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August 24, 2012

William Teuscher, P.E.
Department of Environmental Quality
900 North Skyline Dr.
Idaho Falls, ID 83402

RE: Elk Bend Sewer District – Revised WWFPS
IDEQ Grant #WWG-329-2009-5

Dear Mr. Teuscher:

We are pleased to resubmit the Elk Bend Sewer District Wastewater Facilities Planning Study. Please see that the following items have been addressed in response to the review letter of February 24, 2012. Additionally, public involvement activities including a public information mailer and a public information meeting were completed in June 2012. These items are documented in the appropriate sections of the study.

Chapter 1

1. Referenced section revised.
2. Reference section revised.
3. Referenced section revised.
4. Additional section 1.3 – Compliance Status was added. Paragraph 2 of Section 1.2 was relocated to introduce this section, followed by discussion of the points of paragraph 5 of the CO and the actions which have been taken to address those points.

Chapter 2

1. Section 2.1 revised to have two paragraphs, the second paragraph including the recommended language regarding apparent drainfield failure.

Chapter 3

1. Reference section modified as indicated.
2. Reference section modified as indicated.
3. Reference section modified as indicated.

Chapter 4

1. The subdivision plat is depicted on the figures included in Appendix D – System Drawings. These figures were utilized in the creation of the drawings created as part of the study. The incorporation of the platted property boundaries was not completed on the aerial maps as the mapping received could not be incorporated cleanly.
2. Reference Figure 4.1 was modified to reflect a common naming convention for the lift stations.

3. Weather information for the May, ID weather station was included in this section.
4. Reference section modified as indicated.
5. Reference to Health Department modified to IDEQ as noted. The following paragraph was added as paragraph 3 in Section 4.4: "The Elk Bend Sewer District implemented a drain field rehabilitation project in 2008. According to documents submitted by the District to IDEQ in 2008, the existing drainfield was removed, the soil excavated, stockpiled, and treated with lime. New fill was placed including a layered system of 2" drain rock, sewer sand, and 3/8-inch pea gravel with a geotextile and soil cap. The intended purpose of the temporary drain field was to improve disposal operation during the evaluation of the system and development and implementation of an acceptable treatment and disposal system. In August and September of 2010 IDEQ observed raw sewage ponding on the surface at the Elk Bend LSAS, indicating that the drain field rehabilitation has failed."
6. The word "environmental" was added to the sentence as indicated.
7. The year was modified as indicated and the following sentences added in paragraph 2 of Section 4.5: "It has been reported that the restaurant is not equipped with a grease trap. It is recommended that the sewer district adopt a policy requiring grease traps for all restaurant facilities and work to ensure that one is installed if the restaurant returns to service."
8. Section 4.2 was revised to state Steelhead Bend wastewater service to the estimated number of people.
9. A "Section 4.7 – Technical, Financial and Managerial Capacity" was added to the report to briefly discuss the responsibilities of the sewer district.

Chapter 5

1. Reference Section 5.1.1 modified as indicated.
2. The following statements were added to Section 5.1.3:
   Paragraph 2: "The lift stations are susceptible to freezing and should be equipped with a proper concrete cover with gravity vents.
   Paragraph 3: "These modifications which have been made to the lift stations did not receive design approval from IDEQ and are in violation of the wastewater rules."
   Paragraph 5: "The lift station electrical connections do not meet the National Electric Code (NEC). "
   End of Section: "Each of the lift stations requires rehabilitation or replacement to bring them into compliance with the wastewater rules, restore the structural integrity and provide the necessary reliability and safety. "
   Lift station photo references were corrected for consistency.
3. Reference section and photo caption modified as indicated.
4. Reference Section 5.1.3 modified to reflect the manual operation required of the lift/suction pump for backup pumping.

5. The available construction drawings for the original construction of the wastewater systems at Elk Bend and Steelhead Bend prepared by Newton-Schafer of Twin Falls, ID in 1973 were scanned and included in Appendix D for reference.
6. Reference section 5.2 modified ADF at Steelhead Bend to 5,150 gpd.
7. Reference Section 5.2.1 modified as indicated.
   Statement was added to paragraph 1: "This sludge disposal method does not meet the EPA 503 regulations for disposal of biosolids."
   Statement was added to paragraph 2: "On Keller Associates' visits to the plant, the aeration blowers were operating, but it has been reported by IDEQ that at inspections of the treatment plant the aeration system was not functioning."
8. Reference Section 5.2.1, second paragraph modified as indicated.
9. Reference Section 5.2.1, last paragraph modified as indicated.
10. Reference Section 5.2.2, disposal to landfill indicated and statement regarding inadequacy to EPA 503 regulations for biosolids disposal was added.
11. Reference Section 5.4 modified as indicated.
12. Two paragraphs were added to Section 5.5 discussing the design capacity, hydraulic application rates, separation distances and the potential impacts to surface water.
13. Reference Section 5.5, 2nd paragraph, 1st sentence modified as indicated. Wastewater ponding at the LSAS is addressed in paragraph 3 and was clarified.
14. Reference Section 5.6 was modified to describe an estimate for user contribution per connection of $18 per month. It was explained that this is an imprecise estimate as the fees are collected via property tax and tax values vary and are applied even to properties which are not connected to the wastewater system.
15. Reference Section 5.7 was modified to add the listed deficiencies.

Chapter 6

1. Reference Section 6.3, 3rd paragraph was modified to have a complete sentence and a second sentence added reading "The wastewater treatment plants are not providing the level of treatment for which they were designed or which is needed for safe disposal of wastewater."
2. Reference Section 6.4 modified as indicated.

Section 6.2 was modified to include reference to the need for backup power at lift stations. Additionally, the following sentence was added as the final paragraph in this section: "Given the extent of work needed to rehabilitate the lift stations, complete replacement should be considered and evaluated on a capital and life-cycle cost basis prior to implementation."

Chapter 7

1. Reference Section 7.1, 1st paragraph was modified as indicated.
2. Reference Section 7.4, 1st paragraph was modified as indicated.

3. Reference Section 7.4, 4th paragraph, 6th sentence was modified as indicated with respect to TGM allowances for reduced set back distance and drain field size with use of advanced treatment.
4. Reference Section 7.6, 6th paragraph, 3rd sentence was deleted as indicated.
5. Reference Section 7.7, 1st paragraph, 3rd sentence was revised to remove reference to the nitrate limitation. The following sentence was added at this point: "The design and implementation of infiltration basins is governed by the Ground Water Quality Rules (IDAPA 58.01.11)."
6. Reference Section 7.8, Table 7.1 was modified to reflect the ranking revisions noted. The ranking was reversed to make higher score more favorable to be consistent with Table 8.1, addressing comment 8.4. Additionally, the table was expanded to include the rankings for the STEP system with cluster drain field alternative.
7. An alternative for STEP systems with cluster drain fields was added to this chapter. In the alternatives ranking the STEP system alternative scored second to LSAS. The major factor scoring against this alternative is land requirement. STEP systems would require significantly greater area for disposal than LSAS due to the fragmentation of the disposal sites and lesser treatment from septic tanks.

Chapter 8

1. Reference Section 8.1, 1st paragraph, 1st sentence modified as indicated.
2. Reference Section 8.2, the following statement was added to replace/modify the final sentence of this section: "Required treatment is governed by the Technical Guidance Manual (TGM) and the Nutrient Pathogen (NP) evaluation and will need to assure that the ground water nitrate levels are not increased more than 1 mg/l above background levels at any compliance boundaries (i.e. at the river or wells). Higher level treatment than the minimum for subsurface disposal can allow for some reduction in the required size of the disposal beds."
3. Project cost estimates were revised to accommodate some of the comments provided and to include Davis-Bacon wages. The statements of cost estimates were modified in the referenced sections to be consistent.
4. Reference Section 8.8, Table 8.1: Table 7.1 was revised to match the scoring array of Table 8.1 with higher numbers indicating greater favorability.

Reference Section 8.3, 4th sentence, making reference to using treatment area 1 (indicated on Figure 9.1) and not needing the Steelhead Bend Lift Station was removed from this section as it was indicated that the treatment area identified at that location would not be acceptable to DEQ.

Chapter 9

1. Reference section 9.1, 1st paragraph, 1st sentence was clarified to include reference to the appropriate lift stations by the consistent naming convention. The 4th sentence was modified as indicated.

2. Reference Figure 9.1 was modified to identify the replacement area and remove alternate treatment location1.
3. Reference Section 9.4, 2nd paragraph was modified for the last two sentences to read "IDEQ loans require authorization to accrue debt. Authorization can be obtained by passing a bond election of through Judicial Confirmation. If the sewer rates for the Elk Bend Sewer District will be more than 2% of the median household income as determined by census, then they may qualify for hardship loan with possible reduced interest rate."
4. Reference Section 9.8 was modified to include discussion of the Public Information Meeting held on June 22, 2012 in conjunction with the EBSD board's annual meeting and the information flyer which was mailed to the residents of Elk Bend and Steelhead Bend in June 2012.
5. Reference Section 9.9, Table 9.1 was modified to remove the items which have been completed and to add the referenced items for the EID and NP evaluation.

The additional comments provided regarding the need for the completion of an EID are noted. The EID will be completed as required for the final approval of the FPS. Keller Associates has discussed the EBSD WWFPS in brief with Ester Ceja as well as some of the project specifics and constraints.

Should you have additional comments or concerns, please contact us. Thank you for your consideration of the WWFPS for the Elk Bend Sewer District.

Sincerely,

KELLER ASSOCIATES, INC.

James P. Mullen, P.E.
Vice President/Project Manager

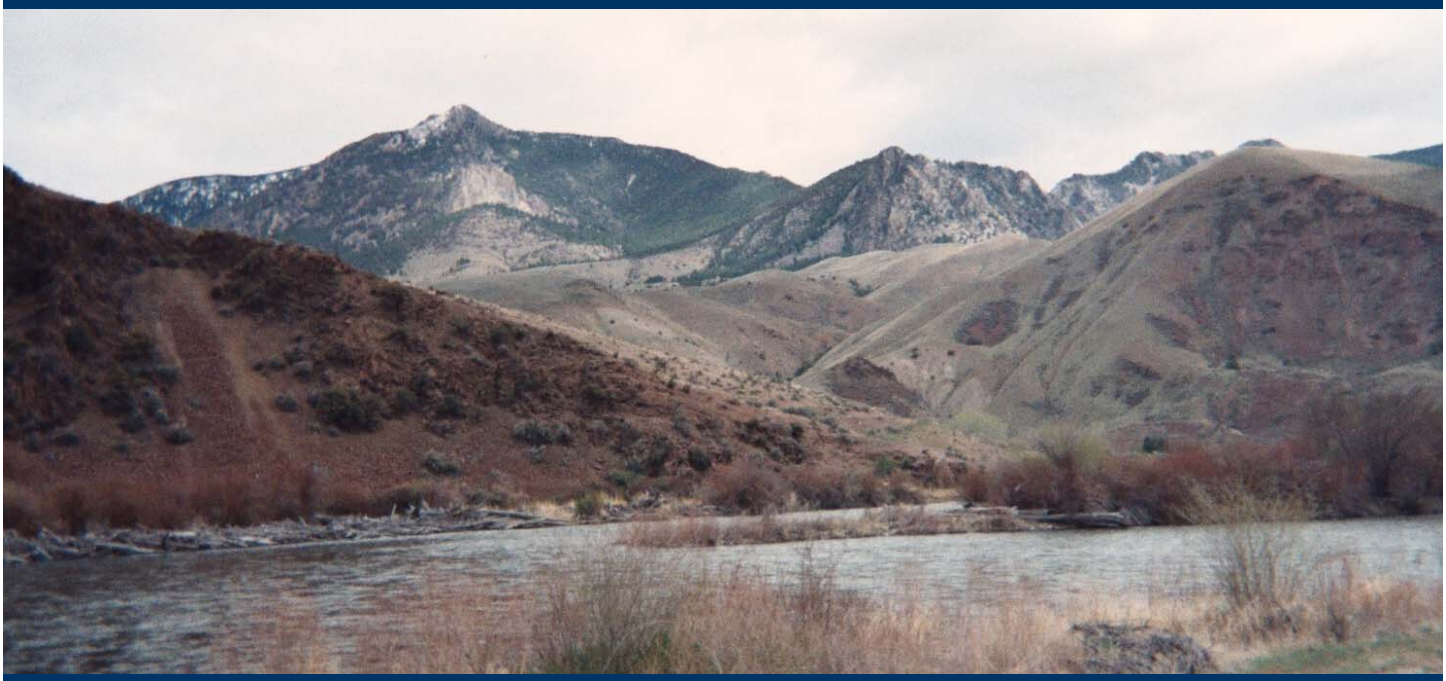
Skyler D. Allen, E.I.
Project Engineer

Attachments: Elk Bend Sewer District WWFPS

cc: Glenn Ross, EBSD
Eleanor Wisner, EBSD
Gregory Eager, IDEQ
file

Elk Bend Sewer District

Wastewater Facilities Planning Study



Draft for Agency Review

KELLER associates

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August 2012

Elk Bend Sewer District

Wastewater Facilities Planning Study

IDEQ Grant # WWG-329-2009-5

Project No. 209003-000
August 2012

KELLER associates

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Authorization

In February 2009, the Elk Bend Sewer District of Elk Bend, Idaho contracted with Keller Associates, Inc. to prepare a Wastewater Facilities Planning Study for the District's wastewater collection and treatment systems. The study was funded in part by a Wastewater System Planning Grant from the Idaho Department of Environmental Quality (WWG-329-2009-5).

CHAPTER 1 Executive Summary

1.1 INTRODUCTION

The Elk Bend Sewer District has undertaken this Wastewater Facilities Planning Study to provide an assessment of the condition of the wastewater collection, treatment and disposal systems; evaluate the capacity and ability to meet current and anticipated future regulatory requirements; identify system shortfalls, short-term and long-term system needs; and examine alternatives to address the identified system needs. The District was awarded a Wastewater System Planning Grant from Idaho Department of Environmental Quality to fund one half of the cost of this Wastewater Facilities Planning Study.

1.2 SYSTEM SUMMARY

The Elk Bend and Steelhead Bend wastewater systems each utilize gravity flow collection systems with lift stations to collect and transport wastewater to centralized treatment facilities. The treatment facilities are extended aeration package treatment plants which were installed in the early 1970's. The package plants include an aeration basin, clarifier, and chlorine contact chamber (unused). The Elk Bend plant has been equipped with a secondary clarifier in the form of an underground septic tank prior to discharge. The treatment plants discharge to Large Soil Absorption Systems at each site.

1.3 COMPLIANCE STATUS

The Idaho Department of Environmental Quality responded to a complaint of sewage on the ground surface at the Elk Bend treatment plant in August of 2007. A Notice of Violation was issued on March 7, 2008 which included four violations of the Idaho Administrative Procedures Act (IDAPA) and outlined monetary penalties. The Notice of Violation extended the Elk Bend Sewer District the opportunity for a compliance conference to discuss the violations and enter into a consent order. As a result of this conference, held April 30, 2008, the IDEQ and the Elk Bend Sewer District entered a Consent Order on June 2, 2008.

The Consent Order (Appendix G) includes provisions requiring the following actions from the Elk Bend Sewer District:

a) Develop a Wastewater Facility Plan and Operating and Maintenance (O&M) Manual
b) Respond to October 26, 2007 letter regarding “failed wastewater system response plan”
c) Complete temporary drainfield repairs and submit report documenting repairs
d) Develop a monitoring program for the WWTP and submit monthly monitoring reports
e) Employ/contract a Responsible Charge Operator (RCO) and designate a Substitute RCO
f) Develop and present a Financial Management Plan

The following actions have been taken by the District to address the provisions of the Consent Order:

a) This document comprises the Wastewater Facility Plan for the Elk Bend Sewer District. The District has on file a copy of the Operating and Maintenance Manual for the existing system.
b) The District responded on June 4, 2008 to the DEQ letter of Oct. 26, 2007.

c) Temporary drainfield repairs at the Elk Bend LSAS were completed and reported to DEQ in the letter of June 4, 2008.
d) Keller Associates assisted the District in developing a monitoring program for the WWTP and provided the District with a reporting form to use. Monthly monitoring reports have not been regularly submitted by the District. Reminder notices have been issued to the District from IDEQ regarding the reporting and monitoring requirements (second reminder – 3-29-12 included in Appendix G).
e) The District has not, to date, addressed the requirement of hiring/contracting a licenced Responsible Charge Operator.
f) The Capital Improvements Plan included in Chapter 9 of this document addresses, at least in part, the financial management plan requirement.

1.4 System Deficiencies

In general, the wastewater collection piping and manhole structures are in good condition. Lift station pumps, mechanical and electrical equipment need replacement, the wet well structures are in need of rehabilitation. The wastewater treatment plant equipment is severely debilitated and needs extensive rehabilitation or replacement. The Large Soil Absorption Systems are inadequately sized for the wastewater produced in the systems, particularly at Elk Bend.

1.5 Need for Action

The Elk Bend Sewer District is faced with the consequences of the Consent Order in the immediate future. In longer term consideration, the District assets are at or nearing the end of their useful life and require considerable rehabilitation or replacement to provide continuing service to the District. The District is currently at risk of repeat violations of the Clean Water Act and Idaho Code. There is need for the District to act immediately to improve the wastewater collection, treatment and disposal systems to bring them into compliance with state and federal regulations and to enable the District to provide reliable wastewater treatment and disposal service in the future.

1.6 Proposed Improvements

The recommended improvement alternative developed in the course of this study includes the rehabilitation of the Elk Bend Lift Station #1 at Elk Horn Drive and the Steelhead Bend Lift Station with new pumps and electrical equipment, the construction of a connecting gravity sewer pipeline from the Elk Bend collection system to the Steelhead Bend collection system, construction of a recirculating gravel filter treatment plant at Steelhead Bend with capacity to treat the projected combined wastewater flows, and expansion of the current Large Soil Absorption System at Steelhead Bend for the disposal of wastewater. The total estimated cost for these improvements is **$1,254,000**.

1.7 Implementation and Funding

The Elk Bend Sewer District has submitted a Letter of Interest for the Idaho Department of Environmental Quality State Revolving Fund (SRF) loan program. This program provides low interest loans for the construction of projects of this nature within Idaho. Additionally, the District intends to pursue other funding alternatives including USDA Rural Development and Idaho Community Development Block Grant. USDA RD offers loan/grant funding packages for

projects of this nature with grants typically up to 30% of the total project cost and low interest rates on the loan component. With the sponsorship of Lemhi County, the District would be eligible to apply for a Community Development Block Grant of up to $500,000. These grants are competitive and there is no guarantee of success.

It is recommended that funding for these projects should be pursued immediately and the improvements implemented as funding is available. The total capital improvement cost to fund these projects is estimated to be $**1,254,000.** The District is currently funded as a Special Taxing District through the property taxes collected by the County. The taxing district currently provides funding equivalent to a user rate of approximately $18 per month. In addition to increasing the tax rate through the Special Taxing District, the Sewer District can implement user fees to assist in the repayment of loans to complete the proposed project. Without grant assistance, it is anticipated that the District would need to implement monthly user rates of approximately $46.33 per connection to fund the repayment of a loan. The exact amount of the increase is dependent on actual construction costs, grant and other funding assistance received, and the funding sources selected with projected values from $26 to $46 per connection per month.

CHAPTER 2 Introduction

2.1 INTRODUCTION

Elk Bend is a residential community located in the Salmon River canyon between Challis and Salmon, Idaho. The community was developed in the 1970's currently includes four distinct sections. The Elk Bend Sewer District provides wastewater collection and treatment to two of these sections, including Elk Bend and Steelhead Bend. Each of the systems includes wastewater collection piping networks and lift stations as well as aerated package wastewater treatment plants and subsurface large soil absorption systems. In recent years, the systems have begun to experience problems in achieving proper disposal of the wastewater with the occurrence of wastewater pooling on the surface above the disposal drainfield at Elk Bend.

In 2008, the District completed the temporary replacement of the drainfield at Elk Bend. After the temporary replacement drain field was installed DEQ observed wastewater ponding on the surface of the drain field area in August and again in September of 2011. It is apparent that the temporary replacement drain field has failed.

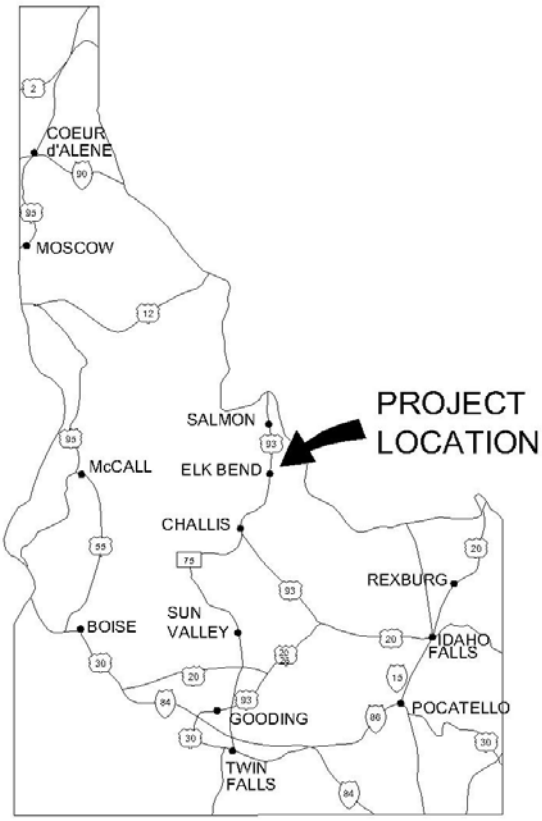


FIGURE 2-1 – LOCATION OF ELK BEND, ID

2.2 PURPOSE & NEED

The purpose of this Wastewater Facilities Planning Study is to provide a comprehensive evaluation of the existing system and provide recommendations in order to meet current and future needs. Specifically, the wastewater facilities planning study addresses the following issues:

1) Evaluation of the existing collection and treatment systems for condition and capacity.
2) Identification of potential future regulatory treatment and disposal requirements.
3) Development of a 20 year capital improvement plan for the collection and treatment systems taking into consideration future growth and life expectancy of the individual system components.
4) Providing opportunities for public involvement, education, and comment.
5) Completing the IDEQ required environmental information document (EID).

This project is needed to determine a solution path for the resolution of the wastewater collection, treatment and disposal issues faced by the Elk Bend Sewer District. On March 7, 2008, the Elk Bend Sewer District was issued a Notice of Violation in response to a citizen complaint of raw sewage on the ground and subsequent site investigation by the Eastern Idaho Public Health District and the Idaho Department of Environmental Quality. In June of 2008, a Consent Order was entered into between the Elk Bend Sewer District and the Idaho Department of Environmental Quality. A civil penalty was assessed in the Notice of Violation, which was waived on condition of compliance with the terms of the Consent Order. One of the conditions of the Consent Order is the completion of this facility planning study.

2.3 PLANNING AREA

The planning area considered in this study includes the area served by the Elk Bend Sewer District at the communities of Elk Bend and Steelhead Bend in the Salmon River Canyon. The area considered lies within the walls of the Salmon River Canyon from Warm Springs Road on the south to the vicinity of Galena Grade, near the Steelhead Bend treatment facility on the north. The project planning area is depicted in Figure 2-2.

FIGURE 2-2 – PROJECT PLANNING AREA

2.4 PLANNING OBJECTIVES

This study addresses the following issues:

- Develop estimates of future population, wastewater flows, and wastewater characteristics as a basis for evaluating the capacity of existing facilities to meet future needs, and for sizing future facilities as may be needed.
- Evaluate the existing wastewater collection system, treatment plant, and disposal system to determine possible deficiencies and capacity limits.
- Evaluate wastewater treatment and disposal alternatives to meet anticipated future growth and regulatory conditions.
- Based on a thorough evaluation, choose the best apparent alternative to meet the District's future needs based on cost and other key criteria.
- Determine the cost per user and assist the District in identifying funding and developing a capital improvements plan for implementation of the best apparent alternative.
- Summarize the above in a facilities planning document that will guide the District through a minimum of the next 20 years in meeting its wastewater collection, treatment, and disposal needs.

The study first identifies applicable design criteria for the wastewater system, then considers existing conditions in the study area including environmental conditions. Then the study presents

an assessment of the current wastewater collection, treatment, and disposal systems with identified deficiencies. Anticipated future conditions are discussed and solution alternatives presented. The alternatives are screened and the best apparent alternative identified. A capital improvements plan is presented for the implementation of the best apparent alternative.

2.5 ABBREVIATIONS

The following abbreviations have been used in this report:

- AC asbestos cement (pipe)
- ACE Army Corps of Engineers
- BOD_5 five day biochemical oxygen demand
- bgs below ground surface
- CI cast iron (pipe)
- CIP capital improvements plan
- CMU concrete masonry unit
- CWA Clean Water Act
- DI ductile iron (pipe)
- EBSD Elk Bend Sewer District
- EDU equivalent dwelling unit
- EID Environmental Information Document
- EIPHD Eastern Idaho Public Health Department
- EPA United States Environmental Protection Agency
- FOG fats, oils & grease
- fps feet per second
- ft feet
- gpcd gallons per capita per day
- gpm gallons per minute
- HDPE high density poly-ethylene
- ICDBG Idaho Community Development Block Grant
- IDAPA Idaho Administrative Procedures Act (Idaho Code)
- IDEQ Idaho Department of Environmental Quality
- IDFG Idaho Department of Fish & Game
- IDWR Idaho Department of Water Resources
- I/I infiltration and inflow
- in inches
- lb pound
- lb/day pound per day
- LSAS large soil absorption system
- MGD million gallons per day
- mg milligram
- mg/L milligrams per liter
- mL milliliter
- MPN most probable number (as unit for total coliform bacteria)
- N nitrogen
- NEC National Electric Code

- NOV notice of violation
- NPDES National Pollutant Discharge Elimination System
- NRCS Natural Resource Conservation Service
- NTU nephelometric turbidity unit
- P phosphorus
- pH standard measure of acidity or basicity
- PVC polyvinyl chloride
- RAS return activated sludge
- RBC rotating biological contactor
- RCO responsible charge operator
- RCP reinforced concrete pipe
- SBC submerged biological contactor
- SBR sequencing batch reactor
- SRCO substitute responsible charge operator
- SRF state revolving fund
- SU standard unit
- TKN total kjeldahl nitrogen
- TMDL total maximum daily load
- TN total nitrogen
- TP total phosphorus
- TSS total suspended solids
- USDA United States Department of Agriculture
- USDA-RD USDA Rural Development
- USFWS U.S. Fish and Wildlife Service
- WRCC Western Regional Climate Center
- WW wastewater
- WWFPS wastewater facilities planning study
- WWTP wastewater treatment plant
- UV ultraviolet
- µg/L microgram per liter

2.6 DEFINITION OF TERMS

- Aerobic requires the presence of oxygen for life
- Anaerobic does not require the presence of oxygen for life
- Anoxic without oxygen
- BOD_5 Biochemical Oxygen Demand – the quantity of oxygen required by microorganisms in the biochemical oxidation of organic matter during a five day period
- I/I Infiltration and Inflow – groundwater and stormwater which enters a collection system
- LSAS Large Soil Absorption System - a subsurface wastewater disposal system
- TSS Total Suspended Solids – a measure of the particulate matter held in suspension

CHAPTER 3 Design Criteria

3.1 WASTEWATER COLLECTION SYSTEM

Wastewater collection system pipeline design is based on the estimated ultimate tributary population and the estimated maximum wastewater flows from the tributary population. The design of wastewater collection systems must adhere to requirements established in *Idaho Wastewater Rules (IDAPA 58.01.16.430)*, including the following:

- Gravity sewer mains must be a minimum of 8 inches in diameter. Gravity sewer service lines must be a minimum of 4 inches in diameter.
- Gravity wastewater lines must have sufficient slope and velocity to "self clean" or transport solids to the treatment facility.
- Manholes should be installed at the end of each line, at changes in grade, size, or alignment, and at all intersections.
- Sewer lines cannot be located in the same trench as potable water lines and must be a minimum of 10 ft away from potable water lines. The design of sewer lines within 10 ft of potable water lines must be reviewed and approved by IDEQ.
- Sewer lines must have at least 18 inches of vertical separation when crossing under potable water lines. When the vertical separation is less than 18 inches the sewer line must be constructed with potable water class pipe for 10 ft on each side of the crossing.

3.2 WASTEWATER PUMPING STATIONS

Many issues must be considered in the design of wastewater pumping stations. The design of wastewater pumping stations must adhere to requirements established in *Idaho Wastewater Rules (IDAPA 58.01.16.440)*, including the following:

- Construction materials must be selected that are appropriate for exposure to corrosive gases, greases, oils, and other constituents present in wastewater.
- Pumps and controls must be selected based upon peak hourly flow
- Each pumping station should include a method of measuring flow.
- Emergency pumping capabilities are required for all new pumping stations and all existing stations undergoing modification or expansion.
- Force mains must maintain a minimum cleansing velocity of 2 fps.

3.3 WASTEWATER TREATMENT

Design considerations regarding wastewater treatment plants should focus on meeting permit requirements, influent wastewater characteristics, and anticipated flows. General Design criteria are found in the *Idaho Wastewater Rules (IDAPA 58.01.16.450)* and are briefly summarized below:

- The WWTP design should have the ability to operate effectively within the range of expected waste characteristics and flows and meet discharge regulations as applicable.
- Facilities must exist to isolate, remove, and drain unit processes from operation to facilitate maintenance and emergency repair without requiring complete plant shutdown.
- Construction material must be appropriate for exposure to corrosive gases, greases, oils, and other common wastewater constituents.

- Alternate power supply sources must be available to allow continued plant operation during a power failure.
- WWTP should include a laboratory for performing tests used for operational control. Plants that do not rely on laboratory data for operational controls are not required to have an onsite laboratory if an adequate off-site laboratory is available.

3.4 REGULATIONS

3.4.1 CLEAN WATER ACT

The Federal Water Pollution Act was enacted in 1948 but completely revised in 1972 to become the Clean Water Act (CWA). The CWA has two major parts. Title II and VI provisions provide federal financial assistance for municipal sewage treatment plant construction. The other major part is regulatory requirements that apply to industrial and municipal dischargers. The Act is considered a technology-forcing statute because of the demands to achieve higher and higher levels of pollution control.

Under the CWA certain responsibilities are delegated to the states where there is a federal-state cooperative relationship. The federal government establishes standards while the states implement and enforce these standards. Under the CWA all discharges into a water body must be authorized by a permit.

3.4.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

The National Pollutant Discharge Elimination System (NPDES) is administered through qualified states or the federal government under the CWA. NPDES Permits require municipal point source dischargers to reach receiving water quality goals. Permits typically specify numerical effluent pollutant concentrations, and a deadline for compliance. Permits are issued for five year periods and must be renewed to continue discharging. Throughout the nation the EPA has issued water quality criteria for more than 115 pollutants including "priority pollutants."

3.4.3 REUSE OF MUNICIPAL WASTEWATER

In conjunction with discharging wastewater to a receiving water body, beneficial reuse may be a practical method of disposing of WWTP effluent. IDEQ is charged with monitoring and permitting wastewater reuse programs in the State of Idaho. Rules that govern wastewater reuse are found in *IDAPA 58.01.17 – Recycled Water Rules*. Five effluent classes are defined (A through E) for wastewater reuse. Class A effluent is reclaimed municipal wastewater that may be used under specific conditions for irrigation, groundwater recharge, dust suppression, or other uses approved by IDEQ. Class B effluent is reclaimed municipal wastewater that may come in direct contact with any edible raw food crop, irrigation of golf courses, parks, playgrounds, schoolyards, or toilet flushing at commercial or industrial sites. Class C effluent may be used for irrigation of food crops where the reclaimed water does not come in direct contact with the edible food crop. Class D effluent may be used to irrigate fodder, seed, or processed food crops. Class E effluent may be used to irrigate forested lands where public access is limited. Table 3-1 – Municipal Wastewater Reuse Classifications summarizes Class A and D

effluents. Only these effluent classes are summarized here because they are most applicable to the City's available disposal methods as discussed in Chapter 7.

TABLE 3-1 – MUNICIPAL WASTEWATER REUSE CLASSIFICATIONS[1]

Classification	Class A	Class D
Treatment	Oxidized, clarified, and coagulated, with filtration approval requirements or treated by an equivalent process, plus nutrient removal requirements, adequately disinfected and tested.	Oxidized and adequately disinfected
Disinfection	Total coliform does not exceed 2.2 organisms per 100 mL	Total coliform does not exceed 230 organisms per 100 mL
Uses	May be used for residential irrigation at individual homes; groundwater recharge using surface spreading, seepage ponds, or other unlined surface water features, groundwater recharge using subsurface distribution; fire suppression from dedicated, marked hydrants; dust suppression at construction sites; toilet flushing at industrial and commercial sites, or Class B, C, D, or E uses.	May be used to irrigate fodder, seed, or processed food crops; or Class E uses
Access Restrictions	Irrigated during periods of non-use	Public access restricted
Buffer Distances	No effluent is allowed to be applied to surface waters in those circumstances when a NPDES Permits is required. One hundred feet minimum to drinking water wells	Site specific - No effluent is allowed to be applied to surface waters in those circumstances when a NPDES Permits is required.
Grazing	Grazing allowed only with approved grazing management plan	Grazing not allowed

3.4.4 SUBSURFACE WASTEWATER DISPOSAL

Subsurface disposal of wastewater is considered a Nonpoint Discharge and is permitted under the Idaho Code (IDAPA 58.01.03 - Individual/Subsurface Sewage Disposal Rules). Disposal of wastewater flows larger than 2,500 gallons per day require the use of Large Soil Absorption Systems (LSAS). A site investigation concluding that the effluent will not adversely impact or harm the waters of the State may be required. An installation permit is required and the system must be designed by a licensed engineer specializing in environmental or sanitary engineering.

Subsurface disposal requires the use of modules with a maximum size of 10,000 gallons per day. It is required that two disposal systems be installed, each sized to accept daily design flow and a replacement area equal to the size of one disposal system must be reserved. Soil depth, soil type, proximity surface water, groundwater movement and topography are all factors which impact the design of a LSAS.

[1] IDAPA 58.01.17.600.08

CHAPTER 4 Existing Conditions

4.1 PLANNING AREA

The Elk Bend Sewer District serves Units #1 and #2 of Salmon River Estates. The two units are referred to as Elk Bend and Steelhead Bend. Each unit has a separate collection and treatment system. The project planning area included as part of this study includes Elk Bend and Steelhead Bend as shown in Figure 4-1 on the following page.

4.2 POPULATION & DEMOGRAPHICS

Elk Bend contains approximately 100 residences. There are also a few small cabins, a 20 space RV park with showers and a small convenience store/restaurant. It is estimated that about 20-30% of the residences are occupied throughout the year with higher seasonal occupancy seasonally. The average household size in Lemhi County per the 2010 Census is 2.2 persons per household. The Elk Bend system is estimated to serve approximately 60-75 people year round and up to 200 people at peak times.

Steelhead Bend is located approximately 1-mile downriver of Elk Bend and contains approximately 38 residences, most of which are only seasonally occupied. It is estimated that approximately 20-26 people reside year round. The Steelhead Bend system is estimated to serve a peak of approximately 50 people. There are no commercial enterprises located at Steelhead Bend.

4.3 STUDY AREA CHARACTERISTICS

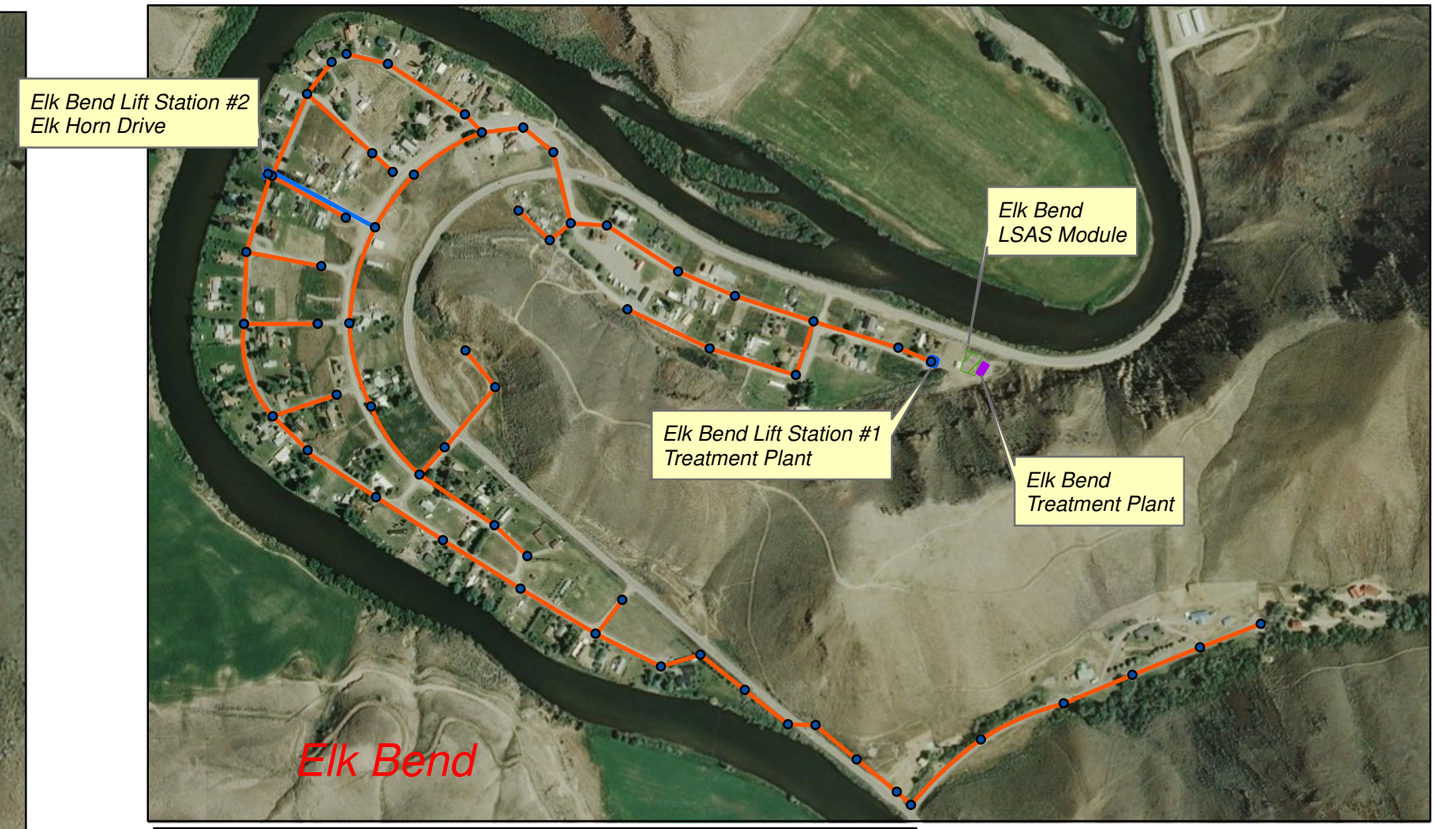
4.3.1 PHYSIOGRAPHY & TOPOGRAPHY

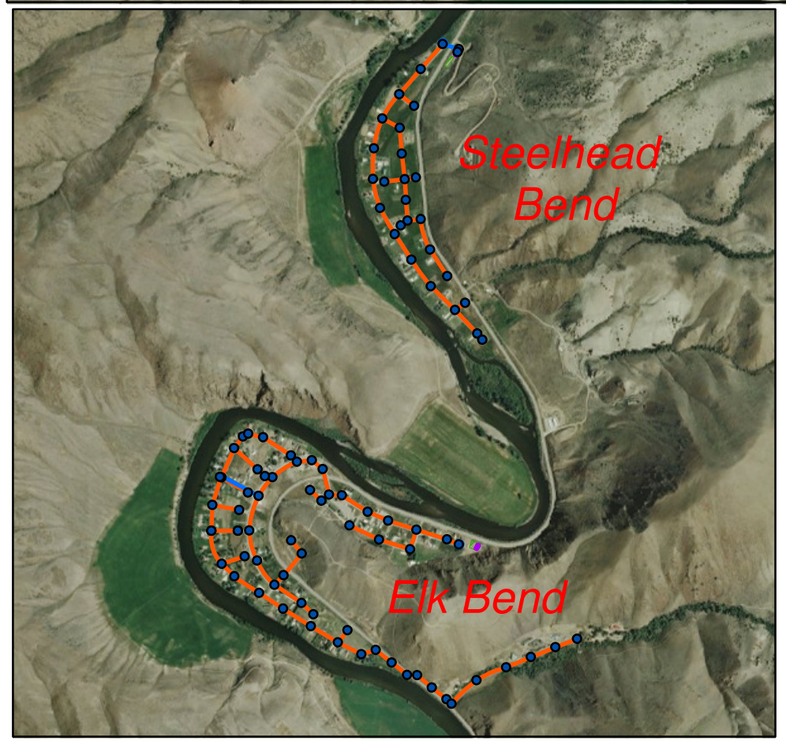
Elk Bend is located in the Salmon River corridor between the Cities of Challis and Salmon. The elevation is 4,345 ft above sea level and the immediate area is dominated by the mountains of the Salmon National Forest. The planning area lies in the Salmon River Valley with mildly sloping topography in the river plain and slopes increasing to 30-50% approaching the mountains in all directions.

4.3.2 SOIL & GEOLOGY

The soils found within the planning area consist of alluvial and colluvial deposits. Predominant soils in the Salmon River plain near Elk Bend include Bock-Bromaglin complex, Milhi silt loam, Copperbasin cool-Redfish complex, as well as other silty, sandy, and gravelly loams. The foothills surrounding the area include Zer gravelly loam, Calcids-Rubble Land-Rock outcrop complex, Dawtonia-Custco Association and other gravelly loams and rock. Table 4-1 – Typical Soil Profiles in the Salmon Region contains typical profiles for some of these soils. Appendix B contains a map and soil descriptions as found in the Soil Resource Report obtained from the NRCS web soil survey[2].

[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov





Legend

- Collection Piping
- Pressure Lines
- Manholes
- Lift Stations
- Existing Treatment Plants
- Existing LSAS (drainfields)

N

PROJECT NO. 209003-000

FILENAME Fig 4.1

305 N. 3rd Avenue
Pocatello, ID 83201
208.238.2146
www.kellerassociates.com
KELLER associates

Elk Bend Sewer District

Wastewater Systems

Existing Wastewater Systems

FIGURE NO. 4.1

The soil types found in Elk Bend are not classified as prime farmland. Prime farmland does not have an impact in the planning study area.

TABLE 4-1 – TYPICAL SOIL PROFILES IN THE SALMON REGION

Classification	Depth, inches	Description
Bock	0-18	Silt loam
	18-48	Stratified fine sandy loam to gravelly loam
	48-60	Very gravelly loamy sand
Bromaglin	0-5	Silt loam
	5-12	Very fine sandy loam
	12-20	Sandy loam
	20-60	Extremely gravelly loamy coarse sand
Zer gravelly loam	0-5	Gravelly loam
	5-14	Very gravelly loam
	14-60	Extremely gravelly sandy loam
Dawtonia	0-4	Gravelly loam
	4-24	Very gravelly loam
	24-60	Extremely gravelly loam
Custco	0-17	Very gravelly loam
	17-60	Stratified extremely gravelly loamy sand to extremely gravelly sandy loam
Copperbasin, cool	0-5	Very gravelly fine sandy loam
	5-25	Extremely gravelly loamy sand
	25-33	Extremely cobbly loamy sand
	33-60	Extremely gravelly loamy coarse sand
Redfish	0-3	Moderately decomposed plant material
	3-8	Gravelly sandy loam
	8-13	Very gravelly sandy loam
	13-63	Extremely gravelly coarse sand

4.3.3 CLIMATE

The climate in Elk Bend is similar to adjacent communities. Climate data for weather stations at Salmon and May, the closest weather monitoring stations, are found in Table 4.2 - Climate Date for Salmon Idaho and Table 4-3 – Climate Data for May, Idaho. Climate data is summarized for each location to provide a general understanding of the prevalent climate near Elk Bend. Precipitation averages 9.91 inches in Salmon, ID and 7.77 inches in May, ID per year of which about half falls during the summer months (May to August). Annual snowfall averages 26.1 inches in Salmon and 19.2 inches in May, ID and the average freeze-free season in Salmon is 117 days at 32.5˚F.

TABLE 4-2 – CLIMATE DATA FOR SALMON, IDAHO[3]

Month	Mean Temp, ˚F	Precipitation, inches	Snowfall, inches	Evaporation[4,5], Inches
January	21.1	0.68	7.8	0.0
February	27.6	0.45	3.8	0.0
March	38.7	0.53	2.0	0.0
April	46.8	0.77	1.0	0.0
May	54.8	1.42	0.1	6.81
June	62.5	1.41	0.0	8.39
July	69.5	1.02	0.0	10.23
August	67.8	0.80	0.0	8.73
September	58.1	0.76	0.0	6.39
October	46.1	0.59	0.1	0.0
November	32.6	0.76	3.8	0.0
December	22.2	0.72	7.5	0.0
Annual	45.7	9.91	26.1	40.55

TABLE 4-3 – CLIMATE DATA FOR MAY, IDAHO[6]

Month	Mean Temp, ˚F	Precipitation, inches	Snowfall, inches	Evaporation[4,5], Inches
January	18.7	0.43	5.0	0.0
February	24.0	0.28	2.7	0.0
March	34.8	0.31	2.0	0.0
April	41.7	0.56	1.2	0.0
May	50.6	1.24	0.4	6.81
June	58..2	1.38	0.0	8.39
July	65.4	0.7	0.0	10.23
August	63.0	0.7	0.0	8.73
September	54.6	0.74	0.0	6.39
October	43.0	0.44	0.4	0.0
November	29.1	0.5	2.5	0.0
December	17.2	0.5	4.9	0.0
Annual	40.2	7.77	19.2	40.55

[3] Western Regional Climate Center, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?idsalm
[4] Western Regional Climate Center, http://www.wrcc.dri.edu/htmlfiles/westevap.final.html#IDAHO - Mackay
[5] Pan evaporation measurements are not taken during the winter months, therefore "0.0" indicates that no measurement was taken.
[6] Western Regional Climate Center, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?idmay

4.3.4 SURFACE & GROUNDWATER HYDROLOGY

Elk Bend and the planning area lie within the Middle-Salmon-Panther IDWR planning basin. This basin is administered by the Idaho Department of Water Resources Eastern Region office in Idaho Falls, ID. The area does not contain a sole source aquifer. Surface water in the planning area is found in the Salmon River and Warm Springs Creek. Surface waters near but not within the planning area include Iron Creek, Deer Creek and other small tributary streams to the Salmon River.

The Salmon River originates to the southwest in the Sawtooth and Salmon River Mountains and the Sawtooth Valley and flows north through Elk Bend. The Salmon River is a Federal protected wild and scenic river downstream of the City of Salmon. The River is an important resource for the community in supporting sportsmen and recreation. The tourism generated by the River is a vital component of the local economy.

Designated beneficial uses for the Salmon River in the planning area include domestic water supply, agricultural water supply, cold water biota, salmonid spawning, and primary contact recreation. The main stem of the Salmon River is considered a migration corridor for sockeye and chinook salmon and steelhead trout.

The Salmon River has a 125 mile segment of the main stem from North Fork to Long Tom Bar that is designated as a wild and scenic river (79 miles designated as wild and 46 miles as recreational). This portion of the river begins approximately 45 miles downstream of Elk Bend. There are no wild and scenic rivers within the planning area.

The Salmon River is a 303(d) listed water but does not currently have a Total Maximum Daily Load (TMDL) for the portion within the planning area. More information regarding TMDLs and their significance to surface waters can be found at DEQ's website[7].

4.3.5 FAUNA, FLORA AND NATURAL COMMUNITIES

The Salmon River basin supports a wide diversity of animal and plant life. The river is a highly sought fishery which draws sportsmen for salmon and steelhead fishing. The mountains surrounding the Salmon River canyon are home to many species of large game including elk, deer, and bighorn sheep.

Animals whose range extends into the study area that are included on the US Fish and Wildlife Service Threatened and Endangered Species list include the Canada Lynx and Bull Trout as threatened species, Grizzly Bear as an experimental population, Gray Wolf as a recovery species, and the North American Wolverine, Yellow-billed Cuckoo, and Greater Sage-grouse as candidate species. The Whitebark Pine is also listed as a candidate plant species[8].

[7] http://www.deq.idaho.gov/water/data_reports/surface_water/tmdls/overview.cfm
[8] US Fish and Wildlife Service, Idaho Threatened and Endangered Species List

4.3.6 HOUSING, INDUSTRIAL AND COMMERCIAL DEVELOPMENT

The majority of buildings within the project planning area are primary and secondary residences. There is a 20 space RV park, restaurant and convenience store. There are no industrial interests represented in the planning area.

4.3.7 CULTURAL RESOURCES

The Elk Bend area is part of the cultural and historic lands of the Shoshone-Bannock Tribes. The rich Native American heritage of the region is an important part of the historic and cultural identity of the area. There are a number of mining claims in the surrounding hills, some of which may be of historic value.

There are no historic places listed on the National Register of Historic Places in the planning area.

4.3.8 UTILITY USE

The Elk Bend area is served by Idaho Power and Century Link. Natural gas is not available. Water service is provided by local water districts.

4.3.9 FLOODPLAINS

The majority of the planning area lies within the 100 year floodplain as identified by the Federal Emergency Management Administration. The low lying area along the Salmon River is categorized as flood zone A. A Flood Insurance Rate Map (FIRM) for the Elk Bend area can be found in Appendix C.

4.3.10 WETLANDS

The Salmon River canyon is narrow and dominated by the river and former river channel areas. Many springs are found in the area which produce localized wetland areas.

4.4 PUBLIC HEALTH AND ENVIRONMENTAL CONSIDERATIONS

The Department of Environmental Quality conducted a site investigation at the Elk Bend Sewer District on August 31, 2007 in response to a citizen complaint of raw sewage on the ground. EIPHD and IDEQ subsequently conducted a site visit on October 10, 2007 in which the following determinations were made:

- The wastewater treatment plant (WWTP) was not operating as designed
- The WWTP was consistently bypassed
- No monitoring was being performed
- The WWTP was not in good repair
- The operator was not currently licensed in accordance to State of Idaho requirements

The Department of Environmental Quality issued a Notice of Violation to the Elk Bend Sewer District on March 7, 2008. The Notice of Violation included a civil penalty. The Idaho Department of Environmental Quality held a compliance conference with representatives of the

Elk Bend Sewer District on April 30, 2008. EBSD and the Idaho Department of Environmental Quality entered into a Consent Order effective June 2, 2008[9].

The Elk Bend Sewer District implemented a drain field rehabilitation project in 2008. According to documents submitted by the District to IDEQ in 2008, the existing drainfield was removed, the soil excavated, stockpiled, and treated with lime. New fill was placed including a layered system of 2" drain rock, sewer sand, and 3/8-inch pea gravel with a geotextile and soil cap. The intended purpose of the temporary drain field was to improve disposal operation during the evaluation of the system and development and implementation of an acceptable treatment and disposal system. In August and September of 2010 IDEQ observed raw sewage ponding on the surface at the Elk Bend LSAS, indicating that the drain field rehabilitation has failed.

The assessment of the Elk Bend Sewer District wastewater collection and treatment systems, the recommendations, and capital improvements plan presented in this Wastewater Facilities Planning Study are intended to address some items outlined in the consent order. The implementation of a plan of action to alleviate the public health and environmental concerns related to the disposal of wastewater at Elk Bend is of high importance to the Eastern Idaho Public Health District, Idaho Department of Environmental Quality, the Elk Bend Sewer District and others.

4.5 LAND USE & DEVELOPMENT

The Salmon River Estates development was created in the 1970's with four units ultimately developed, Elk Bend, Steelhead Bend, Salmon River Meadows, and Salmon River Meadows Annex. The Elk Bend Sewer District provides wastewater collection and treatment services to Units #1 and #2 of the development known as Salmon River Estates. Lots in Units #1 and #2 (Elk Bend and Steelhead Bend) are primarily in the range of 0.1 to 0.25 acres. Several of the residential sites include multiple lots. Elk Bend and Steelhead Bend are each less than 50% developed, even considering multiple lots for each residence. The majority of the residences are small cabins or mobile homes.

There is a 20 space RV park at Elk Bend with a convenience store/cafe. There is also a restaurant located in Elk Bend that is currently closed. It has been reported that the restaurant is not equipped with a grease trap. It is recommended that the sewer district adopt a policy requiring grease traps for all restaurant facilities and work to ensure that one is installed if the restaurant returns to service. The community has a small emergency response building located at Elk Bend.

Development in Elk Bend and Steelhead Bend proceeds at a fairly slow pace as reported by the residents. A few new residences may be constructed each year, but it was reported that there has never really been a booming growth period. The anticipation is that development will continue as it has been with a few new residences constructed each year, with many utilizing two or three of the small lots. In recent years there have been several residents leave the area for various reasons. As a result, very low growth is expected at Elk Bend for the foreseeable future.

[9] EBSD - IDEQ Consent Order

4.6 DRINKING WATER SYSTEMS

Elk Bend and Steelhead Bend are served by two water systems. Elk Bend Water Company serves the Elk Bend area as Idaho Public Water System Number ID7300013. They operate four groundwater wells to serve approximately 94 service connections. The system provides water service to business and residential customers. Water services are unmetered and the system does not utilize storage. Connection fees are $1,500 with a $36/quarter user charge for full time residents and $18/quarter for part-time residents.

Steelhead Bend Mutual Water Company serves the Steelhead Bend area as Idaho Public Water System Number ID 7300048. They operate a single groundwater well to provide approximately 14 service connections. Water services are unmetered and the system operates without storage. The water company charges a $1,500 connection fee and $37.50 every three months user charge.

4.7 TECHNICAL, FINANCIAL AND MANAGERIAL CAPACITY

The Elk Bend Sewer District is required by IDAPA 58.01.16.409 to demonstrate technical, financial and managerial capacity for the operation of the wastewater system. The Elk Bend Sewer District is managed by the District Board of Directors. The District employs Roger Lanni part time as the wastewater system operator. Mr. Lanni has many years of experience operating the system but is not currently licensed as a wastewater operator. The system will require a licensed operator on staff or by contract to satisfy the technical requirements for system operation. The system does not currently have a written emergency operation plan which should be developed and implemented. The WWFPS (this document) will provide a plan for improvements of infrastructure.

The District is funded as a special taxing district of Lemhi County as discussed in Section 9.6 - Rate Analysis. The current taxing rate is sufficient to support the current level of operation and maintenance expense. Additional funding sources will be needed to support the implementation of the improvements recommended by this report.

The technical capacity of the Elk Bend Sewer District is addressed throughout this report. The system currently needs significant infrastructure improvements to safely collect wastewater and meet the discharge standards and treatment requirements.

CHAPTER 5 Existing Facility Evaluation

The Elk Bend Sewer District (EBSD) wastewater systems provide sanitary sewer service for the residents of Elk Bend and Steelhead Bend (Units #1 and #2 of Salmon River Estates). The entire system was constructed in the 1970's. EBSD operates two separate collection and treatment systems for the two units. Collection system lines are primarily 8-inch gravity sewer lines with three lift stations. The treatment systems are activated sludge package wastewater treatment plants. The plants discharge effluent wastewater to Large Soil Absorption Systems (LSAS).

5.1 WASTEWATER COLLECTION SYSTEMS

5.1.1 ELK BEND

The Elk Bend system is located at Elk Bend and includes the RV park and surrounding residences and businesses on both sides of the highway.

The Elk Bend system contains approximately 17,200 feet of 8-inch and 4-inch transite collection system piping with 52 concrete manholes and several cleanouts. Lift Station #1 is located at the termination of the Elk Bend collection system and pumps the collected wastewater to the Elk Bend treatment facility. Lift Station #2 is located at Elk Horn Drive and Sage Way. Lift Station #2 pumps wastewater collected from Elk Horn Drive, nearest the river, approximately 510 feet through a 4-inch pressure line to Antelope Drive. It has been reported to IDEQ by an Elk Bend resident that the manhole upstream from this lift station surcharges and overflows during power outages.

Observation of several manholes, in August 2009, showed that manholes appear to be in good condition. Signs of past manhole leaks are evident. Leaking manholes were patched utilizing an applied cement product. The leak repair has been successful according to the operator (See Figure 5-1).

FIGURE 5-1 - MANHOLE WITH SEALANT AT RINGS

Evidence of infiltration and inflow (I/I) was not found during the evaluation of the collection system. The collection piping is located in close proximity to the Salmon River and may be below the groundwater level at certain locations under high groundwater conditions. Additionally, some manholes are located such that potential exists for inflow from stormwater runoff.

5.1.2 STEELHEAD BEND

Steelhead Bend is located approximately 1-mile downriver of Elk Bend. The Steelhead Bend system contains approximately 7,750 ft of 8-inch transite collection system piping

with 21 concrete manholes and several cleanouts. The Steelhead Bend system contains one lift station located at the terminus of the collection system. The lift station pumps the collected wastewater through a 4-inch pipeline across the highway to the Steelhead Bend treatment facility.

Observed manholes within the Steelhead Bend collection system appear to be in good condition and did not exhibit signs of infiltration.

Evidence of infiltration and inflow (I/I) was not found during the evaluation of the collection system. The collection piping is located in close proximity to the Salmon River and may be below the groundwater level at certain locations under high groundwater conditions. Additionally, some manholes are located such that potential exists for inflow from stormwater runoff.

5.1.3 LIFT STATIONS

Lift stations were designed to have the pump characteristics shown in Table 5-1 - Lift Station Design Criteria. The wet wells are 4-foot inside diameter standard manholes with a steel deck located approximately 4-feet from the bottom. An 11"x15" manhole is cut through the cover plate. Originally two Yeomans Duplex Model 834 heavy duty 4-inch screenless nonclog sewage ejecter pumps were mounted on the steel deck and pumped into the 4-inch ductile iron piping that exits the wall of the wet well and into the dry pit. The dry pit contains parallel 4-inch ductile iron lines from the lift station pumps each with a check valve and a gate valve. Following the valves the two lines converge into a single 4-inch ductile iron line. The four-inch line is AC pipe outside of the lift station pit.

TABLE 5-1 - LIFT STATION DESIGN CRITERIA

Design Capacities	Capacity gpm	TDH ft	8" Pipe Invert In	4" Pipe Invert Out	Top of Station	Cover Plate Elev.	Wet Well Floor
Elk Bend LS#1 –WWTP	60	20	32.68	35.3	39.0	34.5	30.0
Elk Bend LS #2 –Elk Horn Dr.	30	10	43.0	45.8	50.0	45.0	40.5
Steelhead Lift Station	40	20	7.36	10.8	15.0	10.0	5.5

Each lift station is fenced with chain link fencing. An open sided awning shelter over each lift station provides some protection from the weather. The shelters are steel framed with metal roof sheeting (see Figure 5-2, Figure 5-3 and Figure 5-4). The lift stations are susceptible to freezing and should be equipped with proper concrete covers with gravity vents.

FIGURE 5-2 - LIFT STATION #1 – ELK BEND WWTP

FIGURE 5-3 - LIFT STATION #2 – ELK HORN DRIVE

FIGURE 5-4 - STEELHEAD BEND LIFT STATION

All of the original lift station pumps have been replaced with Myers submersible pumps with a 50 gpm capacity. The pumps have been lowered through a hole cut in the deck plate. The new pumps connect to the old pipelines through 2" diameter flexible pipe that runs over the wall of the wet well and to a steel pipe that goes down into the dry pit to connect to the pipe after the control valves in the old pump lines (See Figure 5-5 and Figure 5-6). Insulated plywood covers are onsite to cover the wet/dry pits to help avoid freezing in the winter months. These modifications which have been made to the lift stations did not receive design approval from IDEQ and are in violation of the wastewater rules.

FIGURE 5-5 - LIFT STATION #1 WET WELL

FIGURE 5-6 - LIFT STATION #1 PIPING TO DRY PIT

The wet and dry pit walls end 2-3 feet below the ground surface. The upper section is surrounded with a CMU block wall three courses high. The CMU walls show significant displacement from soil pressure at Lift Stations #1 & #2 (Figure 5-7, Figure 5-8, and Figure 5-10). The concrete walls in the dry pit are bowed from soil pressure at Lift Station #2 (Figure 5-9). CMU and concrete construction at Lift Station #3 appears to be in good condition.

FIGURE 5-7 - LIFT STATION #1 CMU WALL

FIGURE 5-8 - LIFT STATION #1 CMU WALL

FIGURE 5-9 - LIFT STATION #2 DRY PIT

FIGURE 5-10 - LIFT STATION #2 CMU WALL

The electrical panels for the lift stations are pole mounted and are under the shelters constructed over each lift station. Each lift station has a hour meter and an event counter for the pumps. Electrical wires run down the wet pit to the submerged pumps. All electrical equipment and wiring appears aged (See Figure 5-11 through Figure 5-16). A lift/suction pump is on hand, located at the Steelhead Lift Station (See Figure 5-17). The lift station electrical connections do not meet the National Electric Code (NEC).

FIGURE 5-11 - LIFT STATION #1 ELECTRICAL

FIGURE 5-12 - LIFT STATION #2 ELECTRICAL

FIGURE 5-13 – STEELHEAD LS ELECTRICAL

FIGURE 5-14 - ELECTRICAL PANEL INTERIOR

FIGURE 5-15 - LIFT STATION #2 ELECTRICAL

FIGURE 5-16 - LIFT STATION #1 WIRING

FIGURE 5-17 – LIFT/SUCTION PUMP

FIGURE 5-18 - WATER TAP AT LIFT STATION #2

The lift stations are in poor condition. Each lift station has a submersible pump with a temporary piping setup that does not satisfy the wastewater rules. No redundant pumps are available. Backup power is limited to one engine/pump unit for the three lift stations. The lift/suction pump is not an automatic backup and requires manual connection and startup to provide backup pumping. The functionality of the valves is unknown as the valves have been unused for several years. Electrical panels are rusted and poorly protected from dust, moisture, etc. Electrical wiring is exposed and unprotected. The masonry wall courses are bowed inward from soil pressure at Lift Stations #1 and #2.

It was reported by the operator that each of the lift stations experience problems with large items clogging the pumps. Towels, mop heads and other debris are more than the pumps can handle. The suggestion of adding a screen or grinder pumps at each lift station was well received.

Each of the lift stations requires rehabilitation or replacement to bring them into compliance with the wastewater rules, restore the structural integrity and provide the necessary reliability and safety.

5.2 WASTEWATER TREATMENT

The two systems served by the Elk Bend Sewer District utilize an aerated package plant for wastewater treatment. The two package plants follow the same process, but are sized for slightly different flows. The Elk Bend plant is sized to treat 22,000 gallons per day and the Steelhead Bend plant was sized for 15,000 gallons per day. The systems are Clow Aer-o-Flo systems with aeration, clarification, and chlorine contact chambers. Volumes for each section are shown in Table 5-2. The treatment plant construction drawings can be found in Appendix D.

TABLE 5-2 - CLOW AER-O-FLO PACKAGE PLANT DESCRIPTIONS

	Design Flow	Aeration	Clarifier	Cl_2 Contact	Blower	
Plant	gpd	gal	gal	gal	cfm	HP
Steelhead Bend	15,000	15,000	2,500	625	75	3
Elk Bend	22,000	22,000	3,667	930	110	5

Flows in the Elk Bend and Steelhead Bend systems were estimated based on the lift station hour and event counters and estimated pump flow rates. The Elk Bend system has an estimated average daily flow of 16,330 gallons per day and the Steelhead Bend system has an estimated average daily flow of 5,120 gallons per day.

5.2.1 ELK BEND TREATMENT PLANT

The Elk Bend package wastewater treatment plant is in very poor condition. Rust is prevalent, roof trusses are degraded, roof sheeting is rusted and pieces are missing, the comminutors have been removed, a significant amounts of scum buildup is evident in the steel tanks. Aerator blowers and motors are old and only one is in functional condition. Air piping above the water surface shows significant signs of corrosion. The Return Activated Sludge (RAS) system does not operate optimally and only returns a portion of the settled solids from the clarifiers to the aeration basin. The scum collection and return

system is inoperable. The operator reports that once or twice per year, he pumps down the clarifier basin to remove the remaining settled sludge and scum into the overflow basin, applied chlorine and lime, and allowed the sludge to dry then shoveled it out and landfilled. This sludge disposal method does not meet the EPA 503 regulations for disposal of biosolids. The Elk Bend Sewer District has not followed a monitoring program for the treatment plants and no records of treatment are available.

FIGURE 5-19 - ELK BEND WASTEWATER TREATMENT PLANT

Treatment capability and performance of the treatment plant is very poor. It is shown that proper treatment is not occurring as indicated by the effluent sample results in Table 5-3 and Table 5-4. The treatment plant has not been able to nitrify ammonia as shown in the results of the TKN values. Built up sludge does not appear to have been removed from the plants for some time. On Keller Associates' visits to the plant, the aeration blowers were operating, but it has been reported by IDEQ that at inspections of the treatment plant the aeration system was not functioning. A temporary 1,000 gallon septic tank with a filter at the effluent end of the Elk Bend plant was installed in 2007. The septic tank has significant amount of scum buildup. The influent piping at the Elk Bend plant has been modified from the original construction. The first few roof trusses near the inlet show signs of degradation resulting from wastewater splashing onto them as it enters the aeration vessel.

Figure 5-20 to Figure 5-33 show components of the Elk Bend Wastewater Treatment Plant.

FIGURE 5-20 - NORTH END OF WWTP

FIGURE 5-21 - INLET PIPING

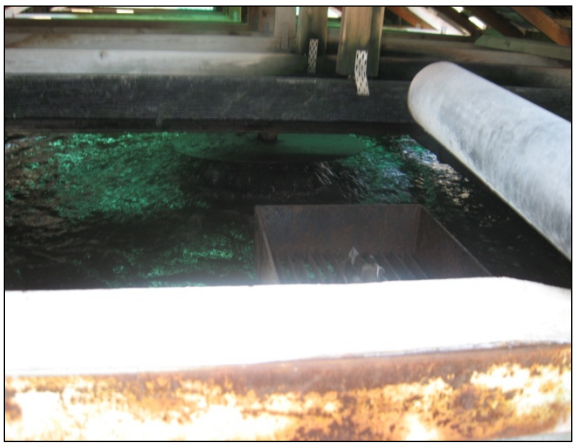


FIGURE 5-22 - AERATOR ACTIVE

FIGURE 5-23 - SOUTH END OF WWTP

FIGURE 5-24 - CLARIFIER BASIN

FIGURE 5-25 - SCUM BUILDUP IN CLARIFIER

FIGURE 5-26 - FUNCTIONING BLOWER

FIGURE 5-27 - AERATION

FIGURE 5-28 - EFFLUENT & AERATOR PIPING

FIGURE 5-29 - SEPTIC TANK WITH FILTER

FIGURE 5-30 - ELK BEND DRAINFIELD

FIGURE 5-31 - OVERFLOW POND

FIGURE 5-32 - WATER TAP (NEAR THE BOULDER)

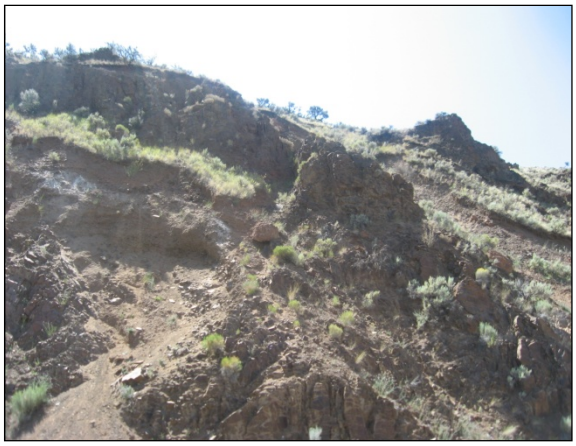


FIGURE 5-33 - CLIFF ABOVE WWTP

The Elk Bend Wastewater Treatment Plant is located along a steep hillside. Rock fall and rockslides are a concern at the plant. No rock fall protection has been installed at the plant.

The frost free hydrant located near the treatment equipment was relocated at the direction of the Idaho Department of Environmental Quality. In the winter of 2009-2010 the hydrant froze and cracked. Repair of the frost free hydrant has not yet been completed.

5.2.2 STEELHEAD BEND TREATMENT PLANT

The Steelhead Bend treatment plant has not experienced the same problems with the drainfield as the Elk Bend plant. The plant is in slightly better condition than the Elk Bend treatment plant. The roof appears to be in decent condition and the inlet piping has not been modified. The comminutor has been removed. Scum buildup was not as severe as the Elk Bend plant. Corrosion of piping and rust on metal surfaces inside the tank is prevalent. The Return Activated Sludge (RAS) system does not function fully as with the Elk Bend plant. The operator performs the same pumping of the clarifier tank into the overflow basin, application of lime and chlorine, and removal of solids after drying as at the Elk Bend plant with solids landfilled. Again, it should be noted that this method of biosolids disposal does not comply with EPA 503 regulations. As with the Elk Bend plant the treatment performance is unknown. Figure 5-34 to Figure 5-39 show components of the Steelhead Bend Wastewater Treatment System.

FIGURE 5-34 - STEELHEAD BEND PLANT - SOUTH

FIGURE 5-35 - STEELHEAD BEND - NORTH

FIGURE 5-36 - AERATION BASIN

FIGURE 5-37 - BLOWER HOUSING

FIGURE 5-38 - OVERFLOW BASIN

FIGURE 5-39 - DRAINFIELD

5.3 WASTEWATER FLOWS

Wastewater flows were estimated on the basis of the hour meters on the lift station pumps in each of the collection systems. Lift station hour meters were read and recorded by the system operator on a few days in 2009 and 2010 and on a weekly basis from August 1 to October 17,

2011. The hours recorded were used to estimate flow on the basis of the estimated flow rate of the pumps of 50 gpm.

The results indicate that the terminal lift station pump in the Elk Bend system pumps an average of 16,330 gallons per day. Winter months average approximately 10,000 gallons per day. This equates to approximately 133 gallons per person per day (gpcd). Typical wastewater production is 80-120 gpcd. The Steelhead Bend system had an annual average of approximately 5,150 gallons per day. Winter months average approximately 3,250 gallons per day, which equates to approximately 125 gpcd.

5.4 WASTEWATER TREATMENT PLANT PERFORMANCE

Per IDAPA 58.01.03, the Elk Bend Sewer District is responsible for the storing, treatment and disposal of wastewater produced within the system. Treatment proscribed is on the basis of technology and at a minimum would include the use of septic tanks with capacity equal to two times the average daily flow. Additionally, disposal of wastewater through large soil absorption systems must not result in adverse impact or harm to the waters of the State. Treatment above the levels achievable by typical septic tanks may be necessary to facilitate proper disposal of the wastewater.

Wastewater samples were taken in June and July 2010 of influent and effluent wastewater at both treatment plants and on Sept. 28, 2011 at the Elk Bend plant. Results of the wastewater testing are shown in Table 5-3 and Table 5-4 below. These samples provide a spot check of the treatment performance which indicate that the treatment plant is not functioning properly and is not achieving proper treatment or nitrification as seen in the effluent TKN values.

TABLE 5-3 - ELK BEND TREATMENT PLANT - WASTEWATER CHARACTERISTICS

Elk Bend Treatment Plant - Wastewater Characteristics							
	6/1/2010			7/14/2010			9/28/2011
Constituent	Influent	Effluent	% Removal	Influent	Effluent	% Removal	Effluent
BOD5	239	53	77.8%	44	26	40.9%	48
TSS	229	74	67.7%	84	28	66.7%	
TN	21.2	26	-22.6%	19.5	14.1	27.7%	16.49
TP	3.74	3.78	-1.1%	3.11	2.02	35.0%	
pH	7.27	7.26	0.1%	7.21	7.27	-0.8%	
Nitrate N	0.3	0.3	0.0%	0.3	0.3	0.0%	1
TKN	21.2	26	-22.6%	19.5	14.1	27.7%	17.3
FOG	17.4	8	54.0%	5.8	7.7	-32.8%	
Total Coliform		830,000	MPN/100mL		105,000	MPN/100mL	

TABLE 5-4 - STEELHEAD BEND TREATMENT PLANT - WASTEWATER CHARACTERISTICS

Steelhead Bend Treatment Plant - Wastewater Characteristics						
	6/1/2010			7/14/2010		
Constituent	Influent	Effluent	% Removal	Influent	Effluent	% Removal
BOD5	310	36	88.4%	48	31	35.4%
TSS	157	62	60.5%	18	39	-116.7%
TN	19.4	40.1	-106.7%	15	22.6	-50.7%
TP	2.55	5.31	-108.2%	3.94	3.94	0.0%
pH	7.3	7.27	0.4%	7.26	7.6	-4.7%
Nitrate N	0.3	0.3	0.0%	0.3	0.3	0.0%
TKN	19.4	40.1	-106.7%	15	22.6	-50.7%
FOG	18.1	16.6	8.3%	6.1	7.5	-23.0%
Total Coliform		1,550,000	MPN/100mL		242,000	MPN/100mL

5.5 WASTEWATER DISPOSAL

The Elk Bend and Steelhead Bend wastewater systems each have large soil absorption systems for the disposal of wastewater. Wastewater ponding on the surface at the Elk Bend disposal field in 2007 was the precipitating factor for the Notice of Violation issued in 2008 and the subsequent Consent Order between the Elk Bend Sewer District and the Idaho Department of Environmental Quality. The Notice of Violation outlined four violations of IDAPA 58.01.03, 58.01.11 and 58.01.16.

On March 15, 2010, IDEQ and EPA received complaints regarding sewage on the ground adjacent to the lift station at Steelhead Bend and the Salmon River. IDEQ visited the site in response to the complaint and issued a letter to the Elk Bend Sewer District on March 18, 2010. The EPA Criminal Investigative Division investigated the incident and elected not to pursue further action because it was not evident that sewage had been illegally discharged to the river. The incident occurred when the lift station pump failed and the operator pumped the contents of the lift station wet well onto the ground to service the pump. IDEQ included in their letter of March 18, 2010 direction regarding the proper action in such circumstance, which would be to pump the wastewater into a contained vessel and properly dispose of it.

A temporary drain field at the Elk Bend treatment plant was installed in 2007. The previous drainfield had become compromised with wastewater appearing on the ground surface. The previous piping and soil was removed and new fill and piping placed. At the time of this study, the placement of backfill and topsoil above the drainfield had not been completed. Wastewater ponding on the surface has been observed since the drainfield replacement, specifically in August and September of 2011.

The LSAS at Elk Bend, the temporary replacement drainfield, is approximately 4,800 square feet. The estimated hydraulic application rate at the Elk Bend LSAS averages 3.5 gpd/sf with an estimated peak of 5.5 gpd/sf. This exceeds by far the hydraulic application rates proscribed by

the subsurface wastewater disposal rules (IDAPA 58.01.03) which provides for a maximum hydraulic application rate of 1.0 gpd/sf. Additionally, the LSAS at Elk Bend is located approximately 100 feet from the waters of the Salmon River, less than the required separation distance of 200 to 300 feet (depending on soil classification). The very close proximity to the surface water of the Salmon River coupled with the very high application rate of wastewater create a significant risk that the wastewater will enter the river in a short amount of time, creating environmental and safety concerns. Additionally, the LSAS is located within 50 feet of the property line, less than the required separation distance of 75 feet.

The Steelhead Bend LSAS has an estimated average hydraulic application rate of 0.85 gpd/sf and estimated peak of 1.1 gpd/sf. The Steelhead Bend LSAS is located approximately 250 feet from the river and less than 50 feet from the property line along Highway 93.

The large soil absorption systems at Elk Bend and Steelhead Bend do not conform to current rules for subsurface wastewater disposal (IDAPA 58.01.03 - Individual/Subsurface Sewage Disposal Rules). The systems do not have redundant disposal fields and are not rotated. Size of the subsurface disposal system at Elk Bend is not adequate for the volume of wastewater being discharged. Better understanding of the soil properties and groundwater movement in the area are necessary to quantify what measures would be required to bring the subsurface disposal systems into compliance with the regulations.

5.6 FINANCIAL STATUS

The Elk Bend Sewer District collects funds through a special taxing district administered by Lemhi County with property taxes. The tax levy is applied to properties within the District, Elk Bend Units #1 and #2, identified as code areas 6 and 7 by Lemhi County. The County has three other levies that apply to the area, School District 291, the County Library, and the Fire District. Lemhi County property tax rates for 2009 are shown in the following table.

TABLE 5-5 - LEMHI COUNTY TAXES SUMMARY

Lemhi County Taxes within Elk Bend Sewer District	
Lemhi County Tax Component	Tax Rate
Property Tax	0.003154644
Elk Bend Sewer District Levy	0.002136696
School District 291 Levy	0.000686466
Library	0.000216098
Fire	0.000873440
Total	**0.009014022**

The budget for fiscal year 2011 was $27,037 with a breakdown shown below in Table 5-6 - Elk Bend Sewer District 2011 Budget. With an estimated 125 total connections, the approximate user cost to fund the current budget is $18 per connection per month. Note that this is imprecise as property taxes vary among the connected users and properties which are not connected to the system still contribute through the property tax assessment.

TABLE 5-6 - ELK BEND SEWER DISTRICT 2011 BUDGET

Elk Bend Sewer District General Fund Budget - 2011		
Revenues:		
Estimated Elk Bend Sewer Levy:		
	$	21,037
Estimated Interest & Delinquent Taxes		
	$	6,000
	$	**27,037**
Expenditures:		
Payroll	$	10,525
Payroll Taxes	$	1,200
Utilities	$	2,900
Chemicals & Tests	$	5,708
Insurance	$	3,630
Travel	$	827
Repair & Maintenance	$	2,000
Administration & Legal	$	247
	$	**27,037**

5.7 SYSTEM DEFICIENCIES

The wastewater system has the following deficiencies identified in this study:

- Lift stations in poor condition with insufficient equipment, no redundant pumps, outdated electrical equipment, corroded valves and piping, deteriorating wet wells, and insufficient freeze protections.
- Elk Bend Treatment Plant does not have sufficient capacity for the estimated peak flow.
- Elk Bend and Steelhead Bend treatment plants are not achieving the level of treatment they were designed for.
- Elk Bend and Steelhead Bend Large Soil Absorption Systems do not have redundant LSAS modules required by IDAPA 58.01.03.013.
- Electrical systems do not meet current NEC code.
- Lift stations do not have proper backup power or redundancy.
- Elk Bend drain field has failed (sewage ponding on the ground surface).
- There is non-uniform application of wastewater to drain fields.
- The drain fields for LSAS are not pressurized.
- Elk Bend Sewer District does not comply with the LSAS monitoring and reporting requirements.
- Elk Bend Sewer District has no certified licensed operator operating the systems.
- Sludge disposal does not comply with EPA 503 regulations for bio-solids.

CHAPTER 6 Future Conditions

6.1 FLOW PROJECTIONS

The anticipated growth in the Elk Bend and Steelhead Bend systems is moderate to low. A 1% annual growth was applied to develop 10, 20 and 40 year flow projections as shown in Table 6-1 below. The 2011 estimated flow is 16,330 gallons per day in Elk Bend and 5,150 gallons per day in Steelhead Bend. Projected average annual flows for the 20 year planning horizon are 19,926 gallons per day in Elk Bend and 6,284 gallons per day in Steelhead Bend. Peak flow projections are 32,457 gallons per day in Elk Bend and 8,114 gallons per day in Steelhead Bend.

TABLE 6-1 - POPULATION AND WASTEWATER FLOW PROJECTIONS

Elk Bend Sewer District - Population and Wastewater Flow Projections								
	Elk Bend Unit				Steelhead Bend Unit			
	2011	2021	2031	2051	2011	2021	2031	2051
Estimated EDUs	125	138	153	186	38	42	46	57
Estimated Year Round Population	75	83	92	112	26	29	32	39
Estimated Peak Population	200	221	244	298	50	55	61	74
Winter Average (gpd)	10,000	11,046	12,202	14,889	3,250	3,590	3,966	4,839
Annual Average (gpd)	16,330	18,038	19,926	24,313	5,150	5,689	6,284	7,668
Estimated Peak (gpd)	26,600	29,383	32,457	39,604	6,650	7,346	8,114	9,901

6.2 COLLECTION SYSTEM

The Elk Bend and Steelhead Bend collection piping networks are in reasonably good condition on the basis of the visual inspections conducted. No major problems have been reported for the collection piping.

The three lift stations in use by the Elk Bend Sewer District are in disrepair and do not meet the reliability and operational integrity needed. Lift stations should be rehabilitated to accommodate the build-out pumping requirements, satisfy IDEQ requirements for lift station construction, and provide for better serviceability.

Lift station rehabilitation should include repair of wet and dry pit walls that are beginning to shift, replacement of failed valves and piping, installation of new pumps of adequate capacity and with redundant pumps in place and capability to service pumps without entering wet wells, upgrade electrical controls and equipment, and provide either screening or grinder pumps to handle towels, mop heads, and other debris that have caused recurring problems in the lift stations. Lift stations should be equipped with backup power generators with automatic switching capability for pump operation in the event of power loss.

Given the extent of work needed to rehabilitate the lift stations, complete replacement should be considered and evaluated on a capital and life-cycle cost basis prior to implementation.

6.3 WASTEWATER TREATMENT PLANTS

The Steelhead Bend package treatment plant was originally sized to treat 15,000 gallons per day and the Elk Bend plant was sized for 22,000 gallons per day. Comparing to average and peak flow projections, the Steelhead Bend treatment plant is sized adequately for the projected flows. The Elk Bend treatment plant currently has flows estimated to exceed the treatment capacity of the plant during peak periods.

The condition of the current wastewater treatment package plants is such that the plants need equipment repair or replacement. The wastewater treatment plants are not providing the level of treatment for which they were designed or which is needed for safe disposal of wastewater.

6.4 FUTURE CONDITIONS WITHOUT IMPROVEMENTS

If action is not taken at the Elk Bend Sewer District to improve the collection, treatment and disposal systems, it is anticipated that equipment failures will become more common with eventual total failure of the lift stations and treatment plants. It is also anticipated that without expansion of the disposal beds the occurrence of wastewater ponding at the ground surface would become a recurring event. These issues would place the system at risk of contaminating adjacent surface water of the Salmon River and will raise public health and environmental concerns. The Elk Bend Sewer District would be subject to additional enforcement action by the state and federal agencies for violations of the clean water act and State Code. No action on the part of the Elk Bend Sewer District to correct the problems will result in the Idaho Department of Environmental Quality issuing a certificate of disapproval and the re-imposition of sanitary restrictions on the subdivisions.

6.5 LAND USE PLANS

Land use in the project planning area is not expected to vary from the current uses. The undeveloped properties at Elk Bend and Steelhead Bend will continue to be available as residential home sites with other uses similar to those currently seen including service oriented businesses.

CHAPTER 7 Wastewater Disposal Alternatives

7.1 WASTEWATER DISPOSAL

Wastewater collected to the Elk Bend and Steelhead Bend treatment facilities is discharged to Large Soil Absorption Systems (LSAS). The failure of the drain field at the Elk Bend facility led to the installation of a temporary drain field and the undertaking of the Facility Planning Study. The systems, approved and installed in the 1970's, do not meet the current regulatory requirements for subsurface wastewater disposal (IDAPA 58.01.03).

Alternatives to provide for the disposal of wastewater for the Elk Bend Sewer District include the continued use of Large Soil Absorption Systems, discharge into the Salmon River, land application of wastewater, rapid infiltration, and STEP systems with cluster drain fields. Each of these alternatives is considered in this section.

7.2 REGIONALIZATION

The area immediately surrounding the project planning area has very few residences and little buildable space for future development. Units #3 and #4 of Salmon River Estates lie directly upstream of Elk Bend on the opposite side of the Salmon River. These units have larger lot sizes and typically have individual septic systems. No discussion of regionalization with residents at these locations has been entertained. Significant barriers to such consolidation exist including the distance to Elk Bend (approximately 1.5 miles) and crossing the river. Without some compelling motive to create a combined wastewater system in these developments, there would not be a viable solution for incorporation into the Elk Bend Sewer District. Additionally, there exists very little available space at Elk Bend and Steelhead Bend for the disposal of wastewater.

7.3 NO ACTION ALTERNATIVE

The No Action alternative would constitute continuing to operate the current discharge LSAS's as is. This alternative would do nothing to resolve the problem of wastewater ponding at the surface, lack of drain field capacity, and lack of capacity for proper management through rotation. As it is presently constituted, there is little the District can do to improve the operation of the existing wastewater disposal system. This alternative is not considered a viable solution for the Elk Bend Sewer District's wastewater disposal needs.

7.4 LARGE SOIL ABSORPTION SYSTEM

The continued use of large soil absorption systems (LSAS) for the disposal of wastewater at the Elk Bend and Steelhead Bend treatment facilities requires improvements to be made to the current systems to provide for the adequate disposal of wastewater. The current LSAS drain fields do not meet the standards outlined in IDAPA 58.01.03, the State requirements for LSAS. Neither of the drain fields satisfies the separation distance requirement of 300 feet from the surface water of the Salmon River. Neither system has a secondary drain field installed or a replacement area identified.

The Idaho Administrative Code (IDAPA 58.01.03) relating to LSAS provides that existing systems that cannot meet the current rules and regulations, must meet the intent by utilizing a

standard subsurface sewage disposal design or alternative system as specified by the Director. For the remediation of the Elk Bend Sewer District's large soil absorption systems, the design should be completed to meet the current requirements to the fullest extent possible given the constraints presented.

One of the factors that may preclude full satisfaction of the rules and regulations includes the limited available land space. The current disposal facilities are situated such that achieving the required separation distance from the Salmon River at the Elk Bend location is not possible and at the Steelhead Bend location is marginal. Additionally, there are no better alternative locations available without significant conveyance of the wastewater up or down the Salmon River canyon.

Large soil absorption systems are required to have secondary disposal drainfields (IDAPA 58.01.03.013.04.f) and it is required that each drainfield module have a maximum capacity of 10,000 gallons per day (IDAPA 58.01.03.013.03). To satisfy the design flow requirements of the treatment plants and these two requirements, the Elk Bend treatment plant would need to have a minimum of four drainfield modules and Steelhead Bend would need at least two modules. Drainfields at the Elk Bend plant should be sized for 10,000 gallons per day while those at the Steelhead Bend plant could be sized as low as 7,500 gallons per day. Additionally, space will need to be reserved to provide for an additional disposal system for future use at each site. The subsurface disposal rules allow absorption ranging from 0.2 to 1.0 gallons per square foot per day depending on soil suitability. For some “Alternative Systems,” set back distances and drain field size may be reduced or application rates may be increased if advanced treatment is used per the Subsurface Disposal Technical Guidance Manual (TGM). The total area required for each of these disposal modules is dependent on the soil suitability, treatment level achieved, potential allowances from DEQ and other factors which will need to be addressed during the design phase of this project.

7.5 SURFACE WATER DISCHARGE

Discharge of wastewater into surface water requires a discharge permit through the National Pollution Discharge Elimination System administered by the United States Environmental Protection Agency. Successfully receiving an NPDES permit for discharge into the Salmon River could prove to be a difficult process. If the application were successful, the District would be subject to oversight by the U.S. Environmental Protection Agency through the NPDES program. The discharge requirements which would be imposed for a surface water discharge permit would be considerably more restrictive than the requirements for the current subsurface wastewater discharge method. Treatment being achieved at the current wastewater treatment plants would not be adequate to meet the anticipated discharge limits. Disinfection would also be required, with constraints on disinfectant residuals. Monitoring and testing of wastewater required under the NPDES permit would be significantly greater than that required for subsurface disposal or land application of wastewater.

7.6 IRRIGATION LAND APPLICATION

FIGURE 7-1 - IRRIGATION

Land application of wastewater is under the jurisdiction of the Idaho Department of Environmental Quality. If wastewater can be disposed of by land application then a wastewater treatment operation is not subject to the Clean Water Act or EPA oversight. IDEQ does have treatment requirements for land applied wastewater depending on the wastewater reuse classification.

The IDEQ permits the reuse of treated wastewater under the standards established in *IDAPA 58.01.17 – Reclamation & Reuse of Municipal & Industrial Wastewater*. Depending upon the level of treatment employed, reclaimed wastewater can be applied for uses ranging from irrigation of farmland to cemeteries, golf courses, schools, and parks. Reclaiming wastewater for irrigation conserves raw water that otherwise would be used for irrigation and utilizes nutrients, considered to be pollutants in wastewater (nitrogen, phosphorus, etc), beneficially as fertilizer.

According to IDEQ reuse requirements, wastewater for reuse is distinguished by five classes, A to E. Class A effluent may be used for irrigation and groundwater recharge and all other reuse scenarios acceptable for Class B, C, D, and E effluents. Class B effluent can be used for irrigation in public places but not for groundwater recharge. Class C and D effluents are not suitable for reuse in public space, such as parks or schools but can be used for differing types of crop irrigation. Class E effluent may be used for irrigation of restricted access forested areas.

In order to achieve Class A effluent, wastewater must be oxidized, coagulated, clarified, and filtered, or treated by an equivalent process that provides nutrient removal, and be adequately disinfected. Class B effluent has the same treatment requirements as Class A effluent without nutrient removal requirements. Class C and D effluent must be oxidized and disinfected. Class E effluent must be of primary effluent quality.

The most viable option for land application of wastewater for the Elk Bend Sewer District would be to agricultural land for crop irrigation. Space is limited in the Elk Bend area and there is very little public space which would lend itself to a Class A or B application of wastewater. Higher level treatment requires a corresponding level of expense to implement and maintain.

The currently targeted level of treatment at the wastewater treatment plant could meet the requirements for producing Class C or D effluent. Class D effluent may be applied to fodder and seed crops. Class D effluent could be applied as irrigation water to locally grown crops such as alfalfa or grains. This would require; installation of a storage lagoon or alternative wastewater disposal method for the winter months, installation of pumping and piping facilities to deliver the reclaimed wastewater to the application site, and purchasing or negotiating a long term lease for an adequately sized application site.

Land application of wastewater is typically permitted by IDEQ from April 15 to October 1. Wastewater produced during the winter months must either be stored in a storage lagoon for application the following spring and summer or an alternative wastewater disposal method used. Total wastewater production within the Elk Bend Sewer District is estimated to be 7.84 million gallons per year, with a projected total wastewater production in 2051 of 11.67 million gallons per year. A winter storage lagoon for the Elk Bend Sewer District would be required to hold approximately 18 acre-feet of wastewater. A storage lagoon for this volume would require approximately 3 acres. Crop area to utilize the entire year of wastewater production as irrigation would be approximately 8 acres.

The current wastewater treatment plants are on limited sites. Acquisition of 3 acres for winter storage and 8 acres for the land application site totals approximately 11 acres of land required for purchase or long term lease for this alternative. A pumping facility and transmission line for reclaimed water delivery to the application site would also be necessary.

7.7 INFILTRATION BASINS

Rapid infiltration is a method of land applying treated wastewater through basins in which the wastewater primarily infiltrates into the ground. Land application by rapid infiltration requires a land application permit from IDEQ. Minimum treatment requirements for rapid infiltration include: 30 day average total suspended solids concentration not to exceed 100 mg/L. The design and implementation of infiltration basins is governed by the Ground Water Quality Rules (IDAPA 58.01.11). Additional considerations for rapid infiltration include: type and quantity of wastewater (organic wastewater constituents must be biodegradable and inorganic constituents must be utilized by vegetation or organisms normally present in the soil), soil and geology of application site that will provide required level of treatment and not allow movement of pollutants into groundwater, and soil and vegetative cover that will remove pollutants through consumptive use and biological and chemical inactivation.

Rapid infiltration basins can typically infiltrate 20-600 ft per year depending on soil conditions. For the Elk Bend it is estimated that an infiltration solution would require between 2,600 and 80,000 square feet of rapid infiltration basins. The proximity of the existing wastewater treatment plant to the Salmon River could necessitate locating infiltration basins at a more removed location both to increase percolation rates and create a less direct hydraulic path to surface water. Distant infiltration basins would require pumping facilities and transmission line to deliver treated wastewater to the site.

7.8 STEP SYSTEMS WITH CLUSTER DRAIN FIELDS

Septic Tank Effluent Pump (STEP) systems utilize individual or group septic tanks for wastewater treatment and effluent pumps to discharge wastewater into a pressurized sewer line. The pressure sewer transports the wastewater to a drain field location. Cluster drain fields would serve several individual or grouped septic tanks for wastewater disposal. These systems are very similar to individual septic tank systems commonly utilized in rural locations. The exception is the pressurized effluent system for wastewater transmission and disposal. A slight modification to the STEP system could partially utilize the gravity collection system already in place in Elk Bend to consolidate the wastewater from several households to small lift stations from which wastewater would be pumped to the septic tanks and drain fields.

Implementing this system at Elk Bend and Steelhead Bend would disperse the wastewater disposal drain fields throughout the developments in clusters. As with the current Large Soil Absorption System, the drain fields have requirements for setback to the surface water of the River of 200 feet and would require designated replacement areas. Depending on the soils found at each site, the wastewater could most likely be discharged into the disposal drain fields at a rate of 0.5 gallons per square foot per day.

The current wastewater flows at Elk Bend and Steelhead Bend would mean a total required active disposal area of approximately 50,000 square feet with an additional 50,000 square feet of designated alternative drain fields. Many septic tanks and effluent pump systems would be needed for collection and treatment of wastewater.

These systems are fairly simple and easy to operate. There would be a significant number of small pumps involved in this system. Some systems utilizing this type of system require individual users or groups of users to install and maintain the septic tank and effluent pump. The recommended arrangement would be for the District to provide regular maintenance of the septic tanks and effluent pumps.

This alternative would involve the installation of septic tank and pump systems, pressure sewer transmission lines, acquisition of sufficient area for wastewater drain fields, and installation of multiple drain fields.

7.9 DISPOSAL ALTERNATIVE COMPARISON

Wastewater disposal alternatives were compared on the basis of five primary considerations: operator attention requirements, land requirements, general aesthetics, treatment requirements, and feasibility. The current wastewater operation is considered the baseline for each category. Operator attention refers to the additional operator time required for operation and maintenance of each alternative. Land requirement ranks the alternatives based on the quantity of land required for each alternative. General aesthetics refers to the general expected acceptability of each alternative based on appearance and impact to the community. Treatment requirements rank the alternatives based on how stringent current and anticipated treatment requirements for each alternative are. Feasibility considers both foreseeable logistic challenges and cost. A comparison table of the discharge alternatives is shown in Figure 7.1 below.

TABLE 7-1 - WASTEWATER DISCHARGE ALTERNATIVE SCREENING

	Parameter	Large Soil Absorption Systems	Surface Water Discharge	Land Application	Rapid Infiltration	STEP system & cluster drain fields
1	Operator Attention	3	1	1	2	3
2	Land Requirements	2	3	1	2	1
3	General Aesthetics	3	1	1	1	2
4	Treatment Requirements	3	1	2	2	3
5	Feasibility	2	1	1	2	2
Total		**13**	7	6	9	11
1- Least Favorable 2- Moderately Favorable 3- Most Favorable						

7.9.1 LARGE SOIL ABSORPTION SYSTEMS

As the currently utilized method of wastewater disposal, this alternative does not increase the amount of operator attention. To comply with state regulations governing large soil absorption systems additional area is needed for drain fields. Drain field area could potentially be reduced if enhanced treatment is utilized. Since drain fields are located in the subsurface, the general aesthetics ranked favorably. Treatment requirements would remain as they currently are since this is the current disposal methodology. Space is limited at the current treatment facilities, however, the feasibility of this alternative was ranked moderate.

Large soil absorption systems emerged from the alternative screening as the preferred alternative with the most favorable ranking from the evaluation shown in Table 7-1.

7.9.2 SURFACE WATER DISCHARGE

Surface water discharge would require additional operator attention in collection of samples and reporting to EPA to comply with the NPDES program requirements. Land requirements would be minimal. General aesthetics was rated moderate since the visual aesthetics of surface water discharge would be low but discharging treated wastewater into the river has some environmental impacts to the ecology of the river. Discharging to the river would require a significantly higher level and consistency of treatment than is currently occurring at the treatment plants. The feasibility of this alternative was ranked as least favorable due to the uncertainty and anticipated difficulty of obtaining a NPDES permit for discharge from EPA.

7.9.3 LAND APPLICATION

A land application alternative would require a significant increase in operator attention to manage the irrigation system. Land requirements would be approximately 11 acres as discussed in Section 7.6. A moderate rating was given for general aesthetics due to the 3 acres that would be occupied by wastewater storage lagoon and the potential effect of a land application site on surrounding property owners. Treatment requirements for land application for irrigation of cropland would be similar to the current treatment and would require greater consistency, but would be less than for surface water discharge resulting in a moderate rating. The feasibility of land application was rated moderate due to the significant challenge of locating a feasible application site of adequate size and the effort of implementation and continued operation of an irrigation system.

7.9.4 INFILTRATION BASINS

Rapid infiltration basins ranked moderately in all categories. It would require more operator attention than the current system, but less than irrigation. It would require some space which may be greater than large soil absorption but much less than surface water discharge or land application. It would have some aesthetic concerns due to the open infiltration basins. Treatment requirements would be less than surface water discharge, but greater than for land application and similar to large soil absorption systems. There are no huge obstacles to rapid infiltration, but there are some uncertainties such as locating a site at a suitable distance from the river and in suitable soils that present some logistic challenges.

7.9.5 STEP SYSTEMS

STEP Systems ranked well in operator attention and treatment requirements, moderate in general aesthetics and feasibility and low in land requirements. Utilizing septic tank treatment alone would not provide any opportunity for reducing the required drain field area from the base regulations. This means that a significant area would be required for active drain fields and designated replacement drain fields. This would total approximately 100,000 square feet, or a total of about 20 lots of typical size. The disposal drain fields would have to be located more than 200 feet from the river, which significantly reduces the eligible locations. Potential negative environmental impacts could result from the use of septic tanks alone for treatment.

7.9.6 ALTERNATIVE COMPARISON

An alternative evaluation matrix comparing of the five wastewater disposal alternatives outlined above is shown in Table 7.1. The alternative evaluation matrix indicates that continuing with large soil absorption systems is the most preferable solution under the conditions evaluated. The alternative scoring second was STEP systems with cluster drain fields. Each of these alternatives involves the use of soil absorption systems for disposal.

CHAPTER 8 Evaluation of Treatment Alternatives

8.1 GENERAL DISCUSSION

The effective treatment of wastewater in an economical manner is the primary objective of the Elk Bend Sewer District wastewater treatment facilities. As discussed previously, the existing systems are in poor condition with components that no longer function, corrosion and obvious wear. Wastewater treatment is necessary to comply with regulations for the discharge of wastewater. The discharge method utilized plays an important role in determining the level of treatment required prior to wastewater disposal.

Alternatives considered include: No Action, Rehabilitate Existing Package Plants, Sequencing Batch Reactor (SBR), and recirculating media (gravel) filters (RGF). Consideration is also given to combining the wastewater streams to a single treatment plant site for SBR and RGF treatment processes. These alternatives are discussed in more detail in the following sections.

The cost estimates herein is based on Keller Associates' perception of current conditions at the project location. The estimates reflect our opinion of probable costs at this time and are subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the costs presented herein.

8.2 TREATMENT REQUIREMENTS

Wastewater collected within the Elk Bend Sewer District is required to be treated prior to disposal. Required levels of treatment are different for different disposal methods. Surface water discharge is subject to the Clean Water Act and is regulated by EPA under the NPDES program. To discharge wastewater to surface water bodies requires an NPDES permit which can include limits on concentration and total mass of constituents such as pH, Biochemical Oxygen Demand, Total Suspended Solids, dissolved oxygen, total coliform bacteria, and nutrients. Land application of wastewater as Class D effluent for agricultural irrigation of feed crops requires oxidation and disinfection. Subsurface disposal through large soil absorption systems requires at a minimum that adequately sized septic tanks be used to provide solids and oil separation and properly designed disposal beds to achieve further treatment as the wastewater percolates through the soil layers. Required treatment is governed by the Technical Guidance Manual (TGM) and the Nutrient Pathogen (NP) evaluation and will need to assure that the ground water nitrate levels are not increased more than 1 mg/l above background levels at any compliance boundaries (i.e. at the river or wells). Higher level treatment than the minimum for subsurface disposal can allow for some reduction in the required size of the disposal beds.

8.3 COMBINATION OF WASTEWATER FLOWS

The Elk Bend system has a projected wastewater flow of 19,926 gallons per day average and 32,457 gallons per day peak while Steelhead Bend has a projected wastewater flow of 6,284 gallons per day average and 8,114 gallons per day peak. The two collection systems combined

are projected to have average daily flow of approximately 26,210 gallons per day with a maximum estimated to be 40,571 gallons per day. In addressing the treatment of wastewater, economies of scale are realized by treating a larger volume of wastewater at a single location as compared to separate systems for these two locations. Combination of wastewater flows would also alter the considerations for wastewater discharge.

Since the Steelhead Bend system lies over 100 feet in elevation lower than Elk Bend, is located more distant from the Salmon River, has slightly more available space, and does not have the same hazard of rock fall it would appear to be a preferable location for a combined treatment facility. A wastewater line extending from the current end of the Elk Bend system at the lift station and terminating at the upper end of the Steelhead Bend collection line on Agate Drive would accomplish the combination of flow. The 8-inch line on Agate Drive would have sufficient pipe size and slope to accommodate the projected wastewater flows from both systems. Additionally, this combination could remove the need for the main lift station at Elk Bend. The connecting wastewater line would be approximately 3,900 feet in length at 8-inches or larger in size. It would need to run parallel to the highway with a highway crossing at Steelhead Bend.

To combine the wastewater streams for the two locations, the following items would be needed:

- Approximately 3,900 feet of 8-inch or larger gravity sewer line
- Consideration of discharge area for the combined wastewater stream

It is estimated that the construction of the connecting wastewater line would cost approximately **$485,000**. Total cost of the combined flow alternatives for Sequencing Batch Reactor and Recirculating Gravel Filter alternatives are summarized below in Sections 8.6 and 8.7.

8.4 NO ACTION ALTERNATIVE

This alternative does not involve any changes to the equipment or the operation of the plants and thus does not address the deficiencies experienced by the Elk Bend Sewer District. Currently the treatment plants are not providing treatment in a manner which could be considered consistent and reliable. This alternative does not address the capability of the treatment plants to consistently meet the needed wastewater treatment. Pursuing this alternative would likely result in continued violation of the compliance order and increasing problems with maintaining reliable treatment. This alternative does not meet the needs of the Elk Bend Sewer District.

8.5 REHABILITATE EXISTING PACKAGE PLANTS

The current wastewater treatment package plants utilize a steel tank basin which provides intermittent aeration in the primary basin, clarification in the secondary basin, return activated sludge piping, scum skimmers, and a currently unused chlorination chamber. The plants are covered with sheet metal roof on trusses over the main basin and plywood & foam insulated covers over the clarification and chlorination chambers. The plant provides oxidation and clarification of wastewater when in effective operation. During the inspections performed as part of this study, significant wear, corrosion, and failed equipment was noted.

The rehabilitation of the existing wastewater treatment package plants at the Elk Bend and Steelhead Bend systems would include significant replacement of equipment. Based on the

review of the equipment performed as part of this study, the condition of piping, blowers, valves, etc. is such that most of the equipment would require replacement. The steel of the tanks was recoated several years ago, however the coating also shows signs of degradation. To rehabilitate the systems the following items are expected to be needed:

- Thorough cleaning of all system components
- New roof structures
- New insulating panels
- Replace inlet piping
- Replace comminutors
- Replace RAS piping
- Replace blowers & motors
- Replace air piping
- Replace electrical wiring and controls
- Repaint exterior of blower cabinets
- Steel tanks may require replacement or recoating

The extent of the repairs and replacement is fairly extensive and may not be less expensive than total replacement of the system. Additionally, the current systems are not performing as would be desired. Some of the performance issues may be addressed by replacement of some components and improved operator attention to the equipment. A preliminary estimate of the cost to rehabilitate the Elk Bend treatment plants is **$203,000**. Rehabilitation of the Steelhead Bend Plant is estimated to be slightly less at **$162,000** since the observed condition was better and the plant is smaller. This alternative would additionally include the rehabilitation of each of the three lift stations and expansion of the large soil absorption systems. Total cost of this alternative is summarized here:

• Elk Bend Treatment Plant Rehabilitation	$203,000
• Steelhead Bend Treatment Plant Rehabilitation	$162,000
• Lift Station Rehabilitation	$324,000
• Elk Bend LSAS	$495,000
• Steelhead Bend LSAS	$247,000
• Nutrient Pathogen Evaluation	$ 36,000
Total	**$1,467,000**

8.6 SEQUENCING BATCH REACTOR

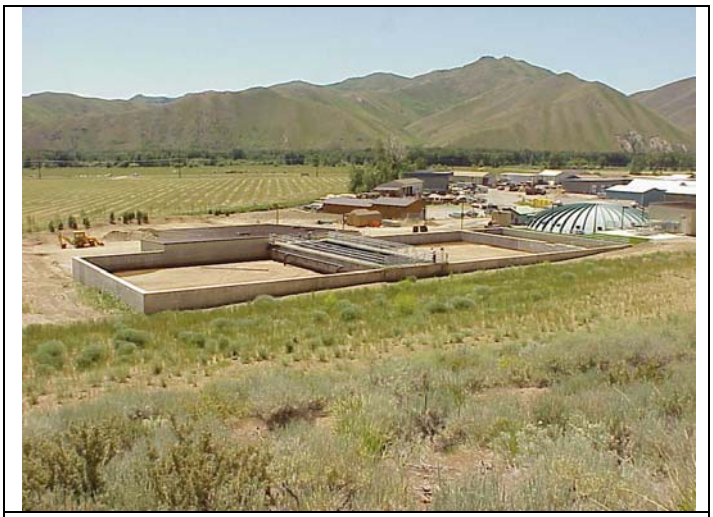


FIGURE 8-1 – SEQUENCING BATCH REACTOR (SBR)

This process deviates from the typical flow-through process by using batch reactors in an activated sludge process. In this process equalization, aeration, and secondary clarification are carried out sequentially in the same tank. While one tank is in operation, at least one other tank is being used to receive and store wastewater until a new batch is started. Computer automation is utilized to control individual processes such as aeration and automatic valves during a batch sequence. The overall SBR process is compact and can effectively remove BOD, TSS, phosphorus, and nitrogen from the wastewater. For Elk Bend the installation of a treatment system of this type would make more sense as a consolidated system, with wastewater consolidated to a single treatment point. The cost of a SBR system is estimated to be **$658,000**.

Advantages
- Small footprint
- Flexible operation and control
- No need for secondary clarifiers

Disadvantages
- Complex system operation
- Susceptible to violations if automated equipment fails
- Equalization basin is needed after SBR to equalize flows to the disinfection process

The SBR alternative would result in higher level treatment with better treatment control than other alternatives considered. This is expected to result in less area of LSAS required for wastewater discharge. This alternative would require rehabilitation of only one lift station, a pipeline connecting the two collection systems, construction of an SBR treatment plant, and expansion of the Steelhead Bend LSAS system. Estimated costs are as follows:

• Elk Bend - Steelhead Bend Connector	$485,000
• SBR Treatment Plant	$658,000
• Lift Station Rehabilitation	$195,000
• LSAS Expansion	$147,000
• Nutrient Pathogen Evaluation	$ 18,000
Total	**$1,503,000**

8.7 RECIRCULATING MEDIA FILTER

Recirculating filters are relatively simple with little equipment and operation requirements. The system includes pretreatment through septic tanks for settling, a recirculation/dosing tank, pump and controls, filter bed with an underdrain system, and dosing and return piping. The system doses wastewater onto sand, gravel or other media bed placed in a lined structure. Wastewater percolates through the media into an underdrain system where it is collected and recycled to a recirculation tank for further processing or discharge. Treatment occurs through biological means as a fixed-film bioreactor process. A film of microorganisms develops on the media surfaces, primarily in the top six inches or so of the media. The microorganisms break down the wastewater through physical processes. This process requires that the surface of the media bed have open air circulation, but it must not be allowed to freeze as this would prevent water infiltration.

The filter media is typically gravel, sand or other materials such as glass. Typically the recirculation to discharge ratio is between 3:1 and 5:1. The system relies on pretreatment by septic tanks to remove some of the solids and grease prior to application to the media beds. Recirculating filters have good success in removal of BOD and can achieve nitrification. Filter bed media can be selected to achieve adsorption of some wastewater constituents. Adjustment to the recirculation ratio can be used to optimize treatment. Equipment needs are low.

As with the Sequencing Batch Reactor alternative, some cost savings can be realized by combining the wastewater streams of the two systems. The lower cost results from the minimal cost increase to treat additional wastewater in a single system versus a separate system and elimination of lift stations. The estimated cost of a recirculating media filter for the Elk Bend system as a combined wastewater stream is **$298,000.** Individually, the system for Elk Bend is estimated at **$253,000** and Steelhead Bend is estimated to cost **$179,000**. Recirculating gravel filter alternatives for two plants and for a single combined flow plant are considered below.

<u>Advantages</u>

- Easy to operate
- Low power consumption
- Low operation requirements

<u>Disadvantages</u>

- Cannot be allowed to freeze

The Recirculating Gravel Filter alternative would result in higher level treatment with better treatment control than the existing system but less than a SBR system. This is expected to result in less area of LSAS required for wastewater discharge. This system requires the least amount of operator attention of the alternatives considered.

This alternative would require a connector line from Elk Bend to Steelhead Bend as discussed in Section 8.3. Also required would be rehabilitation of two lift stations, construction of the RGF treatment plant, and expansion of the Steelhead Bend LSAS system. In order to understand what area and locations will be satisfactory for the LSAS, a Nutrient Pathogen (N-P) evaluation is needed. Estimated costs are as follows:

• Elk Bend - Steelhead Bend Connector	$485,000
• RGF Treatment Plant	$298,000
• Lift Station Rehabilitation	$195,000
• LSAS Expansion	$258,000
• Nutrient Pathogen Evaluation	$ 18,000
Total	**$1,254,000**

8.7.1 INDIVIDUAL RECIRCULATING MEDIA FILTERS

A variation of the Recirculating Media Filters alternative involving the construction of Recirculating Gravel Filters at Elk Bend and Steelhead Bend was also considered. This would not require the connector but would require more effort in the LSAS system expansions and would require the rehabilitation of Elk Bend Lift Station #1. The total estimated cost of this variation on the RGF alternative is **$1,249,000**. This alternative is the least cost alternative, but is only slightly less costly than the combined system RGF alternative.

A quick comparison of operation and maintenance costs reveals that this alternative would be more expensive to operate than the combined system since two plants and two sets of drainfield areas would need to be operated in addition to an additional lift station which would not be eliminated. The cost of operating these additional items would result in a higher total operating cost for the sewer district. Additionally, the Steelhead Bend Plant Area has open property located in closer proximity which could be looked at for additional space if needed and is located further from the river making it more suitable for subsurface wastewater disposal.

8.8 ALTERNATIVE EVALUATION

In considering the treatment alternatives for the Elk Bend Sewer District, comparison was made on the following criteria: capital cost, O&M cost, operator attention, footprint, treatment level, expandability, process complexity, reliability, and general appearance. Each was evaluated as an entire system, including the collection system and discharge requirements for each alternative. An importance factor for each of these criteria from 1-5 with five being most important was assigned to weight the calculation. Each alternative was rated on a scale of 1-5 for each criteria with 1 least favorable and five most favorable. Importance factor times the alternative rating results in a score for each alternative for each criteria. The total score for each alternative provides a comparison for the selection of the best apparent alternative. Table 8-1 below shows this calculation.

	Parameter	Importance Factor	No Action		Rehabilitate Existing Package Plant		Sequencing Batch Reactor (SBR)		Recirculating Gravel Filter	
1	Capital Cost	5	5	25	3	15	2	10	4	20
2	O & M Cost	4	5	20	3	12	2	8	4	16
3	Operator Attention	4	1	4	2	8	3	12	5	20
4	Footprint	4	5	20	5	20	4	16	3	12
5	Treatment Level	3	1	3	2	6	5	15	4	12
6	Expandability	2	1	2	1	2	5	10	4	8
7	Process Complexity	3	3	9	3	9	2	6	5	15
8	Reliability	3	1	3	2	6	5	15	4	12
9	General Appearance	2	1	2	2	4	3	6	4	8
	Total			**88**		**82**		**98**		**123**
1- Least Favorable 5 - Most Favorable										

TABLE 8-1 - TREATMENT ALTERNATIVE SCREENING TABLE

8.9 RECOMMENDED ACTION

As can be seen in Table 8-1 above, the highest ranking alternative from this evaluation is the Recirculating Gravel Filter alternative. This is also the least capital cost alternative with an estimated total cost of **$1,254,000**. This alternative includes rehabilitating Elk Bend Lift Station #2 and the Steelhead Bend Lift Station, installing a connector pipeline from Elk Bend to Steelhead Bend, constructing a Recirculating Gravel Filter treatment facility at Steelhead Bend, conducting a Nutrient Pathogen Evaluation at Steelhead Bend, and expanding the LSAS system at Steelhead Bend. It is estimated that this system may require additional funding for operation and maintenance of approximately $10,000 per year. This would provide for equipment maintenance for the pumps and electrical equipment. It is recommended that the Elk Bend Sewer District pursue the implementation of this alternative and complete the improvements included.

The completion of the Nutrient Pathogen (N-P) evaluation is an important pre-design step which will need to be completed as soon as possible. The N-P evaluation will aid in determining what locations will provide an adequate disposal area and the specific wastewater application rate which can be safely utilized. The application rate will directly determine the required area

needed for the LSAS system. The results of the N-P evaluation may require investigation of alternate or additional disposal areas beyond the area identified in this study as the preferred LSAS location, at the Steelhead Bend treatment facility. A few potential areas have been discussed with the EBSD board and will be further considered if needed.

CHAPTER 9 Implementation and Funding Analysis

This section includes an evaluation of the implementation and funding for the alternative recommended in the previous section. This evaluation is based on the information provided for budget, revenue, and the best available information for construction costs at the time of this writing.

9.1 RECOMMENDED IMPROVEMENTS

The recommended improvements include the rehabilitation of Elk Bend Lift Station #2 at Elk Horn Drive and the Steelhead Bend Lift Station, installation of a connector pipeline between Elk Bend and Steelhead Bend, installation of a Recirculating Gravel Filter system, completion of a Nutrient-Pathogen Evaluation at Steelhead Bend and expansion of the Large Soil Absorption System at Steelhead Bend for wastewater discharge. The lift station rehabilitation includes removal of worn equipment and piping, rehabilitating the wet well, installing new pumps and piping, new electrical and control equipment, and weather protection. The connector pipeline from Elk Bend to Steelhead Bend includes approximately 3,900 feet of 8-inch or larger gravity flow wastewater piping along Highway 93. The RGF system should be sized for the treatment of 26,000 gallons per day average and 40,000 gallons per day peak. The Nutrient-Pathogen Evaluation will determine more precisely the area (size), proper placement and level of treatment for the needed LSAS. It is anticipated that approximately 15,000 square feet of additional disposal area will need to be installed at Steelhead Bend. Estimated project costs are summarized below:

• Elk Bend - Steelhead Bend Connector	$485,000
• RGF Treatment Plant	$298,000
• Lift Station Rehabilitation	$195,000
• LSAS Expansion	$258,000
• Nutrient Pathogen Evaluation	$ 18,000
Total	**$1,254,000**

This alternative is not the least cost alternative on the basis of these preliminary cost estimates. The variation of the recirculating gravel filter alternative with two treatment plants results in an estimated cost $5,000 less than this alternative. However, a preliminary consideration of the operation and maintenance cost difference makes this alternative preferable since the combined systems eliminates O&M for a treatment plant, a lift station, and one set of LSAS modules.

A preliminary layout of the proposed improvements is shown in Figure 9.1 Existing System and Proposed Improvements Preliminary Layout.

Legend

- Collection Piping
- Pressure Lines
- Manholes
- Lift Stations
- Gravity Connector Pipeline
- Existing LSAS (drainfields)
- Proposed LSAS Areas
- Existing Treatment Plants
- Preferred Treatment Site
- Alternate Treatment Site

N

PROJECT NO. 209003-000

FILENAME Fig 9.1

305 N. 3rd Avenue
Pocatello, ID 83201
208.238.2146
www.kellerassociates.com
KELLER associates

Elk Bend Sewer District

Wastewater Systems

Existing System and Proposed Improvements Preliminary Layout

FIGURE NO. 9.1

9.2 OPERATION AND MAINTENANCE

The operation of the proposed system improvements will not vary substantially from the type of operation currently employed by the staff of the Elk Bend Sewer District. Maintenance of electrical, pumping, and piping systems will be included as well as regular observation of the functioning of the system. Additional management efforts may be needed for the proper rotation of wastewater discharge to the LSAS fields. Additional labor and maintenance for the proposed improvements is anticipated to be minimal. An estimate of $10,000 per year of increased operation and maintenance cost is included in the evaluations presented in this study.

9.3 IMPROVEMENT PRIORITY RANKING

In terms of priority for the improvements, all recommended improvements are needed to bring the system up to the expected standard for wastewater collection, treatment and discharge. None of the recommended improvements can reasonably be deferred for future implementation while achieving the desired level of wastewater service for the Elk Bend Sewer District.

9.4 POTENTIAL FUNDING SOURCES

Funding for system improvements may come from several sources. The primary source of funds for the recommended system improvements will come from low interest loans through USDA-Rural Development or through IDEQ's State Revolving Fund (SRF) loan program. Remaining monies could come from others sources the City may be eligible for. These include grants from USDA-Rural Development, Idaho Department of Commerce [Community Development Block Grant Program (ICDBG)], and Special Congressional Appropriations.

The Idaho Department of Environmental Quality offers funding for wastewater systems in Idaho through the State Revolving Fund. Loans are currently being offered for 20 to 30 years at interest rates of 1.75% and lower. The interest rate is variable depending on the funding environment and project eligibility and could possibly be less. IDEQ loans require authorization to accrue debt. Authorization can be obtained by passing a bond election of through Judicial Confirmation. If the sewer rates for the Elk Bend Sewer District will be more than 2% of the median household income as determined by census, then they may qualify for hardship loan with possible reduced interest rate.

The grant selection process for water and wastewater projects is competitive. Idaho Department of Commerce offers Community Development Block Grants of up to $500,000 for projects like this. The Elk Bend Sewer District is not eligible to apply directly for CDBG funds, but Lemhi County can submit an application for the District. This would not require a financial obligation by the County, but it does require the County to accept responsibility for administering a grant if awarded. Grant administration costs are typically paid from the grant monies received. Additionally, to be eligible for CDBG funds, the community must have a "low to moderate income" (LMI) of 51% or higher. Further efforts would be necessary to determine eligibility and coordinate with the county for the application.

Elk Bend may be eligible for grant and low interest loan funds from USDA-Rural Development. In order to for the City to be competitive for USDA-Rural Development grant funds the

community would be typically required to have a user rate in excess of approximately $35.00 to $40.00 per month. USDA-RD grant funds are awarded in conjunction with USDA-RD loan funds. The total funding package would be likely to consist of 70% loan and 30% grant. USDA-RD loans are currently being offered for 30 years at 3.50% interest and less. There is no penalty for early repayment should the District desire to pay the loan back in less than 30 years. USDA-RD funds require authorization to incur bond debt.

Special Congressional Appropriations vary in amount and are difficult to predict. Homeland Security Grants are a new source of funds with special regulations for eligibility, therefore eligibility and amount are difficult to predict. Additional grant sources may be available and should be investigated as the project is developed.

9.5 CAPITAL IMPROVEMENTS PLAN

The total project cost of $1,254,000 is a significant expenditure for the Elk Bend Sewer District. The system has an estimated 125 connections and does not currently charge user rates. The sewer district budget is funded through a special taxing district applied to property taxes. In 2011 the total general fund budget for the Elk Bend Sewer District was $27,037. This budget includes all operation, maintenance, and administration for the sewer district. The District has reported that the current budget has been adequate to support the current level of operation and maintenance.

9.6 RATE ANALYSIS

The special taxing district is limited in the ability to increase tax rates. It may be necessary for the District to implement additional user fees to fund this project. For the purpose of this analysis it is assumed that there are 125 connections to the system, the best estimate utilized in this study, and that the taxing district would continue as presently constituted. For the repayment of a 30 year loan at 1.75% interest it is anticipated that user rates would need to be approximately $46.33 per month. There is a reasonable possibility that the District would receive some funding assistance through grants, lower interest rates, or principal forgiveness. The range of user rates to support this project is estimated to be $26 to $46 per connection per month.

9.7 POTENTIAL ENVIRONMENTAL IMPACTS

The proposed project will include excavation in an area which is in close proximity to the Salmon River. Potential impacts to the Salmon River ecosystem must be accounted for. The project planning area is in an area of cultural significance to the Shoshone-Bannock Tribes. Proper coordination and caution should be taken for the protection of cultural resources in the event of inadvertent discovery. Best practices for construction should be maintained for control of fugitive dust, proper waste disposal, construction noise, and other hazards posed by heavy equipment operation and construction. The potential environmental impacts of the proposed project are minimal and can be controlled through proper management of the construction project. These and other potential environmental impacts will be more thoroughly reviewed in an Environmental Information Document for the proposed project.

9.8 PUBLIC PARTICIPATION

Members of the Elk Bend Sewer District Board of Directors have been the primary contact for Keller Associates throughout the development of this study. We anticipate that additional efforts will be made following the completion of this study to inform the members of the community regarding the wastewater problems faced by the district and the proposed solutions.

Meetings between the District and Keller Associates over the course of the study including working sessions with the District Board on March 22, 2010 and August 18, 2011.

The Elk Bend community is primarily composed of seasonal occupants. A relatively small proportion of the residents live in Elk Bend year round. As a seasonal community, it is difficult to schedule public information sessions that will be accessible to all. To best inform all of the residents of the community and provide opportunities for comment, an informational flyer was prepared and provided to the sewer district for distribution to the residents of Elk Bend and Steelhead Bend. The mailing list and a copy of the information flyer sent are included in Appendix I. No written comments were received in response to the mailing.

On June 22, 2012 at 10 am the Elk Bend Sewer District Board met for the District's annual budget meeting. In conjunction with the board meeting, a public information meeting was held to present a draft of this study and receive public comments. Discussion of the proposed improvements was held and the District Board passed a resolution accepting the recommendations of Keller Associates included in this study. Additionally, the board passed a resolution to pursue additional grant funding to complete the necessary nutrient-pathogen evaluation.

9.9 PROPOSED PROJECT SCHEDULE

Developing a schedule to implement system improvements provides a timeline that will help motivate project development, find funding sources, educate the public, and establish deadlines for major project milestones.

Informed community consent is an important part of finalizing the Wastewater Facilities Planning Study. As a part of the study process, information mailers are proposed to inform the public of the findings of this study. These flyers will focus on educating the public about the costs of operating the wastewater system, maintaining the wastewater system, system deficiencies identified in the study, and the cost to remedy system deficiencies.

Keller Associates staff has worked closely with District staff and board members in analyzing the wastewater system and developing improvements that will have lasting beneficial impacts on the community. A proposed project schedule is presented in Table 9-1 - Proposed Project Schedule.

TABLE 9-1 - PROPOSED PROJECT SCHEDULE

Event	Date
Submit EID for DEQ Review	October 2012
Public Information Meeting for EID	October 2012
NP Evaluation	October 2012
Apply for Funding	December 2012
Begin Design of Improvements	January 2013
30% Design Review	February 2013
90% Design Review	March 2013
IDEQ Improvements Design Review	April 2013
Bid Improvements	May 2013
Begin Construction	June 2013

9.10 CERTIFICATION OF OPERATORS

The Elk Bend Sewer District does not currently have a licensed wastewater operator. Keller Associates has provided the current system operator with information and resources to assist in acquiring the proper licensing. A current wastewater license of Class 1 Collection and Class 1 Treatment will be needed for the operation of the proposed wastewater improvements. Additionally, licensing is a requirement for eligibility for many of the funding sources discussed in Section 9.3.

9.11 NEED FOR ACTION

The Elk Bend Sewer District entered a consent agreement with the Idaho Department of Environmental Quality in 2008. This agreement came about as a result of issues at the District with wastewater ponding on the ground surface at the Elk Bend treatment facility. The Consent Order requires the District to complete this wastewater facilities planning study and to bring the system into compliance with wastewater disposal regulations of the State of Idaho. Failure to comply with the Consent Agreement could subject the District to fines and future compliance action by IDEQ.

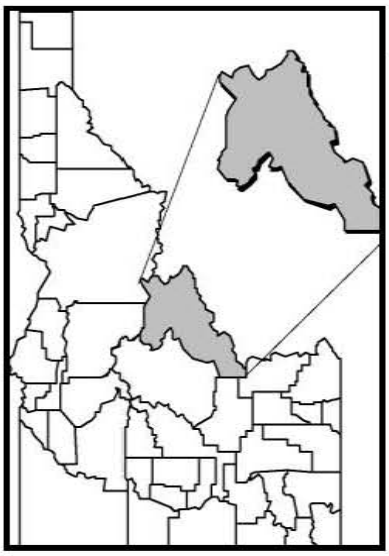
It is necessary for the Elk Bend Sewer District to take action by implementing wastewater treatment and disposal system improvements to bring the wastewater treatment system into compliance State regulations and to comply with the Consent Order. The actions recommended by this study will enable the District wastewater system to provide wastewater collection, treatment and disposal which will comply with the current and anticipated regulations. Without such action the District wastewater system will continue to violate federal and state regulations designed and intended to protect the people of Elk Bend and the Salmon River, an important natural resource for the nation, the state, and the community.

APPENDIX A. Demographic Information

Idaho Department of Commerce - Lemhi County Community Profile

County Profiles of Idaho — Lemhi

County Seat: Salmon



I. People

Population

	1980	1990	2000	2006
Total	7,460	6,899	7,806	7,930
Per Sq. Mile	1.6	1.5	1.7	1.7
Percent Rural	55.7	57.4	61.6	
Percent Urban	44.3	42.6	38.4	

	70-80	80-90	90-00	00-06
Population Change (%)	34.00	-7.5	13.1	1.6

Demographic Component Changes

	1970-1980	1980-1990	1990-2000	2000-2006
Births	1,200	1,197	897	500
Deaths	700	662	781	601
Net Migration	1,400	-1,096	791	220
Percent Migration	24.8	-14.7	11.5	2.8

	1980	1990	2000	2006
Birth Rate	18.4	12.9	7.2	10.2
Fertility Rate	88.4	68.8	41.9	59.8
Median Age	30.9	38.1	42.7	45
Under 18 Years (%)	31.6	27.5	25.5	21.4
18 to 64 Years (%)	56.4	55.0	57.7	60.5
65+ Years (%)	12.0	17.5	16.8	18.0
Persons Per Household	2.76	2.47	2.38	

Geographic Mobility: 2000

Persons 5 Years and Older Living in a Different State in 1995 (%)	13.6
Persons 5 Years and Older Living in a Different County in 1995 (%)	20.1

Lemhi

II. Housing

	1980	1990	2000
Housing Units			
Total	3,452	3,752	4,154
Mobile Homes, Boat, RV, Van, etc.	541	813	741
Overcrowded Units (1.5+ Persons Per Room)	53	26	16
Units Lacking Some or All Plumbing	183	292	16 *
Total Vacant Units	771	983	879
Household Composition (Household Size by %)			
1 to 2 Persons	56.2	64.2	67.9
3 to 5 Persons	37.3	31.7	28.6
6+ Persons	6.5	4.1	3.4
Tenure			
Owner Occupied Units	2,494	1,981	2,038
Renter Occupied Units	700	731	781
Value			
Median Housing Value	$39,400	$47,500	$91,500
Median Rent	$132	$196	$390
Plumbing Facilities			
Public Sewer	1,296	1,502	N.A.
Public Water System or Private Company	1,518	1,607	N.A.
Age of Housing Stock - Year Structures Built			
Number Built 1995 Through March 2000	361		
Number Built 1990 Through 1994	252		
Number Built 1980 Through 1989	704		
Number Built 1970 Through 1979	1,209		
Number Built 1960 Through 1969	396		
Number Built 1950 Through 1959	648		
Number Built 1949 or Earlier	584		

* Category changed in Census 2000 to "Lacking Complete Plumbing Facilities"

Lemhi

III. Work Force

	2001	2002	2003	2004	2005
Total Employment	4,310	4,317	4,477	4,535	4,700
Employment by Type					
Wage and Salary Employment	2,766	2,766	2,852	2,898	2,943
Farm Proprietors	352	365	356	356	358
Non-Farm Proprietors	1,192	1,186	1,269	1,281	1,399
Employment by Industry					
Farming	467	483	467	469	464
Forestry	(D)	(D)	98	(D)	(D)
Mining	(D)	(D)	24	(D)	(D)
Utilities	(L)	(L)	(D)	(D)	(D)
Construction	318	312	360	373	409
Manufacturing	208	178	182	202	205
Wholesale Trade	52	56	(D)	(D)	88
Retail Trade	573	519	541	511	526
Transportation and Warehousing	80	87	98	104	(D)
Information	47	46	42	46	52
Finance and Insurance	100	99	98	98	100
Real Estate and Rental and Leasing	171	160	187	180	218
Professional and Technical Services	143	142	147	(D)	(D)
Mgmt. of Companies and Enterprises	(D)	(D)	(D)	(D)	(D)
Administrative Waste Services	(D)	(D)	(D)	141	(D)
Educational Services	23	(D)	(D)	(D)	(D)
Health Care and Social Assistance	261	(D)	(D)	(D)	(D)
Arts, Entertainment, and Recreation	125	146	138	142	150
Accomodation and Food Services	321	313	335	350	368
Other Services (Except Public Admin.)	313	320	344	346	360
Federal Civilian	276	300	301	291	257
Federal Military	31	31	31	31	29
State and Local Government	576	581	584	582	603

(D) = Not shown to avoid disclosure of confidential material

Employment: full- and part-time by place of work.
Source: U.S. Bureau of Economic Analysis.

Lemhi

IV. Economy

	2000	2002	2004	2006
Annual % Labor Force Unemployed	9.0	7.4	6.7	5.5

	1970	1980	1990	2000
Percent Females (16+) in Labor Force	28.0	40.6	46.9	50.9

Local Government Revenues

Travel and Convention Room Tax (2%)

	FY 2000	FY 2002	FY 2004	FY 2006
Total Sales	$2,134,845	$2,383,269	$2,434,242	$2,468,500
Tax Receipts	$39,923	$41,098	$43,776	$47,425

Property Taxes

Net Taxable Market Value - 2006	$486,501,682
Property Taxes Budgeted - 2006	$3,729,449
Property Tax as a % of Market Value - 2006 *	
Urban	1.26583
Rural	0.59198

* After homeowner exemption

Income

	1990	2000	2005
Per Capita Personal Income	$13,078	$19,673	$23,375
Percent of National Average	67.1%	65.9%	67.8%
Percent of State Average	83.2%	81.7%	82.1%
Government Transfer Payments (in Thousands of Dollars)	$16,662	$32,032	$44,842

Business

	1990	2000	2005
Total Business Establishments	222	303	326

Lemhi

V. Education and Social Indicators

Education Funding Level Per ADA * - 2005-06

School District	State Funds	Local and State Funds	All Funds
Salmon District	$4,355	$5,796	$6,788
South Lemhi District	$12,625	$14,555	$16,192
Upper Carmen Charter School	$7,408	$7,408	$13,551

* Per ADA means per Average Daily Attendance

Education Level *

	1980	1990	2000
Bachelor's Degree + (%)	12.8	11.8	17.9
High School Graduates + (%)	70.3	73.9	82.5

* Population age 25 or over

Average Monthly Fourth Quarter Welfare Roll

	No. of Cases	
	2001	2006
Aid to Aged, Blind, Disable	81	75
Temporary Assistance for Families	3	5
Food Stamp Cases	146	198
Medicaid Cases	570	580

Percent Below Poverty

	1989	1999	2004
Families	17.6	7.9	
Persons	20.2	15.3	12.6

Lemhi

Other Social Indicators - 2005

	County	State
Suicide Rate per 100,000	12.6	15.7
Marriage Rate per 1,000	11.1	10.4
Divorce Rate per 1,000	5.1	5.0

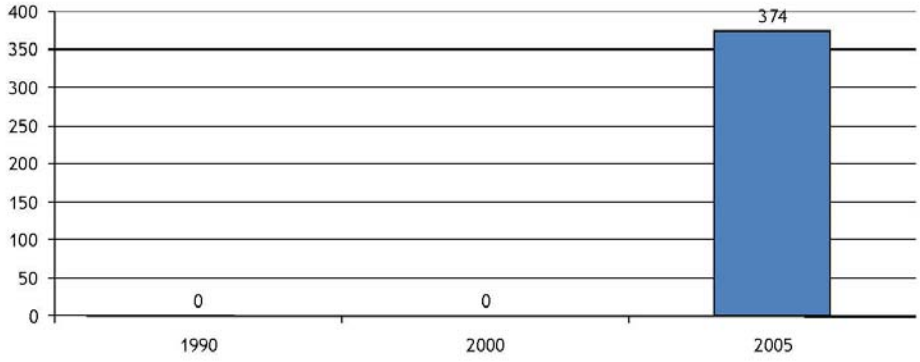
Health Care

	2007
Physicians per 100,000 (2004)	129
Number of Hospitals	1
Total Hospital Beds	18

Crime - Number of Offenses

	1990	2000	2005
Murder	N/A	N/A	0
Rape	N/A	N/A	2
Robbery	N/A	N/A	0
Aggravated Assault	N/A	N/A	6
Burglary	N/A	N/A	3
Larceny	N/A	N/A	17
Motor Vehicle Theft	N/A	N/A	2
Arson	N/A	N/A	0

Crime - Rate per 100,000



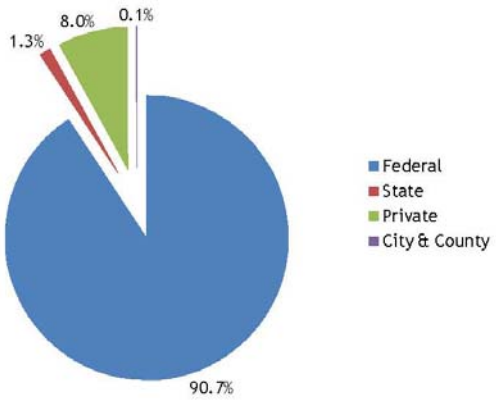
Lemhi

VI. Natural Resources

Land Ownership

	Acres
Federal Land	**2,648,258**
BLM	574,943
National Forests	2,073,315
Other	0
State Land	**37,829**
Endowment Land	37,267
Fish and Game	562
Parks and Recreation	0
University of Idaho Land	0
Private Land	**233,189**
County Land	**1,800**
Municipal Land	**76**
Total	**2,921,152**

Percent of Total Land Ownership



Land Use *

	Acres	Percent of Total
Urban Land	1,300	0.0%
Agricultural	133,100	4.5%
Rangeland	923,300	31.5%
Forest	1,814,300	61.9%
Water	1,300	0.0%
Wetland	0	0.0%
Barren Land	51,500	1.8%
Tundra	6,900	0.2%
Perennial Snow	0	0.0%
Total	**2,931,700**	100.0%

* USGS land use/cover classification system. The water category and the rounding and estimating of satellite-based data usually results in slightly higher totals for land use.

Lemhi

VII. Agriculture

Summary Data - All Farms			
Inventory: Farms, Cropland, and Livestock	**1992**	**1997**	**2002**
Total Number, All Farms	333	308	303
Total Acres in Farms	193,908	196,584	173,578
Average Farm Size (Acres)	582	638	573
Total Farms in Crops	275	258	235
Total Acres in Crops	84,859	83,790	70,253
Cattle and Calves Inventory	55,422	54,102	41,313
Number of Irrigated Farms	280	267	270
Number of Irrigated Acres	70,300	82,351	75,153
Farms by Size (Acres)			
Under 10	38	35	40
10 to 49	75	69	99
50 to 179	58	45	40
180 to 499	61	56	39
500 to 999	49	40	38
1,000 and Over	52	63	47
Value of Land and Buildings and Products			
Average Value of Land and Buildings Per Farm	$359,086	$512,340	$652,328
Average Value of Land and Buildings Per Acre	$637	$830	$1,228
Average Value Per Farm of Products Sold	$56,025	$60,981	$55,914
Principal Occupation of Farm Operators			
Farming	211	189	191
Other	122	119	112

Lemhi

VII. Miscellaneous

Motor Vehicles Registered

	1990	2000	2005
Cars and Pickups	7,119	7,926	7,751
Other	986	1,619	1,934
Total Vehicles Per Capita	1.17	1.22	1.21

Idaho Drivers Licenses in Force

	1990	2000	2006
Total Licenses	5,908	5,936	6,163

Top Place of Work Destinations for Workers in County (16 years and over) - 2000

Lemhi County	2,999	Bingham County	9
Custer County	26	Missoula County MT	8
Bonneville County	23	Adams County	8
		Total County Workers	3,097

City Population Trends

	1970	1980	1990	2000	2006
Leadore	111	114	74	90	88
Salmon	2,910	3,308	2,941	3,122	3,059

Lemhi County is located in central Idaho, bordering Montana along the Continental Divide. It ranks 31st among Idaho counties in population and 4th in area. The federal government owns nearly 91 percent of the county. Government employment, especially by federal land agencies, has a large effect on the local economy. Cattle ranching and tourism are significant industries in the county, and to a lesser extent, so are mining and forest products manufacturing. Annual average total employment in the county decreased by 1.9 percent from 1996 to 2006. Major employers include Steele Memorial Hospital, Saveway Market, Discovery Care Center, Q B Corporation, Idaho Department of Fish & Game, Salmon Public Schools, U.S. Government and Lemhi County government.

The city of Salmon serves as the whitewater recreation capital of the world. Rafters and kayakers launch trips here on the famous "River of No Return" Salmon River. Sacagawea, a Native American woman from the Lemhi Shoshone Tribe, was born near Tendoyard. She was an interpreter for the Lewis and Clark Expedition from 1805-1806.

For more information about activities and recreation in the area, visit www.visitidaho.org/placestogo/central.aspx

Idaho Department of Commerce
700 West State Street
P.O. Box 83720
Boise, Idaho 83720-0093
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APPENDIX B. Environment

US Fish and Wildlife Service Threatened and Endangered Species List
Western Regional Climate Center - Salmon Climate Conditions
National Resources Conservation Service - Elk Bend Soils Report
National Resources Conservation Service - Steelhead Bend Soils Report

Species Reports

Environmental Conservation Online System

Species By County Report

The following report contains Species that are known to or are believed to occur in this county. Species with range unrefined past the state level are now excluded from this report. If you are looking for the Section 7 range (for Section 7 Consultations), please visit the IPaC application.

County: Lemhi, ID

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Action Status	Recovery Plan Stage
Birds	Yellow-billed Cuckoo (*Coccyzus americanus*)	Western U.S. DPS	Candidate	Sacramento Fish And Wildlife Office	-	-	-
	Greater sage-grouse (*Centrocercus urophasianus*)	entire	Candidate	Wyoming Ecological Services Field Office	-	-	-
Conifers and Cycads	Whitebark pine (*Pinus albicaulis*)		Candidate	Wyoming Ecological Services Field Office	-	-	-
Fishes	Bull Trout (*Salvelinus confluentus*)	U.S.A., conterminous, lower 48 states	Threatened	Idaho Fish And Wildlife Office	Draft Recovery Plan for Three of the Five Distinct Population Segments of Bull Trout (Salvelinus confluentus)	View Implementation Progress	Draft
					Draft Recovery Plan for the Jarbidge River Distinct Population Segment of Bull Trout	View Implementation Progress	Draft
					Draft Recovery Plan for the Coastal-Puget Sound Distinct	View Implementation	Draft

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Action Status	Recovery Plan Stage
					Population Segment of Bull Trout	Progress	
Mammals	Grizzly bear (*Ursus arctos horribilis*)	experimental, non-essential, portions of ID and MT	Experimental Population, Non-Essential	Office Of The Regional Director	-	-	-
	Gray wolf (*Canis lupus*)	Northern Rocky Mountain DPS (delisted, except WY)	Recovery	Office Of The Regional Director	-	-	-
	Canada Lynx (*Lynx canadensis*)	(Contiguous U.S. DPS)	Threatened	Montana Ecological Services Field Office	Recovery Outline for the Contiguous United States Distinct Population Segment of Canada Lynx (Lynx canadensis)	Recovery efforts in progress, but no implementation information yet to display.	Outline
	North American wolverine (*Gulo gulo luscus*)		Candidate	Montana Ecological Services Field Office	-	-	-

Export options: CSV | EXCEL | XML | PDF

Last updated: November 28, 2011

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SALMON KSRA, IDAHO (108080)

Period of Record Monthly Climate Summary

Period of Record : 12/1/1967 to 8/31/2009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.7	37.9	50.7	60.7	69.9	78.2	87.9	86.2	75.2	60.4	42.3	30.6	59.2
Average Min. Temperature (F)	12.2	17.3	26.2	32.4	39.6	46.4	51.4	49.0	40.5	31.4	23.1	13.7	31.9
Average Total Precipitation (in.)	0.67	0.44	0.54	0.78	1.35	1.40	0.96	0.79	0.76	0.61	0.75	0.75	9.81
Average Total Snowfall (in.)	7.8	3.7	1.9	0.9	0.1	0.0	0.0	0.0	0.0	0.1	3.5	7.6	25.6
Average Snow Depth (in.)	5	3	0	0	0	0	0	0	0	0	0	2	1

Percent of possible observations for period of record. Max. Temp.: 99.9% Min. Temp.: 99.8% Precipitation: 99.9% Snowfall: 99.2% Snow Depth: 97.7%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

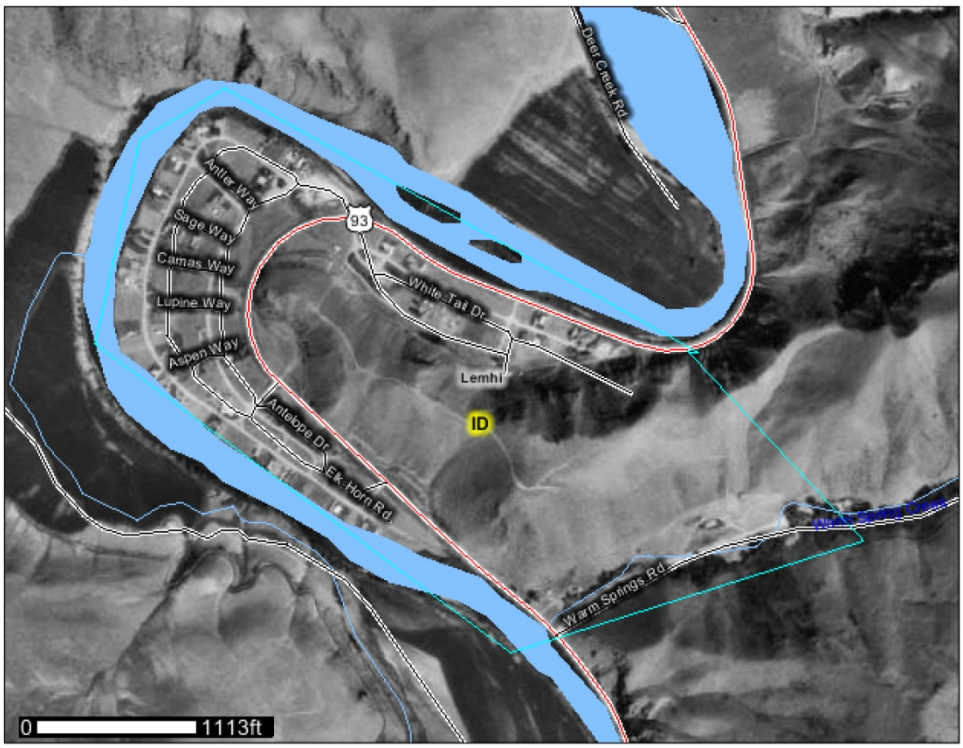
United States Department of Agriculture

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 Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties

Elk Bend



March 2, 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.

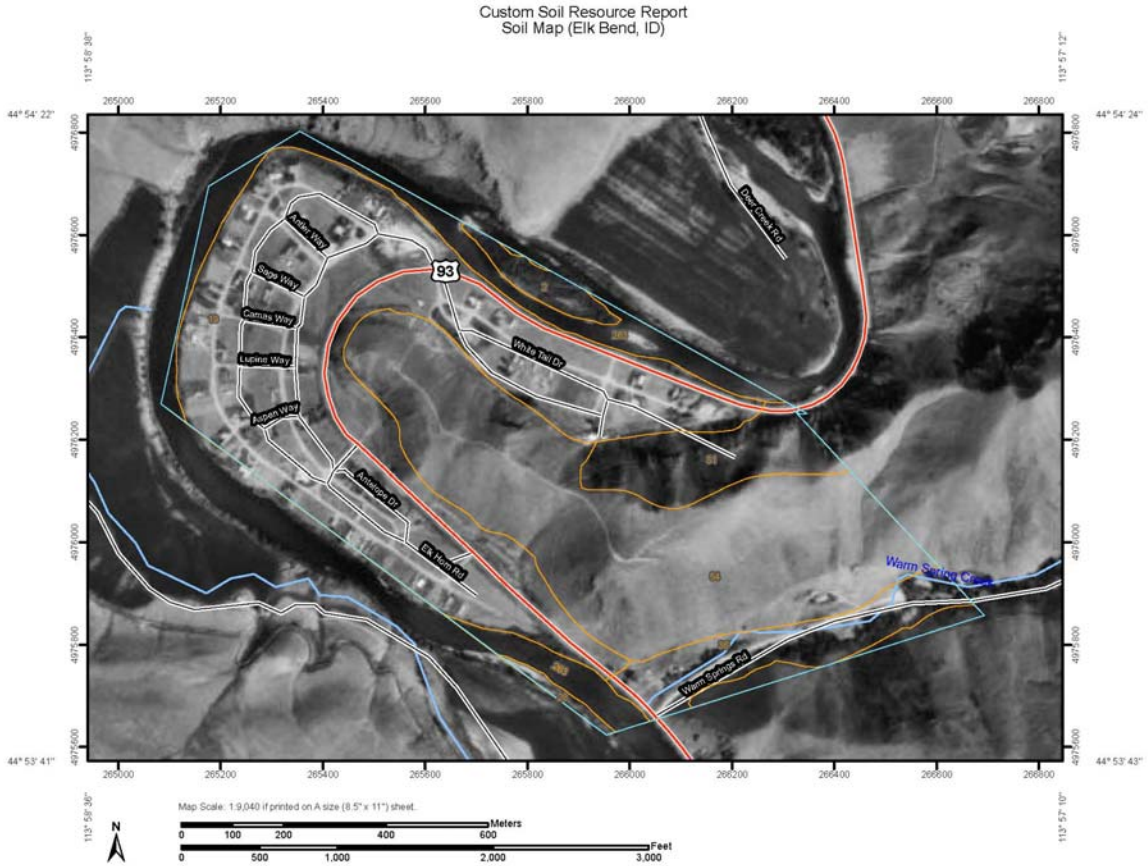
While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the 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 (Elk Bend, ID)
Aspen Way
Sage Way
Camas Way
Lupine Way
Aspen Way
Antelope Dr
Elk Horn Rd
93
White Tail Dr
Deer Creek Rd
Warm Spring Rd
Warm Spring Creek
Map Scale: 1:9,040 if printed on A size (8.5" x 11") sheet.
Meters
0 100 200 400 600
Feet
0 500 1,000 2,000 3,000
N

Custom Soil Resource Report

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: 1:9,040 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

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 12N NAD83

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

Soil Survey Area: Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties
Survey Area Data: Version 9, Jan 29, 2008

Date(s) aerial images were photographed: 7/31/1992

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 (Elk Bend, ID)

Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties (ID752)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Aquents-Riverwash complex, nearly level	3.8	1.6%
19	Bock-Bromaglin complex, 1 to 4 percent slopes	105.7	44.8%
28	Bursteadt-Tohobit complex, 0 to 3 percent slopes	1.2	0.5%
31	Calcids-Rubble land-Rock outcrop complex, 50 to 80 percent slopes	14.1	6.0%
36	Copperbasin, cool-Redfish complex, 1 to 4 percent slopes	15.2	6.4%
54	Dawtonia-Custco association, 20 to 50 percent slopes	78.1	33.1%
263	Water	17.7	7.5%
Totals for Area of Interest		**235.8**	**100.0%**

Map Unit Descriptions (Elk Bend, ID)

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.

Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties

2—Aquents-Riverwash complex, nearly level

Map Unit Setting

Elevation: 3,900 to 7,500 feet
Mean annual precipitation: 10 to 20 inches
Frost-free period: 40 to 70 days

Map Unit Composition

Aquents and similar soils: 75 percent
Riverwash: 20 percent
Minor components: 5 percent

Description of Aquents

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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 6 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 2 inches: Very cobbly fine sandy loam
2 to 60 inches: Stratified extremely cobbly loamy coarse sand to silt loam

Description of Riverwash

Setting

Landform: Flood plains

Properties and qualities

Slope: 0 to 2 percent
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 60 inches: Stratified sand to gravel

Minor Components

Marsh

Percent of map unit: 5 percent
Landform: Marshes

19—Bock-Bromaglin complex, 1 to 4 percent slopes

Map Unit Setting

Elevation: 3,800 to 6,600 feet
Mean annual precipitation: 8 to 13 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 75 to 100 days

Map Unit Composition

Bock and similar soils: 55 percent
Bromaglin and similar soils: 35 percent

Description of Bock

Setting

Landform: Stream terraces, fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 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 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: 25 percent
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 3c
Land capability (nonirrigated): 6e
Ecological site: LOAMY 8-12 ARTRW8/PSSPS (R012XY032ID)

Typical profile

0 to 11 inches: Silt loam
11 to 18 inches: Silt loam
18 to 48 inches: Stratified fine sandy loam to gravelly loam

48 to 60 inches: Very gravelly loamy sand

Description of Bromaglin

Setting

Landform: Stream terraces, fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 14 to 24 inches to strongly contrasting textural stratification
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: 20 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6s
Ecological site: LOAMY 8-12 ARTRW8/PSSPS (R012XY032ID)

Typical profile

0 to 5 inches: Silt loam
5 to 12 inches: Very fine sandy loam
12 to 20 inches: Sandy loam
20 to 60 inches: Extremely gravelly loamy coarse sand

28—Bursteadt-Tohobit complex, 0 to 3 percent slopes

Map Unit Setting

Elevation: 3,600 to 5,000 feet
Mean annual precipitation: 8 to 14 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Bursteadt and similar soils: 50 percent
Tohobit and similar soils: 35 percent
Minor components: 10 percent

Description of Bursteadt

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 25 to 35 inches to strongly contrasting textural stratification
Drainage class: Moderately 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: About 24 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 3w
Ecological site: ALLUVIAL BOTTOM 8-13 ARTRT/ELLAL-LECI4 (R012XY011ID)

Typical profile

0 to 5 inches: Very fine sandy loam
5 to 20 inches: Sandy loam
20 to 31 inches: Fine sandy loam
31 to 60 inches: Stratified extremely cobbly coarse sand to loamy coarse sand

Description of Tohobit

Setting

Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 12 to 24 inches to strongly contrasting textural stratification
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 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability (nonirrigated): 4w
Ecological site: RIVERBOTTOM 10-16 POPUL/PASM (R012XY042ID)

Typical profile

0 to 9 inches: Silt loam
9 to 21 inches: Silt loam
21 to 60 inches: Stratified extremely gravelly coarse sand to loamy fine sand

Minor Components

Cowbone

Percent of map unit: 10 percent
Landform: Flood plains
Ecological site: RIVERBOTTOM 10-16 POPUL/PASM (R012XY042ID)

31—Calcids-Rubble land-Rock outcrop complex, 50 to 80 percent slopes

Map Unit Setting

Elevation: 3,900 to 7,000 feet
Mean annual precipitation: 7 to 12 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Calcids and similar soils: 50 percent
Rubble land: 25 percent
Rock outcrop: 15 percent

Description of Calcids

Setting

Landform: Mountain slopes
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or mixed slope alluvium

Properties and qualities

Slope: 50 to 80 percent
Depth to restrictive feature: 20 to 72 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: Low (about 4.1 inches)

Interpretive groups
Land capability (nonirrigated): 7e
Ecological site: STEEP LIMESTONE 12-20 CELE3/PSSPS-FEID (R012XY015ID)

Typical profile
0 to 2 inches: Very cobbly loam
2 to 16 inches: Very gravelly loam
16 to 37 inches: Extremely gravelly loam
37 to 60 inches: Extremely gravelly coarse sandy loam

Description of Rubble Land

Interpretive groups
Land capability (nonirrigated): 8

Typical profile
0 to 60 inches: Fragmental material

Description of Rock Outcrop

Properties and qualities
Slope: 50 to 80 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups
Land capability (nonirrigated): 8

Typical profile
0 to 60 inches: Unweathered bedrock

36—Copperbasin, cool-Redfish complex, 1 to 4 percent slopes

Map Unit Setting
Elevation: 4,500 to 7,400 feet
Mean annual precipitation: 10 to 18 inches
Mean annual air temperature: 34 to 39 degrees F
Frost-free period: 5 to 30 days

Map Unit Composition
Redfish and similar soils: 45 percent
Copperbasin, cool, and similar soils: 45 percent
Minor components: 10 percent

Description of Copperbasin, Cool

Setting
Landform: Flood plains, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 18 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 6c
Land capability (nonirrigated): 6c
Ecological site: RIVERBOTTOM 10-16 POPUL/PASM (R012XY042ID)

Typical profile

0 to 5 inches: Very gravelly fine sandy loam
5 to 25 inches: Extremely gravelly loamy sand
25 to 33 inches: Extremely cobbly loamy sand
33 to 60 inches: Extremely gravelly loamy coarse sand

Description of Redfish

Setting

Landform: Flood plains, stream terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 10 to 22 inches to strongly contrasting textural stratification
Drainage class: 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 6 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability (nonirrigated): 5w
Other vegetative classification: RIPARIAN SALIX/CAREX (043AY011ID)

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 8 inches: Gravelly sandy loam
8 to 13 inches: Very gravelly sandy loam
13 to 63 inches: Extremely gravelly coarse sand

Minor Components

Aquolls

Percent of map unit: 10 percent
Landform: Flood plains

54—Dawtonia-Custco association, 20 to 50 percent slopes

Map Unit Setting

Elevation: 4,000 to 7,200 feet
Mean annual precipitation: 8 to 16 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Dawtonia and similar soils: 50 percent
Custco and similar soils: 35 percent

Description of Dawtonia

Setting

Landform: Hillslopes, mountain slopes
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium and/or colluvium

Properties and qualities

Slope: 20 to 50 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: Low (about 5.1 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: GRAVELLY LOAM 8-12 ARTRW8/PSSPS (R012XY004ID)

Typical profile

0 to 4 inches: Gravelly loam
4 to 12 inches: Very gravelly loam
12 to 24 inches: Very gravelly loam
24 to 60 inches: Extremely gravelly loam

Description of Custco

Setting

Landform: Mountain slopes, hillslopes
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Colluvium derived from igneous rock and/or quartzite

Properties and qualities

Slope: 20 to 50 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 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: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 7.7 inches)

Interpretive groups

Land capability (nonirrigated): 6e
Ecological site: NORTH SLOPE LOAMY 12-16 ARTR4/FEID (R012XY010ID)

Typical profile

0 to 4 inches: Very gravelly loam
4 to 17 inches: Very gravelly loam
17 to 60 inches: Stratified extremely gravelly loamy sand to extremely gravelly sandy loam, extremely gravelly sandy loam

263—Water

Map Unit Composition

Water: 100 percent

Description of Water

Interpretive groups

Land capability (nonirrigated): 8

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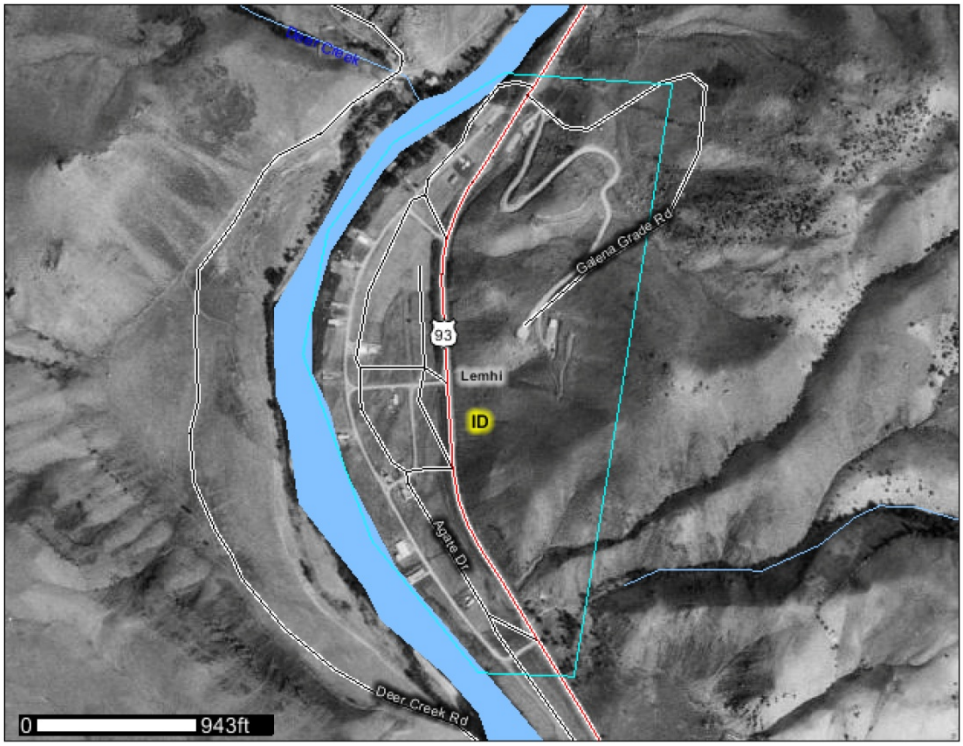
United States Department of Agriculture

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 Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties

Steelhead Bend



March 2, 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.

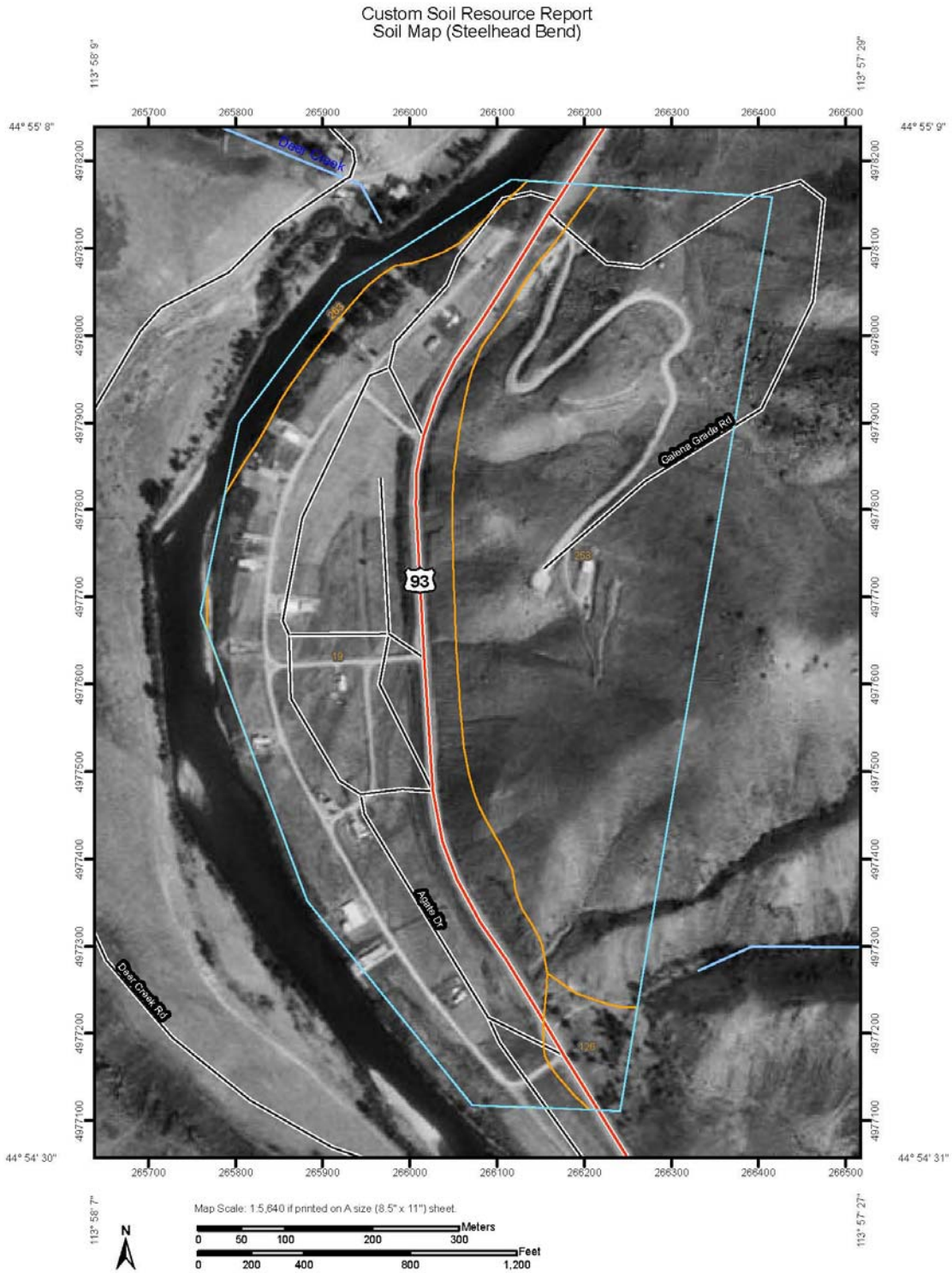
While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the 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 (Steelhead Bend)
Bear Creek
Galena Grade Rd
93
Acorns Dr
Bear Creek Rd
Map Scale: 1:5,640 if printed on A size (8.5" x 11") sheet.
Meters
Feet
N

Custom Soil Resource Report

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: 1:5,640 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

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 12N NAD83

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

Soil Survey Area: Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties
Survey Area Data: Version 9, Jan 29, 2008

Date(s) aerial images were photographed: 7/31/1992

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 (Steelhead Bend)

Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties (ID752)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Bock-Bromaglin complex, 1 to 4 percent slopes	56.2	47.5%
126	Millhi silt loam, 2 to 4 percent slopes	2.8	2.4%
253	Zer gravelly loam, 20 to 50 percent slopes	56.8	47.9%
263	Water	2.6	2.2%
Totals for Area of Interest		**118.4**	**100.0%**

Map Unit Descriptions (Steelhead Bend)

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.

Custer-Lemhi Area, Idaho, Parts of Blaine, Custer, and Lemhi Counties

19—Bock-Bromaglin complex, 1 to 4 percent slopes

Map Unit Setting

Elevation: 3,800 to 6,600 feet
Mean annual precipitation: 8 to 13 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 75 to 100 days

Map Unit Composition

Bock and similar soils: 55 percent
Bromaglin and similar soils: 35 percent

Description of Bock

Setting

Landform: Stream terraces, fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 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 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: 25 percent
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 3c
Land capability (nonirrigated): 6e
Ecological site: LOAMY 8-12 ARTRW8/PSSPS (R012XY032ID)

Typical profile

0 to 11 inches: Silt loam
11 to 18 inches: Silt loam
18 to 48 inches: Stratified fine sandy loam to gravelly loam
48 to 60 inches: Very gravelly loamy sand

Description of Bromaglin

Setting

Landform: Stream terraces, fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: 14 to 24 inches to strongly contrasting textural stratification
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: 20 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 6s
Ecological site: LOAMY 8-12 ARTRW8/PSSPS (R012XY032ID)

Typical profile

0 to 5 inches: Silt loam
5 to 12 inches: Very fine sandy loam
12 to 20 inches: Sandy loam
20 to 60 inches: Extremely gravelly loamy coarse sand

126—Millhi silt loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 3,900 to 5,200 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 75 to 100 days

Map Unit Composition

Millhi and similar soils: 90 percent

Description of Millhi

Setting

Landform: Lake terraces, hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: 1 to 12 inches to natric
Drainage class: Moderately 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: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water capacity: Very low (about 1.2 inches)

Interpretive groups
Land capability (nonirrigated): 6e
Ecological site: CLAYEY 7-10 ARTRW8-ATCO/PSSPS (R012XY036ID)

Typical profile
0 to 4 inches: Silt loam
4 to 9 inches: Silt loam
9 to 60 inches: Clay

253—Zer gravelly loam, 20 to 50 percent slopes

Map Unit Setting
Elevation: 4,000 to 8,000 feet
Mean annual precipitation: 8 to 13 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition
Zer and similar soils: 95 percent

Description of Zer

Setting
Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Mixed alluvium and/or colluvium

Properties and qualities
Slope: 20 to 50 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 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: 40 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 8.0
Available water capacity: Low (about 4.0 inches)

Interpretive groups
Land capability (nonirrigated): 7e

Ecological site: GRAVELLY LOAM 8-12 ARTRW8/PSSPS (R012XY004ID)

Typical profile

0 to 5 inches: Gravelly loam
5 to 14 inches: Very gravelly loam
14 to 26 inches: Extremely gravelly sandy loam
26 to 60 inches: Extremely gravelly sandy loam

263—Water

Map Unit Composition

Water: 100 percent

Description of Water

Interpretive groups

Land capability (nonirrigated): 8

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Custom Soil Resource Report

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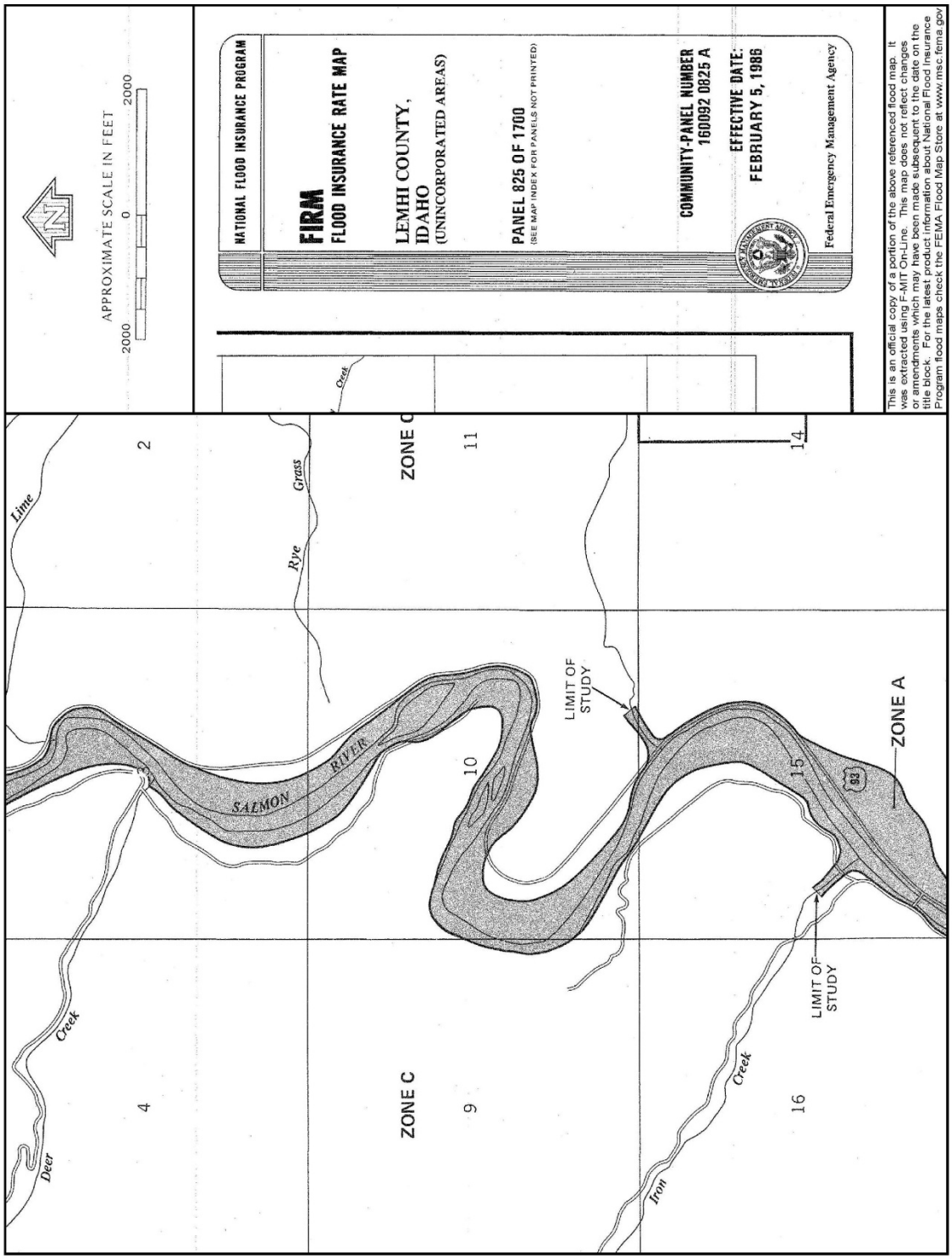
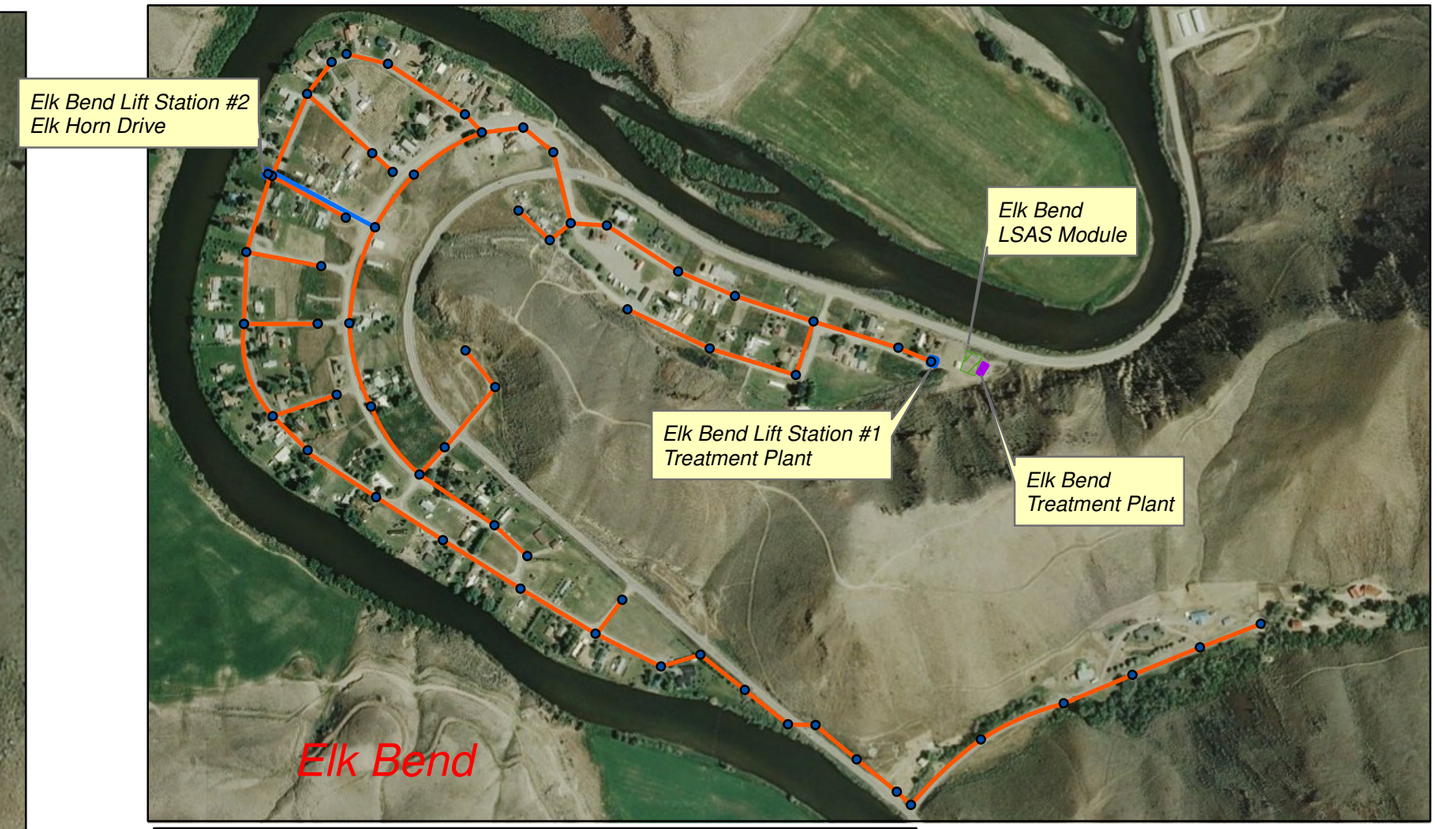
APPENDIX C. Floodplains

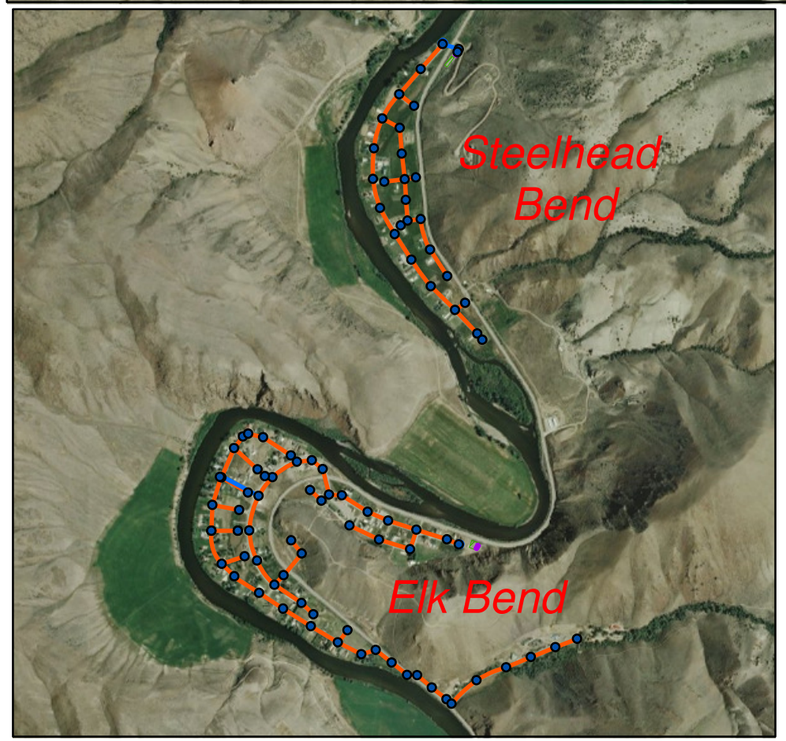
Federal Emergency Management Agency - Elk Bend Flood Insurance Rate Map (FIRM)


APPROXIMATE SCALE IN FEET
2000
0
2000
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
LEMHI COUNTY, IDAHO
(UNINCORPORATED AREAS)
PANEL 825 OF 1700
(SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER
160092 0825 A
EFFECTIVE DATE:
FEBRUARY 5, 1986
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov
Lime
Grass
Rye
Creek
Deer
SALMON
RIVER
ZONE C
ZONE C
ZONE A
LIMIT OF STUDY
LIMIT OF STUDY
Creek
Iron
2
4
9
10
11
14
15
16
93

APPENDIX D. Maps

Elk Bend Project Planning Area
Elk Bend Proposed Project Layout
1971 Construction Drawings





Legend

- Collection Piping
- Pressure Lines
- Manholes
- Lift Stations
- Existing Treatment Plants
- Existing LSAS (drainfields)

N

PROJECT NO. 209003-000

FILENAME Fig 4.1

305 N. 3rd Avenue
Pocatello, ID 83201
208.238.2146
www.kellerassociates.com
KELLER associates

Elk Bend Sewer District

Wastewater Systems

Existing Wastewater Systems

FIGURE NO. 4.1

Legend

- Collection Piping
- Pressure Lines
- Manholes
- Lift Stations
- Gravity Connector Pipeline
- Existing LSAS (drainfields)
- Proposed LSAS Areas
- Existing Treatment Plants
- Preferred Treatment Site
- Alternate Treatment Site

N

PROJECT NO. 209003-000

FILENAME Fig 9.1

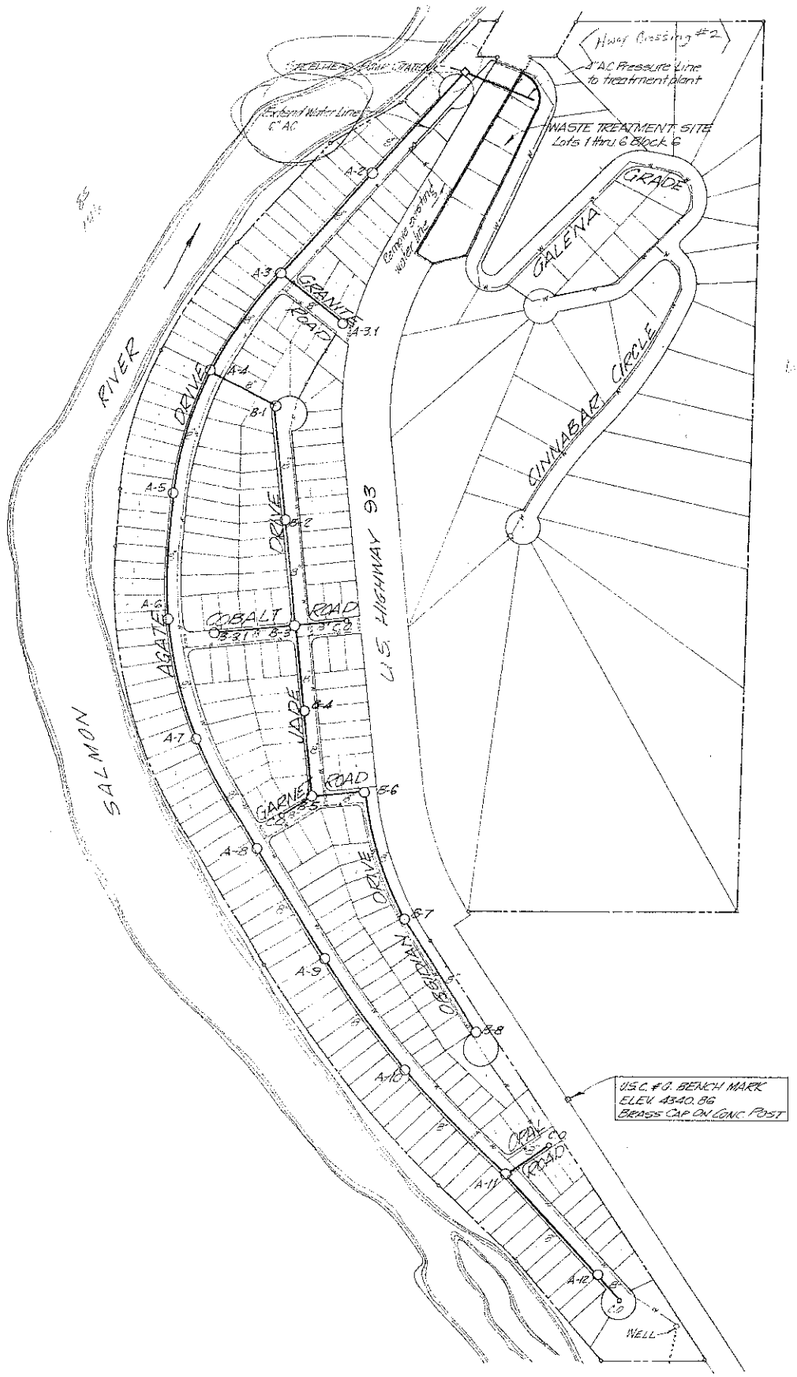
305 N. 3rd Avenue
Pocatello, ID 83201
208.238.2146
www.kellerassociates.com
KELLER associates

Elk Bend Sewer District

Wastewater Systems

Existing System and Proposed Improvements Preliminary Layout

FIGURE NO. 9.1



SCALE 1" = 200'

STEELHEAD BEND
INDEX

Sheet Number

1 ..... COVER SHEET
2 ..... AGATE DRIVE
3 ..... AGATE DRIVE, GRANITE ROAD, COBALT ROAD
4 ..... JADE DRIVE, OPAL ROAD, GARNET ROAD, OBSIDIAN DRIVE
5 ..... SITE PLAN - SEWAGE TREATMENT
6 ..... PUMP STATION AND UTILITY DETAILS (STEELHEAD AND ELK BEND)
7 ..... SECONDARY TREATMENT PLANT (STEELHEAD AND ELK BEND)

8"
813
240
730
380
580
370
365
330
412
133
165
160
733
1160
400
120
160
800
7,590

4"
220

elk bend sewer district

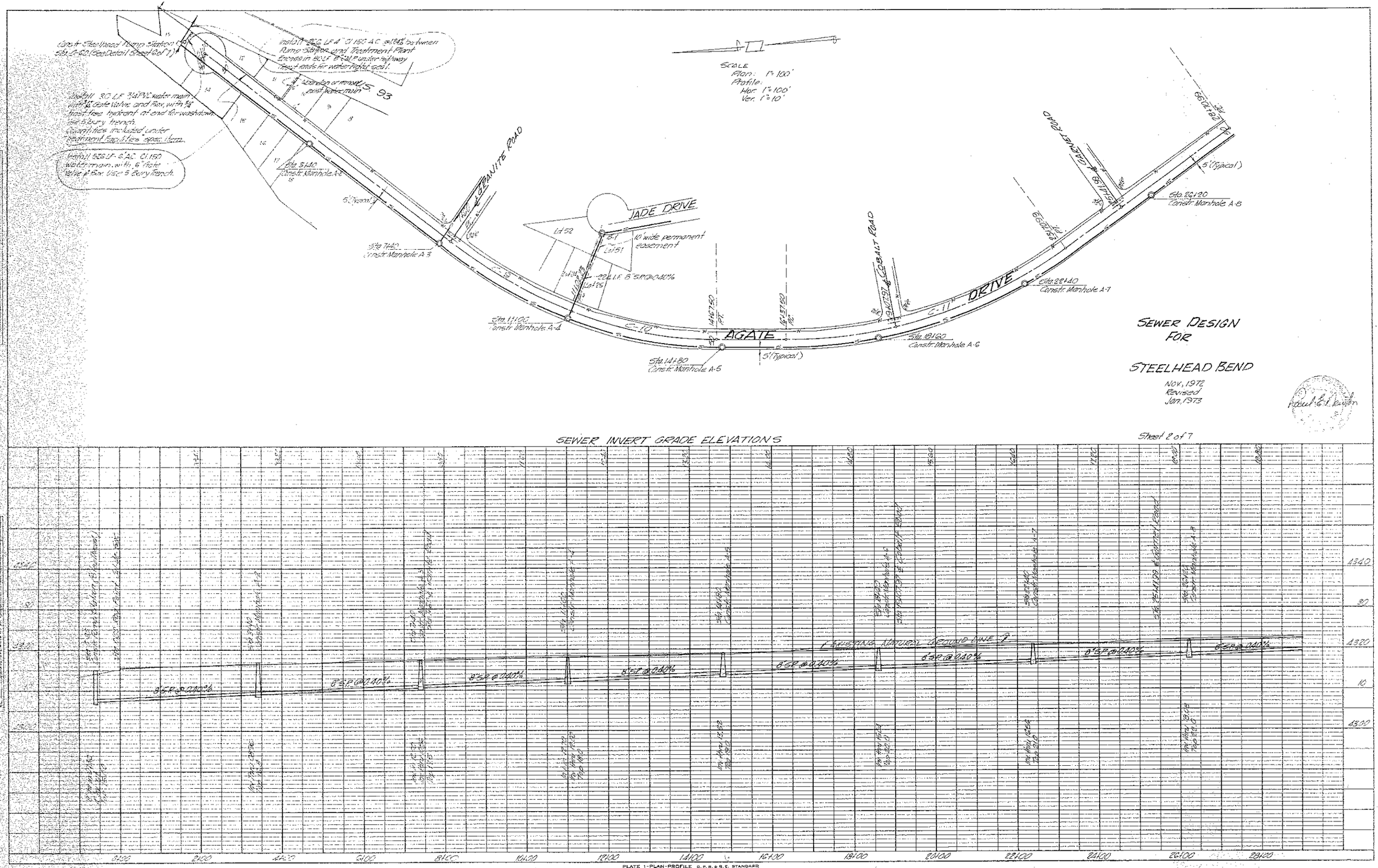
SEWER DESIGN FOR STEELHEAD BEND

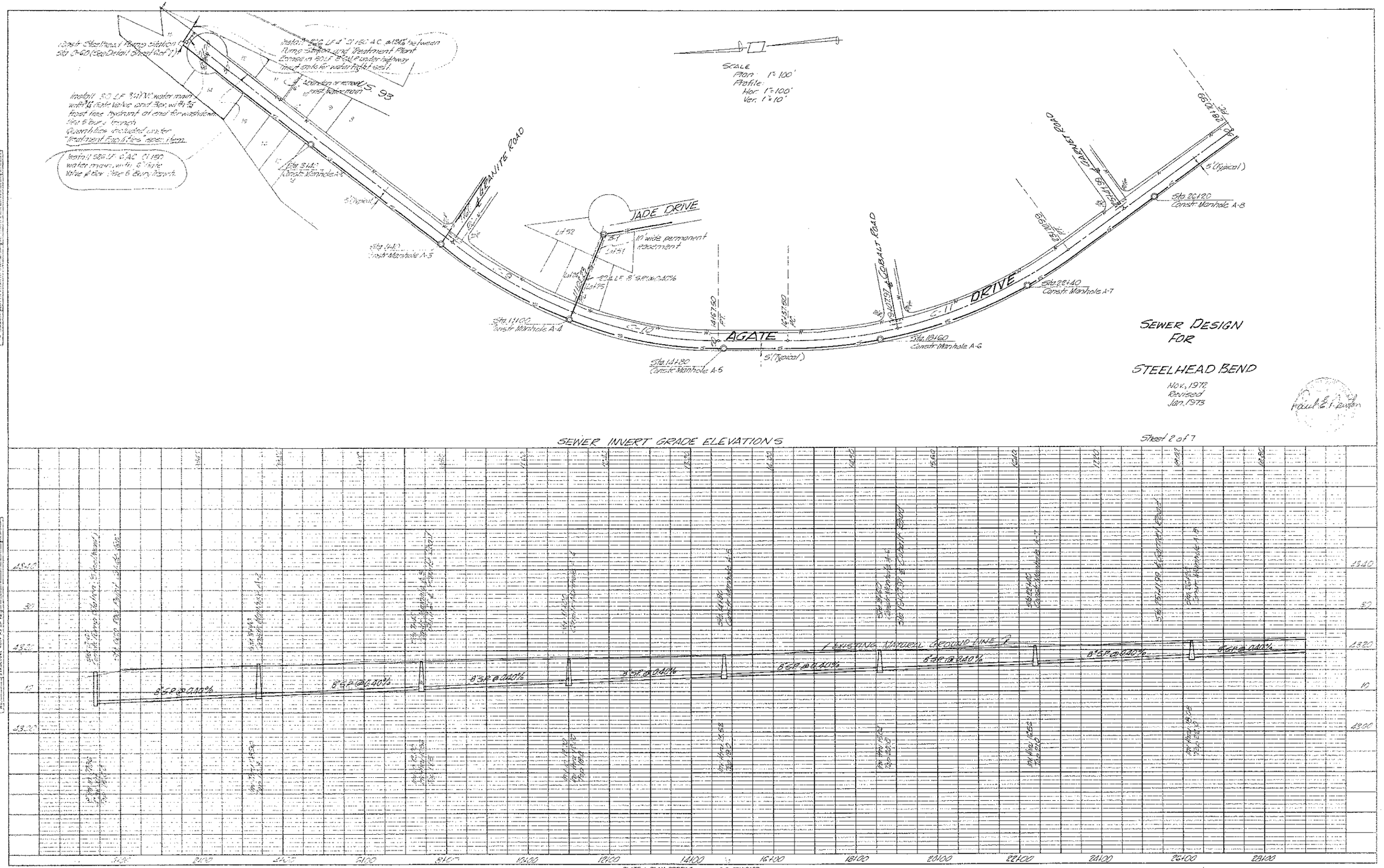
Nov. 1972
Revised
Jan. 1973

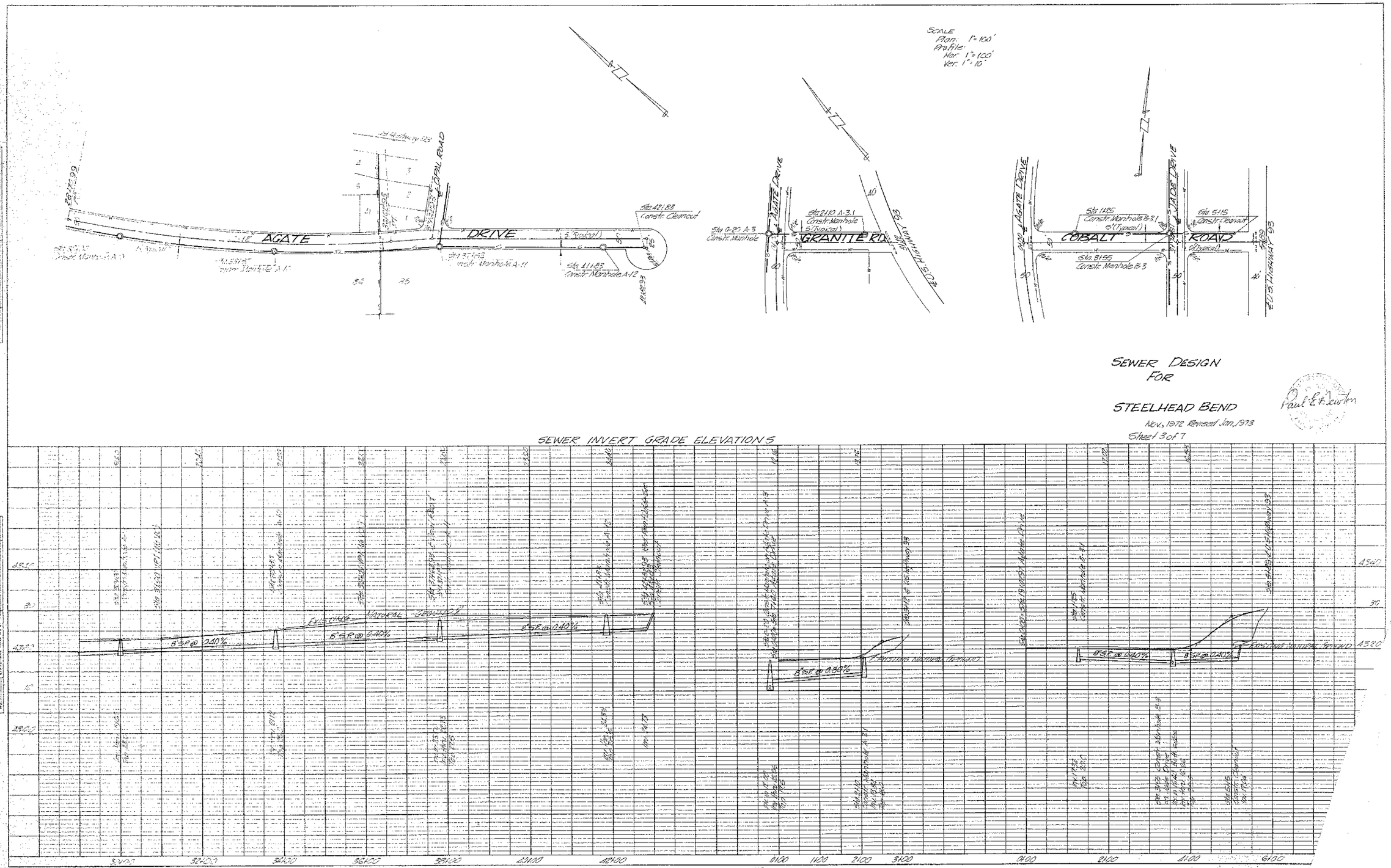
newton · schafer
engineers · planners
twin falls · idaho

Paul E. Newton

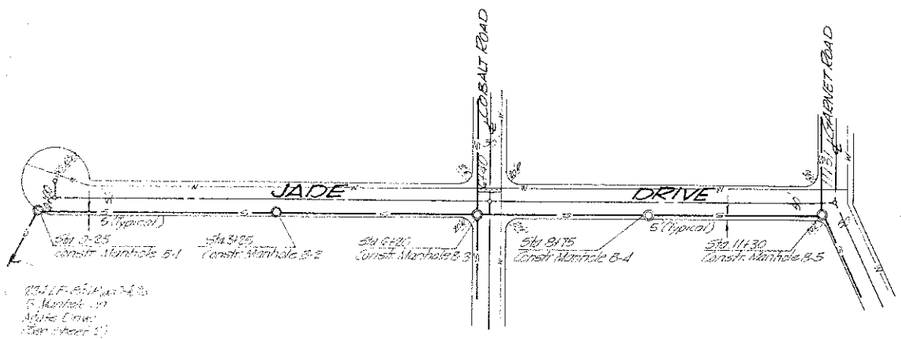
Sheet 1 of 7

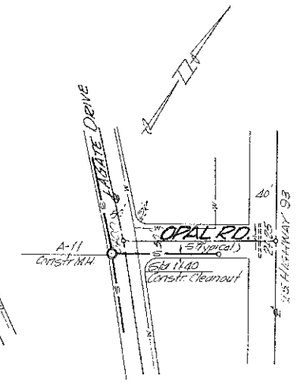

Line to Steelhead Pump Station Sta. 2+62 (See Detail Sheet No. 7)
Install 20 L.F. 3/4" PVC water main with 3/4" Gate Valve and Box, with 3/4" frost free hydrant at end for wash down. Use 5' bury trench. Insulate and lagged under Treatment Facilities approx. 1 time.
Install 526 L.F. 6" A.C. Cl. 150 water main with 6" Gate Valve & Box. Use 5' bury trench.
Install 20 L.F. 4" Cl. 150 A.C. at 18" between Pump Station and Treatment Plant. Encase in 80 L.F. 8" S.P. under roadway. Heat ends for water-tight seal.
Abandon or remove existing sewer main
S. 93
Sta. 3+40 Constr. Manhole A-2
Sta. 7+40 Constr. Manhole A-3
Sta. 11+00 Constr. Manhole A-4
Sta. 14+80 Constr. Manhole A-5
Sta. 18+60 Constr. Manhole A-6
Sta. 22+40 Constr. Manhole A-7
Sta. 26+20 Constr. Manhole A-8
GRANITE ROAD
JADE DRIVE
10' wide permanent easement
Lot 52
Lot 51
Lot 25
22 L.F. 8" S.P. @ 0.40%
COBALT ROAD
AGATE
DRIVE
14+67.50 PT
16+37.50 PC
19+07.97
5' (Typical)
SCALE
Plan: 1" = 100'
Profile:
Hor. 1" = 100'
Ver. 1" = 10'
SEWER DESIGN FOR STEELHEAD BEND
Nov. 1972
Revised
Jan. 1973
Sheet 2 of 7
SEWER INVERT GRADE ELEVATIONS
EXISTING NATURAL GROUND LINE
8" S.P. @ 0.40%
4340
30
4320
10
4300
2+00
4+00
6+00
8+00
10+00
12+00
14+00
16+00
18+00
20+00
22+00
24+00
26+00
28+00
PLAN
PROFILE
PLATE 1 - PLAN-PROFILE O.P.R.&R.E. STANDARD
100% ASCPROOF VELLUM — MADE AND PRINTED IN U.S.A.
EUGENE DIETZGEN CO.

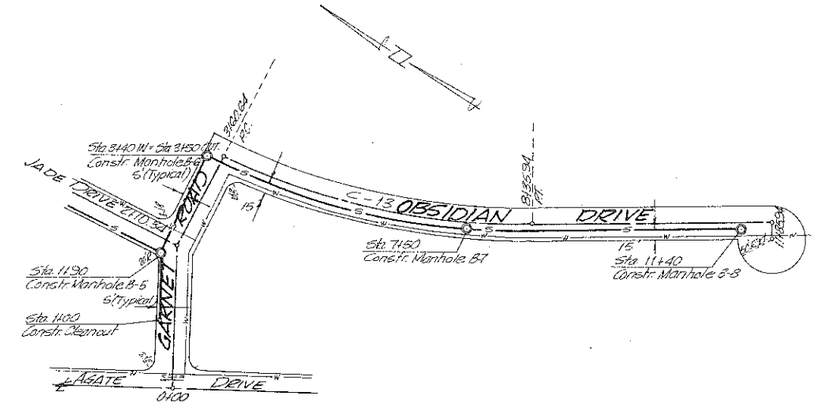

Constr. Steelhouse Pump station to 500 3-60 (See Detail Sheet Ref. 1)
Install 9 Sta. LF 4" Cl 150 AC at 12% between Pump Station and Treatment Plant. Encase in 80 LF 8" Cl 2 under highway. Install ends for water tight seal.
Abandon or remove existing force main
S 93
Install 900 LF 3/4" PVC water main with 3/4" gate valve and 3/4" w/ 3/4" frost free hydrant at road for washdown. Use 5' bury trench. Quantities included under "Treatment Facilities" description.
Install 980 LF 8" AC Cl 150 water main with 6" gate valve. Use 6' bury trench.
Sta. 9+40 Constr. Manhole A-2
5' (Typical)
GRANITE ROAD
Sta. 11+40 Constr. Manhole A-4
Sta. 14+40 Constr. Manhole A-5
JADE DRIVE
Lot 52
Lot 51
Lot 50
Lot 49
Lot 48
10' wide permanent easement
270 LF 8" SDR 35 PVC
AGATE
DRIVE
COBALT ROAD
CADMIUM ROAD
Sta. 14+80 Constr. Manhole A-5
Sta. 18+60 Constr. Manhole A-6
Sta. 20+40 Constr. Manhole A-7
Sta. 20+20 Constr. Manhole A-8
SCALE
Plan: 1" = 100'
Profile:
Hor. 1" = 100'
Ver. 1" = 10'
SEWER DESIGN FOR STEELHEAD BEND
Nov. 1972
Revised Jan. 1973
SEWER INVERT GRADE ELEVATIONS
Sheet 2 of 7
EXISTING NATURAL GROUND LINE
8" SP @ 0.15%
8" SP @ 0.80%
8" SP @ 0.00%
8" SP @ 0.40%
8" SP @ 2.10%
8" SP @ 0.30%
8" SP @ 0.00%
PLAN
PROFILE
PLATE 1 - PLAN - PROFILE O.P.R.&R.E. STANDARD
100% ASEPROOF VELLUM — MADE AND PRINTED IN U.S.A.
EUGENE DIETZGEN CO.


SCALE
Plan: 1"=100'
Profile: Hor. 1"=100'
Ver. 1"=10'
AGATE DRIVE
OPAL ROAD
Sta 42+83 Const. Cleanout
Sta 37+93 Const. Manhole A-11
Sta 41+83 Const. Manhole A-12
Sta 0+20 A-3 Const. Manhole
Sta 2+10 A-3.1 Const. Manhole
GRANITE RD.
COBALT ROAD
Sta 11+25 Const. Manhole B-3.1
Sta 31+55 Const. Manhole B-3
Sta 51+15 Const. Cleanout
JADE DRIVE
SEWER DESIGN
FOR
STEELHEAD BEND
Nov. 1972 Revised Jan. 1973
Sheet 3 of 7
SEWER INVERT GRADE ELEVATIONS
EXISTING NATURAL GROUND
8"SR @ 0.40%
8"SR @ 0.80%
EXISTING NATURAL GROUND
PLATE 1-PLAN-PROFILE G. P. R. & R. E. STANDARD
100% ASCEROOF VELLUM - MADE AND PRINTED IN U.S.A.
EUGENE DIETZGEN CO.

SCALE
Plan: 1" = 100'
Profile:
Hor: 1" = 100'
Ver: 1" = 10'







SEWER DESIGN FOR STEELHEAD BEND

Nov. 1972
Revised
Jan. 1973

Paul E. Burton

SEWER INVERT GRADE ELEVATIONS

Sheet 4 of 7

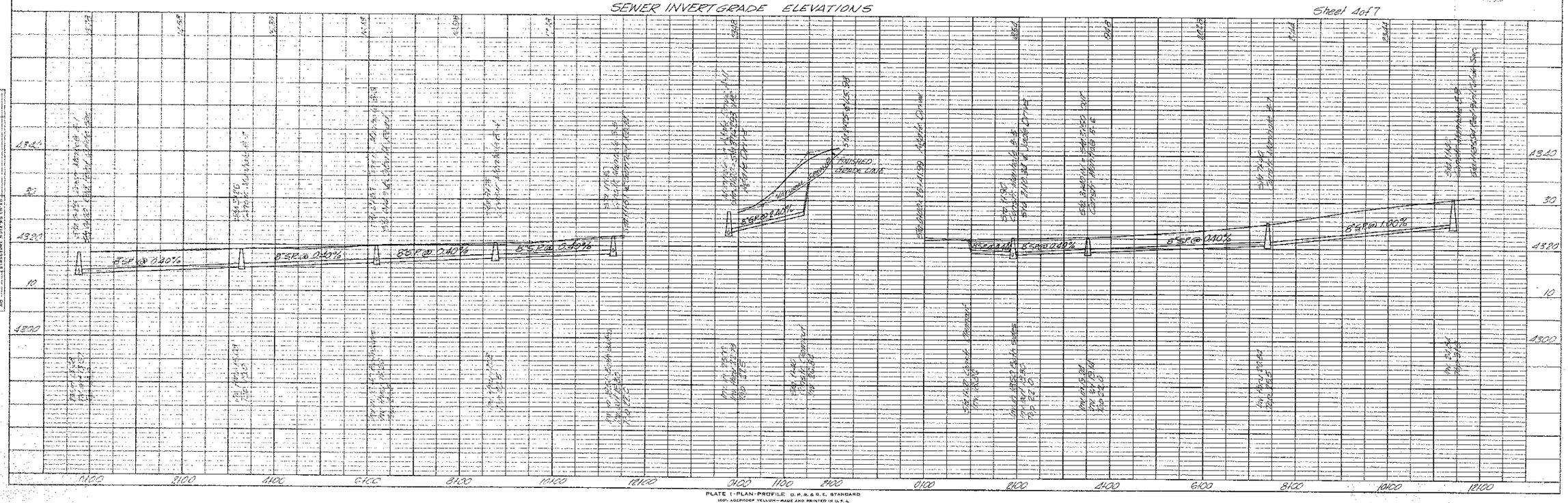
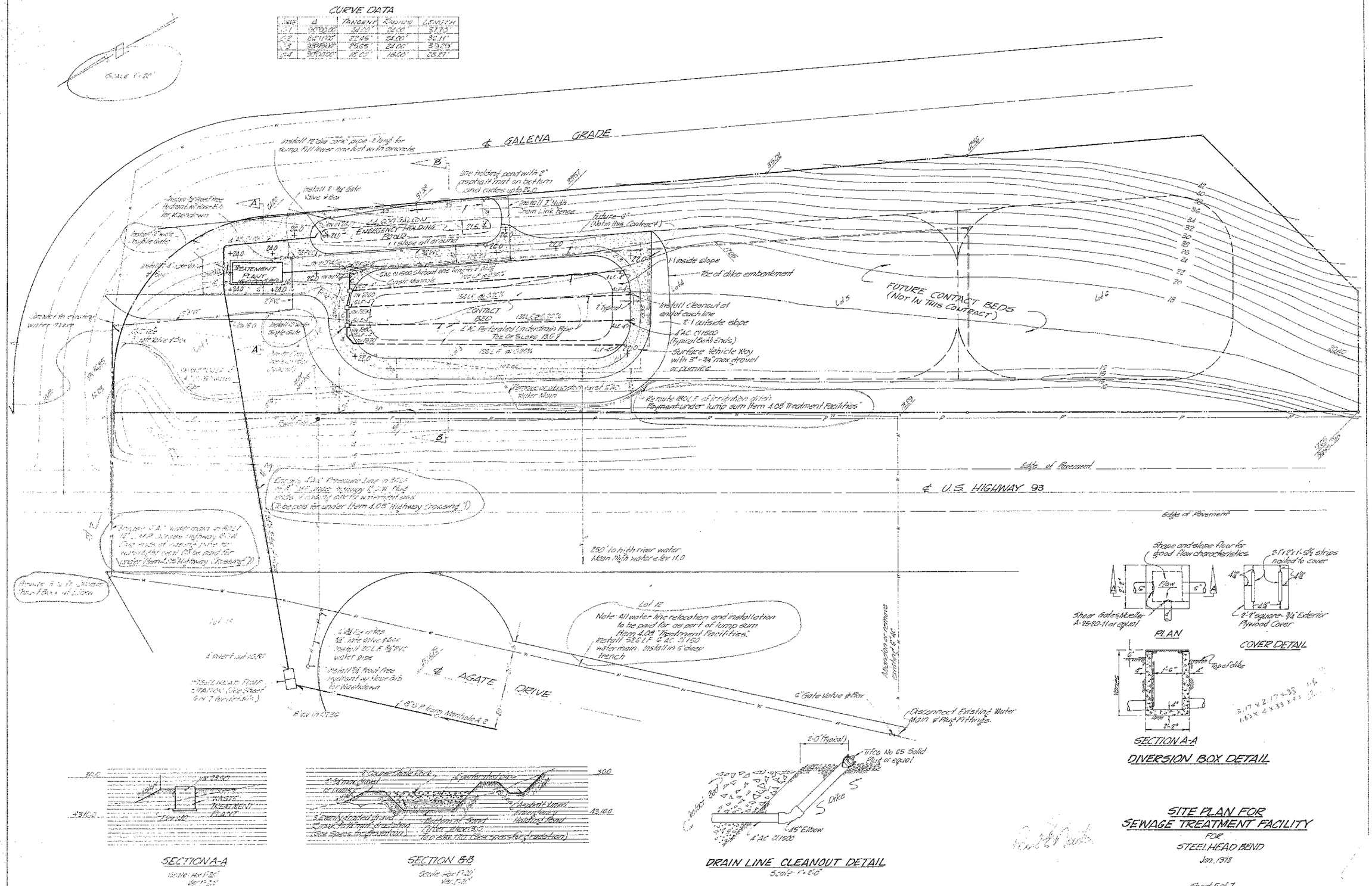


PLATE I-PLAN-PROFILE O.P.R. & R.E. STANDARD
100% ASEPTIOOF VELLUM—MADE AND PRINTED IN U.S.A.
EUGENE DIKYZGEN CO.

CURVE DATA

Curve	Δ	Tangent	Radius	Length
C1	90°00'00"	24.00'	24.00'	37.70'
C2	84°11'20"	22.45'	24.00'	36.11'
C3	33°59'00"	24.65'	24.00'	33.33'
C4	90°00'00"	18.00'	18.00'	28.27'



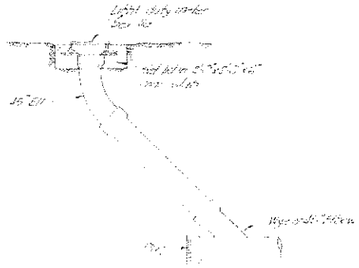
SITE PLAN FOR SEWAGE TREATMENT FACILITY

FOR

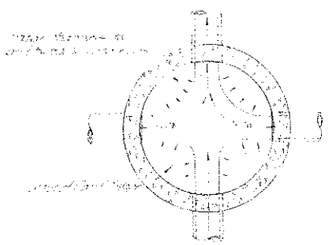
STEELHEAD BEND

Jan. 1978

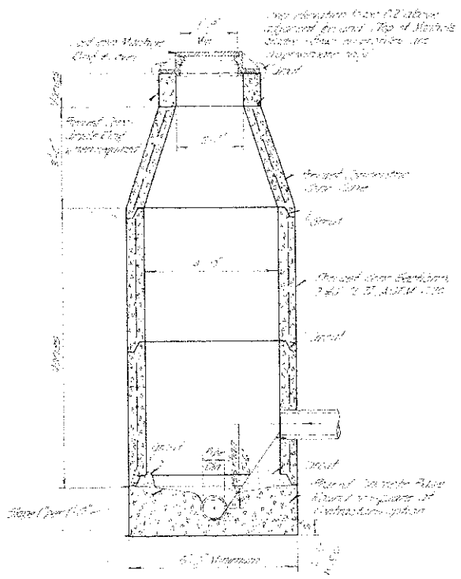
Sheet 5 of 7



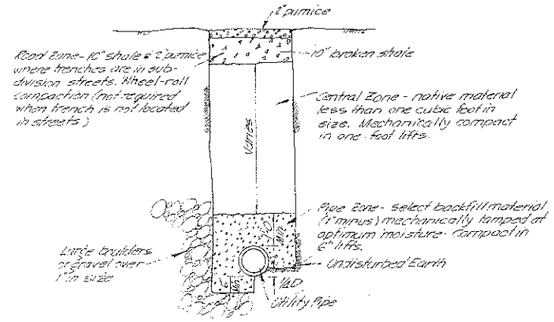
CLEANOUT DETAIL



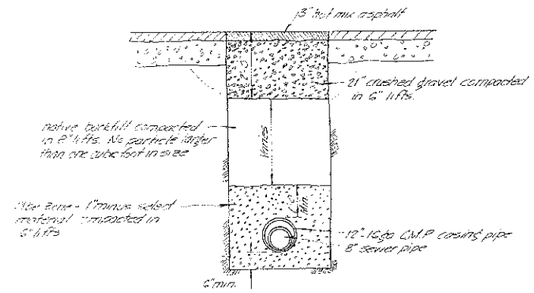
TYPICAL PLAN OF MANHOLE BASE CHANNELS



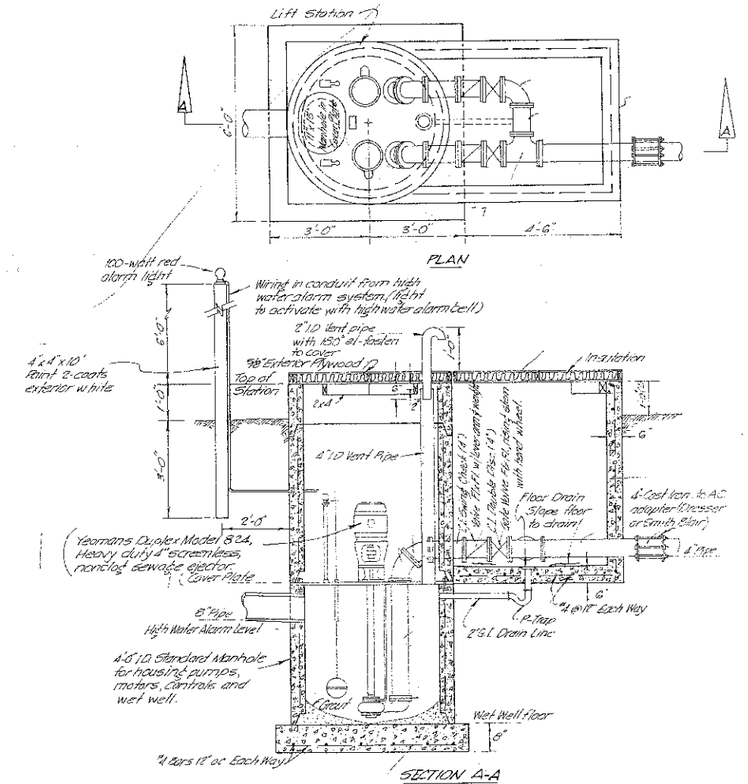
TYPICAL SEWER MANHOLE

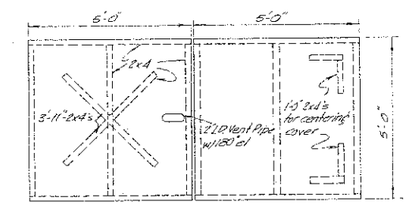


TYPICAL UTILITY TRENCH DETAIL



HIGHWAY CROSSING TRENCH SECTION
(when open cut is necessary)
Scale: 1" = 2'-0"





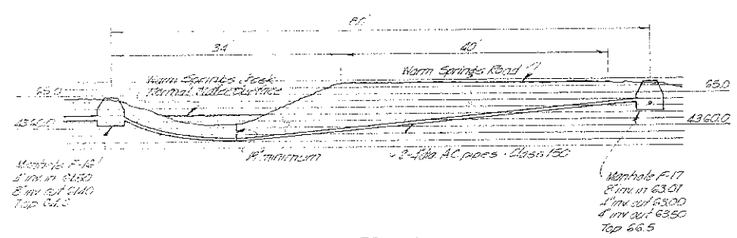
FRAMING PLAN FOR LIFT STA. COVERS

PUMP STATION CRITERIA

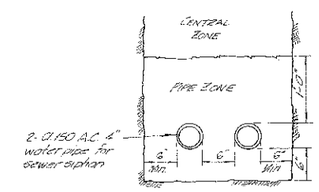
Station No.	Capacity G.P.M.	T.D.H. Feet	8" Pipe Invert In	4" Pipe Invert Out	Top Of Station	Cover Plate Elev.	Wet Well Floor
Elk Bend #1	60	20	32.68	35.30	39.00	34.50	30.00
Elk Bend #2	30	10	43.00	43.50	50.00	45.00	40.50
Steelhead	40	20	07.36	10.80	15.00	10.00	05.50

Note: Available power: 120 v, single ϕ, 60 cycle (Idaho Power Co.)

PUMP STATION DETAIL
Scale: 1" = 2'-0"



PROFILE
Scale: 1" = 10'-0"



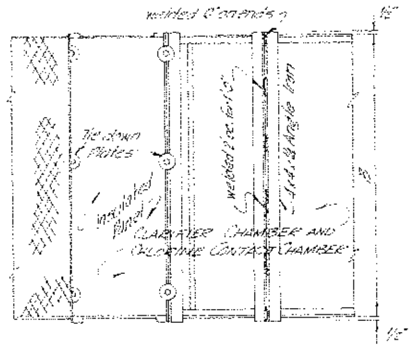
SIPHON TRENCH SECTION
Scale: 1" = 1'-0"

CREEK CROSSING SIPHON DETAIL

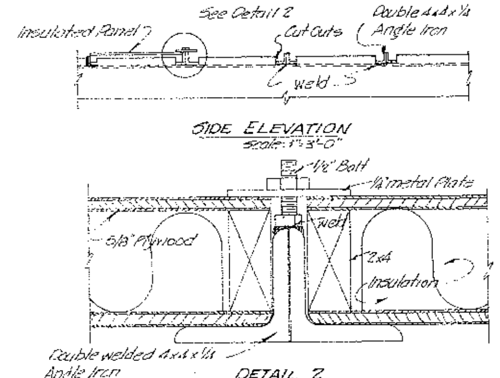
PUMP STATION AND UTILITY DETAILS
FOR
ELK BEND AND STEELHEAD BEND

Nov. 1972
Revised
Jan. 1973

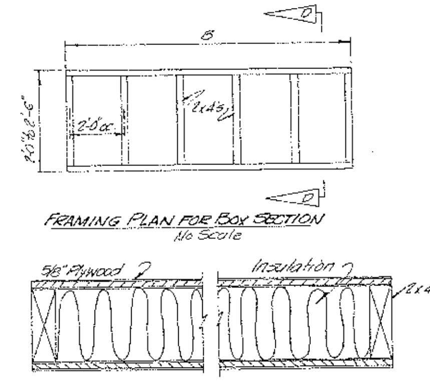
SPECIFICATIONS FOR WINTER COVERS
Material: 2x4x1/4" Angle Iron
1/2" Bolts 1 1/2" long
2x4's Fir, KD, Const
5/8" Plywood, Exterior
6x2x1/4 Metal Plates
Plywood to be glued and nailed to 2x4's.
Insulation is to be placed between 2x4's to completely fill the space;
Angle Iron to be welded for 6" on each end and for 1'-0" every 2' OC;
Angle Iron to be painted same as plant.
Panel to be painted according to Pratt & Lambert Spec #17.



PLAN
Scale: 1"=3'-0"

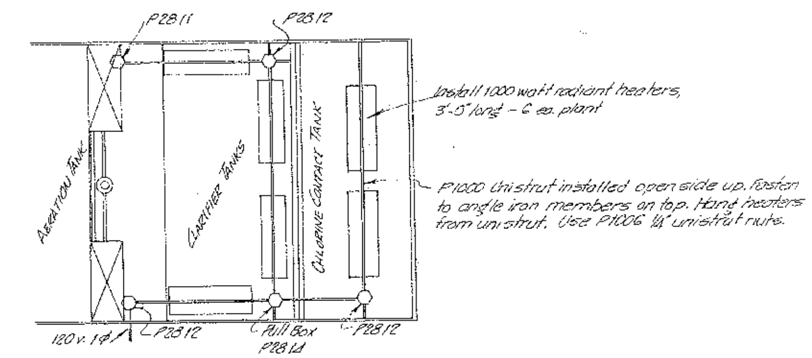


DETAIL 2
No Scale

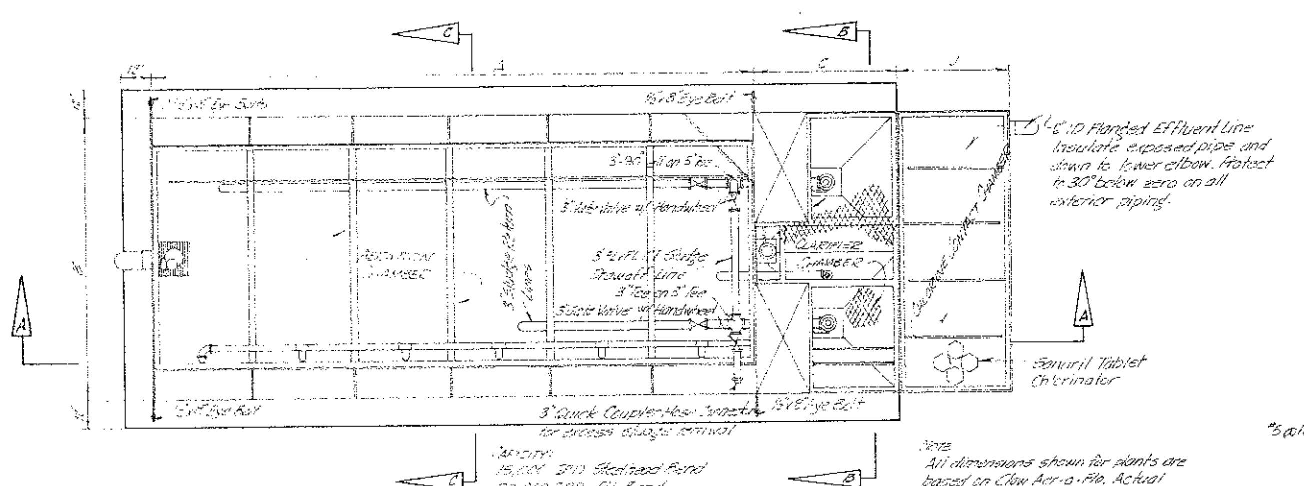


SECTION D-D
No Scale

INSULATED PANEL AND SUPPORT DETAIL FOR CLARIFIER CHAMBERS AND CHLORINE CONTACT TANKS

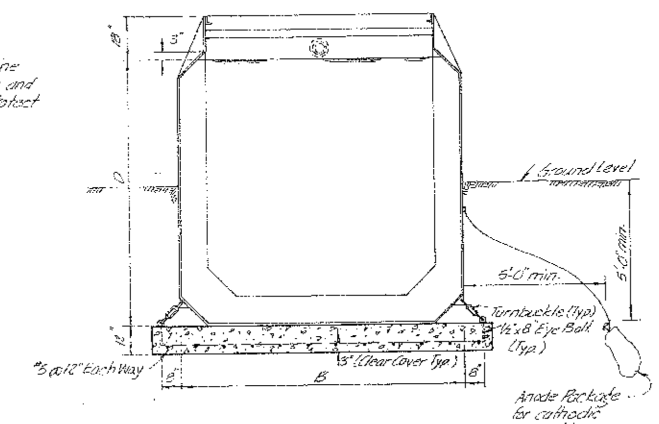


HEATER INSTALLATION FOR CLARIFIER CHAMBERS AND CHLORINE CONTACT TANKS
Scale: 1"=3'-0"

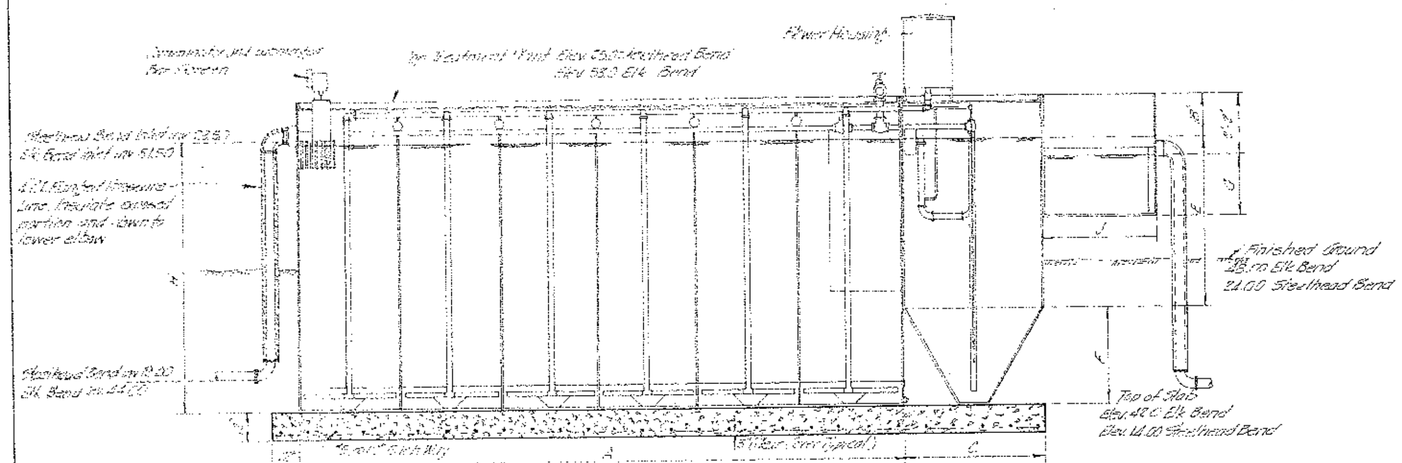


PLAN
Scale: 1"=3'-0"

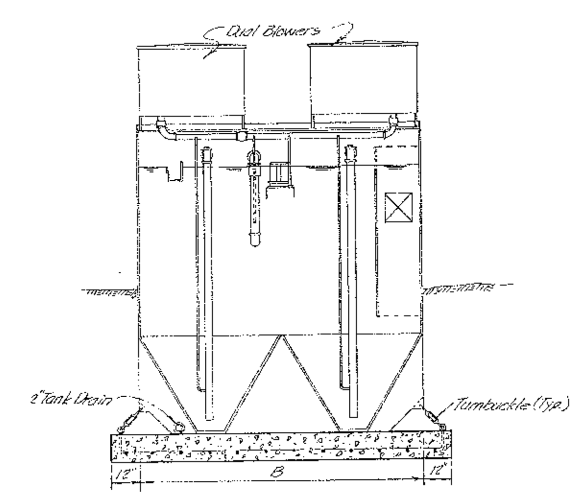
Note:
All dimensions shown for plants are based on Clow Aer-o-Flo. Actual installation dimensions, based on design capacities, shall be as provided on shop drawings furnished by Manufacturer.



SECTION C-C
Scale 1"=3'-0"



SECTION A-A
Scale 1"=3'-0"



SECTION B-B
Scale: 1"=3'-0"

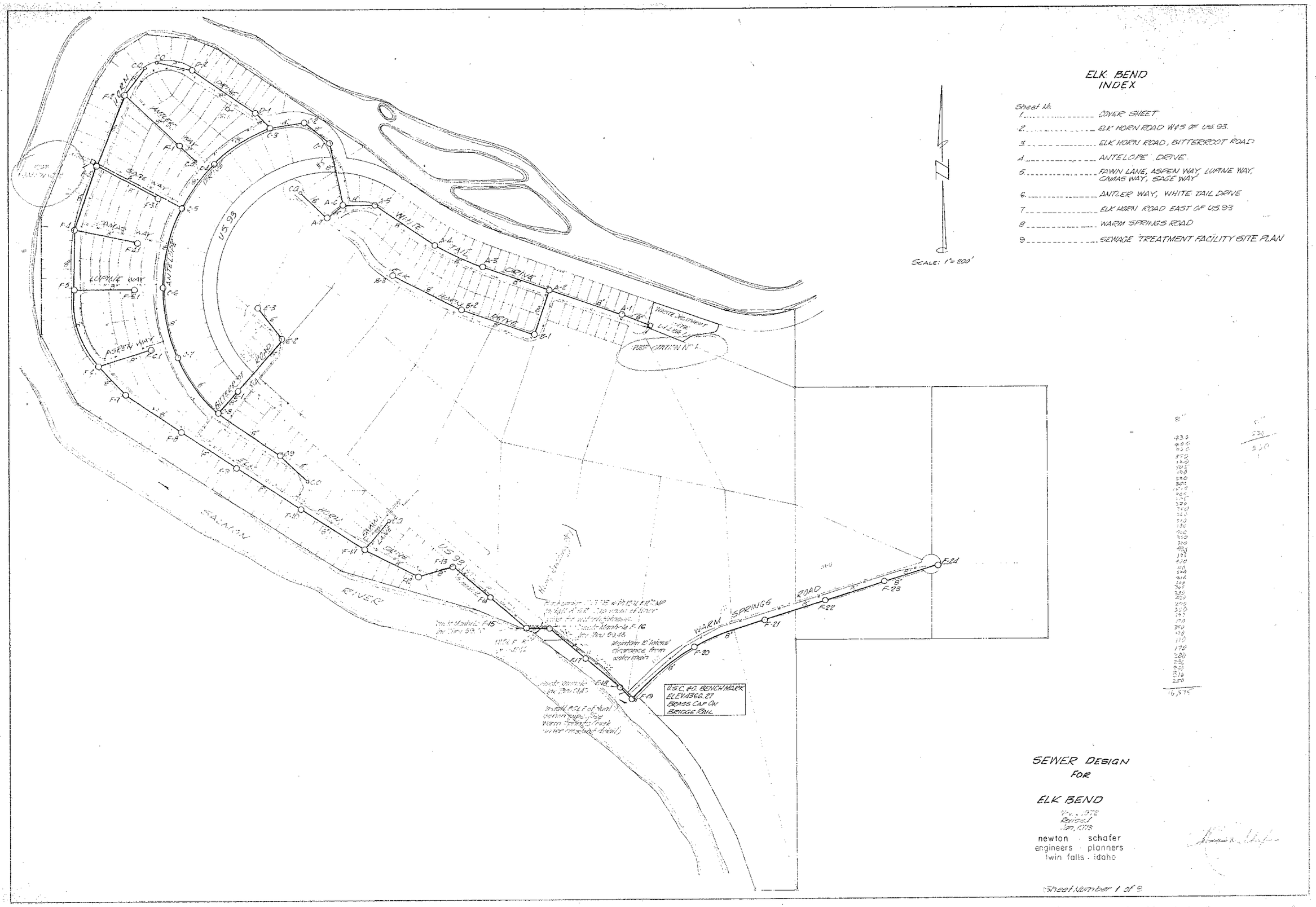
NOMINAL DIMENSIONS FOR PLANT CAPACITIES

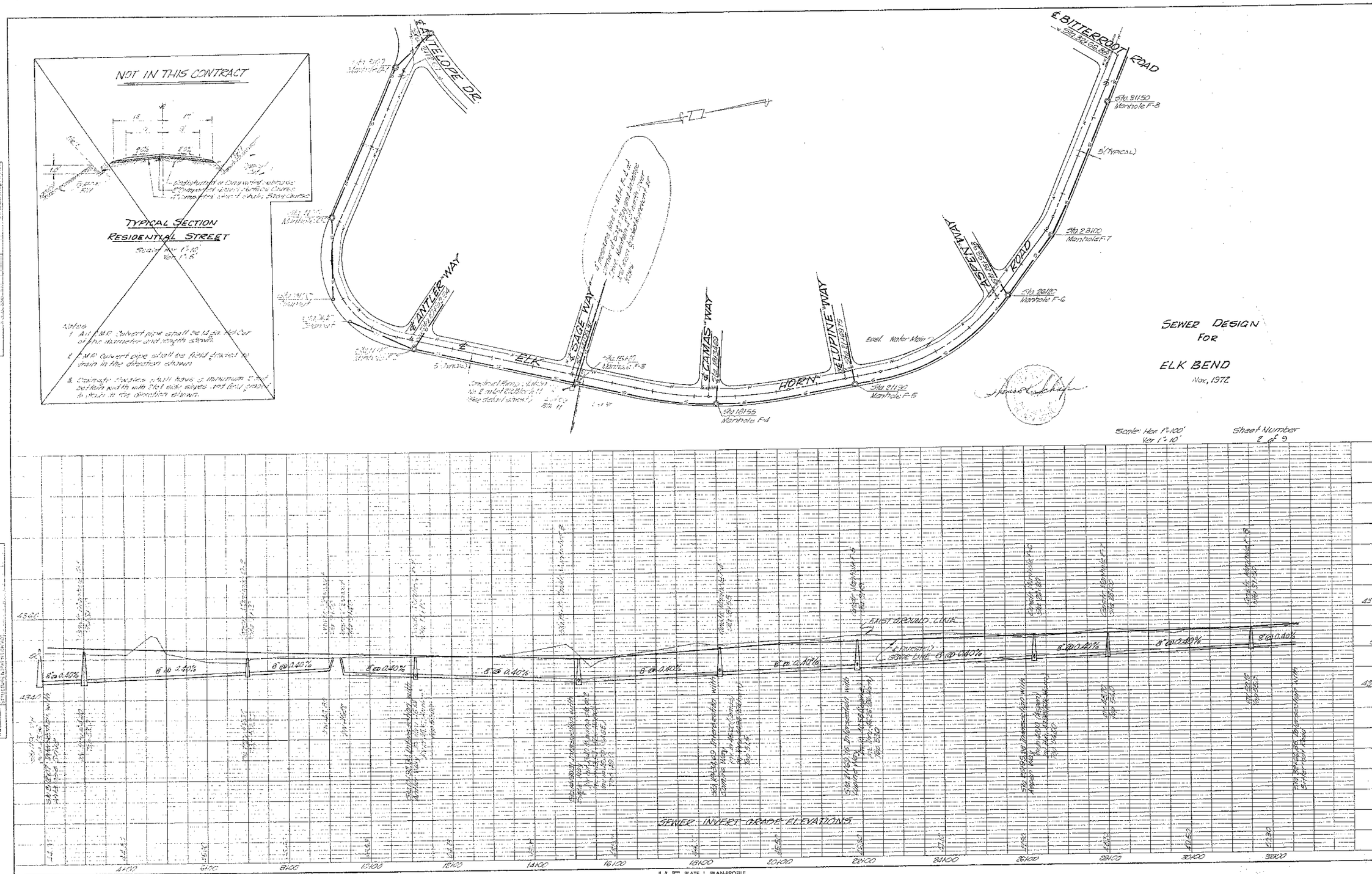
PLANT	DESIGN FLOW GPD	AERATION VOL. GAL.	CLARIFIER VOL. GAL.	CLORINE TANK VOL.	BLOWER CFM	BLOWER HP	DIMENSIONS A	B	C	D	E	F	G	H	J
STEELHEAD BEND	15,000	15,000	2500	625 gal.	75	3	21'-6"	10'-0"	5'-0"	9'-6"	6'-1"	3'-5"	2'-2"	9'-8"	4'-0"
ELK BEND	22,000	22,000	3,667	930 gal.	110	5	26'-6"	12'-0"	7'-0"	9'-6"	4'-5"	5'-1"	2'-7"	9'-8"	4'-0"

SECONDARY TREATMENT PLANTS
FOR
STEELHEAD BEND AND ELK BEND

Nov. 1972
Revised Jan. 1973

Sheet 7 of 7


ELK BEND
INDEX
Sheet No.
1 ..... COVER SHEET
2 ..... ELK HORN ROAD W'LY OF US 93.
3 ..... ELK HORN ROAD, BITTERROOT ROAD
4 ..... ANTELOPE DRIVE
5 ..... FAWN LANE, ASPEN WAY, LUPINE WAY, CAMAS WAY, SAGE WAY
6 ..... ANTLER WAY, WHITE TAIL DRIVE
7 ..... ELK HORN ROAD EAST OF US 93
8 ..... WARM SPRINGS ROAD
9 ..... SEWAGE TREATMENT FACILITY SITE PLAN
SCALE: 1" = 200'
SEWER DESIGN
FOR
ELK BEND
Nov. 1972
Revised
Jan. 1973
newton · schafer
engineers · planners
twin falls · idaho
Sheet Number 1 of 9
US 93
ANTELOPE DRIVE
SAGE WAY
CAMAS WAY
LUPINE WAY
ASPEN WAY
BITTERROOT ROAD
ELK HORN DRIVE
WHITE TAIL DRIVE
FAWN LANE
SALMON RIVER
WARM SPRINGS ROAD
PUMP STATION No. 1
WASTE TREATMENT SITE
U.S.C. & G. BENCH MARK
ELEV. 3662.27
BRASS CAP ON
BRIDGE RAIL
Maintain 18" Vertical clearance from watermain


NOT IN THIS CONTRACT
TYPICAL SECTION
RESIDENTIAL STREET
Scale: Hor 1"=10'
Ver 1"=5'
Undisturbed or Compacted earth
Compacted Gravel Surface Course
Compacted Gravel Surface Course
Asphaltic Concrete
Notes:
1. All 8" M.P. Culvert pipe shall be 12 ga. Metal or the diameter and length shown.
2. 8" M.P. Culvert pipe shall be field placed to drain in the direction shown.
3. Drainage Swales shall have a minimum 3' wide bottom width with 2:1 side slopes and field placed to drain in the direction shown.
℄ ANTELOPE DR
℄ BITTERROOT ROAD
Sta. 30+56.82
Sta. 31+50
Manhole F-8
5' (Typical)
Sta. 28+00
Manhole F-7
Sta. 26+80
Manhole F-6
℄ ASPEN WAY
℄ LUPINE WAY
Sta. 21+30
Manhole F-5
Sta. 18+55
Manhole F-4
℄ CAMAS WAY
Sta. 15+40
Manhole F-3
℄ SAGE WAY
℄ ELK HORN
℄ ANTLER WAY
Sta. 10+00
Manhole F-2
Sta. 7+00
Manhole F-1
Sta. 3+00
Manhole F-0
Existing Water Main
Sewer Design
For
Elk Bend
Nov, 1972
Scale: Hor 1"=100'
Ver 1"=10'
Sheet Number
2 of 9
PLAN
PROFILE
EXIST. GROUND LINE
℄ PROPOSED SEWER LINE 8" @ 0.40%
8" @ 0.40%
4560
4540
4520
4500
4480
4460
4440
4420
4400
4380
4360
4340
4320
4300
4280
4260
4240
4220
4200
4180
4160
4140
4120
4100
4080
4060
4040
4020
4000
3980
3960
3940
3920
3900
3880
3860
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3780
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3320
3300
3280
3260
3240
3220
3200
3180
3160
3140
3120
3100
3080
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3040
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3000
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2300
2280
2260
2240
2220
2200
2180
2160
2140
2120
2100
2080
2060
2040
2020
2000
1980
1960
1940
1920
1900
1880
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1200
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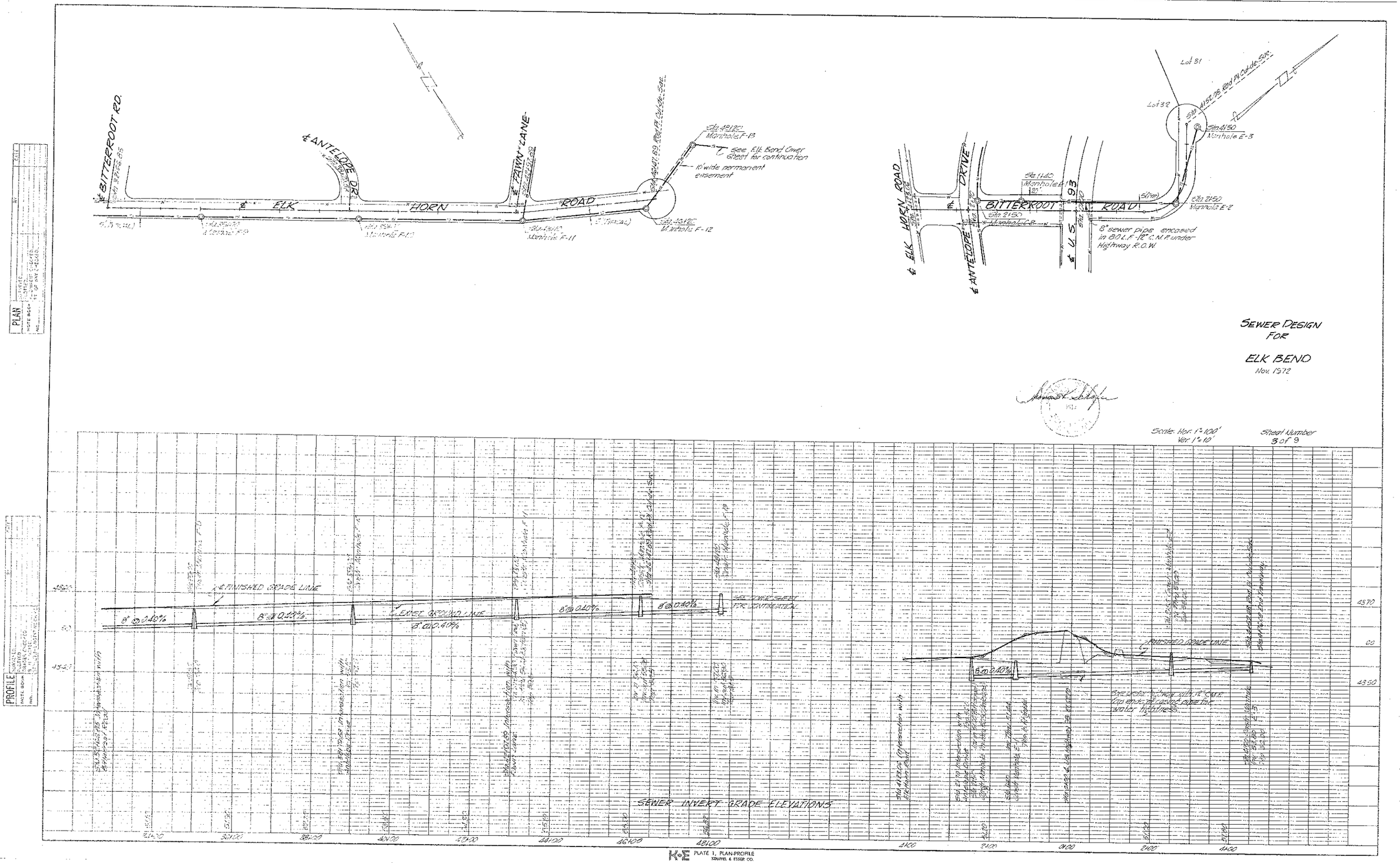
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
4100
6100
8100
10100
12100
14100
16100
18100
20100
22100
24100
26100
28100
30100
32100
SEWER INVERT GRADE ELEVATIONS
PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.
46 7008 ALDANENE® TRACING PAPER


PLAN
PROFILE
℄ BITTERROOT RD.
℄ ANTELOPE DR.
℄ ELK HORN ROAD
℄ ZAWA LANE
Sta 48+20
Manhole F-13
see Elk Bend Cover sheet for continuation
10' wide permanent easement
Sta 48+11.69 PC of 12" culvert
Sta 40+20
Manhole F-12
Sta 43+10
Manhole F-11
Sta 39+10
Manhole F-10
Sta 34+10
Manhole F-9
Sta 30+10
Manhole F-8
Sta 26+10
Manhole F-7
Sta 22+10
Manhole F-6
Sta 18+10
Manhole F-5
Sta 14+10
Manhole F-4
Sta 11+10
Manhole F-3
Sta 7+50
Manhole F-2
Sta 2+50
Manhole F-1
℄ ELK HORN ROAD
℄ ANTELOPE DRIVE
℄ BITTERROOT ROAD
℄ U.S. 93
Sta 11+10
Manhole E-4
Sta 2+50
Manhole E-8
Sta 7+50
Manhole E-2
Sta 4+50
Manhole E-3
Sta 4+52.38 PC of 12" culvert
Lot 31
Lot 32
8" sewer pipe encased in 80 L.F. 12" C.M.P. under Highway R.O.W.
SEWER DESIGN FOR
ELK BEND
Nov. 1972
Scale: Hor. 1" = 100'
Ver. 1" = 10'
Sheet Number 3 of 9
FINISHED GRADE LINE
EXIST. GROUND LINE
8" @ 0.40%
SEE NEXT SHEET FOR CONTINUATION
SEWER INVERT GRADE ELEVATIONS
4570
4550
4530
60
0
20+00
22+00
24+00
26+00
28+00
30+00
32+00
34+00
36+00
38+00
40+00
42+00
44+00
46+00
48+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
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15+00
16+00
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KEUFFEL & ESSER CO.
46 7008 ALBANENE® TRACING PAPER
MADE IN U.S.A.

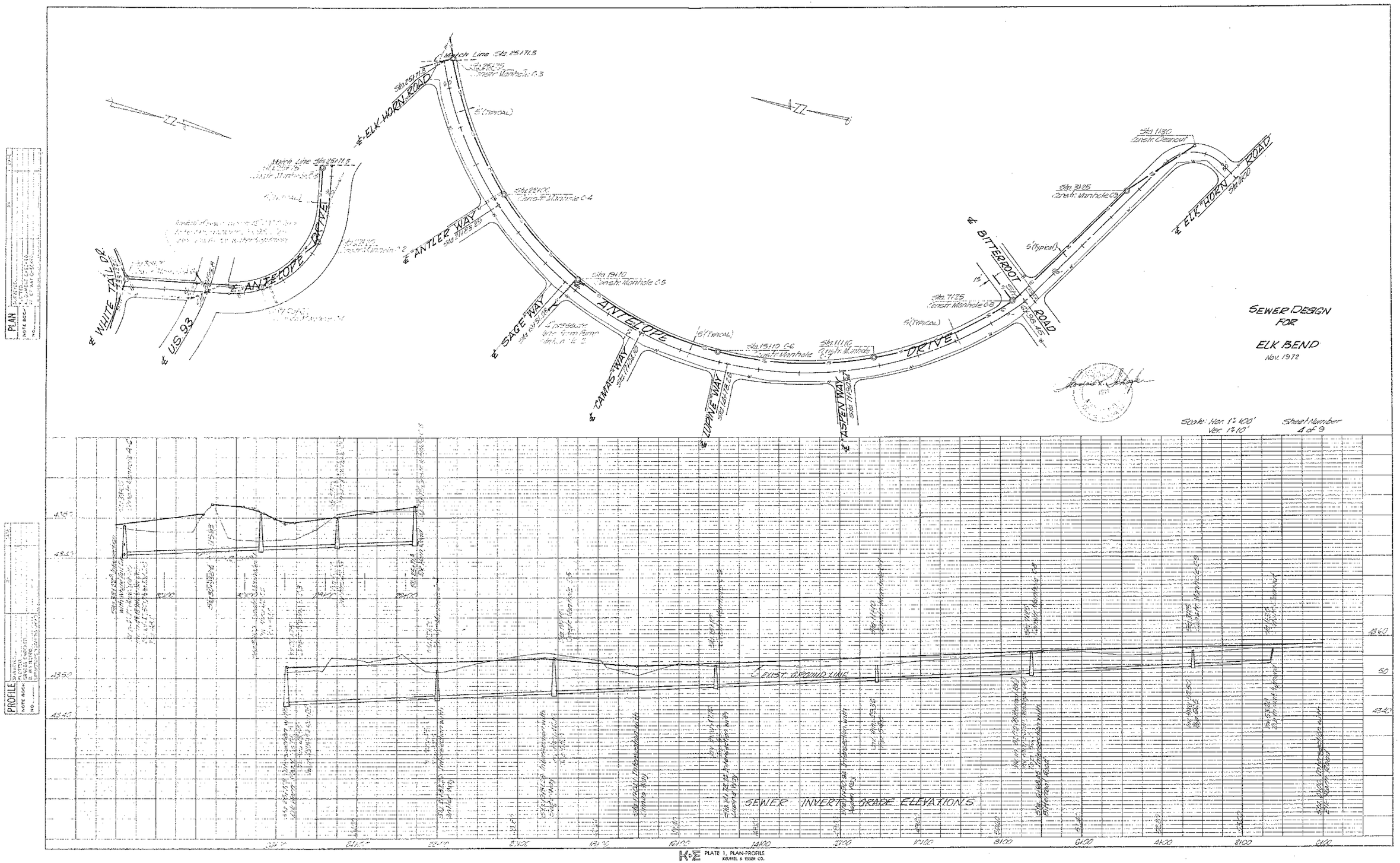
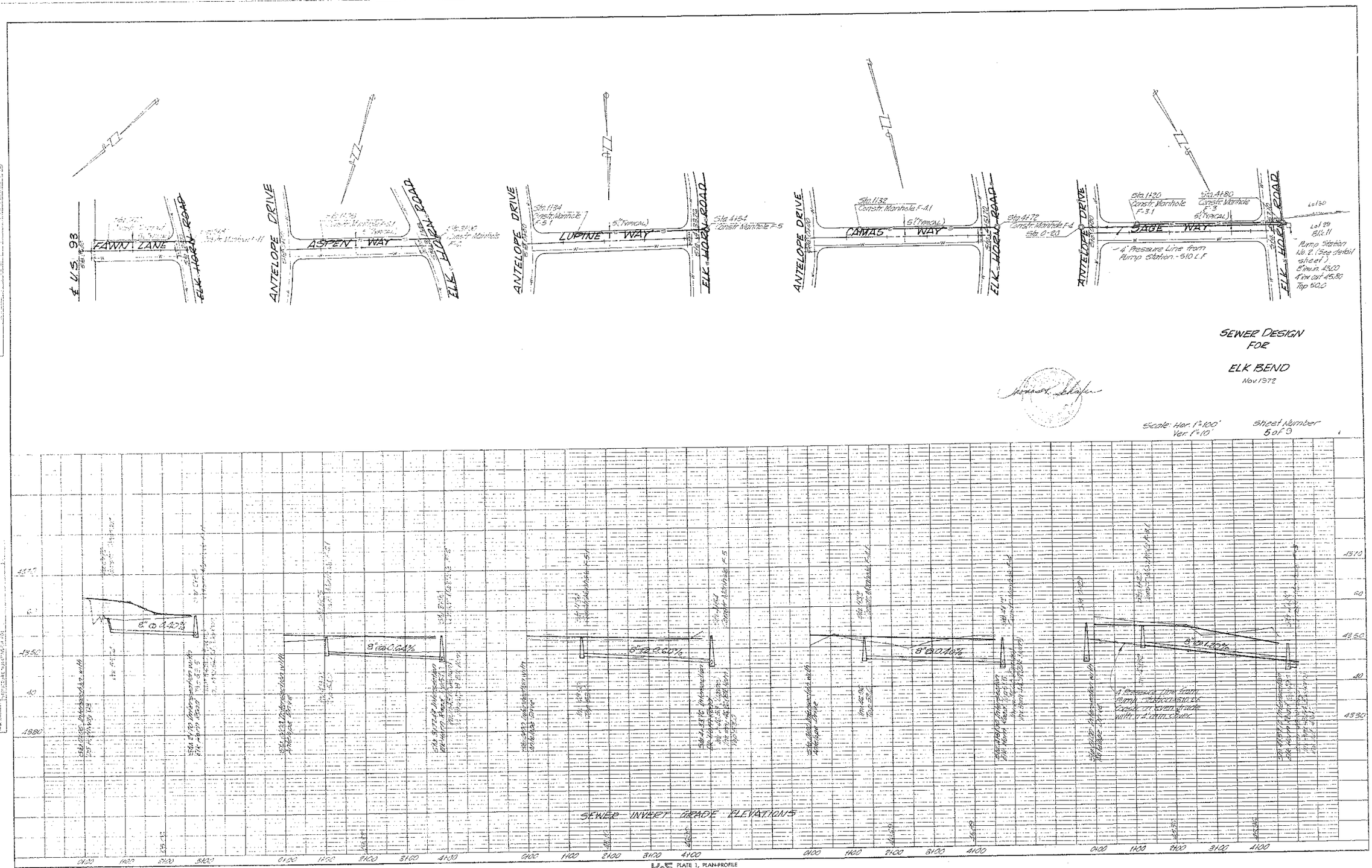


PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.
48 7008 ALBANENE® TRACING PAPER



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KEUFFEL & ESSER CO.

48 7005 ALBANENE® TRACING PAPER
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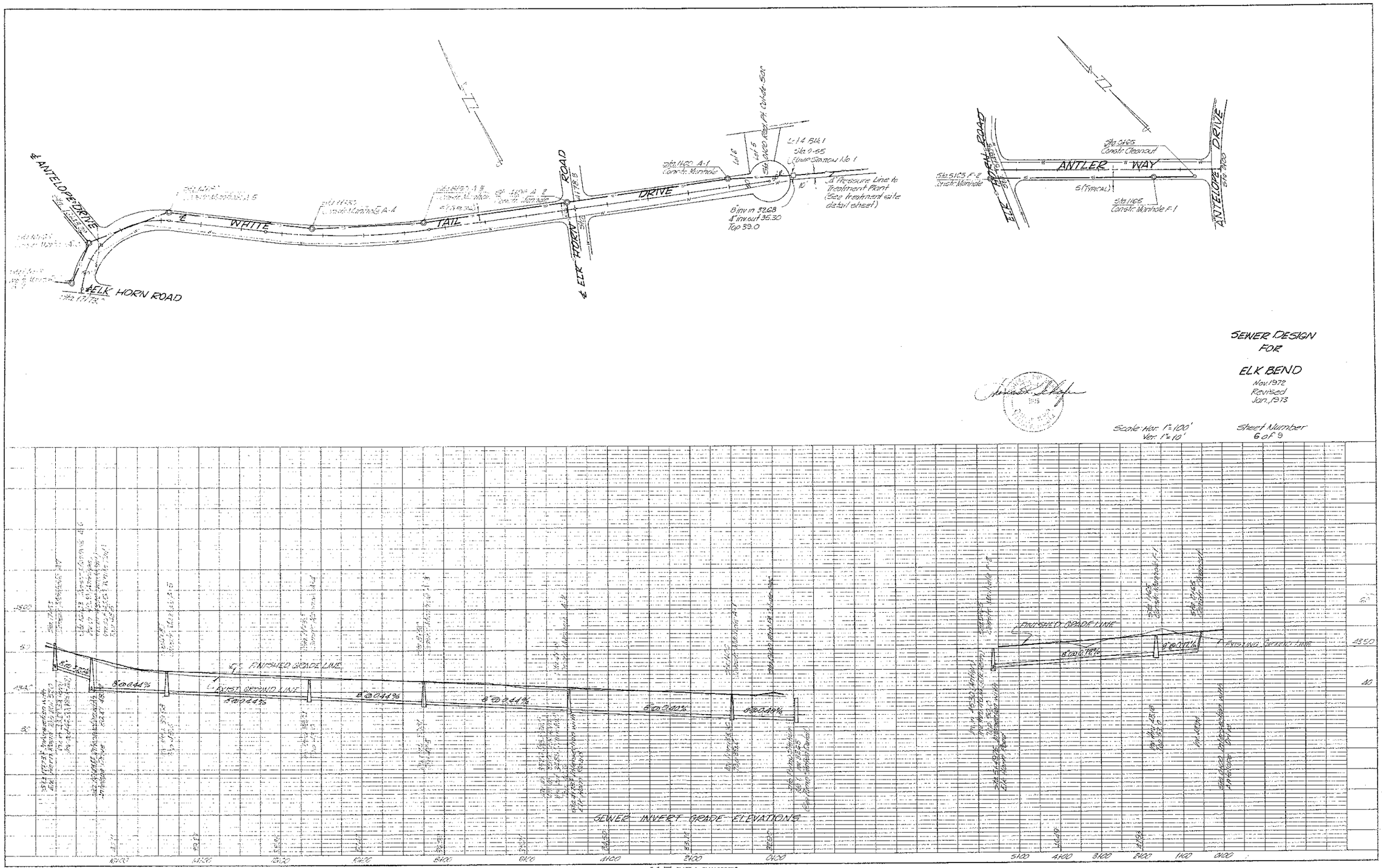
PLAN
PROFILE
ANTELOPE DRIVE
ELK HORN ROAD
WHITE TAIL DRIVE
ELK HORN ROAD
Sta 1+20 A-1
Const. Manhole
Lot 6
Lot 5
Sta 0+00 Begin PL Const. Sta.
L-14 Blk 1
Sta 0+55
Lift Station No 1
Pressure Line to Treatment Plant (See treatment site detail sheet)
8" inv in 32.68
4" inv out 36.30
Top 39.0
Sta 5+65
Const. Cleanout
ANTLER WAY
Sta 5+65 F-2
Const. Manhole
5' (Typical)
Sta 1+65
Const. Manhole F-1
ELK HORN ROAD
ANTELOPE DRIVE
FINISHED GRADE LINE
EXISTING GROUND LINE
8" @ 0.44%
8" @ 0.77%
8" @ 0.77%
SEWER INVERT GRADE ELEVATIONS
4150
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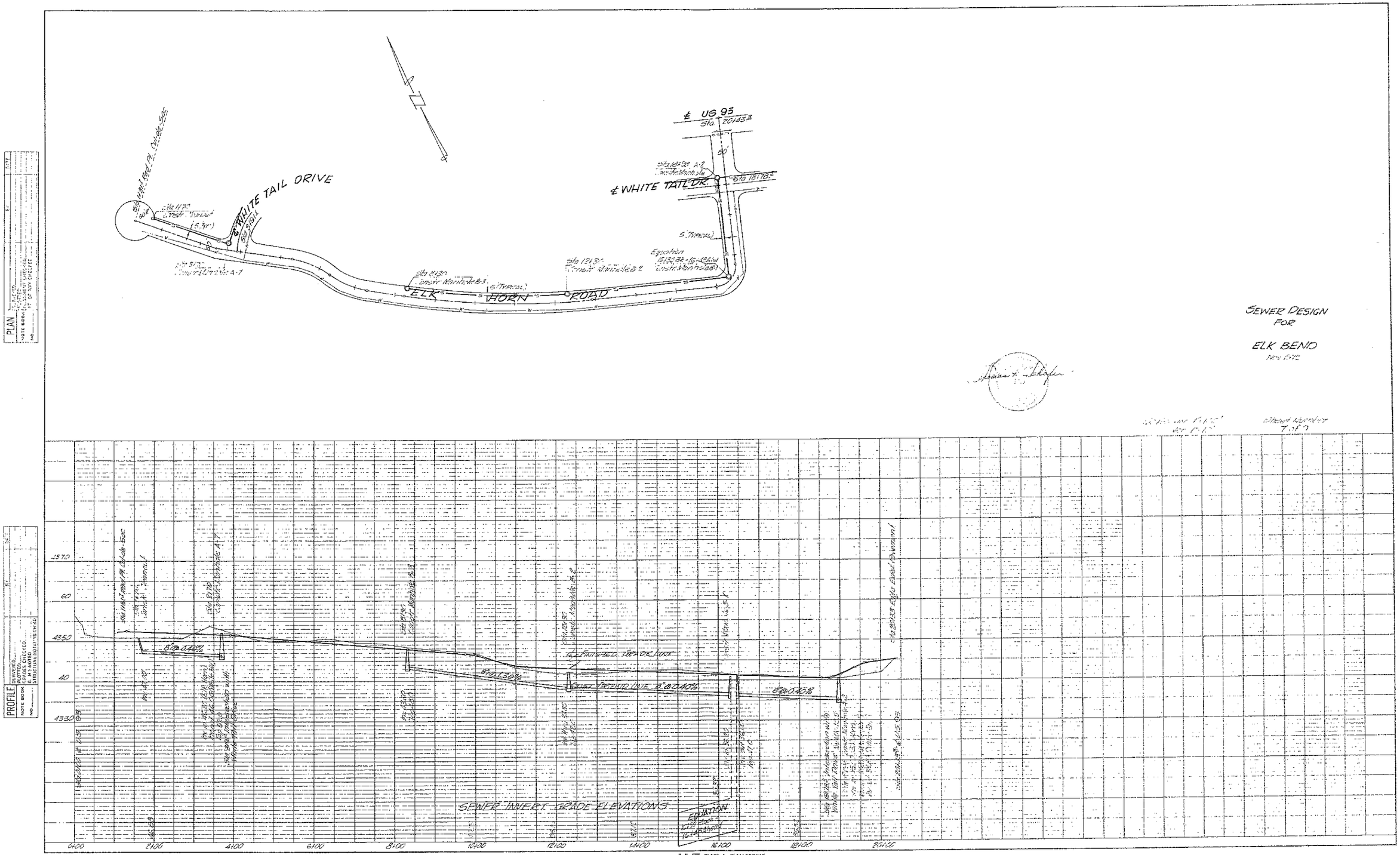
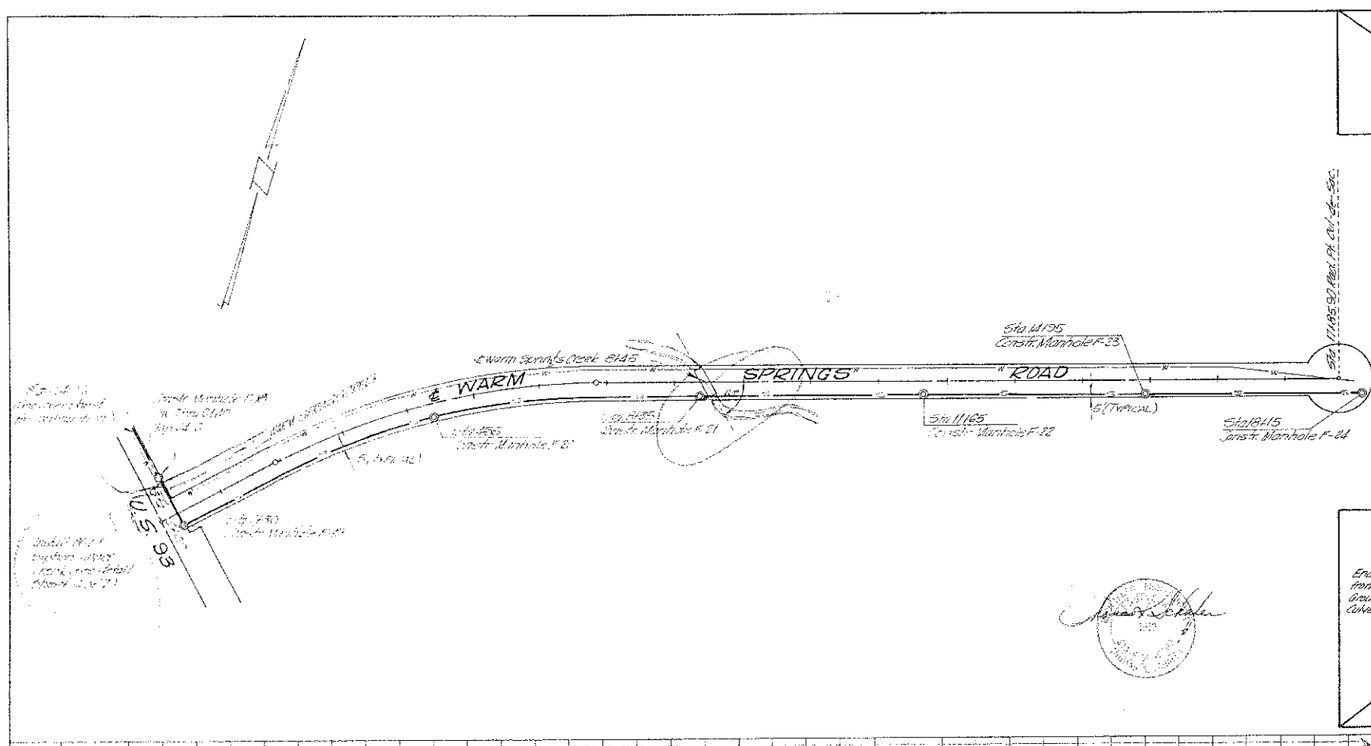
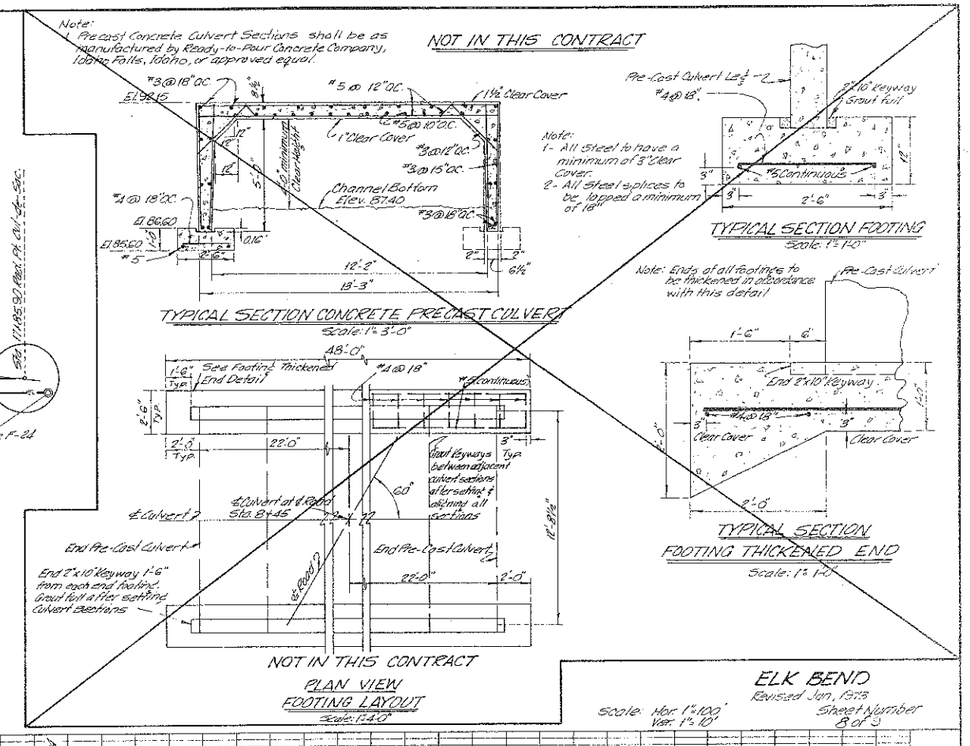


K+E PLATE 1, PLAN-PROFILE
EQUFEL & ESSER CO.

46 7008 ALBANENE TRACING PAPER



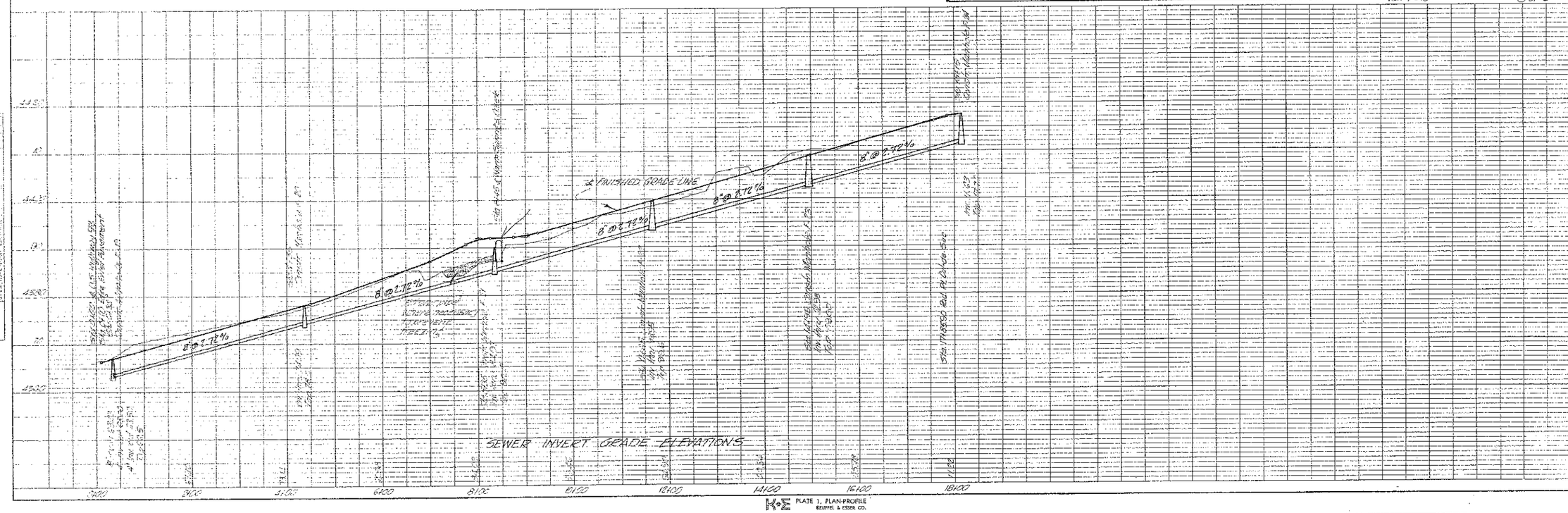
PLAN



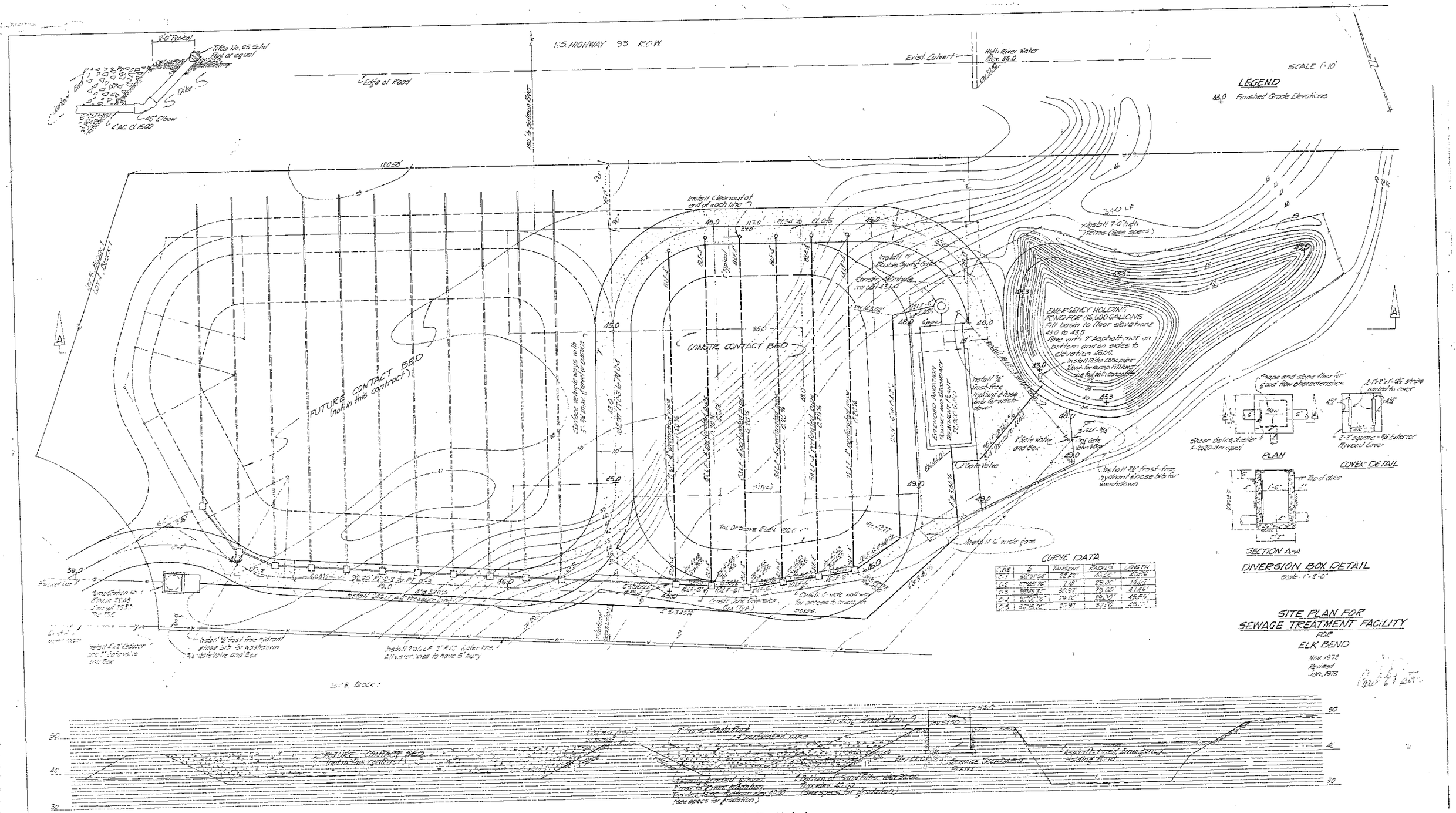
ELK BEND
Revised Jan. 1973
Sheet Number 8 of 9

Scale: Hor. 1" = 100'
Ver. 1" = 10'

PROFILE



K+E PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.
48 7008 ALBANENE® TRACING PAPER MADE IN U.S.A. 1960


U.S. HIGHWAY 93 R.O.W.
Edge of Road
Exist Culvert
High River Water Elev. 36.0
SCALE 1"=10'
LEGEND
48.0 Finished Grade Elevations
Install Cleanout at end of each line
Install 12" Double Swing Gate
Install 7'-0" high Fence (see specs)
EMERGENCY HOLDING POND FOR 65,500 GALLONS
Fill basin to floor elevations 43.0 to 43.5
Line with 8" Asphalt mat on bottom and on sides to elevation 48.00
Install 18" conc. pipe (Vent for sump. Fill below pipe with concrete)
CONSTR. CONTACT BED
FUTURE CONTACT BED (not in this contract)
Install 3/4" frost-free hydrant & hose bib for wash-down
Gate Valve and Box
Install 6" wide gore
Toe Of Slope ELEV. 36.0
Install 2" frost free hydrant & hose bib for washdown
3/4" Gate Valve and Box
Install 290 LF 3" PVC water line (Water line to have 6' bury)
Install 2" Balcomb and 2" Gate Valve and Box
Pump Station No. 1
Shape and slope floor for good flow characteristics
Shear Plate & Anchor 2-3/8"-11 x 4" each
PLAN
2-1'-2" x 1'-5½" strips nailed to cover
2-2' square - ⅝" Exterior Plywood Cover
COVER DETAIL
Tapered dike
SECTION A-A
DIVERSION BOX DETAIL
Scale: 1"=2'-0"
CURVE DATA
SITE PLAN FOR SEWAGE TREATMENT FACILITY FOR ELK BEND
Nov 1978
Revised Jan. 1979
FUTURE CONTACT BED (not in this contract)
Existing Ground Line
Sewage Treatment Plant
Asphalt Lined Emergency Holding Pond
SECTION A-A
Scale: Hor. 1"=15'-0" Ver. 1"=10'-0"
Sheet Number 3 of 5

APPENDIX E. Wastewater Flow & Treatment Records

Wastewater Flow Summary
Wastewater Sampling - June 1, 2010
Wastewater Sampling - July 14, 2010
Wastewater Sampling - Sept 29, 2011

Elk Bend Sewer District - Population and Wastewater Flow Projections								
	Elk Bend Unit				Steelhead Bend Unit			
	2011	2021	2031	2051	2011	2021	2031	2051
Estimated EDUs	125	138	153	186	38	42	46	57
Estimated Year Round Population	75	83	92	112	26	29	32	39
Estimated Peak Population	200	221	244	298	50	55	61	74
Winter Average (gpd)	10,000	11,046	12,202	14,889	3,250	3,590	3,966	4,839
Annual Average (gpd)	16,330	18,038	19,926	24,313	5,150	5,689	6,284	7,668
Estimated Peak (gpd)	26,600	29,383	32,457	39,604	6,650	7,346	8,114	9,901

Elk Bend and Steelhead Bend Lift Station Summary

	LS#1			LS#2			SB		
	hr	event	Q (gpd)	hr	event	Q (gpd)	hr	event	Q (gpd)
05/08/09	3.8	114		2,626.8	19,728		309.7		
05/15/09	19.1	617	6,557.1				313.1		1,457.1
06/05/09	131.4	2,451	16,042.9	2,791.5	20,589	17,646.4	399.9	115	12,400.0
08/04/09	311.0	8,941	8,980.0	3,127.2	22,249	16,785.0	620.3	1,049	11,020.0
03/15/10	1,047.4	17,337	9,906.7	3,826.2	25,941	9,403.6			
03/16/10	1,050.5	17,346	9,300.0	3,829.4	25,959	9,600.0	848.6	2,108	3,057.6
03/17/10	1,055.1	17,349	13,800.0	3,832.8	25,978	10,200.0	849.4	2,119	2,400.0
03/18/10	1,061.4	17,352	18,900.0	3,835.5	25,995	8,100.0	849.8	2,122	1,200.0
03/19/10	1,067.8	17,354	19,200.0	3,839.0	26,015	10,500.0	850.1	2,126	900.0
08/01/11	4,309.1	18,552	19,447.8	6,550.0	26,785	16,266.0	3,446.7	34,743	15,579.6
08/06/11	4,346.7	18,580	22,560.0	6,556.9	26,813	4,140.0	3,450.4	34,574	2,220.0
08/12/11	4,382.9	18,619	18,100.0	6,562.7	26,840	2,900.0	3,455.1	34,621	2,350.0
08/17/11	4,419.7	18,651	22,080.0	6,569.5	26,888	4,080.0	3,459.8	34,668	2,820.0
08/22/11	4,455.4	18,680	21,420.0	6,575.3	26,925	3,480.0	3,464.6	34,705	2,880.0
08/28/11	4,492.2	18,719	18,400.0	6,582.1	26,962	3,400.0	3,467.3	34,743	1,350.0
09/02/11	4,528.1	18,742	21,540.0	6,588.2	27,001	3,660.0	3,472.1	34,782	2,880.0
09/06/11	4,565.3	18,765	27,900.0	6,594.6	27,030	4,800.0	3,476.5	34,811	3,300.0
09/12/11	4,601.2	18,800	17,950.0	6,601.0	27,069	3,200.0	3,480.0	34,834	1,750.0
09/18/11	4,637.1	18,821	17,950.0	6,608.2	27,095	3,600.0	3,483.2	34,867	1,600.0
09/23/11	4,674.2	18,852	22,260.0	6,615.4	27,113	4,320.0	3,487.0	34,893	2,280.0
09/28/11	4,710.3	18,871	21,660.0	6,622.3	27,142	4,140.0	3,490.1	34,911	1,860.0
10/02/11	4,750.0	18,890	29,775.0	6,629.2	27,180	5,175.0	3,493.9	34,851	2,850.0
10/07/11	4,800.2	18,910	30,120.0	6,634.0	27,219	2,880.0	3,504.1	34,942	6,120.0
10/12/11	4,833.1	18,981	19,740.0	6,659.0	27,251	15,000.0	3,524.3	35,094	12,120.0
10/14/11	4,837.9	18,993	7,200.0	6,675.9	27,280	25,350.0	3,527.9	35,112	5,400.0
10/17/11	4,859.0	18,997	21,100.0	6,683.6	27,310	7,700.0	3,530.1	35,121	2,200.0
5/09 - 10/11			16,329.1			13,643.9			10,830.9
8/09-3/10			10,001.8			9,407.0			3,037.0
5/09-3/10			10,133.3			11,544.8			5,146.7
5/09-8/09			10,811.1			17,059.1			11,377.8
8/09-8/11			16,539.8			14,056.1			11,598.8
8/11-10/11			21,424.7			5,205.2			3,249.4

Elk Bend LS#1

Q= 50 gpm

Date	Clock Hrs	Hour Reading	Event Reading	Hrs #	Event #	V (gal)	Q (gpd)
8/1/2011		43091	18552				
8/6/2011	120.0	43467	18580	376	28	112,800	22,560
8/12/2011	144.0	43829	18619	362	39	108,600	18,100
8/17/2011	120.0	44197	18651	368	32	110,400	22,080
8/22/2011	120.0	44554	18680	357	29	107,100	21,420
8/28/2011	144.0	44922	18719	368	39	110,400	18,400
9/2/2011	120.0	45281	18742	359	23	107,700	21,540
9/6/2011	96.0	45653	18765	372	23	111,600	27,900
9/12/2011	144.0	46012	18800	359	35	107,700	17,950
9/18/2011	144.0	46371	18821	359	21	107,700	17,950
9/23/2011	120.0	46742	18852	371	31	111,300	22,260
9/28/2011	120.0	47103	18871	361	19	108,300	21,660
10/2/2011	96.0	47500	18890	397	19	119,100	29,775
10/7/2011	120.0	48002	18910	502	20	150,600	30,120
10/12/2011	120.0	48331	18981	329	71	98,700	19,740
10/14/2011	48.0	48379	18993	48	12	14,400	7,200
10/17/2011	72.0	48590	18997	211	4	63,300	21,100
				344	28	103,106	21,235
							5408.682

Elk Bend LS#2

Q= 50 gpm

Date	Clock Hrs	Hour Reading	Event Reading	Hrs Count	Event Count	V (gal)	Q (gpd)
8/1/2011		65500	26785				
8/6/2011	120	65569	26813	69	28	20,700	4,140
8/12/2011	144	65627	26840	58	27	17,400	2,900
8/17/2011	120	65695	26888	68	48	20,400	4,080
8/22/2011	120	65753	26925	58	37	17,400	3,480
8/28/2011	144	65821	26962	68	37	20,400	3,400
9/2/2011	120	65882	27001	61	39	18,300	3,660
9/6/2011	96	65946	27030	64	29	19,200	4,800
9/12/2011	144	66010	27069	64	39	19,200	3,200
9/18/2011	144	66082	27095	72	26	21,600	3,600
9/23/2011	120	66154	27113	72	18	21,600	4,320
9/28/2011	120	66223	27142	69	29	20,700	4,140
10/2/2011	96	66292	27180	69	38	20,700	5,175
10/7/2011	120	66340	27219	48	39	14,400	2,880
10/12/2011	120	66690	27251	350	32	105,000	21,000
10/14/2011	48	66759	27280	69	29	20,700	10,350
10/17/2011	72	66836	27310	77	30	23,100	7,700
							5,552

Steelhead Bend LS

Q =	50	gpm					
Date	Clock hrs	Hour Reading	Event Reading	Hrs Read	Events	V (gal)	Q (gpd)
8/1/2011		34467	34743				
8/6/2011	120.00	34504	34574	37	-169	11,100	2,220
8/12/2011	144.00	34551	34621	47	47	14,100	2,350
8/17/2011	120.00	34598	34668	47	47	14,100	2,820
8/22/2011	120.00	34646	34705	48	37	14,400	2,880
8/28/2011	144.00	34673	34743	27	38	8,100	1,350
9/2/2011	120.00	34721	34782	48	39	14,400	2,880
9/6/2011	96.00	34765	34811	44	29	13,200	3,300
9/12/2011	144.00	34800	34834	35	23	10,500	1,750
9/18/2011	144.00	34832	34867	32	33	9,600	1,600
9/23/2011	120.00	34870	34893	38	26	11,400	2,280
9/28/2011	120.00	34901	34911	31	18	9,300	1,860
10/2/2011	96.00	34939	34851	38	-60	11,400	2,850
10/7/2011	120.00	35041	34942	102	91	30,600	6,120
10/12/2011	120.00	35243	35094	202	152	60,600	12,120
10/14/2011	48.00	35279	35112	36	18	10,800	5,400
10/17/2011	72.00	35301	35121	22	9	6,600	2,200
							3,374

MAGIC VALLEY LABS
210 Addison Ave / PO Box 1867
Twin Falls ID 83303-1867
Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
ELK BEND UNIT 1

P.O. BOX 1045
SALMON, ID 73467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:55 AM	**Received Time**	10:30 AM	INFLUENT-AESATION TANK	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1023011	BOD SM5210B	239	6/7/2010	JD
1023012	TSS SM2540D	229	6/4/2010	JD
1023013	TOTAL NITROGEN	21.2	6/7/2010	DB
1023014	TOTAL P EPA365.1	3.74	6/7/2010	SK
1023015	pH SM4500H+B	7.27	6/2/2010	MW
1023016	NITRATE/N EPA300.0	<0.30	6/3/2010	JF
1023017	NITRITE/N EPA300.0	<0.20	6/3/2010	JF
1023018	TKN PA1-DK03	21.2	6/7/2010	SK
1023019	FOG SM5520B	17.4	6/9/2010	JF

Signature **Report Date:** Monday, June 14, 2010

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Fax: (208) 734-2539

ROGER LANNI
ELK BEND UNIT 1

P.O. BOX 1045
SALMON, ID 73467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:57 AM	**Received Time**	10:30 AM	EFFLUENT DIV BOX	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1023021	BOD SM5210B	53	6/7/2010	JD
1023022	TSS SM2540D	74	6/4/2010	JD
1023023	TOTAL NITROGEN	26.0	6/7/2010	DB
1023024	TOTAL P EPA365.1	3.78	6/7/2010	SK
1023025	pH SM4500H+B	7.26	6/2/2010	MW
1023026	NITRATE/N EPA300.0	<0.30	6/3/2010	JF
1023027	NITRITE/N EPA300.0	<0.20	6/3/2010	JF
1023028	TKN PA1-DK03	26.0	6/7/2010	SK
1023029	FOG SM5520B	8.00	6/9/2010	JF

Signature **Report Date:** Monday, June 14, 2010

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Phone: (208) 733-4250
Fax: (208) 734-2539

ELK BEND UNIT 1

P.O. BOX 1045
SALMON, ID 83467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:55 AM	**Received Time**	8:30 AM	EFFLUENT DIV BOX	

Sample #	Test / Method Code	Results	Units	Date Analyzed	Analyst
711688831	TOTAL COLIFORM	830000	MPN/100ML	6/3/2010	JD

Brenda Ellis
Lab Supervisor
Report Date: Monday, June 07, 2010

MAGIC VALLEY LABS
210 Addison Ave / PO Box 1867
Twin Falls ID 83303-1867
Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:20 AM	**Received Time**	10:30 AM	INFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1023031	BOD SM5210B	310	6/7/2010	JD
1023032	TSS SM2540D	157	6/4/2010	JD
1023033	TOTAL NITROGEN	19.4	6/7/2010	DB
1023034	TOTAL P EPA365.1	2.55	6/7/2010	SK
1023035	pH SM4500H+B	7.30	6/2/2010	MW
1023036	NITRATE/N EPA300.0	<0.30	6/3/2010	JF
1023037	NITRITE/N EPA300.0	<0.20	6/3/2010	JF
1023038	TKN PA1-DK03	19.4	6/7/2010	SK
1023039	FOG SM5520B	18.1	6/9/2010	JF

Signature **Report Date:** Monday, June 14, 2010

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Phone: (208) 733-4250
Fax: (208) 734-2539

JUN 29 2010

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:19 AM	**Received Time**	10:30 AM	EFFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1023041	BOD SM5210B	36	6/7/2010	JD
1023042	TSS SM2540D	62	6/4/2010	JD
1023043	TOTAL NITROGEN	40.1	6/7/2010	DB
1023044	TOTAL P EPA365.1	5.31	6/7/2010	SK
1023045	pH SM4500H+B	7.27	6/2/2010	MW
1023046	NITRATE/N EPA300.0	<0.30	6/3/2010	JF
1023047	NITRITE/N EPA300.0	<0.20	6/3/2010	JF
1023048	TKN PA1-DK03	40.1	6/7/2010	SK
1023049	FOG SM5520B	16.6	6/9/2010	JF

Signature **Report Date:** Monday, June 14, 2010

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Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	6/1/2010	**Received Date**	6/2/2010	**Location**	
Collection Time	11:15 AM	**Received Time**	8:30 AM	EFFLUENT	

Sample #	Test / Method Code	Results	Units	Date Analyzed	Analyst
711688841	TOTAL COLIFORM	1550000	MPN/100ML	6/4/2010	JD

Brenda Ellis
Lab Supervisor
Report Date: Tuesday, June 08, 2010

MAGIC VALLEY LABS
210 Addison Ave / PO Box 1867
Twin Falls ID 83303-1867
Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
ELK BEND WASTEWATER

130 N AGATE DR
SALMON, ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:00 PM	**Received Time**	8:30 AM	ELK BEND INFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1033821	BOD SM5210B	44	7/20/2010	JD
1033822	TSS SM2540D	84	7/22/2010	JD
1033823	TOTAL NITROGEN	19.5	8/4/2010	SK
1033824	TOTAL P EPA365.1	3.11	7/10/2010	SK
1033825	pH SM4500H+B	7.21	7/15/2010	JF
1033826	NITRATE/N EPA300.0	<0.30	7/15/2010	JF
1033827	NITRITE/N EPA300.0	<0.20	7/15/2010	JF
1033828	TKN PA1-DK03	19.5	7/20/2010	SK
1033829	FOG SM5520B	5.8	7/30/2010	JF

Signature **Report Date:** Wednesday, August 04, 2010

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210 Addison Ave / PO Box 1867
Twin Falls ID 83303-1867
Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
ELK BEND WASTEWATER

130 N AGATE DR
SALMON, ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:00 PM	**Received Time**	8:30 AM	ELK BEND FINAL EFFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1033831	BOD SM5210B	26	7/20/2010	JD
1033832	TSS SM2540D	28	7/22/2010	JD
1033833	TOTAL NITROGEN	14.1	8/4/2010	SK
1033834	TOTAL P EPA365.1	2.02	7/10/2010	SK
1033835	pH SM4500H+B	7.27	7/15/2010	JF
1033836	NITRATE/N EPA300.0	<0.30	7/15/2010	JF
1033837	NITRITE/N EPA300.0	<0.20	7/15/2010	JF
1033838	TKN PA1-DK03	14.1	7/20/2010	SK
1033839	FOG SM5520B	7.7	7/30/2010	JF

Brenda Ellis

Signature **Report Date:** Wednesday, August 04, 2010

MAGIC VALLEY LABS
210 Addison Ave / PO Box 1867
Twin Falls ID 83303-1867
Phone: (208) 733-4250
Fax: (208) 734-2539

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:00 PM	**Received Time**	8:30 AM	STEEL HEAD BEND INFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1033841	BOD SM5210B	48	7/20/2010	JD
1033842	TSS SM2540D	18	7/22/2010	JD
1033843	TOTAL NITROGEN	15.0	8/4/2010	SK
1033844	TOTAL P EPA365.1	3.94	7/10/2010	SK
1033845	pH SM4500H+B	7.26	7/15/2010	JF
1033846	NITRATE/N EPA300.0	<0.30	7/15/2010	JF
1033847	NITRITE/N EPA300.0	<0.20	7/15/2010	JF
1033848	TKN PA1-DK03	15.0	7/20/2010	SK
1033849	FOG SM5520B	6.1	7/30/2010	JF

Signature **Report Date:** Wednesday, August 04, 2010

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Fax: (208) 734-2539

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:00 PM	**Received Time**	8:30 AM	STEELHEAD BEND FINAL EFFLUENT	

Sample #	Test / Method Code	Results in mg/L	Date Analyzed	Analyst
1033851	BOD SM5210B	31	7/20/2010	JD
1033852	TSS SM2540D	39	7/22/2010	JD
1033853	TOTAL NITROGEN	22.6	8/4/2010	SK
1033854	TOTAL P EPA365.1	3.94	7/20/2010	SK
1033855	pH SM4500H+B	7.60	7/15/2010	JF
1033856	NITRATE/N EPA300.0	<0.30	7/15/2010	JF
1033857	NITRITE/N EPA300.0	<0.20	7/15/2010	JF
1033858	TKN PA1-DK03	22.6	7/20/2010	SK
1033859	FOG SM5520B	7.5	7/30/2010	JF

Signature **Report Date:** Wednesday, August 04, 2010

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Fax: (208) 734-2539

ROGER LANNI
STEELHEAD BEND UNIT #2

130 N AGATE DR.
SALMON ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:15 PM	**Received Time**	8:30 AM	STEEL HEAD BEND	

Sample #	Test / Method Code	Results	Units	Date Analyzed	Analyst
711693621	TOTAL COLIFORM	>242000	MPN/100ML	7/16/2010	MW

Brenda Ellis
Lab Supervisor
Report Date: Thursday, July 22, 2010

MAGIC VALLEY LABS
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Fax: (208) 734-2539

ROGER LANNI
ELK BEND UNIT 1

AUG 12 2010

P.O. BOX 1045
SALMON, ID 83467

Collection Date	7/14/2010	**Received Date**	7/15/2010	**Location**	
Collection Time	1:00 PM	**Received Time**	8:30 AM	ELK BEND	

Sample #	Test / Method Code	Results	Units	Date Analyzed	Analyst
711693611	TOTAL COLIFORM	105000	MPN/1090ML	7/16/2010	MW

Brenda Ellis
Lab Supervisor
Report Date: Monday, July 19, 2010

IAS EnviroChem
3314 Pole Line Rd. • Pocatello, ID 83201
Phone: (208) 237-3300 • Fax: (208) 237-3336
email: iasec3308@iasenvirochem.com • www.iasenvirochem.com

Idaho Falls DEQ
Gregory Eager
900 N. Skyline, Suite B
Idaho Falls, ID 83402

Date Submitted: 09/29/2011
Date Reported: 10/06/2011

Certificate of Analysis

Sample Description: Elk Bend
Lab Tracking #: I109224-01
Sampling Date/Time: 09/28/11 16:00

Analyte	*Result*	*Units*	*Method*	*Analyzed*	*Analyst*
Ammonia as N	16.49	mg/L	4500 NH3 G	10/03/2011	BWH
Biochemical Oxygen Demand	48	mg/L	5210 B	09/29/2011	MPH
Nitrate as N	< 1.00	mg/L	300.0	09/30/2011	BWH
Total Kjeldahl Nitrogen	17.3	mg/L	351.2	10/05/2011	RP

ND = Not Detected
All solids are reported on a dry weight basis unless otherwise noted.

Brad W Hendricks For G. Ryan Pattie
Laboratory Director

Page 1 of 1

1109224
Idaho Falls DEQ
Received: 09/29/2011
AFH

IAS EnviroChem - 3314 Pole Line Rd • Pocatello, ID 83201
P: (208) 237-3300 F: (208) 237-3336 • Email: iasec3308@iasenvirochem.com

Company Name	IDAHO DEQ
Address	900 N Skyline DR
City	Idaho Falls
Phone	208-528-2650
Email	Gregroy.Eager@deq.idaho.gov
Send Bill or Receipt To:	tammy copeland, Admin Asst
Payment due with samples unless credit has been established	
Email Invoice to:	Gregory.Eager@deq,idaho.gov

☐ Cash ■ Bill ☐ Check# ____ ☐ PO # ____
☐ Other ____
Amount ____ Received by ____

Special Instructions

Two samples collected: One for analysis, the other is a backup sample if needed. (please discard and do not test if not needed)

Analyses Requested

SAMPLE INFORMATION

TRK # (Lab use)	Sample Description	Date/Time Collected	Number of Containers	AMMONIA	TKN	NITRATE	BOD											Comments
	Elk Bend 1	9/28, 16:00	1															
	Elk bend 2	9/28, 16:05	1															

RELINQUISHED BY
Signature: Greg Eager
Printed Name: Greg Eager
Date/Time: 9/29 9:47 am

RECEIVED BY
Signature: Steve Gu
Printed Name: Christopher
Date/Time: 092911 0947

Lab Use Only
Temp: 1.4°C
Labels and Chain Agree? YES NO
Container Sealed? YES NO

APPENDIX F. Financial Information

Elk Bend Sewer District Funding Scenario Evaluation
Elk Bend Sewer District - 2008 Budget
Elk Bend Sewer District - 2011 Budget
Elk Bend Sewer District – 2012 Budget

Elk Bend Sewer District Wastewater Improvements Funding Scenarios	
8/24/2012	-
Estimated Project Cost	$ 1,254,000
USDA-RD Alternative	
Grants	
CDBG (potential)	$ 500,000
Rural Development (30%)	$ 376,200
Loans	
Rural Development (70%)	$ 877,800
Estimated User Rate Impact	
Project Rate Impact	$37.42
Previous Rate Equivalent	$18.00
Adjusted Rate Equivalent	**$55.42**
IDEQ Alternative - 20yr	
Grants	
CDBG (potential)*	$ 500,000
SRF Principal Forgiveness	?
Loans	
IDEQ	$ 1,254,000
User Rates per EDU	
Rate Impact	$61.56
Previous Rate	$18.00
Adjusted Rate	**$79.56**
IDEQ Alternative - 30 yr	
Rate Impact	$46.33
Previous Rate	$18.00
	$64.33

*This analysis does not include potential $0.5 M CDBG.

Elk Bend Wastewater Improvements Funding Scenarios

Elk Bend - Steelhead Bend Connector	$485,000
RGF Treatment Plant	$298,000
Lift Station Rehabilitation	$195,000
LSAS Expansion	$258,000
Nutrient-Pathogen Evaluation	$18,000
Total Preliminary Project Cost Estimate	**$1,254,000**

Anticipated Funding Sources	IDEQ		USDA-RD		IDEQ w/ 30 yr repay	
		w/ ICDBG		w/ ICDBG		w/ ICDBG
Idaho Community Development Block Grant*	$0	$450,000	$0	$450,000	$0	$450,000
USDA Rural Development Grant (30%)	$0	$0	$376,200	$241,200	$0	$0
USDA Rural Development Loan (70%) (30 yrs @ 2.5%)	$0	$0	$877,800	$562,800	$0	$0
IDEQ Loan (20 yrs @ 1.75%)	$1,254,000	$804,000	$0	$0	$1,254,000	$804,000
Total	**$1,254,000**	**$1,254,000**	**$1,254,000**	**$1,254,000**	**$1,254,000**	**$1,254,000**
Proposed Wastewater Budget Increase						
Loan Payback (estimated annual payment)	$74,853	$47,992	$41,939	$26,889	$54,085	$34,676
O&M Cost Increase	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Reserve Fund Increase (10% of payment per year)	$7,485	$4,799	$4,194	$2,689	$5,408	$3,468
Total Increase	$92,338	$62,791	$56,133	$39,578	$69,493	$48,144
Number of Equivalent Dwelling Units (EDU)	125	125	125	125	125	125
Current User Rate	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Monthly Increase per EDU	$61.56	$41.86	$37.42	$26.39	$46.33	$32.10
New Monthly Rate per EDU	**$61.56**	**$41.86**	**$37.42**	**$26.39**	**$46.33**	**$32.10**
30 year Total Cost	**$1,946,762**	**$1,355,818**	**$1,683,994.03**	**$1,187,345.45**	**$1,489,863.68**	**$1,062,879.11**

JUL-25-2008 12:00 From:THE RECORDER HERALD 2087562222 To:2082382162 P.1/1

ltc

NOTICE OF BUDGET MEETING FOR THE ELK BEND SEWER DISTRICT

Notice is hereby given that a meeting of the Board of Directors a qualified vectors of the above named District will be held the 4th day of August 2008 at the hour of 1:00pm at the Meeting Room at Salmon River RV Park, Elk Bend, Lemhi County, Idaho. At this meeting there shall be a Public Hearing on the Maintenance and Operational Budget for the coming fiscal year.

The budget as presently determined by the Board of Directors is now available at the Elk Bend Fire Hall #1 Bulletin Board and will remain available until the hearing as provided by law.

The budget meeting is pursuant to Section 42-3229 Idaho Code.

Dated this 14th day of July 2008

Eleanor Wisner
Elk Bend Sewer District
Lemhi County, Idaho

Elk Bend Sewer District General Fund Budget 2008

Revenues:

Estimated Elk Bend Sewer Levy	$19830.00
Estimated Interest & Delinquent Taxes	$6,000.00
	$25,833.00

Expenditures:

Payroll	$ 10,525.00
Payroll Taxes	$ 1200.00
Utilities	$ 4246.00
Chemicals & Tests	$ 491.00
Insurance	$ 38820.00
Travel	$ 827.00
Repair & Maintenance	$ 4412.00
Administration & Legal	$ 247.00
	$25,833.00

ltc 7/31/08

From:The UPS Store #4740 623 925 4761 01/09/2012 12:51 #621 P.002/002

NOTICE OF BUDGET MEETING FOR THE ELK BEND SEWER DISTRICT

Notice is hereby given that a meeting of the Board of Directors a qualified vectors of the above named District will be held the 25th day of June, 2011 at the hour of 1:00 pm at the QRU Building in Unit One, Elk Bend, Lemhi County, Idaho. At this meeting there shall be a Public Hearing on the Maintenance and Operation Budget for the coming fiscal year.

The budget as presently determined by the Board of Directors is now available at the Elk Bend Fire Hall #1 Bulletin Board and will remain available until the hearing as provided by law.

The budget meeting is pursuant to Section 42-3229 Idaho Code.
Dated this 6th day of May 2011
Eleanor Wisner
Elk Bend Sewer District
Lemhi County, Idaho

Elk Bend Sewer District General Fund Budget 2009

Revenues:
Estimated Elk Bend Sewer Levy
$21,037.00
Estimated interest & Delinquent Taxes
$ 6,000.00
$27,037.00

Expenditures:	
Payroll	$10,525.00
Payroll taxes	1,200.00
Utilities	2,900.00
Chemical Tests	5,708.00
Insurance	3,630.00
Travel	827.00
Repair & Maintenance	2,000.00
Administration & Legal	247.00
	$27,037.00

NOTICE OF BUDGET MEETING FOR THE ELK BEND SEWER DISTRICT

Notice is hereby given that a meeting of the Board of Directors a qualified vectors of the above named District will be held the 22nd of June 2012 at the hour of 10:00am at the QRU Building, Elk Bend, Lemhi County, Idaho. At this meeting there shall be a Public Hearing on the Maintenance and Operations Budget for the coming fiscal year.

The budget as presently determined by the Board of Directors is now available at the Elk Bend Fire Hall #1 Bulletin Board and will remain available until the hearing as provided by law.

The budget meeting in pursuant to Section 42-3229 Idaho Code.
Dated this 15th of May 2012
Eleanor Wisner
Elk Bend Sewer District
Lemhi County, Idaho

Elk Bend Sewer District General Fund Budget 2012

Revenues:	
Estimated Elk Bend Sewer Levy	$ 21,848.00
Estimated Interest and Delinquent Taxes	$ 6,000.00
Total	$ 27,848.00
Expenditures:	
Payroll	$ 10,625.00
Payroll Taxes	$ 1,200.00
Utilities	$ 2,900.00
Chemical Tests	$ 5,708.00
Insurance	$ 3,630.00
Travel	$ 827.00
Repair and Maintenance	$ 2,711.00
Administration and Legal	$ 247.00
Total	$ 27,848.00

APPENDIX G. Agency Involvement

October 26, 2007 IDEQ Letter - Elk Bend Sewer District Failed Wastewater System Response Plan

November 7, 2007 Elk Bend Temporary Disposal Area Plan and Permit

June 4, 2008 Elk Bend Sewer District - Reply to Letter from DEQ, October 26, 2007

January 6, 2009 IDEQ Letter - Consent Order

March 3, 2010 IDEQ Letter - March 15 Sewage on Ground Incident...

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402 • (208) 528-2650

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

October 26, 2007

Glen Ross, President
Elk Bend Sewer District
111 Whitetail Dr.
Salmon, Idaho 83467

ELK BEND SEWAGE DISTRICT FAILED WASTEWATER SYSTEM RESPONSE PLAN

Dear Mr. Ross,

During our meeting at the Elk Bend Sewage District on October 10, 2007, we understood that the District was going to submit a plan to address the failed wastewater disposal bed and mitigate the public health hazard of the open sewage. I or Steve Adams did not receive a plan from the District.

As discussed, the District needs to develop a short term solution of the failed disposal system and long term solution to the dilapidated wastewater treatment plant and a suitable site for subsurface wastewater application. Ponding of open sewage effluent meets the definition of a failed system, as defined by the State of Idaho subsurface sewage disposal regulations, IDAPA 58.01.03.003.13.

Mitigation of the failed wastewater system discussed during our meeting included:

1. During the site visit, raw sewage was being discharge to the overflow line and bypassing the wastewater treatment plant. Do not discharge raw sewage directly into the overflow pond. Connect a separate discharge line from the wastewater treatment plant effluent to the overflow so the wastewater can be treated and chlorinated at the plant before discharging to the overflow pond.

2. The effluent from the wastewater treatment plant discharging to the disposal bed should not be chlorinated because chlorine will inactivate the organisms that provide treatment.

3. Eliminate the cross connection hazard to the water system by removing the frost free hydrant that is adjacent to the overflow pond.

4. Develop a plan to rehabilitate the existing drainfield and submit a copy to DEQ and Steve Adams, EIPHD. A permit is required to work on the drainfield.

5. The District needs to contract with a licensed installer for the repair of the drainfield. A Distribution Box (s) on the influent line to the drainfield needs to be installed so wastewater flow is distributed evenly. The drainfield lines should be placed as close to the ground surface to achieve separation from high groundwater and capped with soil.

6. The District can begin to excavate the rock cover of the drainfield to begin the rehabilitation of the drainfield. The excavated drain rock should be stockpiled with the addition of lime and allowed to dry out or hauled away to a site acceptable to DEQ. The District can pump the wastewater treatment plant out and haul the wastewater to the Challis wastewater treatment plant during rehabilitation of the drainfield. The basin of the plant can serve as wastewater storage while work is performed on the drainfield.

7. A location and method of disposal for the drainfield sludge needs to be proposed to DEQ. To assist drying out the drainfield, pump out the wastewater from the observation ports if possible. The wastewater could be hauled to the Challis wastewater treatment plant or a site approved by DEQ for land application.

8. The fence should be posted to inform the public of the hazard and to keep them away from the site. Maintain the perimeter fence to ensure no animals or humans have access to the site

9. Hire an electrician to install a run time meter on each pump in the Elk Bend collection system to compile flow data. We understand there are 4 pumps needing meters.

The District needs to begin to collect data that will assist with the management of the system as well as provide critical information on a design of a new wastewater system.

Please submit an inventory of the population served by the District. For example, describe the number of total connections, commercial connections, full time residents and part time residents including occupancy rates. Please include the number of current buildable vacant lots within the District.

A monitoring program to determine the characteristics of the wastewater needs to be implemented. Parameters include BOD (Biochemical Oxygen Demand), TSS (total suspended solids), pH, Total Nitrogen, Total Phosphorous, Bacteria, and Fats, Oils and Grease (FOG). An initial sample should be taken immediately and a subsequent sampling plan will be negotiated with the District and DEQ.

I have made copies of the engineering drawings provided by your operator. I enclosed the original and two additional copies for your use. Please return the original set to Roger, District Operator.

Please contact me when you received this letter so we may discuss the District's plan of action to address their wastewater system needs. You can contact me at (208) 528-2650.

Sincerely,

Greg Eager, PE
Regional Manager Engineering

C: James Johnston, Regional Administrator
Steve Adams, EIPHD
Kellye Eager, EIPHD

11/07/2007 11:32 FAX 001

EASTERN IDAHO Public Health DISTRICT

ENVIRONMENTAL HEALTH
801 MONROE STREET, SALMON ID 83467
PHONE: (208)756-2122
FAX: (208)756-6600

FAX TRANSMISSION

DATE: 10/7/07

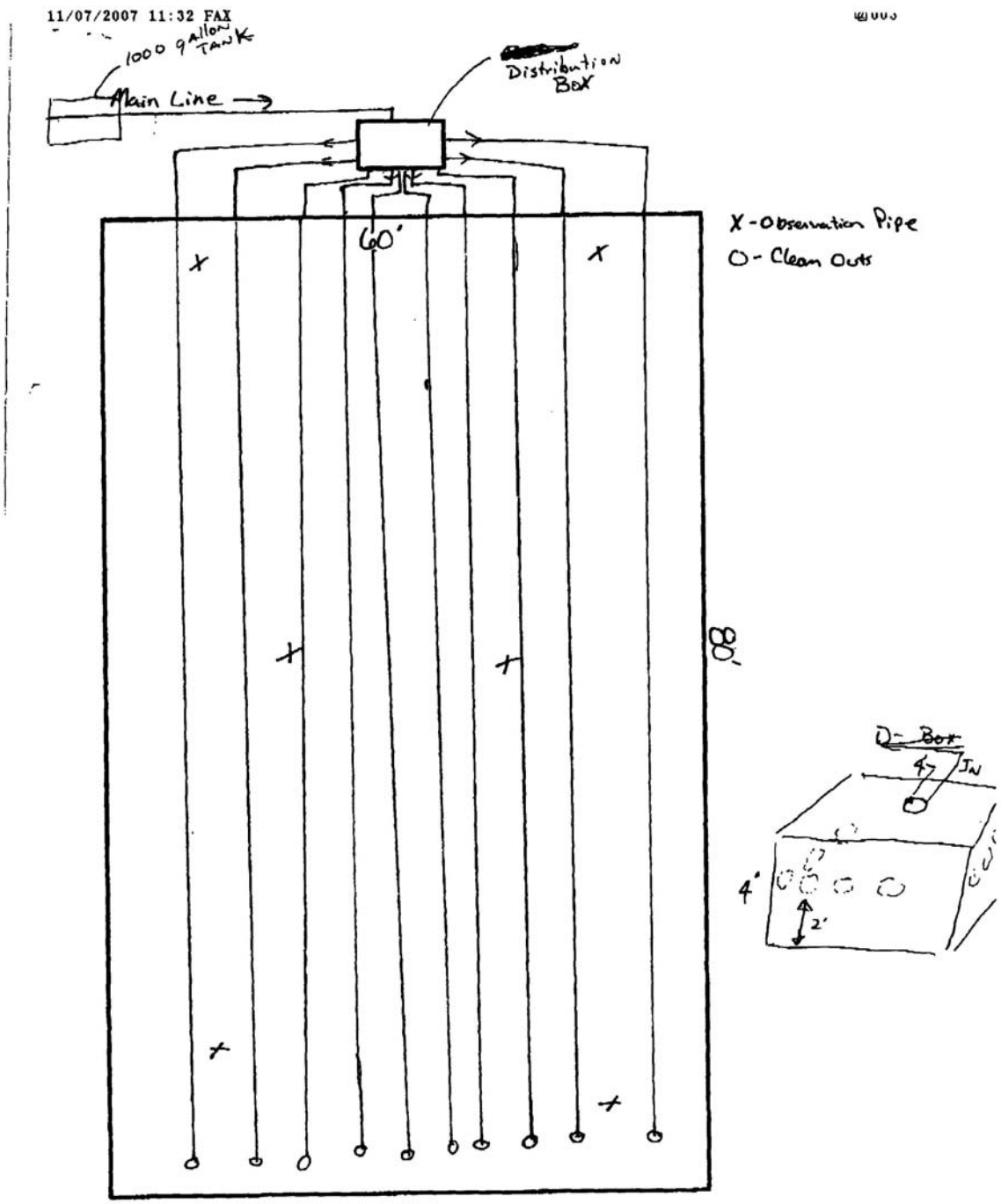
TO: Carlin

FROM: Steve

COVER PLUS 2 **PAGES**

COMMENTS:

ELK BEND'S TEMP
DISPOSAL AREA PLAN


11/07/2007 11:32 FAX
1000 gallon Tank
Main Line
[redacted]
Distribution Box
60'
X - Observation Pipe
O - Clean Outs
80'
D-Box
IN
4'
2'

EASTERN IDAHO PUBLIC HEALTH DISTRICT
SEPTIC PERMIT

NOTE *THIS PERMIT IS ONLY VALID FOR ONE YEAR FROM DATE OF ISSUE and IS NOT TRANSFERABLE*

Installation shall comply with all the requirements of Idaho's Individual Subsurface Sewage Disposal Regulations as stated below.
Failure to install the system in compliance with permit may be grounds for disapproval and may result in further legal action being taken.

CDP No_____ T-Code: 231 Time: 15 min Permit No 3007-76
Receipt No 85569-$1,012

Permit Issued To: Name Elk Bend Sewer District Phone (208)894-2204

For Location: Address 206 Aspen Way City Salmon Zip 83467

Legal Description: 1/4 Section NW/SE Section 10;15 Township 18N Range 21E

Subdivision Salmon River Estates Unit 1 Lot 4 Block 1

SEPTIC TANK SPECIFICATIONS (minimums)

Size of Septic Tank: N/A gallons

Pump Chamber (If required): N/A gallons

Multiple tank (If using or required): _____ Total gallons
First tank: _____ gallons Second tank: _____ gallons
ATU: Company: _____ Model: _____

SEWAGE DISPOSAL (DRAINFIELD) SPECIFICATIONS (minimums)

Type of *Standard & Basic Alternative* System Permitted:

Type of Complex Alternative System Permitted: *

**Note* A licensed complex installer is required to install a complex system. A homeowner cannot install complex systems.*

MAXIMUM DEPTH OF EXCAVATION: * Feet **DISPOSAL AREA SIZE:** * Sq. Ft.
SOIL TYPE: * **APPLICATION RATE:** * gals/day/ft2
DISTANCE TO NEAREST SURFACE WATER (explanation): Vested rights

SPECIAL CONDITIONS

INSPECTION REQUIRED BEFORE COVER

~~*-Permit is for replacement area after Treatment Plant.~~
Additional requirements are attached as per DEQ request.

I hereby agree that the system will be installed as per the permit and will not make any changes from the permit without written approval from Eastern Idaho Public Health District. I also hereby authorize access to this property for purpose of inspection.

Applicant/Agent Signature X Eleanor Wisner

ISSUED BY EHS Steve Adams #09 **Date Issued:** 12/7/07
Expiration Date: 12/7/08

Other requirements on reverse side of permit 1/2007

Addendum to Elk Bend Sewage Permit #3007-76

This addendum lists additional requirements of the above referenced sewage disposal permit. These requirements are both construction and operational.

Construction:

- Site is to be fenced to adequately prevent unauthorized entry.
- Add a septic tank with effluent filter prior to distribution box.
- Add a high water float and alarm to septic tank to signal blocked effluent filter.
- Install event counters and pump run time meters on all pump stations in the collection system.
- Move water hydrant away from by-pass pond.
- Add by-pass valve to treatment plant that allows treated effluent to by-pass drainfield and go to pond.

Operational:

- By-pass from lift station is to be stopped. Activated sludge tank is to be cleaned and the treatment unit activated. Chlorinated effluent is to be sent to pond until drainfield repaired.
- Monthly monitoring report to include the following information-
  - BOD of influent and effluent.
  - TSS of influent and effluent.
  - Total Nitrogen of influent and effluent
  - Pump run events and hour amounts of all lift station pumps in collection system
- Provide Department of Environmental Quality a yearly report that contains monthly reports and summarizes the results of the monthly data.

Eleanor Wisner — 12-12-07

Signature of authorized agent — Date

RECEIVED
JUN 11 2008
DEQ-IDAHO FALLS

Elk Bend Sewer District
206 Aspen Way
Salmon, ID 83467
(208) 894-2204

Mr. Greg Eager
Department of Environmental Quality
900 N. Skyline
Idaho Falls, ID 83402

June 4, 2008

RE: Reply to letter from DEQ, dated Oct. 26, 2007

Replies to individual concerns:

1. A separate discharge line from the wastewater treatment plant effluent to the overflow was treated and chlorinated at the plant.

2. Chlorination of the effluent was stopped.

3. The frost-free hydrant adjacent to the overflow pond was moved.

4. A plan to rehabilitate the existing drain field was developed, accomplished and plans are included. Mr. Adams has necessary paperwork to acquire said permit.

5. Mr. Chas Dahle, Dahle Construction, was hired and did required repair of the drain field. A distribution box was installed as per instructed and the drain field was capped with soil.

6. In accordance with instructions, the excavated rock was removed, stockpiled and treated with sufficient lime. The basin of the plant served as wastewater storage while work on the drain field was completed.

7. The drain field sludge was dried out and moved to a suitable location.

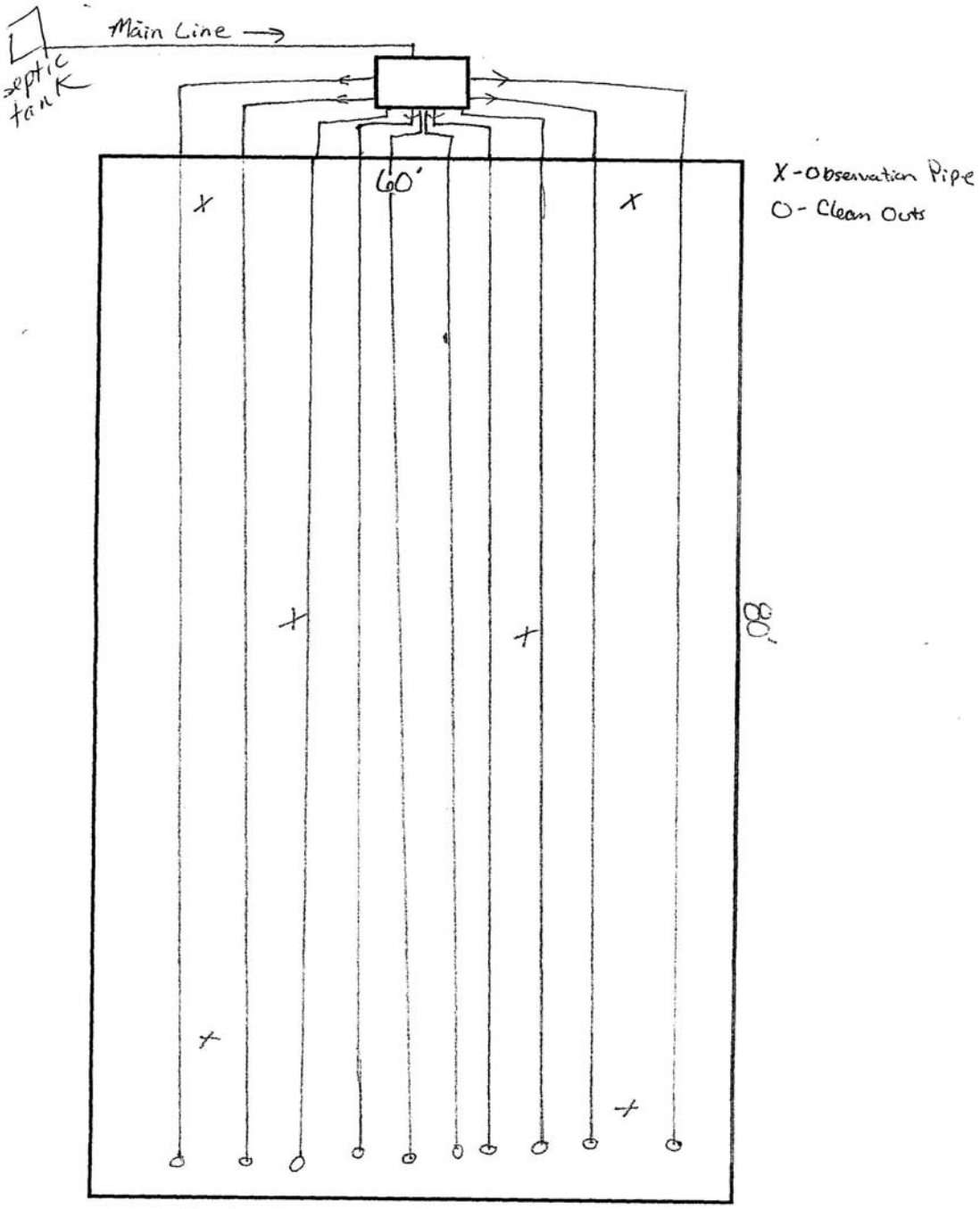
8. The fence is posted adequately to inform the public of hazards. The fence perimeter will be maintained so that no animals or humans can gain access.

9. Run meters are being installed on each pump to compile flow data. A 1500 gallon septic, with filter, was also installed prior to D-box, as per DEQ requests.

Sincerely,

Eleanor Wisner

Eleanor Wisner
Sec'y/Treas.
cc: Steve Adams


Main Line →
septic tank
60'
X - Observation Pipe
O - Clean Outs
80'

Geo textile with topsoil cap minimum of 6" deep
12" of 2" minus drain rock
6" of 3/8 washed pea gravel
2' of Sewer sand
6" of 3/8 washed pea gravel
2' or more of 2" minus drain rock

Dahle Construction proposes to repair the leach field at Elk Bend with the above drawing. We will remove the existing leach field, store that material in the existing compound, and cap over it with native soil on site. We will dig deep enough to insure that new native material is encountered in the bottom of the bed. ~~Six~~ 9 4" laterals will be connected to a distribution box to ensure that equal distribution occurs throughout the drain bed.

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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

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

January 6, 2009

Certified mail no.:7000 0520 0016 4834 2147

Glen Ross, President
Elk Bend Sewer District
111 Whitetail Dr.
Salmon, Idaho 83467

Dear Mr. Ross:

Enclosed for your file is the fully executed consent order regarding the Notice of Violation issued March 7, 2008. Please bear in mind that this is a legal agreement between the Department of Environmental Quality (DEQ) and Elk Bend Sewer District. If difficulties arise such that a required item in the consent order cannot be met by the stipulated date, please contact DEQ as soon as possible.

Thank you for your continued cooperation in this matter and if you have any questions, please contact Tom Rackow at 208-528-2650.

Sincerely,

Barry N. Burnell

Barry N. Burnell
Water Quality Division Administrator

Enclosure

BNB:OC:bmc

c: Courtney Bebee, Attorney General
Richard Huddleston, DEQ State Office
Olga Cuzmanov, DEQ State Office
Greg Eager, DEQ Idaho Falls Regional Office
Tom Rackow, DEQ Idaho Falls Regional Office
Kellye Eager, EIPHD Idaho Falls Office

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

In the matter of:	)	
	)	CONSENT ORDER
Elk Bend Sewer District	)	Idaho Code § 39-105 and § 39-108

1. Pursuant to the Idaho Environmental Protection and Health Act (EPHA), Idaho Code § 39-105 and § 39-108 the Idaho Department of Environmental Quality (Department) and Elk Bend Sewer District (EBSD) enter into this Consent Order.

2. The EBSD is a small community village located along the banks of the Salmon River between the Cities of Salmon and Challis located at 111 Whitetail Dr., Salmon, Idaho. EBSD installed an activated sludge package wastewater treatment plant (WWTP) between 1972 and 1974. The WWTP discharged its effluent to a Large Soil Absorption System (LSAS).

3. On August 31, 2007 in response to a citizen complaint of raw Sewage on the Ground (SOG), the Eastern Idaho Public Health District (EIPHD) conducted a site investigation at the EBSD. It appeared that the drainfield had failed with sewage ponding and causing an offensive odor and unsightly appearance. EIPHD and the Departments' Idaho Falls Regional Office personnel conducted a site visit on October 10, 2007. During the investigation, the Department determined that the WWTP was not operating as designed, was consistently bypassed, no monitoring was being performed to ensure the efficient operation of the plant. It was also observed that the WWTP was not in good repair and the WWTP operator is not currently licensed.

4. By Notice of Violation (NOV) dated March 7, 2008, the Department notified EBSD of four (4) violations IDAPA 58.01.03, 58.01.11, and 58.01.16. The NOV is incorporated by reference into this Consent Order. The NOV provided EBSD an opportunity for a compliance conference to discuss the violations and enter into a consent order. A compliance conference was held on April 30, 2008. During the compliance conference representatives from EBSD discussed the status of the temporary sewage disposal (drainfield) installed to address the failed wastewater disposal system and mitigate the public health hazard of open sewage.

5. EBSD hereby agrees to the provisions of this Consent Order and the following terms and actions to be completed by the time schedules set forth below:

a. On or before June 16, 2008, EBSD shall enter into an agreement to accept the wastewater grant offered by the Department, for the development of a Facility Plan that identifies a long term solution for the sewage treatment and disposal. Prior to that date, an Operating and Maintenance (O&M) Manual shall be prepared for the current collection and treatment system.

b. On or before June 16, 2008, EBSD shall prepare a written response to the Departments' letter dated October 26, 2007 regarding the "Elk Bend Sewage District failed wastewater system response plan" addressing all the requirements raised throughout the letter. A copy of the letter shall be sent to Steve Adams of EIPHD.

c. On or before June 16, 2008, EBSD shall present to the Department a report documenting of the completion of the temporary drainfield repairs. The Department will perform a final inspection of the new temporary installed system no later than June 30, 2008.

d. By June 30, 2008, a monitoring program of the current WWTP shall be developed by EBSD and monthly monitoring reports shall be submitted to the Department. Following are the parameters that shall be measured for the influent and effluent and shall be included in the monitoring program: BOD_5 (5-Day Biochemical Oxygen Demand), TSS (Total Suspended Solids), pH, Total Nitrogen, Total Phosphorous, Bacteria and FOG (Fats, Oils and Grease). Pump run events and hour amounts of all lift station pumps in collection system shall also be included in the monthly reports.

e. By August 1, 2008, EBSD shall employ or have on contract a Responsible Charge Operator (RCO) and shall designate a Substitute Responsible Charge Operator (SRCO).

f. On or before December 1, 2008, EBSD shall present to the Department a Financial Management Plan evaluating the strategy of acquiring the needed funds to develop the long term options and solution for treatment of the sewage.

6. A civil penalty of THIRTEEN THOUSAND ONE HUNDRED TWENTY FIVE DOLLARS ($13,125) was assessed in the NOV. Based on discussions and information provided during the compliance conference the Department decision was to waive the penalty in its entirety. However, if EBSD does not comply with the terms of the Consent Order, the Department may seek collection of the full penalty amount.

7. All correspondence required of EBSD by this Consent Order shall be addressed to:
Greg Eager, P.E., Acting Regional Administrator
Idaho Department of Environmental Quality
900 N. Skyline
Idaho Falls, ID 83402

Consent Order - 2

All correspondence required of the Department by this Consent Order shall be addressed to:

Glen Ross, President
Elk Bend Sewer District
111 Whitetail Dr.
Salmon, Idaho 83467

8. This Consent Order shall not relieve EBSD from his obligation to comply with any relevant provisions of Idaho's Individual/ Subsurface Sewage Disposal Rules, IDAPA 58.01.03 et seq., Idaho's Wastewater Rules, IDAPA 58.01.16 et seq., Idaho's Ground Water Quality Rules, IDAPA 58.01.11 et seq. or applicable local, state or federal law.

9. This Consent Order shall bind EBSD, his successors and assigns until such time as the terms of the Consent Order are met, and the Department provides EBSD with written notice of Consent Order termination.

10. EBSD expressly recognizes failure to comply with the terms of this Consent Order may result in a district court action for specific performance of the Consent Order, civil penalties, assessment of costs and expenses, attorney's fees, restraining orders, injunctions and other relief available under Idaho Code § 39-108.

11. The Department and EBSD, through the undersigned representatives, each represent and warrant that each has the authority to enter into this Consent Order and to take all actions provided herein.

12. The effective date of this Consent Order shall be the date of the signature by the Director of the Department of Environmental Quality.

DATED this 2nd day of June, 2008

Toni Hardesty, Director
Department of Environmental Quality

DATED this 25 day of May, 2008

Glen Ross, President
Elk Bend Sewer District

Consent Order - 3

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402 • (208) 528-2650

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

March 18, 2010

Glen Ross, President
Elk Bend Sewer District
111 Whitetail Drive
Salmon, ID 83467

March 15th Sewage on the Ground Incident from Agate Drive Lift Station, Steelhead Bend Unit 2

Dear Mr. Ross:

On the morning of March 15, 2010, DEQ received a complaint from a Steelhead Bend property owner regarding sewage on the ground adjacent to the lift station and the Salmon River. I arrived at the lift station located on the cul-de-sac on Agate Road in the afternoon.

The lift station did not have a pump. A soft trickling sound of liquid flow was heard. A corrugated hose was observed to have one end in the wet well, and the discharge end located in a heavily vegetative area of shrubs and grasses.

The hose discharge was not flowing because of a pump was not attached. The area smelled of sewage. The area below the hose discharge was saturated and ponded with sewage. It appeared the sewage was present for several days. A coliform sample was collected at a very small ponded patch immediately to the discharge. The lab reported the fecal count as "too numerous to count." The perimeter of the ponded and saturated area was circumvented by foot. The bank of the Salmon River was 25 paces away from the saturated area. The bank consisted of willows, grasses and approximately 3-inches of snow to the water's edge. No smell or visual sewage runoff on the river bank and snow was observed. The area near the bank's edge was not saturated or spongy. I went to the wastewater plant across the highway 93 and looked into the D-boxes. I observed no flow to the drainfield.

I called Elk Bend's Operator, Roger Lanny during the morning of March 16th, and informed him of the sewage on the ground complaint and my investigation on Monday. He confirmed he pumped sewage out of the lift station onto the adjacent ground. He said there was no place to put it and he had to repair the failed lift station. He indicated the lift station would be repaired today. I asked him to notify me when completed so I may inspect.

I subsequently contacted you and reported the failure of the lift station and ponded sewage. You indicated you were not aware but would go onsite after your last delivery that evening and speak with operator. Roger Lanny called DEQ and left message at 11:15 am stating lift station was repaired.

I arrived at the lift station at 3:00 pm. The hose was gone. A new power conduit and pump were installed in the wet well. Wet well level was normal. The ponded sewage area seen yesterday was free of liquid and relatively dry. Sewage residual appeared to be contained within the vegetation. I went to the wastewater plant across the highway 93 and looked into the D-boxes. I observed flow in the middle D-box prior to the drainfield, as it should be.

I received your phone message on March 17, 2010 but was unable to return your call. I appreciate your efforts to contact me. I have attached my photos for your information. However, I am disappointed by the District's actions in response to this latest incident. My three main issues are:

1. It appears the operator knew of the lift station failure and initiated the pumping of the sewage on the ground. It is the District's responsibility to have replacement equipment readily available onsite to promptly correct system malfunctions or have the means to retain outside professionals to assist with the repair of the lift station.

2. The pumping of sewage onto the ground reflected poor judgment. A proper response if the malfunction could not be immediately corrected would be pumping the sewage into a pumper truck or contained vessel and properly disposing of the sewage to a permitted facility. It was fortunate sewage did not appear to flow to the river or anybody had contact with it.

3. The District did not immediately notify DEQ of the lift station failure. It was an embarrassment responding to the several complaints received by property owners in Steelhead Bend. It also appeared the board members were not informed of the incident by the operator.

To provide a conclusion to this incident, DEQ requests the following be completed by the District.

1. Please submit written documentation to this office on the events relating to the lift station failure and pumping of sewage onto the ground including a timeline of the events.

2. Please submit to this office, an emergency response plan including notification procedures to the District Board and the proper authorities including the County, DEQ and Health District.

As you are aware, DEQ and the District are entered into a consent order in response to failure of Elk Bend Unit 1 subsurface drainfield. We also provided the District with matching grant funding to complete a facility planning study on the aging wastewater system. The District will be eligible for Idaho State Revolving Fund loan but needs to have a licensed operator to receive funding.

Please be aware the United States EPA also received citizens' complaints and requested photos from DEQ. The DEQ is looking forward to our mutual goal of improving the Elk Bend Sewer District's wastewater facilities. If you have any questions, please feel free to contact me at (208) 528-2650.

Attachment

Sincerely,

Greg Eager

Greg Eager, PE
Engineering Manager

C: Erick Neher, Regional Administrator
Richard Huddleston, DEQ Wastewater Manager
Maria Lopez, EPA
Jim Mullen, Keller Associates
Eastern Idaho Public Heath District

March 15, 2010

View of Agate Rd. lift station

Flexible hose in wet well

Hose from wet well lying on ground

Hose discharge and ponded sewage, Salmon River in background

Hose discharge and ponded sewage

Ponded sewage with Salmon R in background

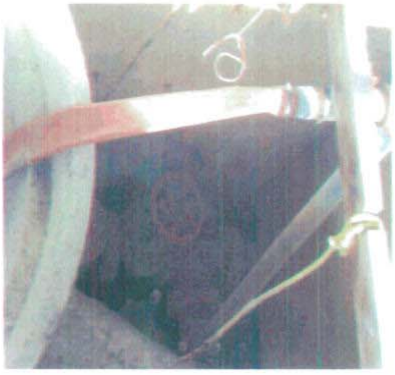
Lift station without pump

Dry middle D-box before drainfield.

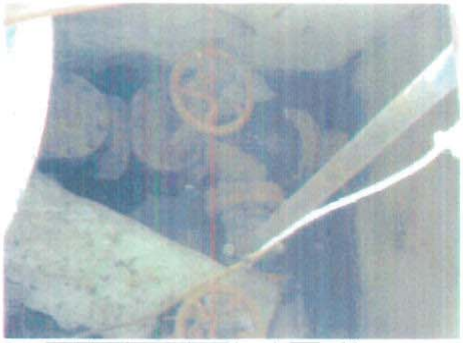
Steelhead Bend WWTP from Hwy 93

March 16, 2010

New power conduit and pump installed



Wetwell connection to main in dry well.



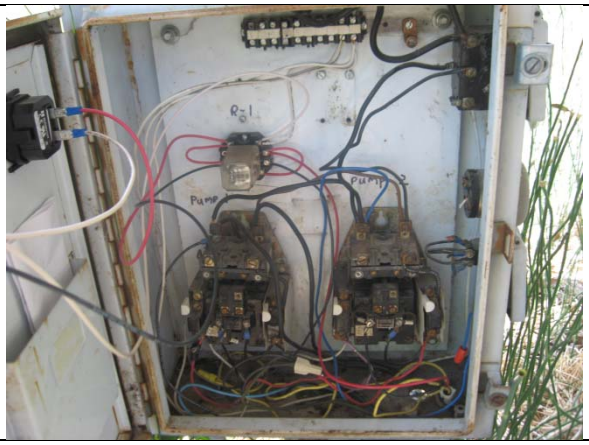
Large block of ice in dry well.

D-box

Sewage debris from hose discharge. Liquid no longer present, Saturated ground less prevalent than the day before indicating seepage into ground.

APPENDIX H. System Photos

Elk Bend Lift Stations
Elk Bend Wastewater Treatment Plant
Elk Bend Discharge Field
Steelhead Bend Lift Station
Steelhead Bend Treatment Plant
Steelhead Bend Discharge Field
Wastewater Operations Building
Laboratory

Entering Elk Bend from the North	Elk Bend Boating Access
Elk Bend Horn Drive Lift Station	Interior of Horn Drive Lift Station Wet Well
	
Electrical Panel at Horn Drive Lift Station	Horn Drive Lift Station Dry Pit

Entering Elk Bend from the North	Elk Bend Treatment Plant Lift Station Interior
Hose from Pump to Dry Pit	Elk Bend Treatment Plant Lift Station
Elk Bend Wastewater Treatment Plant	Elk Bend Treatment Plant Site

Elk Bend Overflow Pond	Elk Bend Treatment Plant Inlet
Aeration Basin	RAS Piping (w/ packed sludge extruding)
Blower & Motor (nonfunctioning)	Blower & Motor (operational)

Clarifier Basin Scum Return Channel	Package Plant Outlet
Clarifier Weir Channel	Scum Return Channel
Secondary Septic Tank & Effluent Screen	Elk Bend LSAS Drainfield

Steelhead Bend Lift Station	Standby Generator
Steelhead Bend Lift Station Wet Well	Steelhead Bend Lift Station Dry Pit
Steelhead Bend Treatment Plant	Steelhead Bend Aeration Basin

Inlet Screen - Comminutor Removed	Steelhead Bend Overflow Pond
Steelhead Bend Package Plant	Steelhead Bend LSAS Drainfield
Elk Bend Wastewater Operations Building	Laboratory Bench

APPENDIX I. Public Involvement

March 3, 2010 Agenda for meeting with EBSD Board

August 18, 2011 Presentation for meeting with EBSD Board

Public Notice publication for June 22, 2012 Board Meeting
and Public Information Meeting

June 22, 2012 Meeting Sign-In Sheet

Record of Annual Meeting June 22, 2012 – Including motion to accept WWFPS and motion to apply for grant money for the N-P Evaluation

Elk Bend Sewer District Mailing List

Public Information Flyer

Elk Bend Sewer District

March 22, 2010

Wastewater Facilities Planning Study Coordination Meeting

1) Overview of WWFPS Process

   a) Evaluation of system condition & capacity
   b) Background information
   c) Projections for population, flow, treatment requirements
   d) Alternative development
   e) Evaluation of alternatives
   f) Selection of preferred alternative
   g) Capital Improvements Plan
   h) Environmental Information Document

2) IDEQ Consent Order

   a) Accept wastewater grant from IDEQ to complete Facilities Planning Study
   b) O&M Manual for system
   c) Written response to 10/26/07 letter regarding failed system response plan
   d) Report documenting temporary drainfield repairs
   e) Develop and implement monitoring program
   f) Contract a licensed Responsible Charge Operator
   g) Designate Substitute Responsible Charge Operator
   h) Financial Management Plan

3) System Discussion

   a) Lift Stations
      i) Recent problems
      ii) Replacement v. rehabilitation
      iii) Lift station requirements

   b) Treatment Plants
      i) Current treatment capacity
      ii) Condition of equipment
      iii) Treatment requirements

c) Wastewater Discharge
   i) Discharge Alternatives
      (1) NPDES permit
      (2) Land Application
      (3) Large Soil Absorption System - (similar to current method)
   ii) Large Soil Absorption System - Nutrient Pathogen Study

4) Needed Information

   a) Current Treatment Levels
   b) System Budget and Expenses
   c) Pump event & hour readings

5) Next Steps

   a) Wastewater Sampling
   b) Implement Monitoring Program
   c) Nutrient-Pathogen Study
   d) Evaluation of Treatment Plants
   e) Develop Alternatives
      i) Collection System
      ii) Treatment Plants
      iii) Wastewater Disposal

1

ELK BEND SEWER DISTRICT WASTEWATER FACILITIES PLANNING STUDY

8/18/2011

Sewer District Advisory Committee Meeting

Discussion Outline

2

1. Introductions (Please Sign In)
2. General Discussion
3. Study Overview
4. Wastewater System Overview
5. Existing Facilities
   A. Collection Systems
   B. Treatment Plants
   C. Discharge Systems
   D. Problem Summary
6. Solution Alternatives
   A. Collection Systems
   B. Treatment Systems
   C. Discharge Systems
7. Criteria for Evaluation
8. Next Steps

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General Discussion

3

- Project Purpose and Need
- Objectives of Discussion
  - Inform District of Project Progress
  - Discuss Major Issues Identified
  - Receive Input on Key Factors for Evaluation
  - Coordinate Next Steps
- IDEQ Role
- Current Project Status

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Wastewater Facilities Planning Study

4

- Inventory Existing Wastewater System
- Evaluate Existing Systems Condition & Performance
- System Analysis
  - Assess Capacity
  - Identify Deficiencies
  - Evaluate Future Facility Needs
- Develop Capital Improvement Plan
  - Evaluate Current & Future Needs
  - Identify the Preferred Alternative Solution
  - Assess the Financial Impacts of the Preferred Alternative

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Wastewater System Overview

5

- District Includes Two Wastewater Systems
  - Elk Bend System
  - Steelhead Bend System
- Systems are comprised of:
  - Collection System
    - Gravity Collection Piping
    - Three Lift Stations
  - Treatment System
    - Activated Sludge Package Plants
  - Disposal System
    - Large Soil Absorption Systems
    - Elk Bend-Septic Tank (solids separation)
- Original Construction – 1973

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Collection Systems

6

- Collection Piping
  - Manholes appear to be in reasonable condition
- Lift Stations
  - Aged Electrical
  - Pumps replaced with submerged and flexible piping over wet-well walls
  - CMU top sections shifting
  - Insulated covers wearing
  - Frost free hydrants too close
  - Control valves rusted
  - Icing reported
  - Debris problems reported

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Treatment Systems

7

- Screening
  - Comminutors removed
  - Rerouted inflow pipe (EB) missing bar screen and hitting frame
- Aeration Basin
  - Basins showing age
  - Piping corroded/rusted
  - Roof in disrepair (EB mainly)
  - Aerators working
  - Valve operation questionable
  - Freezing problems in winter
- Clarifier
  - RAS system operation questionable
  - Skimmers obstructed
  - Piping corroded/rusted
  - Electrical conduit corroded
  - Sludge management
  - Significant floating solids present

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Treatment Systems cont.

8

- Blowers
  - Cases beginning to rust
  - Backups not operational
  - Motors and blowers showing age
  - Piping rusted
  - Electrical conduit corroded
- Disinfection
  - Not currently used
- Septic Tank (Elk Bend Only)
  - Operating as designed
  - Solids accumulation
- General Observations
  - Basin walls, piping, equipment rust/corrosion, aged equipment
  - Steelhead Bend in general better condition than Elk Bend
  - Two effluent samples taken June & July 2010 show treatment meets desired limits for soil absorption system

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Discharge Systems

9

- Large Soil Absorption System (LSAS)
  - Subsurface disposal >2,500 gpd
  - Undersized for flow
  - Additional drain fields needed to satisfy requirements for LSAS
- Elk Bend
  - Drain field replaced recently
  - Need minimum of three drain fields
- Steelhead Bend
  - No problems reported with drain field
  - Need minimum of two drain fields

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Summary of System Deficiencies

10

- Lift Stations
  - Need repair or replacement
  - Freezing issues
  - Debris issues
- Treatment Plants
  - Equipment worn/aged
  - Components not working
  - Freezing problems
- Discharge Systems
  - Wastewater ponding
  - Insufficient sizing
  - Lack of alternate drain fields

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Collection System Alternatives

11

1. Lift Station Rehabilitation ($$)
   - Install fixed pumps with grinder or solids handling
   - Repair/replace rusted piping and valves
   - Rehabilitate wet and dry pits
   - Replace insulated covers
   - Install new electrical panels, wiring, and controls
2. Replace Lift Stations with Similar Style ($$)
   - Demolition of existing
   - Replace wet and dry pits
   - Replace all piping & valves
   - Install new pumps and electrical components
3. Replace Lift Stations with Above Grade Style ($$)
   - Demolition of existing
   - Install new wet well
   - Install above grade pump station
   - Replace piping & valves

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Treatment System Alternatives

12

1. Rehabilitate Existing Systems ($$$$)
   - Current condition of equipment would require extensive work
   - Expected life limited
2. New Extended Aeration Package Plant ($$$)
   - Similar to Existing System
3. Sequencing Batch Reactor ($$$)
   - Activated sludge process by "batch"
   - Low-moderate operating requirements
4. Rotating Biological Contactor ($$$)
   - Fixed film process
   - Low power requirements
   - Low operating requirements
5. Recirculating Gravel Filter ($$$)
   - Fixed film process
   - Low operating requirements
6. Lagoons ($$$)
   - Very low operating requirements
   - Requires land area

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Discharge System Alternatives

13

1. Upgrade existing LSAS ($$)
   - Additional drain fields needed
   - Alternate sites needed
   - Nutrient Pathogen Evaluation
   - Monitoring and reporting requirements
2. River Discharge ($)
   - Requires NPDES permit and compliance
   - Administered by EPA
   - Significant monitoring and reporting requirements
3. Land Application ($$$)
   - Requires estimated 20 acres
   - Agricultural land application site development
   - Winter storage lagoon
   - Piping and pumping to location
4. Total Containment Lagoons ($$$)
   - Requires significant area for lagoons
   - Piping and pumping to location

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Additional Treatment Considerations

14

- Two Facilities versus One Combined
  - Two treatment plants (as current) = higher cost per gallon of treatment
  - Combining flows would require a pipeline and possibly pumping
- Discharge method may influence treatment choice
  - i.e. River discharge may require more robust treatment to meet a NPDES permit

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Alternative Evaluation Criteria

15

	Parameter	Importance Factor	Rehabilitate Existing Package Plant	New Extended Aeration Package Plant	Rotating Biological Contactor	Sequencing Batch Reactor (SBR)	Recirculating Gravel Filter	Wastewater Lagoons
1	Capital Cost							
2	O & M Cost							
3	Operator Attention							
4	Footprint							
5	Treatment Level							
6	Expandability							
7	Process Complexity							
8	Reliability							
9	General Appearance							
	Total		0	0	0	0	0	0

5 - Most Favorable 1- Least Favorable

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Next Steps

16

- Incorporate feedback into evaluation of alternatives
- Refine cost estimates
- Begin investigation of funding alternatives
- Provide recommendation of best apparent alternative
- Help Educate the Community

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Contact Information

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NOTICE OF BUDGET MEETING FOR THE ELK BEND SEWER DISTRICT

Notice is hereby given that a meeting of the Board of Directors a qualified vectors of the above named District will be held the 22nd day of June, 2012 at the hour of 10:00 a.m. at the QRU Building, Elk Bend, Lemhi County, Idaho. At this meeting there shall be a Public Hearing on the Maintenance and Operation Budget for the coming fiscal year.

The budget as presently determined by the Board of Directors is now available at the Elk Bend Fire Hall #1 Bulletin Board and will remain available until the hearing as provided by law.

The budget meeting is pursuant to Section 42-3229 Idaho Code.

Dated this 15th day of May 2012
Eleanor Wisner
Elk Bend Sewer District
Lemhi County, Idaho

Elk Bend Sewer District General Fund Budget 2012

REVENUES:	
Estimated Elk Bend Sewer Levy	$21,848.00
Estimated Interest & Delinquent Taxes	$ 6,000.00
TOTAL	$27,848.00
EXPENDITURES:	
PAYROLL	$10,625.00
PAYROLL TAXES	1,200.00
UTILITIES	2,900.00
CHEMICAL TESTS	5,708.00
INSURANCE	3,630.00
TRAVEL	827.00
REPAIR & MAINTENANCE	2,711.00
ADMINISTRATION & LEGAL	247.00
TOTAL	$27,848.00

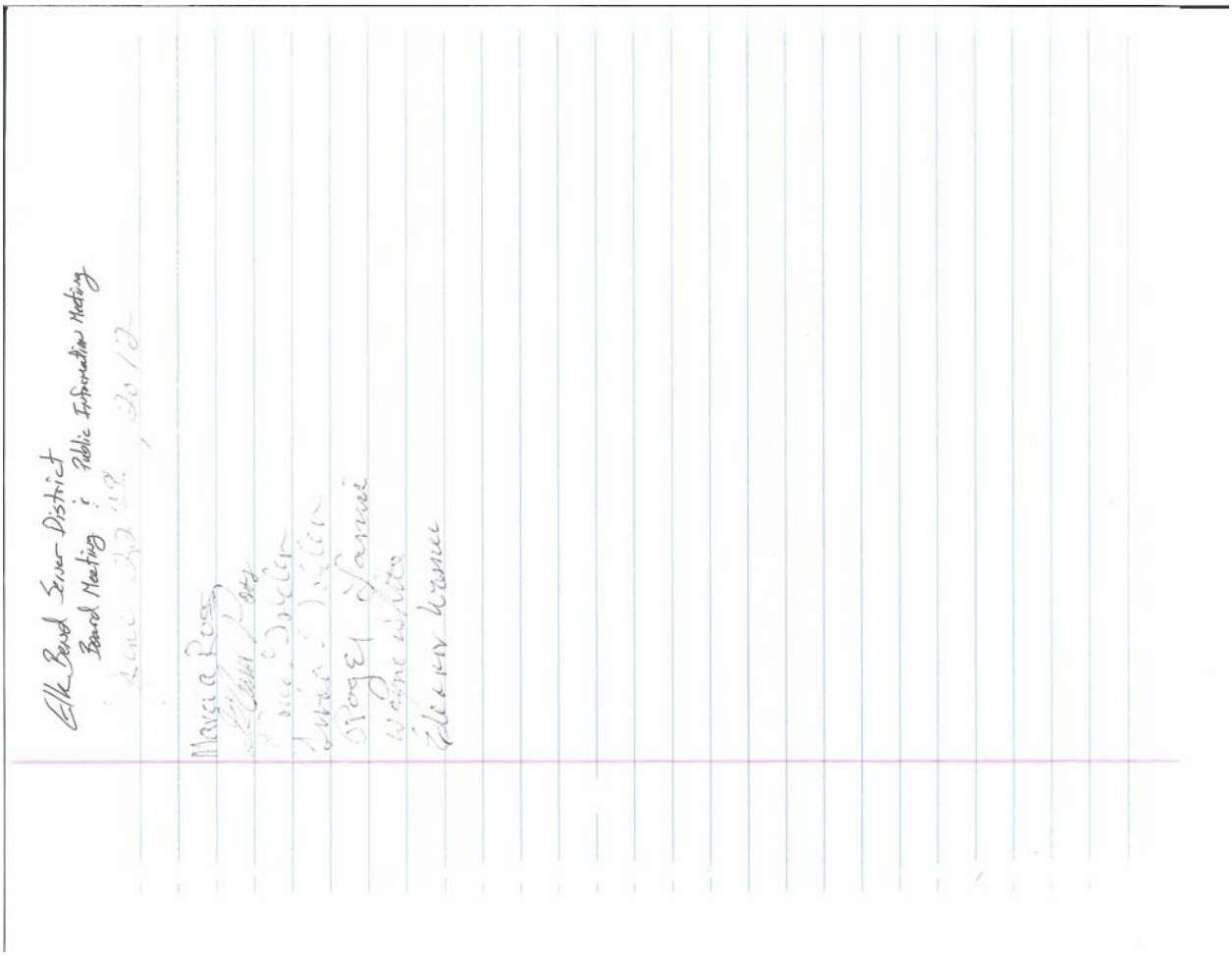
6-7-2tc

required. 6-21-1tc

NOTICE INVITING PUBLIC COMMENT ELK BEND SEWER DISTRICT WASTEWATER PLANNING STUDY

The Elk Bend Sewer District is seeking public comments on the Wastewater Facility Planning Study and the alternatives for the wastewater treatment and collection system. An information meeting will be held on June 22, 2012 in conjunction with the Elk Bend Sewer District annual meeting at 10 a.m., Elk Bend QRU building. A draft of the study and list of alternatives considered can be viewed by contacting Eleanor Wisner (phone: (208) 894-2204). Comments and questions regarding the report and the alternatives considered should be directed to Keller Associates (email: sallen@kellerassociates.com, phone: (208) 238-2146). The public comment period will commence June 21 and conclude at noon on July 6. Comments will be considered by the District and incorporated into the planning documents.

6-21-1tc


Elk Bend Sewer District
Board Meeting & Public Information Meeting
Margie Ross
Doyle Warner

June 22, 2012

Annual Meeting for the Elk Bend Sewer District

The motion was made and seconded to accept the feasibility study on the sewer district as presented by Keller and Associates. The motion passed without dissent.

The Motion was made and seconded to apply for grant monies to provide a ground(s) study and report to go with study provided by Keller and Associates. The motion was carried

Glen Ross Chm.
Eleanor Wisner Sec/Treas.

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Elk Bend Sewer District Public Notice

Wastewater Facilities Planning Study Review

The Elk Bend Sewer District contracted with Keller Associates, of Pocatello, Idaho, to prepare a Wastewater Facilities Planning Study. This study has been funded, in part, by a grant from the Idaho Department of Environmental Quality. The purpose of the study is to provide a comprehensive evaluation of the existing wastewater system, provide recommendations to meet future wastewater handling needs, serve as a baseline document for applying for available grants and loans, and to address regulatory deficiencies of the existing wastewater system. Contained in this flyer is a brief review of this study including cost implications. A comment form is located on the reverse side of this flyer for your convenience.

System Overview

The Elk Bend Sewer District provides wastewater collection, treatment and disposal for the Elk Bend and Steelhead Bend areas. The system contains approximately 26,000 feet of 8-inch and 4-inch collection pipeline which transports wastewater by gravity and the aid of three lift stations to the treatment facilities. Two wastewater treatment plants provide wastewater treatment prior to disposal in large soil absorption systems.

Regulatory Compliance Status

The Idaho Department of Environmental Quality responded to a complaint of sewage on the ground surface at the Elk Bend treatment plant in August of 2007. A Notice of Violation was issued on March 7, 2008 which included four violations of the Idaho Administrative Procedures Act (IDAPA) and outlined monetary penalties. Subsequently, the Elk Bend Sewer District entered into a Consent Order with the Idaho DEQ on June 2, 2008. The Consent Order includes provisions requiring action by the Elk Bend Sewer District, including the completion of this study.

System Evaluation

Issue

1. Lift stations are in poor condition
2. Electrical systems do not meet NEC code
3. Lift stations do not have backup power
4. Lift stations do not have redundant pumps
5. Elk Bend treatment plant has insufficient capacity

Issue

6. Treatment plants are not achieving necessary treatment
7. Insufficient number of drain field modules
8. Drain fields are not pressurized
9. District not in compliance with monitoring & reporting
10. No certified licensed operator
11. Sludge disposal does not comply with regulations

Alternative Evaluation

Alternative wastewater disposal methods were considered and found to be less favorable than continuing to dispose wastewater using drain fields. Five alternatives were evaluated: 1) do nothing; 2) rehabilitate existing facilities and disposal; 3) sequencing batch reactor and new drainfields; 4) recirculating media filters and new drainfields; and 5) STEP systems with cluster drain fields.

Elk Bend Sewer District
Eleanor Wisner, Secretary/Treasurer
Phone: 208.894.2204

Idaho Department of Environmental Quality
Willie Teuscher, P.E.
900 Skyline Suite B
Idaho Falls, ID 83402
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KELLER associates
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Pocatello, ID 83201
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Jim Mullen, P.E. | Skyler Allen, E.I.

Alternative Evaluation Continued

The alternatives were evaluated based on cost, footprint size, treatment level, complexity and other factors. It was determined that the recirculating gravel filter and new drain fields alternative was the most favorable. It was determined that establishing a connecting line from Elk Bend to Steelhead Bend would result in lower long term cost of installation, operation and maintenance for the total wastewater system by combining the treatment facilities and utilizing the better suited Steelhead Bend disposal area.

Preferred Alternative

The preferred alternative selected includes the replacement/rehabilitation of the lift stations at Elk Horn Drive and Steelhead Bend, installation of a gravity sewer line from Elk Bend to Steelhead Bend, construction of a recirculating media filter treatment system and additional drain field modules. The preliminary estimated cost of this alternative is $1,150,000.

User Costs

Funding for wastewater projects is available through grant and low interest loan programs. The project team will pursue available grants which if successfully received would reduce the cost to the users of the Elk Bend Sewer District. The Elk Bend Sewer District is currently funded as a special taxing district of Lemhi County. The current estimated cost per connection is $18 per month. The estimated user cost increase to support the completion of the recommended improvements is anticipated to be in the range of $24 to $43 per connection per month, for a total estimated monthly user cost of $42 to $61.

Need for Action

The Elk Bend Sewer District has a need for improvements to the wastewater infrastructure. For the continued safe collection and disposal of wastewater, it is crucial that the District implement improvements to the wastewater system. Failure to act and to comply with the Idaho Department of Environmental Quality Consent Order could result in monetary penalties and further legal action to enforce compliance by DEQ and/or EPA.

The Elk Bend Sewer District desires to implement the improvements necessary to safely provide wastewater collection and treatment services to the residents of Elk Bend and Steelhead Bend. Achieving this objective will protect our families, our community and the important natural resources which make Elk Bend a great place to live and to visit.

Public Information Meeting & Comment Period

A public information meeting will be held in conjunction with the Elk Bend Sewer District annual meeting on June 22, 2012, 10 am at the QRU building in Elk Bend. We invite you to attend to learn more about the Wastewater Facilities Planning Study and the recommended wastewater improvements. Comments and questions will be received from June 21 to July 6. Comments can be submitted to Keller Associates on the attached form or by contacting Keller Associates directly.

Comment Form

Name

Address

Mail Comments To:
Keller Associates
305 N. 3rd Ave, Suite A
Pocatello, ID 83201

E-mail Comments To:
sallen@kellerassociates.com

Comments (use additional sheet if necessary)