Idaho Administrative Code section 58.01.02.100). Aquatic life, recreation, and domestic water supply are applied on a water body-specific basis, whereas agriculture, industrial, wildlife, and aesthetic uses are applied to all waters of the State. Since the State does not specifically provide a designation for the Sebree Canal, the State designated use would most likely be classified as Agricultural Water Supply (AWS). The State designated use description for AWS is, "water quality appropriate for the irrigation of crops or as drinking water for livestock. This use applies to all surface waters of the state."

Thus, due to the high dilution rates and based on the continual efforts of CHA to maintain compliance with existing NPDES permits, in my professional opinion, the treated effluent does not degrade the water quality of the Sebree Canal because the designated beneficial use of the canal (established by the State) is not impaired by the CHA effluent.

Table 1: Constituent values for both the CHA treated effluent and Sebree Canal.

Constituent	Upstream Concentration[A]	CHA Effluent Concentration[B]	Downstream Concentration[A]	Percent Difference[C]
E-coli	178 mpn/100 mL	<2 mpn/100 mL	233 mpn/100 mL	27%
Fecal Coliform	268 mpn/100 mL	7 mpn/100 mL	245 mpn/100 mL	-7%
Ammonia	.03 mg/L 29 lbs/d	10.17 mg/L 10 lbs/d	.033 mg/L 32 lbs/d	10%
Nitrate	.62 mg/L 605 lbs/d	1.08 mg/L 1 lbs/d	.64 mg/L 624 lbs/d	3%
Nitrogen	.30 mg/L 293 lbs/d	15.02 mg/L 15 lbs/d	.33 mg/L 322 lbs/d	10%
Phosphate	0.093 mg/L 91 lbs/d	4.74 mg/L 5 lbs/d	0.088 mg/L 86 lbs/d	-6%
pH	7.6	8.03	7.7	1%
Oxygen	9.5 mg/L	7.69 mg/L	9.6 mg/L	1%
Susp. Solids	21.3 mg/L 20,781 lbs/d	37.64 mg/L 38 lbs/d	25.4 mg/L 24,781 lbs/d	18%

A. Assumes an average canal flow of 181 ft^3/s to calculate lbs/d
B. Values taken from CHA facility plan and as reported to EPA in daily monitoring reports and assumes an average effluent flow of 0.187 cfs (taken from the CHA facility plan) to calculate lbs/d
C. Difference between upstream and downstream values in the Sebree Canal
D. All values are averages of the data provided.

K

Appendix K. FONSI & Environmental Information Document

EID will be completed as a separate document and attached after approval