Environmental Information Document

for

Fernwood Sewer System

Submitted to the Fernwood Water and Sewer District

July 2012

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ENVIRONMENTAL INFORMATION DOCUMENT

FERNWOOD SEWER SYSTEM
PROJECT NO. 43007

SUBMITTED TO THE:

FERNWOOD WATER AND SEWER DISTRICT

PROFESSIONAL ENGINEER
REGISTERED
11814
STATE OF IDAHO
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7/31/12

JULY 2012

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COVER SHEET

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Project Cost and Funding

Estimated Construction Costs:

Inflow and Infiltration Correction	$ 97,900
Sewer System Rehabilitation	$ 435,200
New Collector Sewers	$ 50,300
Total Estimated Cost	**$** 583,400

Funding:

DEQ Principal Subsidy	$ 47,137
Other Share (ICDBG)	$ 198,000
DEQ Loan	$ 507,419
Total Funding	**$ 752,556**

1. Funding shall include Engineering, Administration, Legal-Bond, and Interim Financing; refer to the Facility Plan in Appendix A for more information.

User Costs

Residents who receive sewer service from the Fernwood Water and Sewer District, will be assessed the cost of improving the collection system components. Residents within the District boundary whom are not currently served by the sewer system will not be assessed the cost of these improvements. Dormant connections that receive service (some on a seasonal basis) and are “hooked up” to the system have been included. Therefore, the following fees will be assessed.

Estimated User Costs for Existing Service Area:

Current Average Monthly User Charge per EDU	$ 41.00
Change in Operation and Maintenance Monthly Charge per EDU	$ 0.00
Change in Debt Service Monthly Charge per EDU	$ 8.00
Future Average Monthly User Charge per EDU	**$ 49.00**

1. Financing terms of 0.25% for 30 years.
2. Cost per user assumes 179 users (166 are active users)

Abstract

The December 2011 Preliminary Engineering Facility Plan for the Fernwood Sewer Collection System, Fernwood Water and Sewer District recommends several improvements to the existing sewer collection system to meet current standards and Idaho Department of Environmental Quality (IDEQ) rules. The improvements are aimed at improving the available capacity of the lift stations and force main in addition to reducing inflow and infiltration within the existing sewer collection system. This Environmental Information Document briefly addresses the expected environmental impacts of the proposed alternatives for the improvements. After receiving public input, the District selected the improvement alternatives to be included in the proposed project. The environmental impacts associated with the proposed project are assessed in this document. After consultation with environmental agencies, mitigation measures were identified to address items of concern. Mitigation measures include the following:

- Best Management Practices (BMPs) shall be developed as part of the project design and implemented during construction.
- Design of the improvements within the floodplain areas should minimize or eliminate infiltration of flood waters into the wastewater system. A floodplain development permit will be required for construction activities and other development in the mapped flood hazard area.
- No fill can be added or planned to be added to waters of the United States (including wetlands) during construction. Work near the designated wetland area will not disturb the wetland area (utilizing methods discussed in this document) and the Finn Creek crossing will likely be attached to the existing railroad crossing of the Creek (at a minimum, this crossing must be trenchless and shall not result in fill added to waters of the United States).
- If artifacts (cultural and historic remains) are discovered during the course of construction, all work will stop and the Coeur d'Alene Indian Tribe and SHPO will be contacted. Mitigation may be further evaluated.
- The Contractor must mitigate fugitive dust. No burning of construction debris or vegetation is allowed.
- Appropriate permits for the potential sewer main crossing at Finn Creek must be incorporated into the construction plans and specifications and applied for at the appropriate time (although, the Army Corps of Engineers will not require any permits due to proposed construction methods).

1. BACKGROUND

1.1. SYSTEM BACKGROUND

The Fernwood Water & Sewer District collection system is designated as a Class I collection system in Benewah County, Idaho. It is owned and operated by the Fernwood Water and Sewer District. The District was organized in 1965 as the Fernwood Water District but was reorganized in 1974 as the Fernwood Water and Sewer District.

The Fernwood sewer collection system was constructed with the 1981-1982 Sewerage Project that also constructed the treatment lagoons and the force mains from Santa and Fernwood to the lagoon site. The collection system consists of 8-inch gravity sewer, two lift stations, and a 6-inch force main from Lift Station No. 1 to the lagoon treatment facility. The majority of the collection system gravity flows to Fernwood's Lift Station No. 1 (LS #1) which is located near the St. Maries River. A smaller portion of the collection system gravity flows to Fernwood's Lift Station No. 2 (LS #2), near Crystal Creek, which pumps to part of the gravity system flowing to LS #1. LS #1 pumps all of the wastewater from Fernwood to the treatment facility through a 6-inch force main. Figure 2-1 in Appendix B provides an overview of the system. Due in part to construction methods that included ungrouted manholes and some damaged mains, the system experiences excessive ground water and surface water infiltration and inflow in the collection system.

The communities of Santa and Fernwood share a common lagoon treatment facility. The Santa sewer collection facility and the shared Santa-Fernwood treatment facility are addressed in separated documents. The scope of this document includes only the Fernwood collection system and the force main between Fernwood and the treatment facility.

1.2. FACILITY PLAN INFORMATION

The Fernwood Water and Sewer District ("District") authorized Welch Comer and Associates, Inc. to prepare a Sewer Collection System Facility Plan for the Fernwood sewer collection system, located in Benewah County, Idaho. The purpose of the report was to analyze the existing system, identify deficiencies, and recommend the best alternatives for a providing quality and reliable public sewer system. Additionally, the facility plan addresses other improvements that are necessary to bring the wastewater collection system into compliance with current standards and Idaho Department of Environmental Quality (IDEQ) rules (which have been developed to protect public health and safety and water quality).

The analysis of the system components (lift stations and sewer lines) is based on the Idaho Department of Environmental Quality (DEQ) requirements identified in the IDAPA 58.01.16 Wastewater Rules. These rules were used as a basis to analyze and evaluate inflow and infiltration and the available capacity of the lift stations and force

main in the Facility Plan (refer to Appendix A). Based on the analysis, deficiencies and recommendation were developed for each of the system components.

- Spring Street: Approximately 6 lots in the vicinity of Spring Street between 4th and 6th Street do not have direct access to sewer including two residences that are currently connect to the system with substandard services.
- Infiltration & Inflow: The collection system experiences severe stormwater inflow resulting in wastewater flows greater than 6 times the average day flow.
- Lift Station #1: The current lift station pumps do not have capacity to handle the peak flows resulting in surcharging of the system and hazardous spills. The lift station is also vulnerable to flooding from the St. Maries River.
- Air Release Valves: Two air release valves on the 6 inch force main from LS #1 are expected to be in need of replacement.

Refer to the Facility Plan (Appendix A) for further information regarding the system deficiencies for existing and projected growth.

1.3. Purpose and Need

The purpose of the proposed project is to protect public health and safety and water quality by addressing the deficiencies with respect to the Idaho Rules for Wastewater Systems and Water Quality. Several deficiencies with respect to the Idaho Rules were identified for system components, such as substandard sewer access, severe storm water inflow, lift station capacity and flooding vulnerability, air release valve conditions (refer to Section 1.2 above). Thus the projects address the public health and safety and water quality concerns identified with respect to Idaho Rules (which protect water quality in surface and ground water in the surrounding area and describe parameters for providing proper wastewater service to users). Specifically, the projects will address flooding and overflow problems with lift stations, reduce high infiltration and inflow to prevent future wastewater spills, and provide dependable sanitary sewer service to the Fernwood community. The improvements (described further in Section 2) include a variety of options which include modifications to lift stations, reduction in high infiltration and inflow, ARV improvements, and providing dependable sewer service.

2. PROPOSED ALTERNATIVES

Detailed descriptions of the proposed alternatives can be found in the Facility Plan (Appendix A). Detailed cost estimates for these alternatives can be found in Appendix C.

2.1. LIFT STATION NO. 1 IMPROVEMENTS

The existing lift station does not have the pumping capacity to handle the peak flow. The lift station is also located within the floodplain and vulnerable to flooding. In addition, the gravity sewer main upstream from the lift station runs along the St. Maries river and is frequently flooded contributing to I&I. The following options provide alternatives for improvements.

2.1.1. OPTION A – LIFT STATION RELOCATION

To avoid the issues associated with maintaining a lift station and approximately 3200 feet of gravity sewer in the floodplain, the following two options were developed which relocate the existing LS #1 outside of the floodplain. The 100 year floodplain identified on the FEMA Flood Insurance Maps (see FEMA Map in Appendix F) includes nearly all of the area between the St. Maries River and the railroad tracks.

2.1.1.1. OPTION A-1

The first option that relocates the existing LS #1 outside of the 100-year floodplain is shown in Figure 4-1 in Appendix B. Option A-1 relocates LS #1 to Isaacson Street just south of 9th Street. A new gravity or pressure sewer main would be constructed along the existing railroad to divert the flow coming down Depot Lane and bring it down the railroad tracks to the new LS #1. The gravity line would be approximately 3,000 feet in length at minimum grade resulting in a depth at the north end of about 25 feet. The sewer would cross over Finn Creek within the railroad prism to maintain adequate ground cover and avoid environmental issues associated with trenching through the stream. The railroad right of way is owned by Potlatch Cooperation. It is understood that the railroad is no longer operated.

A pressure system will be installed to serve the five residences on Depot Lane which are below the elevation of the gravity sewer main. Individual grinder pump stations at each residence would pump to a pressure main and back to the gravity line in the railroad tracks. The existing 8-inch gravity sewer could be slip-lined with the HDPE pressure sewer main allowing the pressure sewer to be installed with minimal excavation.

This option would abandon the existing LS #1 location and approximately 3,200 linear feet of gravity sewer main constructed within the St. Maries River 100-year floodplain. It is estimated that this option would cost $546,800 with a total estimated annual operation cost of $5,110.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for the new lift station and trenching for the

gravity or pressure sewer line); population, economic, and social profile (increased sewer rates but potential for growth); positive impacts to floodplain (abandoning the existing lift station and sewer line located within a floodplain); positive impacts to wetlands and water quality (protection from further damage to existing water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (reduction in public health risk by abandoning existing line and lift station).

2.1.1.2. OPTION A-2

The second option that relocates the existing LS #1 outside of the 100-year floodplain is shown in Figure 4-2 in Appendix B. Option A-2 relocates LS #1 to Isaacson Street as with Option A-1. However, instead of constructing a new gravity sewer main along the railroad, a new lift station (LS #3) would be constructed at Depot Lane near the railroad. The lift station would pump through a force main constructed along S.H. 3 to the gravity sewer manhole in Isaacson Street. From there, it would gravity flow through the existing sewer to the new LS #1. The force main will need to be constructed on the east side of S.H. 3 to avoid conflict with the waterline which is installed on the west side. Thus, the force main will need to cross the highway in two locations, which will require a roadway encroachment permit from the Idaho Transportation Department (ITD) since this work will occur within their right-of-way. The ITD typically requires the crossings to be bored under the highway (this is stated in their encroachment permit). Communication with ITD will occur during the permitting process when the alignment of the force main is finalized. Some asphalt restoration will also be needed where the force main crosses asphalt parking areas, driveways, and cross streets.

As with Option A-1, a pressure system will be constructed for Depot Lane residences. This option would also abandon the existing LS #1 location and approximately 3,200 linear feet of gravity sewer main constructed within the St. Maries River 100-year floodplain. It is estimated that this option would cost $578,500 with a total estimated annual operation cost of $7,440.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for the new lift station and trenching for the gravity or pressure sewer line); population, economic, and social profile (increased sewer rates but potential for growth); positive impacts to floodplain (abandoning lift station and sewer line in floodplain); positive impacts to wetlands and water quality (protection from further damage to existing water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (reduction in public health risk by abandoning existing line and lift station).

2.1.2. OPTION B – REPLACE AND RAISE LIFT STATION

One option to decrease the likelihood of Lift Station #1 flooding is to raise the height of the lift station at its current location. The actual elevation of the 100-year floodplain is not identified on the FEMA Flood Insurance Maps. Since the 100-year flood elevation is unknown, the amount the lift station needs to be raised is arbitrary. Raising the height by 4-6 feet would be beneficial but may not be above the flood level.

Several factors associated with the existing lift station may effectively require replacement of the lift station to achieve the desired increase in elevation. Once the capacity of the lift station is increased, the gravity line along the St. Maries River will need to be sealed up to prevent I&I. The PVC sewer main along the river will need to be inspected to determine if it is contributing to I&I. For more information on this option, refer to the Facility Plan in Appendix A.

It is estimated that this option would cost $177,000 with a total estimated annual operation cost of $5,110.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for the lift station replacement); population, economic, and social profile (increased sewer rates but potential for growth); floodplain development (construction in floodplain, but increasing lift station capability in flood events); wetlands and water quality (construction in wetlands, but protection/improvement to existing water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (reduction in public health risk by increasing lift station capability in flood events).

2.1.3. Option C – Minimum LS Improvements

At a minimum the capacity of the lift station needs to be increased. One option to increase the capacity of the pumps at minimal cost is to replace the pump impellers with a larger diameter. The horsepower of the current pump motors would allow the 11-inch impellers to be replaced with 12-inch impellers. The existing pumps are 11 years old and need to be rebuilt. At the same time the impellers could be replaced with the larger size. The 12-inch impellers are expected to increase the capacity of the pumps to 240 – 250 gpm. Since the lift station will still be vulnerable to flooding and inaccessible during flood events, the District may need to obtain a waiver in regard to several DEQ criteria.

It is estimated that this option would cost $13,000 with a total estimated annual operation cost of $6,735.

The environmental impacts associated with construction of this option are very minimal, if any impacts at all. The pumps would be rebuilt and installed within the existing lift station structure, causing very little disturbance to the surrounding area. However, the long term impacts are problematic since the lift station will still be vulnerable to flooding, the risk to floodplains, wetlands and water quality, and public health would still remain.

2.1.4. Option D – No Action Option

If the capacity of the lift station is not increased, the system will continue to surcharge and periodically overflow. The overflow of wastewater presents a serious public health and environmental risk. For this reason, the do nothing option is not considered a responsible option.

If the elevation of the lift station is not raised, the lift station will remain vulnerable to flooding. Flooding of the lift station will likely damage the pumping and electrical equipment and potentially result in a wastewater spill. It is highly

recommended that the lift station be relocated or raised to reduce the flooding potential.

The environmental impacts associated with this option consist primarily of continued risk to current water quality and public health through uncontrolled and untreated discharges.

2.1.5. LIFT STATION NO. 1 IMPROVEMENT SUMMARY

Each lift station improvement option presented above is unique in the benefit it adds or issues it remedies. Each option is summarized in the following table for the criteria listed.

Table 2-1: Lift Station No. 1 Alternatives Comparison

Rating Criteria	Option A-1 Move LS, Add Gravity Sewer in RR	Option A-2 Move Lift Station and Add LS #3	Option 2 Replace LS at Existing Location	Option 3 New Impeller	Option 4 No Action
LS Capacity	Increases Capacity	Increases Capacity	Increases Capacity	Increases Capacity	Not Addressed
Reduces LS Flooding Potential	Completely - LS moved out of Flood Plain	Completely - LS moved out of Flood Plain	Partially - Still in Flood Plain Reduces Flooding Potential	Not Addressed	Not Addressed
Reduces I&I	Moves 3200 LF of Gravity Sewer out of Flood Plain	Moves 3200 LF of Gravity Sewer out of Flood Plain	Not Addressed - Additional Work Would be Required to Reduce I&I in Gravity Sewer along River	Not Addressed	Not Addressed
Implementation	Requires Easement from RR (Potlatch)	Requires Construction in ITD Right of Way and two Bores under SH 3	Requires Fill in Flood Plain and Associated Environmental Permits	Compliance Agency May Not Allow	Compliance Agency May Not Allow
Reliability	Most Reliable	Reliable but adds an Additional LS	Flooding Potential is Reduced but Not Known	Least Reliable	Not Sustainable
Cost	High Initial Cost	Highest Initial Cost, Increases Annual O&M	Mid-Level Cost	Lowest Upfront Cost	N/A
Meets IDAPA Design Requirements (Table2-3)	Yes	Yes	No, May Need Waiver for Site Access, and Flood Plain Location. Potential for Future Compliance Order by IDEQ		

2.2. INFILTRATION AND INFLOW IMPROVEMENTS

The system currently experiences excessive inflow and infiltration resulting in peak flows more than 6 times the average day flow. Figure 4-3 in Appendix B identifies

some of the locations where I&I flow has been observed. The following options identify methods for reducing the I&I.

2.2.1. Option A – Video Inspection

Video inspecting portions of the collection system that are suspected of contributing to I&I will help identify specific causes of I&I. By observing the flow in manholes relative to upstream manholes, the District has been working to locate sections of sewer that are contributing to I&I. The video inspection can then be used to verify suspected I&I problems and locate manholes that cannot be found.

It is estimated that this option would cost $26,600 with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option are very minimal, if any impacts at all. The video inspection will consist of investigating the existing sewer mains with a video device that is fed through the sewer lines. Thus, there should not be any impact associated with this alternative.

2.2.2. Option B – Manhole Repair

The majority of the points of inflow identified by the District are due to manholes that are improperly sealed. Construction documentation indicates that when the system was constructed manholes were adjusted to grade using concrete blocks rather than grade rings. Because the blocks were not grouted on the exterior, freeze/thaw action has dislodged the blocks enough to allow water to flow into the manholes between the blocks. The District has also found ungrouted lifting holes and manholes what were damaged during construction and not repaired.

It is recommended that manholes contributing to I&I be identified and repaired. Because many of the manholes have been buried, it may be necessary to first locate each manhole and raise them to grade so they can be inspected and repaired. It is anticipated that manholes with concrete blocks will need to be excavated and grouted on the exterior and interior or grade rings installed to replace the blocks. Epoxy coatings applied inside and out could also be used to seal manhole joints and around grade rings.

It is estimated that this option would cost $60,300 with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for location of manholes and repair); population, economic, and social profile (increased user rates); positive impacts to water quality (protection from further damage to water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (improvement to existing conditions).

2.2.3. Option C – Main Replacement

Based on the results of the video inspection, it may be necessary to replace sections of sewer main that have been damaged and are contributing to I&I. A total of approximately 3,330 lineal feet has been estimated to be replaced, but ultimately, a

portion of these can be replaced depending on the selected alternatives and funding availability.

It is estimated that this option would cost $303,600 ($91.00 / lineal feet replaced) with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for line replacement); population, economic, and social profile (increased user rates); positive impacts to water quality (protection from further damage to water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (improvement to existing conditions).

2.2.4. OPTION D – NO ACTION OPTION

If no I&I improvements are made, the system will continue to experience excessive stormwater inflow. The additional flow uses up valuable capacity at the lift stations, treatment facility and in the collection system. Because of the high I&I, LS #1 does not have sufficient capacity to allow for additional growth in the system. As I&I in the system is reduced, the system will have capacity for additional connections.

The environmental impacts associated with this option consist primarily of continued risk to current water quality and public health through uncontrolled and untreated discharges.

2.2.5. I&I IMPROVEMENTS SUMMARY

The following steps outline the recommended process for reducing I&I in the Fernwood collection system:

Phase 1:

1. Locate manholes and adjust to grade.
2. Inspect manholes during periods of high I&I documenting which manholes are contributing to I&I.
3. Seal manholes contributing to I&I: Excavate and seal manholes inside and out, raise rim of manholes that are frequently flooded or seal with watertight covers.

Phase 2:

4. Visually inspect sewer flows in manholes to identify sections of sewer that are still contributing to I&I.
5. Video inspect sewer mains contributing to I&I.
6. Based on the video inspection, replace damaged sections of sewer main.

2.3. SPRING STREET SEWER SERVICE

Two existing residences in the vicinity of Spring Street between 4th Street and 6th Street do not have direct access to sewer. Additionally, there are a couple storage

units and empty lots that could benefit from sewer in this vicinity.

2.3.1. Option A – Spring Street Main Extension

A sewer main extension in Spring Street north from 4th Street to 5th Street and west towards Elk Road at minimum grade would provide sewer to this vicinity at a depth that would provide the two existing residences reliable service (see Figure 4-3 in Appendix B). The main could potentially be extended as far north as 6th Street in the future.

It is estimated that this option would cost $49,400 with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for the main extension); population, economic, and social profile (increased user rates, with the opportunity for future connection); water quality (construction, mitigated through BMPs); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (provide service to two residences and future connection).

2.3.2. Option B – Residential Grinder Pumps

The two existing residences could alternatively be served with individual residential pumping stations. Approximately 200 feet of pressure sewer line would extend to the existing gravity sewer. This option would not provide for the possible future connection of the vacant lots or storage units.

It is estimated that this option would cost $20,000 with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option consist of potential impacts to physical aspects (excavation for the grinder pumps); population, economic, and social profile (increased user rates, but without the opportunity for future connection); water quality (construction, mitigated through BMPs); flora and fauna (site disturbance) air quality (construction emissions); positive impacts to public health (provide service to two residences).

2.3.3. Option C – No Action Option

One of the existing homes which is currently vacant reportedly has a blocked sewer service because the service grade is too flat. The other service could not be constructed to standard grade and frequently has problems. If sewer improvements are not completed in this area, reliable service cannot be provided to the two existing residences.

The environmental impacts associated with this option are public health (blocked or non-standard services have the potential to lead to sewer backflow into the existing residences.

2.4. Air Release Valve Replacement

Two air release valves (ARVs) were originally installed on the LS #1 force main in 1982. There is no indication that the valves have been replaced or inspected in the last

29 years. Figure 4-3 in Appendix B shows the location of the two ARVs.

2.4.1. Option A – ARV Replacement

Due to the corrosive environment in which the ARVs are installed, it is expected that the valves will need to be replaced. It is recommended that the ARVs are located and inspected as soon as possible to verify their condition and ensure that they are not leaking or inoperable.

It is estimated that this option would cost $6,600 with a negligible difference from existing estimated annual operation.

The environmental impacts associated with this option consist of potential impacts to physical aspects (minor excavation for replacement); population, economic, and social profile (increased user rates); positive impacts to water quality (protection from further damage to water quality); flora and fauna (site disturbance); air quality (construction emissions); positive impacts to public health (improvement to existing conditions).

2.4.2. Option B – No Action Option

No action would only be acceptable if an inspection indicates that the valves are operating correctly and replacement is not needed.

If the inspection reveals that the valves are in good working order and no replacement is needed, there should not be any environmental impacts associated with this option.

2.5. Alternative Comparison

An additional comparison of the alternatives has been included in Appendix C. This comparison highlights the major impacts anticipated for each alternative discussed above.

3. Proposed Action/Selected Alternatives

3.1. Selected Alternative

Based on input from the community, the Board decided to proceed with the following improvements to the wastewater system:

1. Lift Station #1: Initially the District did not want to proceed with relocation of the lift station (which is reflected in the project status memo, see Section 6 and Appendix M of this report), but it was recognized that this would be a better option for the District. The District has elected not to spend more than $300,000 on improvements to LS #1. This amount is likely not sufficient based on the preliminary opinion of probable project costs to relocate LS #1 outside of the 100 year floodplain. The District has been successful in obtaining grant funds which will be applied toward relocation of the lift station, which is the recommended option[1].
2. I&I Repairs: Existing manholes that are known to be contributing I&I will be excavated, grouted on the exterior and interior, and sealed to prevent groundwater infiltration. Manhole lids that are too low will also be raised. Sections of sewer main that are suspected of contributing to I&I will be video inspected and replaced.
3. Spring Street Sewer Extension: Approximately 650 feet of 8-inch gravity sewer main will be constructed to provide reliable sewer service to two existing sewer connections and empty lots that currently do not have access to sewer.
4. ARV Replacement: Replacement of the air/vacuum valves on the sewer force main was *removed* from the selected improvements project. Inspection of the valves and necessary improvements will need to be completed by the District as part of their annual operation and maintenance.

The improvements identified above address the necessary existing system deficiencies and will provide additional capacity for future growth.

[1] If the District chooses to pursue other options with respect to Lift Station No. 1, they will be required to update or amend this document (the EID) to reflect these changes, and they have been informed of this requirement.

3.2. SELECTED ALTERNATIVE DESCRIPTION

3.2.1. LIFT STATION NO. 1

The existing lift station is not able to handle the current peak wastewater flow which has resulted in wastewater spills in the past. There are several factors that contribute to this situation. First, approximately 3,200 linear feet of gravity sewer upstream of the lift station is located within the floodplain and periodically floods. During flood events, this section of sewer main contributes to the already high I&I flows. The existing lift station pumps are not able to keep up with the excessive I&I flows and the system surcharges and overflows. Because of the lift station's location in the floodplain, it is at risk to flooding during flood events. Finally, the lift station is inaccessible during relatively frequent flood events.

The recommended solution for Lift Station #1 is to completely relocate it outside of the 100 year floodplain. This would require installation of a new lift station to replace the current lift station, converting about five connections on Depot Lane to a pressure sewer system, and constructing an additional lift station (LS #3) and at least 1,600 feet of pressure sewer.

The best alignment option for the new sewer line will need to be determined during the design phase once topographic survey information is obtained and right-of-way has been secured. The likely alignment for the sewer line is shown in the selected alternative overview in Appendix B. The preferred alignment[2] is within the existing railroad and does not include boring under the Highway. The District is currently in the process of reaching an agreement with the railroad and property owner (Potlatch Corporation); the District will gather and coordinate permitting and scheduling with the property owner and the railroad. The current correspondence is included in Appendix P.

3.2.2. I&I REPAIRS

To reduce the high I&I, existing manholes that are known to be contributing I&I will be excavated, grouted on the exterior and interior, and sealed to prevent groundwater infiltration. Two manholes located near a small stream will be raised and sealed to prevent inflow. Approximately 1,000 linear feet of sewer main that is contributing to I&I has been budgeted to be replaced.

The District has worked over the last few years to identify which parts of the system are contributing to I&I and are in need of repair or replacement. To make the most efficient use of the funds available for I&I improvements, the District will need to prioritize the areas that need repair. This may require video inspecting a significant portion of the system to identify the sources of I&I.

[2] If a different alignment is decided upon prior to construction, this document will need to be revised or amended to reflect this change.

3.2.3. SPRING STREET SEWER EXTENSION

By extending an 8-inch sewer main from 4th Street north on Spring Street at minimum grade and west on 5th Street, it will be possible to provide a gravity sewer service to two existing services that currently do not have adequate access to the sewer. Approximately 650 linear feet of sewer main will be installed.

3.3. COST ESTIMATES FOR THE SELECTED PLAN

Cost estimates for the selected improvements were updated to reflect changes that occurred during the planning process and construction of multiple improvements as one project. The expected construction costs for the sewer improvement project are summarized in the following table. A detailed opinion of costs for the project is presented in Appendix C.

Table 3-1: Estimated Construction Costs

Relocate LS #1	$435,200
I&I Repairs	$97,900
Spring Street Sewer Extension	$50,300
Total Project Construction Cost	$583,400

Table 3-2: Estimated Project Costs

Construction	$583,400
Engineering	$141,000
Administration	$8,362
Legal-Bond	$7,346
Easement Acquisition	$10,000
Interim Financing	$2,448
Project Sub Total	$752,556

4. Affected Environment and Anticipated Impacts

4.1. Service Area / Area of Potential Effect / Proposed Project Planning Area

The Fernwood Water and Sewer District is located about 16 miles southeast of St. Maries, Idaho on State Highway 3. The System is bordered to the west by the St. Maries River. The District provides water and wastewater services to the residents within the water and sewer service area, respectively. The sewer system service area is covered within this document. Since the District boundary and the sewer system service area are different (as was explained in Section 2 of the Facility Plan in Appendix A), the two have been merged into one Area of Potential Effect, as is shown in Appendix B. For this project the Area of Potential Effect (APE) is the same as the Proposed Project Planning Area (PPPA) boundary; maps reference the APE, which should be considered the PPPA/APE boundary. Refer to Appendix B for an overview of the APE and PPPA for the sewer system. The majority of the connections are single-family residences which are primarily year-round single family dwelling units. These residences are located within Sections 30, 31, and 32 Township 44 North, Range 1 East; Sections 25 and 36 Township 44 North, Range 1 West; Section 5 and 6 Township 43 North, Range 1 East; and Section 1 Township 43 North, Range 1 West, Boise Meridian.

The service area borders the eastern bank of the St. Maries River in a fairly flat area with a hillside bordering the area on the east side. The elevation of the system varies from 2,900 feet on the hillside, to 2,700 near the River. The area is flat and open in the town and forested in some areas. The service area consists of varying lot sizes. There are two other major creeks (Finn Creek and Crystal Creek) in addition to several tributaries.

4.2. Physical Aspects

4.2.1. Affected Environment

The Fernwood Water and Sewer District is located about 16 miles southeast of St. Maries, Idaho on State Highway 3. The boundary of the District and the service area is shown in a map in Appendix B. Since these boundaries are different, the two have been merged into one Area of Potential Effect; see Appendix B for this revised boundary.

4.2.1.1. Topography

The topography in the area is variable. The majority of the service area is open and flat within the town of Fernwood. There are forested hillsides surrounding the town of Fernwood. A topographical map of the area is included in Appendix D.

4.2.1.2. Geology

The Geologic Map of St. Maries, Idaho Quadrangle (Lewis et. al, 2000) was consulted to determine the geologic information for the District. This map can be found

in Appendix D. In addition, Appendix D provides an enlarged version of the above map for the Association. The types of rock present are:

- Unconsolidated Deposits – Alluvial deposits (Holocene); Sediment (Oligocene? and Miocene)
- Columbia River Basalt Group, Wanapum Formation – Priest Rapids Member (Miocene)
- Belt Supergroup – Wallace Formation, middle and lower members, undivided (Middle Proterozoic); Schist and phyllite of the Wallace Formation (Middle Proterozoic)

Detailed description of these deposits, sediments, and basalt can be found in Appendix D on the geological map. There is one fold axis through the APE, which roughly follows SH 3. In the northern portion of the APE, there is a Garnet isograd where garnets are present on the "garnet in" side of the line, concealed by post-Cretaceous rock.

4.2.1.3. Soils

The soils in the area are mapped primarily as loams (silt, stony, and gravelly) by the USDA Soil Survey. These soils are generally moderately well drained with some well and some poorly drained. These soils also have higher shrink-swell potential, but since the excavation will occur in previously disturbed areas, this may be reduced. The majority of the soils have a low possibility of erosion due to the moderate grain size. There is a small percentage (~5 percent) of soils that have a possibility of erosion since they are loams with low portions of larger grain sizes; these soils are located near the river and creek areas. A Natural Resources Conservation Service, Web Soil Survey map and soil descriptions is provided in Appendix D. In addition, the erosion potential survey and shallow excavation suitability is included in Appendix D.

4.2.2. Environmental Impacts

4.2.2.1. Topography

The proposed project will primarily consist of improvements within the previously disturbed areas. The I&I improvements will consist of repairing existing manholes via grouting and coating the manholes. As budget allows, the existing sewer mainlines identified in Appendix D and via video inspection will be replaced. The Spring Street sewer extension will be installed within the existing roadway. In addition, the new lift station (No. 1) will be placed in previously disturbed area. The proposed gravity or pressure main will be installed along the existing railroad tracks. Thus all the improvements should be located within the previously disturbed areas and are not anticipated to negatively impact the existing topography.

Therefore, short-term direct impacts due to ground disturbance (I&I improvements, sewer extension, and main construction) are anticipated, but no long-term, indirect, or cumulative impacts are anticipated.

4.2.2.2. GEOLOGY

No active fault lines or unusual geological features that may impact the proposed project were identified within the project planning area. Therefore, no impacts (short-term, long-term, direct, indirect, or cumulative) to geology are anticipated.

4.2.2.3. SOILS

The soils in the area are mapped as silt loam to gravelly loam by the USDA Soil Survey. The soils have a possibility of erosion due to the fine grained particle size. Best Management Practices (BMPs) will be implemented during construction to minimize the potential for the soils to erode and leave the construction site.

Therefore, there will be short-term direct impacts due to ground disturbance (I&I improvements, sewer extension, and main construction) are anticipated, but long-term, indirect, or cumulative impacts are not anticipated.

4.3. CLIMATE

4.3.1. AFFECTED ENVIRONMENT

The following climate information for the Fernwood area was obtained from weather.com, based on monthly averages:

- Average Annual Temperature High – 59° F
- Average Annual Temperature Low – 37° F
- Average Annual Precipitation – 30.6 inches
- Average Annual Snow Fall – 50.3 inches[3]

The prevailing wind in the area is North, Northeast, according to the Western Regional Climate Center. There are no known special or unusual meteorological constraints in the area.

4.3.2. ENVIRONMENTAL IMPACTS

There are no known special or unusual meteorological constraints that would affect the feasibility of the proposed project. Therefore, no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.4. POPULATION AND FLOW PROJECTIONS

4.4.1. AFFECTED ENVIRONMENT

The system currently serves 179 equivalent dwelling units (EDUs[4]) including 13 dormant connections. Based on the lift stations daily pump hour readings provided by

[3] Average annual snow fall for Fernwood (Saint Maries Station) was obtained from NOAA

[4] The term "equivalent dwelling unit" or EDU will be used throughout this document as the common denominator for projecting future sewer flows or comparing flows on an equal basis.

the District and lift station drawdown tests, the wastewater flows for the system were determined per EDU.

For the Fernwood sewer system, the number of EDUs for the year 2010 was estimated as 166. This number is based on billing information provided by the District. The following table provides the current number of EDUs within the system.

Table 4-1: 2010 EDU Summary

	Residential	Large/Commercial			Dormant Connections	Total Active	Total
		Upriver School	The Old School	Crystal Crk Mobile Home Park			
Number of EDUs	141	8	2	15	13	166	179

1. Residential includes all units that are billed as one EDU.

The current population in the District's sewer system can be estimated using the U.S. Census Bureau's estimate for average person per household in Benewah County (2.39 for 2010) multiplied by the EDUs served by the District. Thus, the population served by the District's sewer system is approximately 397 people.

The U.S. Census Bureau has estimated the population growth in Benewah County from 2000 to 2009 as an increase of 87 people. This equates to a 0.1% annual growth rate over this 9 year period. For the Benewah County Cities of St. Maries, Tensed, and Plummer, the Census Bureau reports a slight decrease in the population over the last 9 years. Population data was not available for Fernwood or Santa. Because the future growth rate for Fernwood is unknown, a conservative, yet relatively low, growth rate of 1% per year is assumed for planning purposes.

Growth for the sewer collection system is categorized into three phases, Priority 1, 2, and 3. These phases are used to organize and express expected growth according to its nature and location.

Not all of the customers currently served by the water system receive sewer service. The area that is currently provided water service by the District but not sewer service is considered in this Facility Plan as a potential growth area for the sewer system. This area is divided into Priority 1 growth area which does not require the sewer collection system to cross the St. Maries River, and Priority 2 growth area which is located on the southwest side of the River. Growth areas are shown on Figure 3-1 in Appendix B.

Future growth areas outside of both the current sewer service area and the water service area are identified as Priority 3 growth areas and include the proposed Rivers Edge Northwest development and other areas that have been identified by the District as potential growth areas. The area identified as a proposed development on Figure 3-1 in Appendix B is the proposed Rivers Edge Northwest development. The development would subdivide the existing 71 acres into 52 residential lots. The

An EDU is equivalent to the amount of wastewater produced by the average single-family detached housing unit within a sewer system.

preliminary plat was conditionally approved by Benewah County Commissioners on November 10th, 2008. The Facility Plan identifies the necessary collection system improvements for the District to provide sewer service to the development.

The number of potential EDUs included in Priority 1 and Priority 2 growth areas is based on the number of existing parcels. The number of EDUs in Priority 3 growth areas is estimated based on the number of proposed lots or nearby lot sizes. The following list provides the potential number of EDUs for each growth priority.

- Priority 1: 13 EDUs
- Priority 2: 27 EDUs
- Priority 3: 116 EDUs

Growth outside of the current sewer service area requires an extension of the existing collection system as well as additional downstream capacity. The actual location and amount of this growth is speculative so it is recommended that prior to approving growth outside of the current service area, the District require the developer to fund a detailed hydraulic and component capacity analysis and any necessary collection system improvements needed to maintain the current level of service with inclusion of the new development.

The estimated wastewater flows are projected at 1% annual growth rate (AGR) for the next 40 years and provided in Table 4-2. It is assumed that the flows per EDU remain constant at 181 gpd. Also, the peak I&I flow is assumed to remain constant. That is, additional growth and expansion of the system does not increase the I&I nor does the existing I&I decrease. The reality is likely somewhere in between these extremes.

Table 4-2: Fernwood Wastewater Flow Projection

Notes	Year	# of EDUs	Population	Avg Day (dry weather) (gpd/EDU)	Avg Day Flow (gpd)	Peak I&I (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
Active	2010	166	397	181	30,046	150,000	180,046	125
+ Dormant Connections	2010*	179	428	181	32,399	150,000	182,399	127
	2011	181	432	181	32,723	150,000	182,723	127
	2012	183	436	181	33,050	150,000	183,050	127
	2013	184	441	181	33,381	150,000	183,381	127
	2014	186	445	181	33,715	150,000	183,715	128
	2015	188	450	181	34,052	150,000	184,052	128
	2016	190	454	181	34,392	150,000	184,392	128
	2017	192	459	181	34,736	150,000	184,736	128
	2018	194	463	181	35,083	150,000	185,083	129
	2019	196	468	181	35,434	150,000	185,434	129
	2020	198	473	181	35,789	150,000	185,789	129
	2025	208	497	181	37,614	150,000	187,614	130
	2030	218	522	181	39,533	150,000	189,533	132
	2035	230	549	181	41,550	150,000	191,550	133
Rivers Edge NW Buildout	2036	232	554	181	41,965	150,000	191,965	133
	2040	241	577	181	43,669	150,000	193,669	134
	2045	254	606	181	45,897	150,000	195,897	136
	2050	267	637	181	48,238	150,000	198,238	138

1. Rivers Edge Northwest: Build-out at 52 residential lots.

As can be seen in the table above, the 20 year population estimation is approximately 522 people (218 EDUs x 2.39 people per household).

If I&I in the system does not increase in the future, the additional flow from the 20 year growth is minimal. Potentially, the system could see a decrease in the peak flow rate even with the additional growth if the current I&I problems are aggressively addressed.

4.4.2. Environmental Impacts

The proposed improvements will support the anticipated growth for the District, and the growth is not anticipated to be excessive. Therefore, the direct and indirect impacts to the population should be positive in the long-term since the improvements will support the anticipated growth for the District. Short-term and cumulative impacts are not anticipated.

4.5. Economic and Social Profile

4.5.1. Affected Environment

The majority of the homes served by the District are primary, year-round single family dwelling units. The sewer collection system also serves the Upriver School, the Fernwood Mercantile, and the Hideout Café. Although no social-economic data is

available specifically for this area, the US Census Bureau reports that 15.2 percent of the population in Benewah County is below the poverty level. The median household income in 2010 was reported as $37,500 for Benewah County[5].

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and polices. The Fernwood Water and Sewer District will seek the input of all persons within the Area of Potential Effects through public meetings. All members of the community will be treated the same and have equal access to the District's public services and decision-making process.

The residents within the District will benefit from the proposed project by receiving service from a reliable public sewer system. In addition, the project will allow for future growth and economic expansion within this area.

4.5.2. Environmental Impacts

The residents within the District will benefit from the proposed project by receiving service from a reliable public sewer system. The project will bring the system into compliance with current rules and prevent future compliance action/fines which could be levied to the District. The budgeted project will increase the user rates to 1.50 percent of their monthly income, it is currently 1.26 percent. In addition, the project will allow for future growth and economic expansion within this area, which is a positive long-term impact associated with the project.

Therefore, the direct and indirect impacts to economic and social profile (allowing for future growth and economic expansion) should be positive in the long-term. Short-term and cumulative impacts are not anticipated.

4.6. Land Use

4.6.1. Affected Environment

There are no land use/zoning classifications for areas in Benewah County outside incorporated cities. The area seems to be rural, with residential homes throughout the city. The improvements are not anticipated to impact the existing land uses for the area.

4.6.2. Environmental Impacts

The completion of the improvements is not anticipated to negatively impact the current land use. Therefore, no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

[5] U.S. Census Bureau, 2010 *State and County QuickFacts*

4.7. FLOODPLAINS AND WETLANDS

4.7.1. AFFECTED ENVIRONMENT

Based on the Benewah County, Idaho and Incorporated Areas Flood Insurance Rate map, dated September 25, 2009, there are some proposed improvements located within the 100 year floodplain. A portion of the floodplain map is provided in Appendix F. The new lift station (No. 1) and the sewer line along the St. Maries River will be moved out of the 100 year floodplain for the St. Maries River, which could protect the River from uncontrolled untreated discharges from the lift station. The individual grinder pumps used for the five residences near Depot Lane, which are located within the floodplain, will still be within the floodplain for both St. Maries River and Finn Creek. Lastly, a portion of the new gravity or pressure main along the existing RR tracks will be in a portion of the Finn Creek floodplain. Two manholes (within the I&I improvements shown on the selected improvements map in Appendix A) are located adjacent (within 25-50 feet) to a small, seasonal stream (could be technically designated as a seasonal drainage ditch). These manholes are not located within the designated floodplain but are subject to seasonal flooding (as indicated on the selected improvements map in Appendix A.

United States Fish and Wildlife Service provided a National Wetlands Inventory interactive online mapper. A map of wetlands (also showing the improvements) within the project area was prepared using the mapper and is included in Appendix F. The sewer line located along the St. Maries River is currently in the designated wetland area, but it will be abandoned as part of this project. Additionally, Lift Station No. 1 is currently located in the designated wetland area, but it too will be abandoned as part of this project. The lift station will be "cut off" at the ground level; the top portion will be hauled away and the bottom portion will stay in place. Thus no ground-disturbing work will occur. The other improvements are not within the designated wetland areas.

4.7.2. ENVIRONMENTAL IMPACTS

Best management practices (BMPs) will be utilized to protect the water quality of the wetlands and floodplains and to prevent sediment from leaving the construction site.

The Idaho Department of Water Resources was consulted regarding the impact of the improvements on floodplains in the project area. Fernwood is not an incorporated city and does not participate in the National Flood Insurance Program. However, Benewah County has a flood damage prevention ordinance that regulates floodplain management in the area. They identified the areas and improvements that are within the floodplain areas. Design of the improvements within the floodplain areas should minimize or eliminate infiltration of flood waters into the wastewater system. This can be accomplished, generally, by raising manholes and grinder basins above the Base Flood Elevation (BFE) or equipping with seals to prevent leakage, and by installing electrical panels on the pumping stations above the BFE. The two manholes adjacent to the small, seasonal stream mentioned above will be raised and sealed to prevent inflow from seasonal flooding. Lastly, a floodplain development permit will be

required for construction activities and other development in the mapped flood hazard area.

The Army Corps of Engineers also provided consultation regarding the wetland locations for this project. As stated above, one of the sewer lines and Lift Station No. 1 (refer to Appendix B for a map of the project components) appear to be located in the wetland adjacent to the St. Maries River[6]. The Army Corps of Engineers initially suggested that a wetland delineation for the entire project area be completed to determine if the proposed project would be located within wetland areas. If the improvements were found to be located in wetland areas and involved fill added to waters of the United States (which include wetland areas), permits from the Army Corps of Engineers would be required. However, after a follow up consultation (after clarification of the specific aspects of the improvements, particularly, methods of construction which will eliminate the addition of fill to waters of the United States[7]), the Army Corps of Engineers determined that the project will not require any permits and consequently no wetland delineations. This determination was based on the fact that no fill will be added to waters of the United States to complete the projects. Thus, during design and construction, no fill can be added or planned to be added to wetland areas and wetland areas should be protected from construction runoff through the use of stormwater BMPs. Refer to Appendix N for further information on these consultations.

Therefore, short-term direct impacts are anticipated for floodplains or wetlands due to potential for sediment to leave the construction site and enter wetlands and floodplains near to the proposed project sites (which will be mitigated through best management practices (BMPs. In addition, submittal of and compliance with a floodplain development permit from Benewah County will be required for the construction activities. The facilities will be designed to minimize or eliminate infiltration of flood waters into the wastewater system. Indirect, long-term positive impacts are expected since existing water sources will be protected by improving the overall system reliability. Cumulative impacts are not anticipated.

4.8. WILD AND SCENIC RIVERS

4.8.1. AFFECTED ENVIRONMENT

The nearest designated Wild and Scenic River to the project area is a portion of the St. Joe River. This is approximately 28 miles from the Fernwood area. See Appendix G for a map of the Wild and Scenic Rivers in the area.

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[6] The sewer crossing located at Finn Creek was also discussed with the Army Corps of Engineers (even though it does not fall within a designated wetland area). The crossing will occur within the existing railroad crossing so as not to disturb the stream or the riparian area near the stream (at a minimum this crossing must be trenchless so as not to result in fill within waters of the United States). Thus, the Army Corps of Engineers determined that there would be no impact to wetlands or waters of the United States as a result of this crossing.

[7] The sewer line to be abandoned will be abandoned in place and will not be removed or replaced. The lift station to be abandoned will be "cut off" at the ground level and the top portion will be hauled away with the bottom portion staying in place.

4.8.2. ENVIRONMENTAL IMPACTS

Since there are no designated wild and scenic rivers in the project area, no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.9. CULTURAL RESOURCES

4.9.1. AFFECTED ENVIRONMENT

There are no known historic resources within the Fernwood area. A search of the Benewah County, Idaho sites listed on National Register of Historic Places, provided in Appendix H[8], shows the nearest sites located within the town of St. Maries, Idaho (Kootenai Inn, Benewah County Courthouse, and St. Maries 1910 Fire Memorial) which is approximately 16 miles north of Fernwood. The nearest tribal reservation is approximately 16 miles to the west.

4.9.2. ENVIRONMENTAL IMPACTS

Since the majority improvements will be occurring within previously disturbed areas, impacts to cultural resources are not anticipated.

The State Historic Preservation Office was consulted regarding the impact to cultural resources from this project. They indicated that since there was very little new disturbance, no effect to cultural resources is anticipated and an archeological survey will not be required. If artifacts are discovered during construction of the project, the SHPO and the Coeur d'Alene Tribe shall be contacted immediately and all work must stop. Mitigation will be consulted with these two agencies before construction re-commences.

Therefore no impacts (short-term, long-term, direct, indirect, and cumulative) to cultural resources are anticipated.

4.10. PLANTS AND WILDLIFE

4.10.1. AFFECTED ENVIRONMENT

The US Fish and Wildlife Office was consulted to determine the threatened and endangered plant and animal species in Benewah County. A list from the Office can be found in Appendix I. According to this agency's database, there are no endangered species within the county. Threatened species include the following: Canada Lynx, Bull Trout, Spalding's Catchfly, and Water Howellia. Candidate species include the following: Yellow-billed Cuckoo, North American Wolverine, and Whitebark Pine. The Gray Wolf is listed in recovery. In addition, critical habitat has been identified in the Columbia River Basin for the protection of Bull Trout, but there are no designated critical habitat areas in the Fernwood area, as can be seen in Appendix I.

4.10.2. ENVIRONMENTAL IMPACTS

[8] Major highways (3, 5, and 6) are noted on the map for reference.

As mentioned above, the project area is not located in a critical habitat area and it is not anticipated that the species or habitat areas will be affected by the project.

The Idaho Fish and Wildlife Office provided consultation for this project. They did not anticipate any issues with the project. The only species that could be affected is the bull trout which occurs in the St. Joe River downstream of the project. Best Management Practices will be utilized to protect the water quality of the surface water bodies from further degradation. Thus, the St. Joe River is not anticipated to be affected by this project and thus the bull trout should not be impacted either. In addition, the Idaho Department of Fish and Game does not anticipate that the proposed project will have an impact on the fish and wildlife in the project area, since the improvements will fall within existing rights-of-way.

Therefore, no impacts to plants and wildlife (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.11. Recreation and Open Space

4.11.1. Affected Environment

The project is not located in recreational open spaces, parks, or areas of recognized scenic or recreational value.

4.11.2. Environmental Impacts

Since there are no designated recreational open spaces, parks, or areas of recognized scenic or recreational value in the project area, no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.12. Agricultural Lands

4.12.1. Affected Environment

Prime agricultural classification is provided as part of the USDA Soil Survey conducted for the soil information in Section 4.1. According to the Soil Survey, "farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops." There are no soils listed as prime farmland within the project area.

4.12.2. Environmental Impacts

The planning area does not include prime agricultural lands. Therefore no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.13. Air Quality

4.13.1. Affected Environment

The State of Idaho has been delegated authority to regulate air quality through the EPA and the Clean Air Act. The State Implementation Plan provides the rules and

regulation to maintain acceptable air quality standards within the state and site specific plans delineating areas that do not meet air quality standards. Areas that do not meet specific air quality standards are known as Nonattainment Areas. A map showing Nonattainment Areas and Areas of Concern for the State of Idaho is provided in Appendix J. The proposed project planning area is not located in a Nonattainment area or an area of concern.

Noise from the collection system only occurs when alarms activate for the lift stations. A high-pitched alarm sounds when certain conditions occur within the lift station. Residents have not reported any complaints from this noise in the past. This is the primary notification for the operator of lift station emergencies. The new lift stations will have similar alarm systems to the existing system.

4.13.2. ENVIRONMENTAL IMPACTS

The Department of Environmental Quality (DEQ) was consulted, and they require that reasonable controls be implemented during construction and maintenance to prevent fugitive dust during all phases of the project. The project plans should also describe the proper disposal of any demolition and construction debris in accordance with solid waste regulations. Open burning during of demolition or construction debris is not allowed. Vegetation/land clearing should be accomplished using mechanical methods to avoid generation of smoke.

Short-term impacts are anticipated in association with construction emissions; however, the impact to air quality is not anticipated to exceed state or federal limits. Long-term, indirect or cumulative impacts are not anticipated.

4.14. WATER QUALITY

4.14.1. AFFECTED ENVIRONMENT

4.14.1.1. SURFACE WATER

The primary surface water bodies within the area of potential effect are the St. Maries River, Finn Creek and Crystal Creek, as can be seen in the topographical map in Appendix D. The St. Maries River has a TMDL for sediment and temperature. In addition, several creeks in the area have TMDLs for sediment (Carpenter Creek, Crystal Creek). The project area is adjacent to the St. Maries River and several other creeks; therefore, excess nutrients cannot be input into the River from project. Refer to Appendix K for excerpts from the St. Maries River Subbasin Assessment and Total Maximum Daily Loads (TMDLs).

During construction, BMPs will be developed and implemented to protect the quality of the nearby surface water bodies from further degradation.

4.14.1.2. GROUND WATER

The project area is within the source area for the Spokane Valley-Rathdrum Prairie Aquifer, as can be seen in the map of the Aquifer in Appendix L. The Aquifer is classified as a sole source aquifer by the US Environmental Protection Agency. A sole source aquifer classification indicates that the aquifer supplies at least 50 percent of

the drinking water consumed in the area overlying the aquifer. Fernwood derives its drinking water from two sources, Fernwood Well No. 1 and Adams Creek. The water from Fernwood Well No. 1 is treated for iron and manganese. The Adams Creek diversion is treated through a slow sand filter.

The project is not anticipated to affect water rights or the quantity of ground water available for private drinking water wells. Since the project will improve the existing system with sewer line improvements and new lift stations, the ground water quality will be further protected from future pollution through uncontrolled untreated discharges.

During construction, BMPs will be developed and implemented to protect the quality of the ground water from further degradation from uncontrolled untreated discharges.

4.14.2. Environmental Impacts

4.14.2.1. Surface Water

The primary surface water bodies within the area of potential effect are the St. Maries River, Finn Creek and Crystal Creek, as can be seen in the topographical map in Appendix D. The St. Maries River has a TMDL sediment and temperature; several other Creeks in the area have TMDLs for sediment. The project area is adjacent to the St. Maries River and several other creeks; therefore, excess nutrients cannot be input into the River from project. The Idaho DEQ was consulted, and they require the protection of surface water and control of erosion and sedimentation by the use of acceptable best management practices (BMPs). They also indicated concern for a potential crossing at Finn Creek as part of the relocation of the sewer line. If there is a crossing, the DEQ would require the appropriate permits (the Army Corps of Engineers did not indicate that permits from their agency would be required). This crossing would be attached to the existing railroad crossing of this Creek. Appropriate permits will be applied for and required as part of the construction plans and specifications.

The Idaho Department of Water Resources (IDWR) was consulted regarding this project. They indicated that if any alteration of a stream channel was required in a continuously flowing stream, a stream alteration permit is required from the IDWR. However, stream channels will not be altered as a part of this project.

Therefore, short-term impacts to water quality (surface water) are anticipated due to ground disturbance near surface water bodies, but the surface water bodies will be protected utilizing BMPs during construction, as required by DEQ. Indirect, long-term positive impacts are expected since existing water sources will be protected by improving the overall system reliability. Cumulative impacts are not anticipated.

4.14.2.2. Ground Water

The project area is within the source area for the Spokane Valley-Rathdrum Prairie Aquifer, as can be seen in the map of the Aquifer in Appendix L. The Aquifer is classified as a sole source aquifer by the US Environmental Protection Agency. Fernwood derives its drinking water from two sources, Fernwood Well No. 1 and

Adams Creek.

The project is not anticipated to affect water rights or the quantity of ground water available for private drinking water wells. Since the project will improve the existing system with sewer line improvements and new lift stations, the ground water quality will be further protected from future pollution through uncontrolled untreated discharges.

The Environmental Protection Agency provided consultation regarding the effects to the Spokane Valley-Rathdrum Prairie Aquifer (sole source aquifer). They did not anticipate that the project would have significant adverse impacts to the Aquifer.

Thus, short-term, long-term, direct and indirect positive impacts to water quality and sole source aquifer (ground water) are anticipated due to improvement of existing system to decrease likelihood of unmonitored, untreated discharges from entering the ground water system. Short-term impacts are anticipated due to ground disturbance but will be mitigated through the use of BMPs. Cumulative adverse impacts are not anticipated.

4.15. Public Health

4.15.1. Affected Environment

If improvements are not made to increase the capacity of LS #1 and reduce the high I&I, the system will continue to surcharge and overflow. Because this represents a serious public health issue, it is recommended that proposed projects are implemented as soon as possible. Growth within the collection system cannot be support until improvements are made.

It is apparent that if the District continues utilizing their current system, they could be posing a great risk to public health and water quality as well as subjecting the District to future fines for unpermitted discharges and non-compliance. Thus, the District must improve the existing system to increase capacity and address I&I issues.

4.15.2. Environmental Impacts

Currently, the District's wastewater collection system cannot handle the peak flows in the system and has excessive I&I. Improving the system with this project will bring the system into compliance and reduce the risk to public health and water quality. Thus, the impacts to public health are anticipated to be positive in the long-term, short-term, directly, indirectly, and cumulatively since the system will improve the Districts ability to handle peak flows and reduce the excessive I&I in the system, which reduces the likelihood of untreated, uncontrolled discharges.

4.16. Solid Waste/Sludge Management

4.16.1. Affected Environment

The sludge buildup in the lagoons is monitored and removed when the buildup exceeds the designed limit. The sludge is removed and taken to an approved disposal facility, as needed.

4.16.2. Environmental Impacts

The operation of the lagoons will not significantly change and thus the sludge management will not change either. Therefore no impacts (short-term, long-term, direct, indirect, or cumulative) are anticipated.

4.17. Energy Production/Consumption

4.17.1. Affected Environment

Replacing the aged components with new, energy efficient components has the potential of decreasing the current energy consumption. With the addition of new components, the energy used for the system will increase. But the new components will be selected for energy efficiency. In addition, the improvements for I&I conditions could lead to flow reduction and reduction in energy consumption.

4.17.2. Environmental Impacts

With the replacement of aged components and the addition of new, more efficient components, the overall energy consumption is likely to be reduced as a result of these improvements. In addition, the I&I improvements could lead to flow reduction and energy consumption reduction.

Therefore, the impact to energy consumption is anticipated to be positive in the long-term, directly since old components will be replaced with new higher efficiency components and I&I improvements could lead to flow reduction and energy consumption reduction. Short-term, indirect, and cumulative negative impacts are not anticipated.

4.18. Reuse/Land Application

4.18.1. Affected Environment

The treatment facility discharges to the St. Maries River through a perforated effluent diffuser pipe. Thus, reuse or land application is not utilized in this system.

4.18.2. Environmental Impacts

Since reuse and land application are not utilized in this system, impacts to reuse/land application (short-term, long-term, direct, indirect, or cumulative) are not anticipated.

4.19. Regionalization

4.19.1. Affected Environment

The Fernwood and Santa communities both pump wastewater to the regional Santa-Fernwood Wastewater Treatment Facility. Thus, Fernwood is already a part of a regionalization facility.

4.19.2. ENVIRONMENTAL IMPACTS

The improvements to the collection system will not affect the agreement between Santa and Fernwood for the treatment of wastewater. The improvements may decrease the flows to the treatment facility through reduction of I&I conditions. Thus, the negative impacts (short-term, long-term, direct, indirect, and cumulative) of reuse/land application are not anticipated.

5. Environmental Impact Mitigation

Section	Regulatory Agency	Mitigation
4.2 Physical Aspects AND 4.14 Water Quality	Idaho Department of Environmental Quality	Stormwater controls (BMPs) will need to be developed that adequately protect surface waters and ground water from being impacted during and after construction. If the area of disturbance is larger than 1 acre, a Stormwater Pollution Prevention Plan (complying with General Construction Permit) will be required through EPA.
4.7 Floodplains and Wetlands	Benewah County	Design of the improvements within the floodplain areas should minimize or eliminate infiltration of flood waters into the water system. A floodplain development permit will be required for construction activities and other development in the mapped flood hazard area.
4.7 Floodplains and Wetlands	Army Corps of Engineers	No fill can be added or planned to be added to waters of the United States (including wetlands) during construction. Methods of construction include: Finn Creek crossing to occur within the existing railroad crossing (at a minimum: trenchless crossing), sewer line abandonment must be in-place and not removed or replaced, lift station abandonment will be in-place (the station will be "cut off" at the ground level, the top portion hauled away and the bottom portion will stay in place).
4.9 Cultural Resources	Idaho SHPO and Coeur d'Alene THPO	If artifacts are discovered during the course of construction, the Coeur d'Alene Indian Tribe and SHPO will be contacted and all work will stop. Mitigation may be further evaluated.

4.13 Air Quality	Idaho Department of Environmental Quality	The contractor must mitigate fugitive dust as a result of construction of this project using reasonable controls in accordance with DEQ regulations and should be advised during the preconstruction conference of the requirements to keep dust to a minimum. The project plans should also describe the proper disposal of any demolition, construction, or cleared vegetation debris. Open burning of debris is not allowed.
4.14 Water Quality	Idaho Department of Environmental Quality	If the new sewer line is to cross Finn Creek, the appropriate permits will need to be incorporated into the construction plans and specifications and will need to be applied for well in advance of construction. This crossing will occur within the existing railroad crossing (or at a minimum: trenchless method) of the Creek and no permits are required by Army Corps of Engineers.

6. Public Participation

As part of the improvement alternative selection process, public input was received from the community. This section identifies the steps taken to solicit public input. The Districts' efforts at engaging the public in the planning process were accepted by Idaho DEQ in May 2012 (refer to Appendix M for correspondence).

The DRAFT Facility Plan for the Fernwood Wastewater System was presented to the Community on June 14, 2011. During this meeting a presentation was given identifying and discussing the recommended improvement alternatives. The cost information for the improvements presented in this chapter was also summarized in the presentation. A May Newsletter was used to notify the community of the June 14th meeting and answer questions regarding the wastewater project. Copies of the newsletter, presentation, meeting minutes, and meeting sign-in sheets are included in Appendix M. Comments regarding the project details from the public during the June meeting were summarized and have been included in Appendix M. The comments were generally in reference to the financing for the project and some technical questions which were either addressed by the Board, Welch Comer, or IDEQ. Written comments were submitted and seemed to be in support of the project (refer to Appendix M for these comments and the Board's response to them).

On August 2nd, the Fernwood Board met with IDEQ and Welch Comer to discuss modification to the scope of improvements presented to the public in the June 14th meeting. Comments regarding the project details from the public during this August 2nd meeting were summarized and have been included in Appendix M. The comments were generally in reference to the financing for the project and some technical questions which were either addressed by the Board or IDEQ. A project status report was drafted, summarizing the August 2nd meeting and submitted to the Board on August 8th. Additional revisions were made to the report during another meeting on August 9th. The project status report was updated to reflect these changes. The project status report, meeting minutes, and sign-ins are included in Appendix M. As with all District meetings, and as required by state law, these meetings were noticed to the public and open to the public. Finally, on August 23rd, the Board met for a special meeting in which they identified and selected the alternatives for the project, described in the project status report, based on public comment and board member input. This meeting is described and documented in a letter, which is included in Appendix M.

The District held a second community meeting on September 13, 2011 to provide further information about the recommended sewer improvements and to discuss a bond election for the project. Notice of the meeting and bond election was given in the September newsletter. Copies of the newsletter, meeting minutes, and meeting sign-in sheets are included in Appendix M.

On November 8, 2011, the Fernwood Sewer and Water District voted to pass a sewer revenue bond to allow the District to increase its borrowing capacity to pay for the recommended improvements. The bond passed with 40 yes votes and 31 no votes. Information regarding the bond election is provided in Appendix M.

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Welch Comer & Associates, Inc. *Preliminary Engineering Facility Plan for Fernwood Sewer Collection System.* Welch Comer Engineers and Surveyors, 2011.

8. AGENCY CONSULTATION

The following table provides a list of agencies that were contacted November 18, 2011 via mail to request their comments, concerns, or any potential impacts of the proposed project. The request letters and their response are located in Appendix N.

Agency	Contact	Address
US Army Corps of Engineers, Coeur d'Alene Regulatory Office	Beth Reinhart/ Mike Burgan	2065 W. Riverstone Drive, Ste. 201 Coeur d'Alene, ID 83814
US Fish and Wildlife Service	State Supervisor/ Bryon Holt	11103 East Montgomery Drive Spokane, WA 99206
Idaho Department of Environmental Quality, Coeur d'Alene Regional Office	Katy Baker-Casile/ John Tindall	2110 Ironwood Parkway Coeur d'Alene, ID 83814
US EPA, Coeur d'Alene Field Office	Don Martin	1910 NW Blvd., Suite 208 Coeur d'Alene, ID 83814
US EPA, Idaho Operations Office	James Werntz/ Cyndi Grafe	1435 North Orchard Boise, ID 83706
EPA Region 10	Mike Lidgard, Manager/ Maria Lopez	1200 6th Avenue, OWW 130 Seattle, WA 98101
EPA Region 10, Office of Environmental Assessment (OEA-095)	Sue Eastman, Hydrogeologist	1200 6th Avenue, OWW 136 Seattle, WA 98101
USDA-NRCS	Mark Addy, District Conservationist/ Aubrey Woodcock	7830 Meadowlark Way, Suite C1 Coeur d'Alene, ID 83815
Idaho Department of Water Resources	Mary McGown, State NFIP Coordinator	322 East Front Street, PO Box 83720 Boise, ID 83720
Idaho Department of Water Resources	Allen Beardslee	7600 Mineral Drive, Ste. 100 Coeur d'Alene, ID 83815
Idaho Department of Fish and Game, SE Region	Regional Nongame Biologist/ Charles Cosi	2750 Kathleen Avenue Coeur d'Alene, ID 83815
Idaho Department of Agriculture	Gary Bahr	PO Box 790 Boise, ID 83701
Panhandle District Health Department	Dale Peck, Environmental Health Director/ Dick Martindale	2195 Ironwood Court Coeur d'Alene, ID 83814
Department of Lands, Northern Operations	Roger Jansson, Operations Chief – North/ Kenneth Ockfen	3780 Industrial Avenue South Coeur d'Alene, ID 83815
USDA-RD	Jeff Beeman, Rural Development Specialist/ Howard Lunderstadt	7830 Meadowlark Way, Suite C3 Coeur d'Alene, ID 83815

Idaho Department of Commerce	Dennis Porter, State Program Manager/ Tony Tenne	700 West State Street, PO Box 83720 Boise, ID 83720
Idaho State Historical Society	Suzi Pengilly, Deputy SHPO	210 Main Street Boise, ID 83702
Coeur d'Alene Tribe of Idaho	Jill Wagner, PhD, THPO, Cultural Resource Program	PO Box 408 Plummer, ID 83851

9. MAILING LIST

The mailing list for this project includes both the agencies consulted (see Section 8), and the residents who were contacted with the newsletter (see Appendix M for list of newsletter recipients). Meeting attendees have been summarized and listed in Appendix M as well.

Appendix A

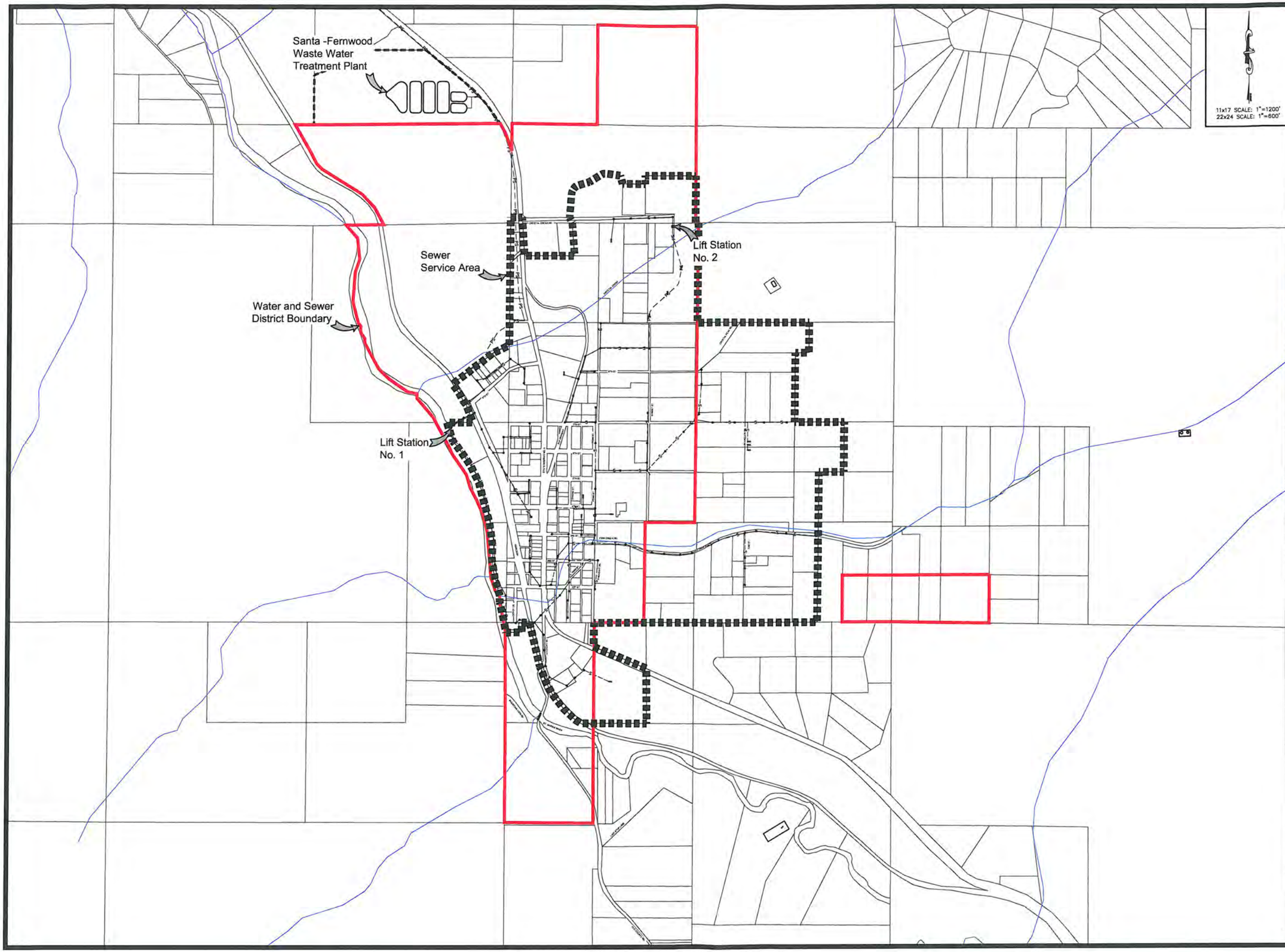
Fernwood Water and Sewer District
Sewer Collection System Facility Plan

(Submitted under separate file)

Appendix B

Maps of the System

- Existing System Overview
- Sewer Service Growth Areas
- Lift Station No. 1 Relocation Option A-1
- Lift Station No. 1 Relocation Option A-2
- Infiltration and Inflow Locations
- Selected Improvements Overview
- APE/PPPA Map



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NO.	DATE	REVISION DESCRIPTION	BY

FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

FERNWOOD SEWER COLLECTION SYSTEM AND SERVICE AREA
FIGURE 2-1

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008PL02.DWG
DATE:	03-10-11
SHEET NO:	

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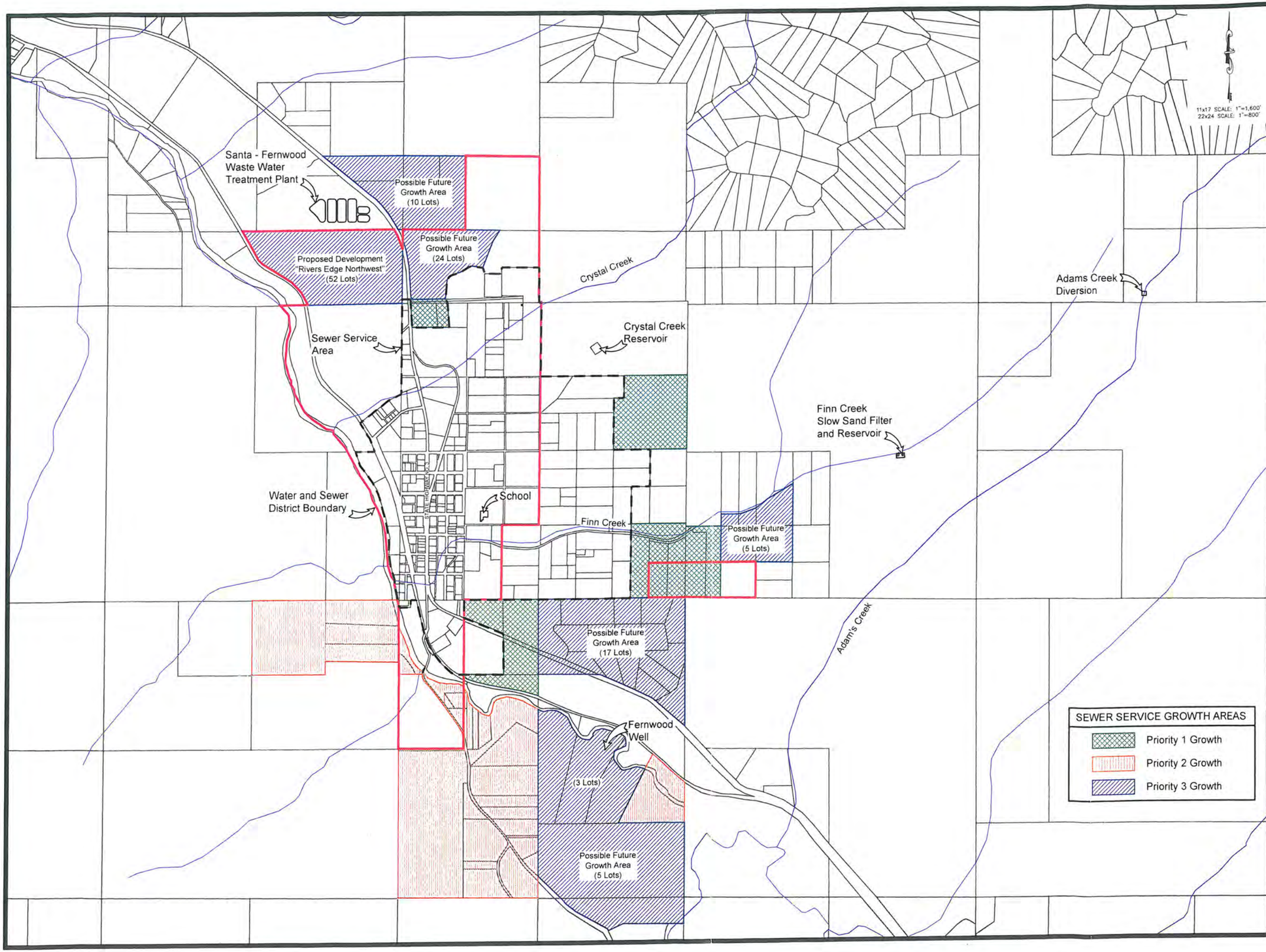

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FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM
FACILITY PLAN

SEWER SERVICE
GROWTH AREAS
FIGURE 3-1

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008PL02.DWG
DATE:	03-22-11
SHEET NO:	

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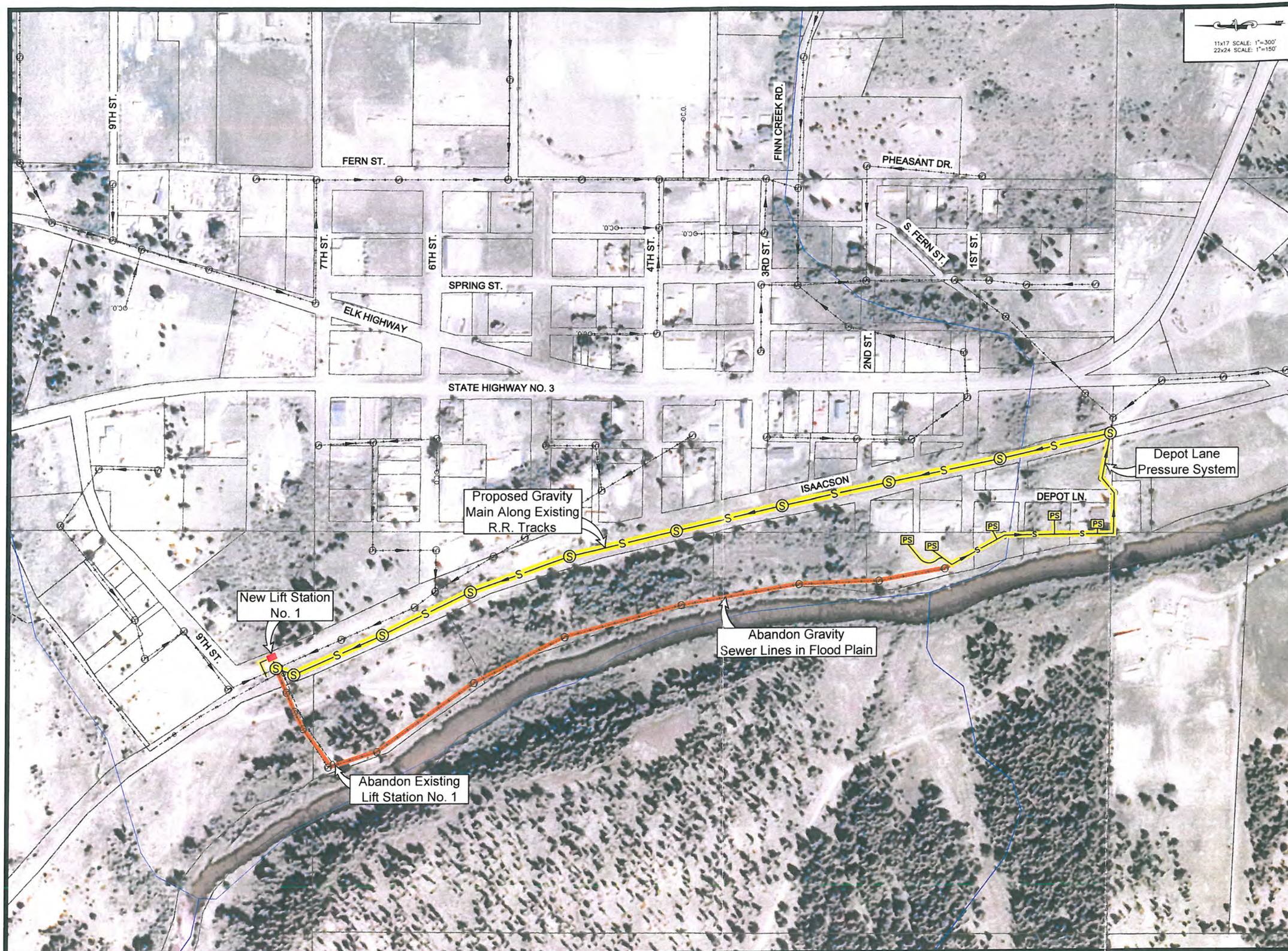

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FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM
FACILITY PLAN

FIGURE 4-1
LIFT STATION #1 RELOCATION
OPTION A-1

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008UT02.DWG
DATE:	03-22-11
SHEET NO:	

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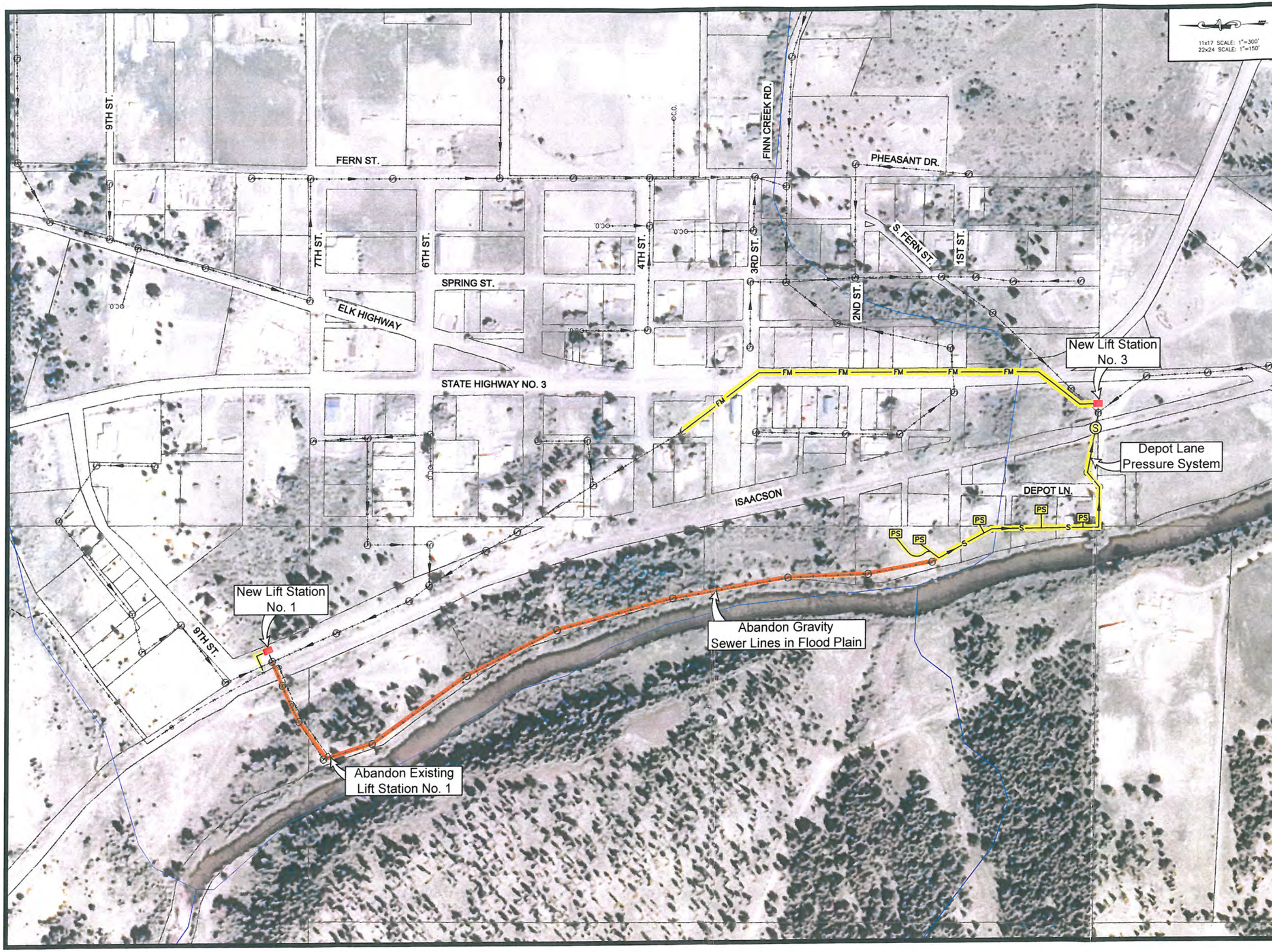

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FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

FIGURE 4-2
LIFT STATION #1 RELOCATION
OPTION A-2

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008UT02.DWG
DATE:	03-22-11
SHEET NO:	

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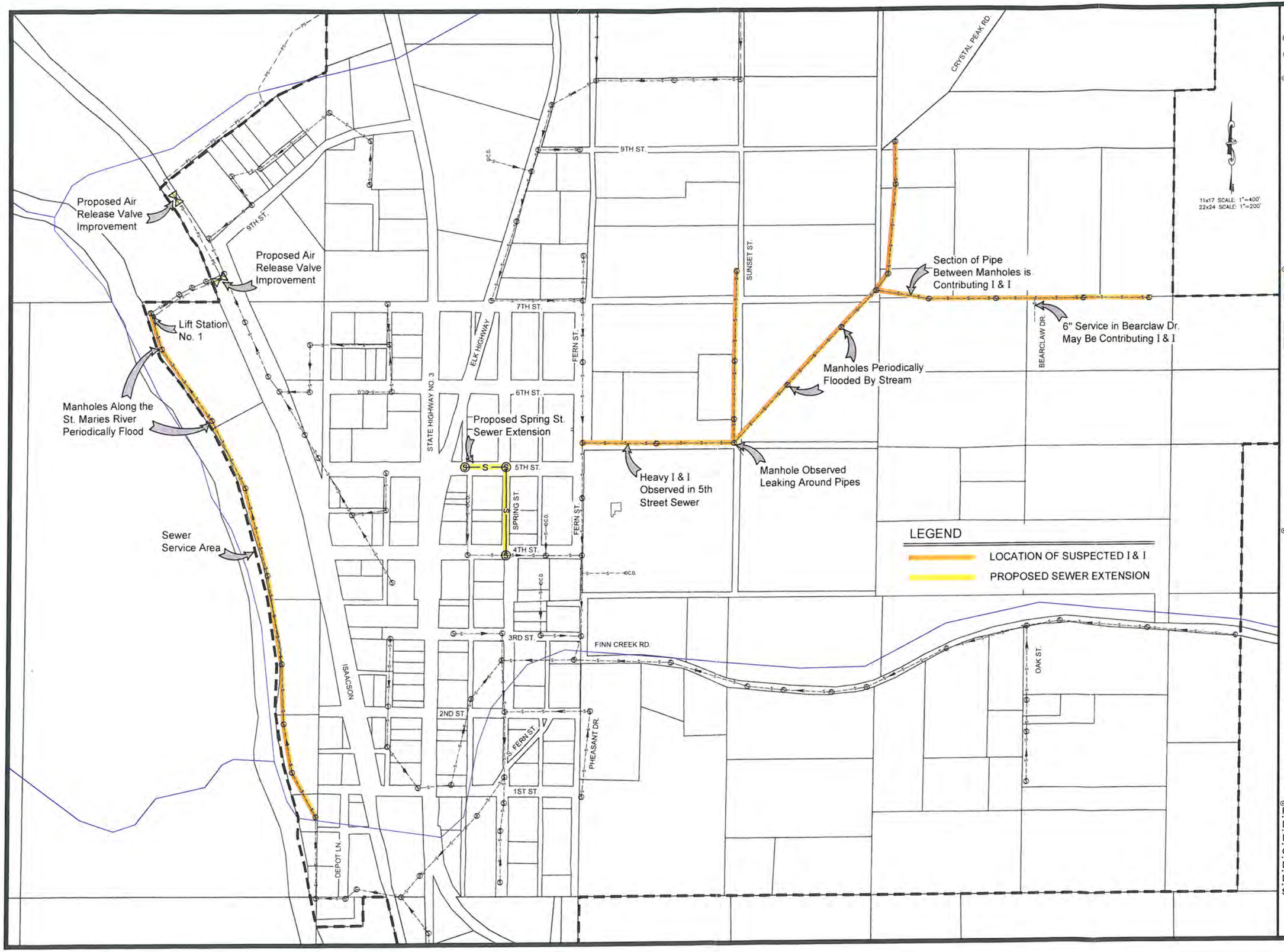

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FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

FERNWOOD SEWER COLLECTION SYSTEM IMPROVEMENTS
FIGURE 4-3

PROJECT NO.:	43008
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DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008PL02.DWG
DATE:	03-22-11
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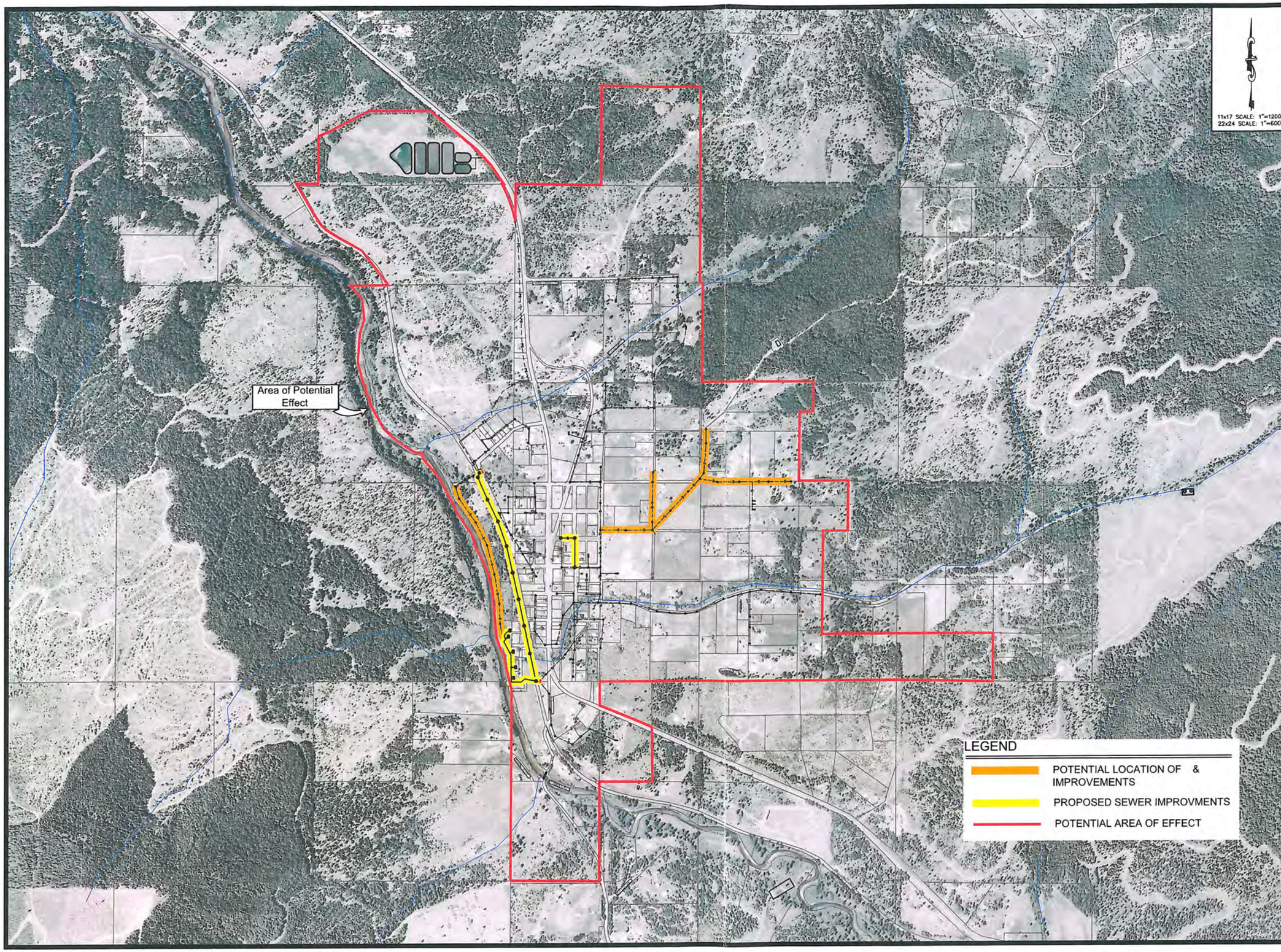

11x17 SCALE: 1"=1200'
22x24 SCALE: 1"=600'

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NO.	DATE	REVISION DESCRIPTION	BY

FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

SELECTED SYSTEM IMPROVEMENTS OVERVIEW

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008DS05-3D.DWG
DATE:	11–14–11
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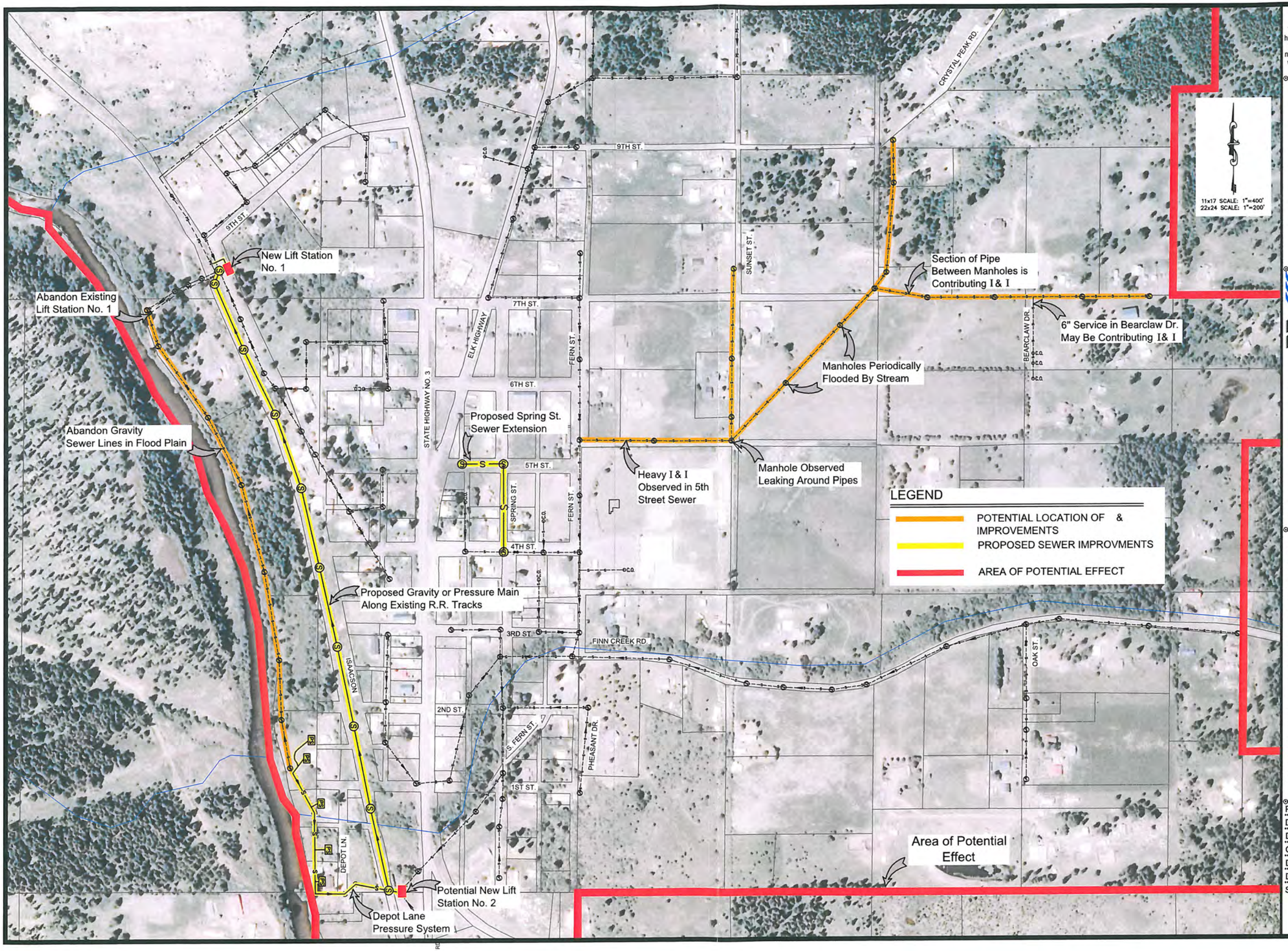

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(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

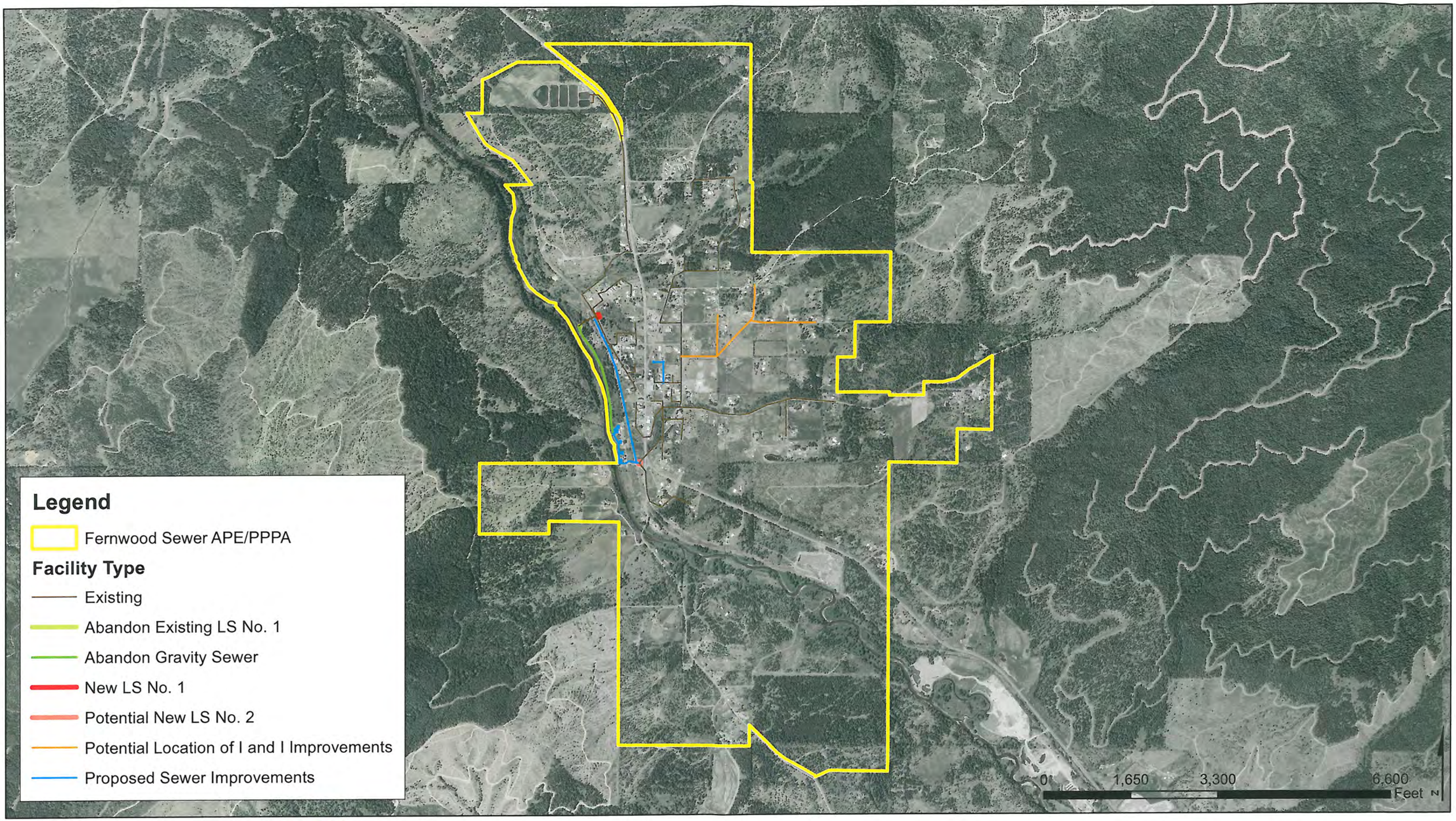
FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

SELECTED SYSTEM IMPROVEMENTS

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008DS05-3D.DWG
DATE:	12-12-11
SHEET NO:	

\\Nas-01\cad\CAD Projects\43008\dwg\43008DS05-3D.dwg, 12/12/2011 10:47:27 AM, julie, 1:2



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Fernwood Sewer

Area of Potential Effect/Proposed Project Planning Area

Sources:
USDA, NAIP 2009

PROJECT NO. 43007
DRAWN BY ..... AW
FILENAME ..... FernwoodSewer_Topo.mxd
DATE 6/15/12

Appendix C

Cost Information and Alternative Comparison Tables

- Alternative Cost Information
- Selected Alternative Cost Information
- Alternative Comparison Table

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood Lift Station #1 Option A-1

Prepared By: DDO | Date: 3/2/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
Replace LS #1 with Lift Station and Gravity Main above Flood Plain					
1	LS #1 Replacement	LS	1	$177,000.00	$ 177,000.00
2	Depot Lane Pressure System	LS	1	$71,300.00	$ 71,300.00
3	Gravity Line From Depot Lane to 9th St	LS	1	$298,500.00	$ 298,500.00
				Subtotal =	$546,800.00
Value of Projects Eliminated					
	LS #1 Replacement in Place	LS	1	$ (150,000.00)	$ (150,000.00)
	Video Inspection	LF	3200	$ (1.77)	$ (5,700.00)
	Sewer Main Replacement Contributing to I&I	LF	3200	$ (51.00)	$ (163,200.00)
	Manhole Repair/Grouting	EA	12	$ (2,200.00)	$ (26,400.00)
				Subtotal =	($345,300.00)
	Assumptions:				
	Does not include R/W acquisition				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood Lift Station #1 Option A-2

Prepared By: DDO — Date: 3/2/2011

Project Manager: NM — Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
Replace LS #1 with 2 Lift Stations above Flood Plain					
1	LS #1 Replacement	LS	1	$177,000.00	$ 177,000.00
2	Depot Lane Pressure System	LS	1	$71,300.00	$ 71,300.00
3	LS #3	LS	1	$ 140,000.00	$ 140,000.00
4	LS #3 FM	LS	1	$190,200.00	$ 190,200.00
				Subtotal =	$578,500.00
Value of Projects Eliminated					
	LS #1 Replacement in Place	LS	1	$ (150,000.00)	$ (150,000.00)
	Video Inspection	LF	3200	$ (1.77)	$ (5,700.00)
	Sewer Main Replacement Contributing to I&I	LF	3200	$ (51.00)	$ (163,200.00)
	Manhole Repair/Grouting	EA	12	$ (2,200.00)	$ (26,400.00)
				Subtotal =	($345,300.00)

Assumptions:

Does not include R/W acquisition

LS #3: Duplex submersible, 250gpm @ 55 ft, 7.5 Hp

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Depot Lane Pressure Sewer System

Prepared By: DDO | Date: 1/7/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	2" Pump to Gravity Sewer Service	EA	5	$ 500.00	$ 2,500.00
	2" HDPE Pressure Sewer Service	LF	250	$ 12.00	$ 3,000.00
	HDPE Pressure Sewer Main (Slipline)	LF	1000	$ 15.00	$ 15,000.00
	Simplex Non-Clog Pump Station	EA	5	$ 2,500.00	$ 12,500.00
	Testing - Simplex Lift Station	EA	5	$ 200.00	$ 1,000.00
	Pump Control Panel - Simplex Panels	EA	5	$ 1,500.00	$ 7,500.00
	Exploratory Excavation	HR	10	$175.00	$ 1,750.00
	Hydroseed	SY	600	$1.00	$ 600.00
					$ -
				Subtotal =	$48,850.00
				10% Contingency =	$4,885.00
				Total Estimated Construction =	$53,735.00
ENGINEERING					
	Design Phase Services				$8,100.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$6,000.00
ESTIMATED TOTAL PROJECT COST					**$71,300.00**
	Assumptions:				
	Existining 8" gravity sewer is sliplined with the HDPE pressure main				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Gravity Line From Depot Lane to 9th Street

Prepared By: DDO — Date: 3/2/2011

Project Manager: NM — Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 13,000.00	$ 13,000.00
	Site Control	LS	1	$ 10,000.00	$ 10,000.00
	Stream Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Hydroseeding	SY	6000	$ 2.50	$ 15,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill 0-15	LF	2000	$ 25.00	$ 50,000.00
	Trench Excavation and Backfill 0-30	LF	1000	$ 50.00	$ 50,000.00
	A8 Pipe Bedding Aggregate	LF	3000	$ 3.00	$ 9,000.00
	8" ASTM D3034 PVC	LF	3000	$ 8.00	$ 24,000.00
	48" Sanitary Sewer Manhole	EA	9	$ 4,000.00	$ 36,000.00
	Tie-In to Existing Sewer	EA	2	$500.00	$ 1,000.00
	Type A-3 Coarse Aggregate	CY	160	$25.00	$ 4,000.00
					$ -
				Subtotal =	$218,000.00
				10% Contingency =	$21,800.00
				Total Estimated Construction =	$239,800.00
ENGINEERING					
	Design Phase Services				$28,800.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$26,400.00
ESTIMATED TOTAL PROJECT COST					**$298,500.00**
ESTIMATED TOTAL PROJECT COST / LF					**$99.50**
	Assumptions:				
	No Asphalt Removal or Replacement				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

LS #3 Force Main

Prepared By: DDO | Date: 3/2/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 10,000.00	$ 10,000.00
	Site Control	LS	1	$1,500.00	$ 1,500.00
	Traffic Control	LS	1	$5,000.00	$ 5,000.00
	Hydroseed	SY		$1.00	$ -
	Trench and Backfill	LF	1550	$12.50	$ 19,375.00
	Type A-8 Bedding	LF	1550	$3.00	$ 4,650.00
	4" C-900 PVC Pipe	LF	1550	$8.00	$ 12,400.00
	4" Gate Valve	EA	2	$1,000.00	$ 2,000.00
	Tie-In to Existing MH	EA	1	$2,500.00	$ 2,500.00
	SH 3 Bore and Casing	EA	2	$30,000.00	$ 60,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
	Saw Cutting	LF	1000	$1.50	$ 1,500.00
	AC Pavement Removal	SY	450	$2.50	$ 1,125.00
	AC Pavement	TON	76	$120.00	$ 9,120.00
	Type A-3 Coarse Aggregate	CY	230	$25.00	$ 5,750.00
	ARV	EA	1	$5,000.00	$ 5,000.00
				Subtotal =	$141,320.00
				10% Contingency =	$14,132.00
				Total Estimated Construction =	$155,452.00
ENGINEERING					
	Design Phase Services				$12,500.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$18,700.00
ESTIMATED TOTAL PROJECT COST					**$190,200.00**

Assumptions:

Forcemain is installed outside of SH 3 pavement but within the R/W

Asphalt replacement is required only infront of business and at cross streets

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood Lift Station #1 Option B

Prepared By: DDO		Date: 1/7/2011			
Project Manager: NM		Date: 3/10/2011			
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
Replace LS #1 at Existing Location					
	Mobilization	LS	1	$10,000.00	$10,000.00
	Pre-Fab Fiberglass Packaged LS with External Vault	LS	1	$46,263.00	$46,263.00
	Demo and Disposal of Ex Lift Station	LS	1	$1,500.00	$1,500.00
	Electrical (Control Panel Replacement)	LS	1	$43,807.00	$43,807.00
	Excavation and Haul	CY	210	$18.00	$3,780.00
	Backfill with Approved Aggregate Material	CY	210	$24.00	$5,040.00
	Dewatering	LS	1	$5,000.00	$5,000.00
	Excavation Shoring	LS	1	$5,000.00	$5,000.00
	Anti-Flotation Ring	LS	1	$1,000.00	$1,000.00
	Bypass Pumping (One Week)	LS	1	$4,350.00	$4,350.00
	Surface Restoration	LS	1	$3,000.00	$3,000.00
				Subtotal =	$128,740.00
				10% Contingency =	$12,870.00
				Total Estimated Construction =	$141,610.00
** Assumptions:*					
Remove existing steel LS, utilize existing concrete base					
AFS packaged lift station with exterior valve vault					
New pumps with similar HP					
Fiberglass slide rail					
3" or 4" SS interior piping					
New electrical equipment rack					
New service disconnect, manual transfer switch, and generator receptacle					
New duplex pump control panel					
ENGINEERING					
	Design Phase Services				$14,000.00
	Bidding/Construction Phase Services				$13,000.00
	Electical Engineering				$8,500.00
				Engineering Subtotal =	$35,500.00
ESTIMATED COST					**$177,000.00**
	Assumptions:				
	Access improvements are not included				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood Lift Station #1 Option C

Prepared By: DDO		Date: 1/7/2011			
Project Manager: NM		Date: 3/10/2011			
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
Replace 11" Pump Impellers with 12" Impellers		LS	1	$12,057.64	$12,057.64
	Includes:				
	(1) New impeller (CW rotation) from Fairbanks Morse				
	(1) New impeller (CCW rotation) from Fairbanks				
	(2) New carbide shaft seals, gaskets, o-rings & misc.				
	Travel mileage to job site				
	(22hr) Labor to rebuild both pumps on site				
				Subtotal =	$12,057.64
				10% Contingency =	$1,210.00
				Total Estimated Construction =	$13,267.64
ENGINEERING					
	Design Phase Services				$0.00
	Bidding/Construction Phase Services				$0.00
	Electical Engineering				$0.00
				Engineering Subtotal =	$0.00
ESTIMATED COST					**$13,000.00**

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Spring Street Sewer Extension Option A

Prepared By: DDO | Date: 1/7/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 3,000.00	$ 3,000.00
	Site Control	LS	1	$ 1,000.00	$ 1,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill	LF	650	$ 12.50	$ 8,125.00
	A8 Pipe Bedding Aggregate	LF	650	$ 3.00	$ 1,950.00
	8" ASTM D3034 PVC	LF	650	$ 8.00	$ 5,200.00
	48" Sanitary Sewer Manhole	EA	3	$ 3,000.00	$ 9,000.00
	Tie-In to Existing Sewer	EA	2	$500.00	$ 1,000.00
	Service Reconnection	EA	2	$500.00	$ 1,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
	Type A-3 Coarse Aggregate	CY	100	$25.00	$ 2,500.00
					$ -
				Subtotal =	$35,175.00
				10% Contingency =	$3,517.50
				Total Estimated Construction =	$38,692.50
ENGINEERING					
	Design Phase Services				$3,900.00
	Bidding Phase Services				$2,500.00
	Construction Phase Services				$4,300.00
ESTIMATED TOTAL PROJECT COST					**$49,400.00**
	Assumptions:				
	No Asphalt Removal or Replacement				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Spring Street Individual Pumps Option B

Prepared By: DDO | Date: 1/7/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 1,000.00	$ 1,000.00
	2" Pump to Gravity Sewer Service	EA	2	$ 500.00	$ 1,000.00
	2" HDPE Pressure Sewer Service	LF	200	$ 1.00	$ 200.00
	Simplex Non-Clog Pump Station	EA	2	$ 2,500.00	$ 5,000.00
	Testing - Simplex Lift Station	EA	2	$ 200.00	$ 400.00
	Pump Control Panel - Simplex Panels	EA	2	$ 1,500.00	$ 3,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
	Type A-3 Coarse Aggregate	CY	20	$25.00	$ 500.00
					$ -
				Subtotal =	$12,500.00
				10% Contingency =	$1,250.00
				Total Estimated Construction =	$13,750.00
ENGINEERING					
	Design Phase Services				$2,100.00
	Bidding Phase Services				$2,500.00
	Construction Phase Services				$1,600.00
ESTIMATED TOTAL PROJECT COST					**$20,000.00**
	Assumptions:				
	No Asphalt Removal or Replacement				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Force Main ARV Replacement

Prepared By: DDO | Date: 1/7/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 1,000.00	$ 1,000.00
	Replace ARV Valve	EA	2	$2,500.00	$5,000.00
					$ -
					$ -
				Subtotal =	$6,000.00
				10% Contingency =	$600.00
				Total Estimated Construction =	$6,600.00
ENGINEERING					
	Design Phase Services				$0.00
	Bidding Phase Services				$0.00
	Construction Phase Services				$0.00
ESTIMATED TOTAL PROJECT COST					**$6,600.00**
	Assumptions:				
	No vault or piping modifications				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood I&I Video Inspection

Prepared By: DDO | Date: 1/7/2011

Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
	Sewer Line Cleaning and Video Inspection	LF	15,000	$ 1.77	$ 26,560.00
			Total Estimated Construction =		$26,560.00
ENGINEERING					
	Design Phase Services				$0.00
	Bidding Phase Services				$0.00
	Construction Phase Services				$0.00
ESTIMATED TOTAL PROJECT COST					**$26,600.00**
	Assumptions:				
	8 days of cleaning and video inspection				
	District provides manhole access				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Sewer Main Replacement

Prepared By: DDO		Date: 1/7/2011			
Project Manager: NM		Date: 3/10/2011			
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
	Mobilization	LS	1	$ 3,000.00	$ 3,000.00
	Site Control	LS	1	$ 1,000.00	$ 1,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill	LF	1000	$ 12.50	$ 12,500.00
	A8 Pipe Bedding Aggregate	LF	1000	$ 3.00	$ 3,000.00
	8" ASTM D3034 PVC	LF	1000	$ 8.00	$ 8,000.00
	48" Sanitary Sewer Manhole	EA	3	$ 3,000.00	$ 9,000.00
	Tie-In to Existing Sewer	EA	2	$500.00	$ 1,000.00
	Service Reconnection	EA	4	$500.00	$ 2,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
	Type A-3 Coarse Aggregate	CY	150	$25.00	$ 3,750.00
					$ -
				Subtotal =	$45,650.00
				10% Contingency =	$4,565.00
				Total Estimated Construction =	$50,215.00
ENGINEERING					
	Design Phase Services				$5,100.00
	Bidding Phase Services				$2,500.00
	Construction Phase Services				$5,600.00
ESTIMATED TOTAL PROJECT COST					**$63,400.00**
ESTIMATED TOTAL PROJECT COST / LF					**$63.40**
	Assumptions:				
	No Asphalt Removal or Replacement				

Fernwood Water and Sewer District

Sewer Collection System

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By: DDO		Date:		1/7/2011, UPDATE 11/4/2011	
Project Manager: NM		Date: 3/10/2011			
Item	**Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
REPLACE LS #1 WITH LS AND GRAVITY MAIN ABOVE FLOOD PLAIN					
1	LS #1 Replacement	LS	1	$141,610.00	$ 141,610.00
2	Depot Lane Pressure System	LS	1	$53,740.00	$ 53,740.00
3	Gravity Line From Depot Lane to 9th St	LS	1	$239,800.00	$ 239,800.00
			Total Estimated Construction =		**$ 435,200.00**
SEWER MAIN REPLACEMENT					
	Mobilization	LS	1	$ 4,000.00	$ 4,000.00
	Site Control	LS	1	$ 1,000.00	$ 1,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill	LF	1000	$ 25.00	$ 25,000.00
	A8 Pipe Bedding Aggregate	LF	1000	$ 4.00	$ 4,000.00
	8" ASTM D3034 PVC	LF	1000	$ 10.00	$ 10,000.00
	48" Sanitary Sewer Manhole	EA	3	$ 3,000.00	$ 9,000.00
	Tie-In to Existing Sewer	EA	2	$1,000.00	$ 2,000.00
	Service Reconnection	EA	4	$1,500.00	$ 6,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
	Type A-3 Coarse Aggregate	CY	150	$25.00	$ 3,750.00
				Subtotal =	$ 67,150.00
				10% Contingency =	$ 6,715.00
			Total Estimated Construction =		**$ 73,900.00**
SPRING STREET SEWER EXTENSION					
	Mobilization	LS	1	$ 3,000.00	$ 3,000.00
	Site Control	LS	1	$ 1,000.00	$ 1,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill	LF	650	$ 25.00	$ 16,250.00
	A8 Pipe Bedding Aggregate	LF	650	$ 4.00	$ 2,600.00
	8" ASTM D3034 PVC	LF	650	$ 10.00	$ 6,500.00
	48" Sanitary Sewer Manhole	EA	3	$ 3,000.00	$ 9,000.00
	Tie-In to Existing Sewer	EA	2	$1,000.00	$ 2,000.00
	Service Reconnection	EA	2	$1,500.00	$ 3,000.00
	Exploratory Excavation	HR	8	$175.00	$ 1,400.00
				Subtotal =	$ 45,750.00
				10% Contingency =	$ 4,575.00
			Total Estimated Construction =		**$ 50,300.00**
MANHOLE REPAIR AND GROUTING					
	Manhole Repair and Grouting	LS	1	$ 21,800.00	$ 21,800.00
				Subtotal =	$ 21,800.00
				10% Contingency =	$ 2,180.00
			Total Estimated Construction =		**$ 24,000.00**
			TOTAL ESTIMATED CONSTRUCTION COST =		**$ 583,400.00**
ENGINEERING					
	Preliminary Engineering (Fernwood Share of Facility Plan and EID)				$4,900.00
	Design Phase Services				$65,600.00
	Bidding Phase Services				$10,500.00
	Construction Phase Services				$60,000.00
			ESTIMATED TOTAL PROJECT COST		**$ 724,400.00**

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Fernwood Lift Station #1 Option A-1

Prepared By: DDO | Date: 3/2/2011
Project Manager: NM | Date: 3/10/2011

Item	Description	Unit	Quantity	Unit Price	Total
Replace LS #1 with Lift Station and Gravity Main above Flood Plain					
1	LS #1 Replacement				
	Mobilization	LS	1	$10,000.00	$10,000.00
	Pre-Fab Fiberglass Packaged LS with External	LS	1	$46,263.00	$46,263.00
	Demo and Disposal of Ex Lift Station	LS	1	$1,500.00	$1,500.00
	Electrical (Control Panel Replacement)	LS	1	$43,807.00	$43,807.00
	Excavation and Haul	CY	210	$18.00	$3,780.00
	Backfill with Approved Aggregate Material	CY	210	$24.00	$5,040.00
	Dewatering	LS	1	$5,000.00	$5,000.00
	Excavation Shoring	LS	1	$5,000.00	$5,000.00
	Anti-Flotation Ring	LS	1	$1,000.00	$1,000.00
	Bypass Pumping (One Week)	LS	1	$4,350.00	$4,350.00
	Surface Restoration	LS	1	$3,000.00	$3,000.00
				Subtotal =	$128,740.00
				10% Contingency =	$12,870.00
				Total Estimated Construction =	$141,610.00
2	Depot Lane Pressure System				
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	2" Pump to Gravity Sewer Service	EA	5	$ 500.00	$ 2,500.00
	2" HDPE Pressure Sewer Service	LF	250	$ 12.00	$ 3,000.00
	HDPE Pressure Sewer Main (Slipline)	LF	1000	$ 15.00	$ 15,000.00
	Simplex Non-Clog Pump Station	EA	5	$ 2,500.00	$ 12,500.00
	Testing - Simplex Lift Station	EA	5	$ 200.00	$ 1,000.00
	Pump Control Panel - Simplex Panels	EA	5	$ 1,500.00	$ 7,500.00
	Exploratory Excavation	HR	10	$175.00	$ 1,750.00
	Hydroseed	SY	600	$1.00	$ 600.00
				Subtotal =	$48,850.00
				10% Contingency =	$4,890.00
				Total Estimated Construction =	$53,740.00
3	Gravity Line From Depot Lane to 9th St				
	Mobilization	LS	1	$ 13,000.00	$ 13,000.00
	Site Control	LS	1	$ 10,000.00	$ 10,000.00
	Stream Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Hydroseeding	SY	6000	$ 2.50	$ 15,000.00
	Traffic Control	LS	1	$ 1,000.00	$ 1,000.00
	Trench Excavation and Backfill 0-15	LF	2000	$ 25.00	$ 50,000.00
	Trench Excavation and Backfill 0-30	LF	1000	$ 50.00	$ 50,000.00
	A8 Pipe Bedding Aggregate	LF	3000	$ 3.00	$ 9,000.00
	8" ASTM D3034 PVC	LF	3000	$ 8.00	$ 24,000.00
	48" Sanitary Sewer Manhole	EA	9	$ 4,000.00	$ 36,000.00
	Type A-3 Coarse Aggregate	CY	160	$25.00	$ 4,000.00
				Subtotal =	$218,000.00
				10% Contingency =	$21,800.00
				Total Estimated Construction =	$239,800.00
				Total Estimated Construction =	$435,150.00
ENGINEERING					
	Design Phase Services				$52,200.00
	Bidding Phase Services				$5,500.00
	Construction Phase Services				$43,500.00
ESTIMATED TOTAL PROJECT COST					**$536,400.00**
	Assumptions:				
	Does not include R/W acquisition				

Environmental Criteria	Option A – Lift Station Relocation Option A-1	Option A – Lift Station Relocation Option A-2	Option B – Replace and Raise Lift Station	Option C – Minimum Lift Station Improvements	Option D – No Action Option
Climate and Physical Aspects (Topography, Geology, and Soils)	Excavation, Short-Term Impact	Excavation, Short-Term Impact	Excavation, Short-Term Impact	No Impact	No Impact
Population, Economic, and Social Profile	Increase User Rates, Potential for Growth	Increase User Rates, Potential for Growth	Increased User Rates, Potential for Growth	No Impact	No Impact
Land Use	No Impact	No Impact	No Impact	No Impact	No Impact
Floodplain Development	Positive, Abandon Lift Station and Sewer Line	Positive, Abandon Lift Station and Sewer Line	Construction in Floodplain, but Positive Impacts Also	Reduces Risk with Lift Station in Floodplain	Continued Risk with Lift Station in Floodplain
Wetlands and Water Quality	No Impacts to Wetlands; Positive Impact to Water Quality through Protection from Further Damage to Existing Water Quality	No Impacts to Wetlands; Positive Impact to Water Quality through Protection from Further Damage to Existing Water Quality	Construction in Wetlands, but Protection from Further Damage to Existing Water Quality	Continued Risk to Water Quality	Continued Risk to Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact	No Impact
Flora and Fauna	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Reduces Risk due to Overflow	Risk due to Overflow
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Impact	No Impact	No Impact	No Impact
Air Quality	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	No Impact	No Impact

Energy	Reduces I&I and thus Pumping	Reduces I&I and thus Pumping	Reduces I&I and thus Pumping	No Impact	No Impact
Public Health	Positive Impact, Improvement to Existing Conditions	Positive Impact, Improvement to Existing Conditions	Positive Impact, Improvement to Existing Conditions	Reduced Risk to Public Health	Continued Risk to Public Health
Option Cost	$546,800	$578,500	$177,000	$13,000	N/A

Environmental Criteria	Option A – Video Inspection	Option B – Manhole Repair	Option C – Main Replacement	Option D – No Action Option
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Location of Manholes and Repair, Short-Term Impact	Excavation for Line Replacement, Short-Term Impact	No Impact
Population, Economic, and Social Profile	No Impact	Increased User Rates	Increased User Rates	No Impact
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	No Impact	No Impacts to Wetlands; Positive Impact to Water Quality through Protection from Further Damage to Existing Water Quality	No Impacts to Wetlands; Positive Impact to Water Quality through Protection from Further Damage to Existing Water Quality	Continued Risk to Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Impact	No Impact	No Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	No Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	No Impact
Energy	No Impact	No Impact	No Impact	Remains High due to Pumping I&I
Public Health	No Impact	Positive Impact, Improvement to Existing Conditions	Positive Impact, Improvement to Existing Conditions	Continued Risk to Public Health
Option Cost	$26,600	$60,300	$303,600	N/A

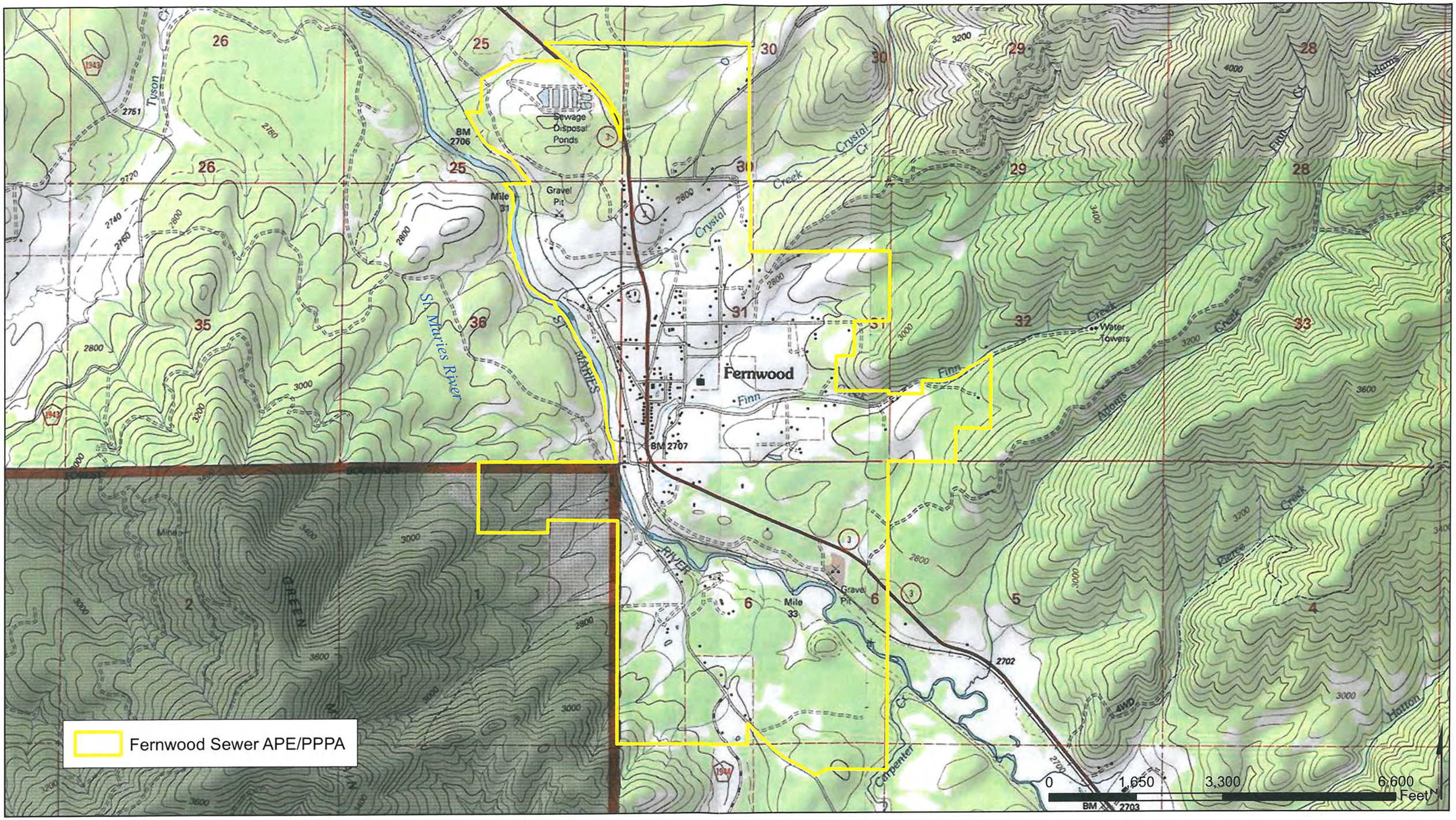
Environmental Criteria	Option A – Spring Street Main Extension	Option B – Residential Grinder Pumps	Option C – No Action Option
Climate and Physical Aspects (Topography, Geology, and Soils)	Excavation for Main Installation, Short-Term Impact	Excavation for Grinder Pumps, Short-Term Impact	No Impact
Population, Economic, and Social Profile	Increased User Rates, With Opportunity for Future Connection	Increased User Rates, Without Opportunity for Future Connection	Existing Residents Continue not to be Served
Land Use	Allows Future Connection/Development in Area of Extension	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact
Wetlands and Water Quality	Construction Impacts, Mitigated through BMPs	Construction Impacts, Mitigated through BMPs	No Impact
Wild and Scenic Rivers	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Impact	No Impact
Flora and Fauna	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	No Impact
Recreation and Open Space	No Impact	No Impact	No Impact
Agricultural Lands	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	No Impact
Energy	No Impact	No Impact	No Impact
Public Health	Positive Impact, Provide Service to Residents	Positive Impact, Improvement to Existing Conditions	Existing Residents Continue not to be Served
Option Cost	$49,400	$20,000	N/A

Environmental Criteria	Option A – ARV Replacement	Option B – No Action Option
Climate and Physical Aspects (Topography, Geology, and Soils)	Excavation for Replacement, Minor Short-Term Impact	No Impact
Population, Economic, and Social Profile	Increased User Rates	No Impact
Land Use	No Impact	No Impact
Floodplain Development	No Impact	No Impact
Wetlands and Water Quality	No Impacts to Wetlands; Positive Impact to Water Quality through Protection from Further Damage to Existing Water Quality	No Impact, If Inspection Reveals Good Working Order
Wild and Scenic Rivers	No Impact	No Impact
Cultural Resources	No Impact	No Impact
Flora and Fauna	Site Disturbance, Short-Term Impact	No Impact
Recreation and Open Space	No Impact	No Impact
Agricultural Lands	No Adverse Impact	No Adverse Impact
Air Quality	Construction Emissions, Short-Term Impact	No Impact
Energy	Potential for Improved Pumping Capacity	No Impact
Public Health	Positive Impact, Improvement to Existing Conditions	No Impact, If Inspection Reveals Good Working Order
Option Cost	$6,600	N/A

Appendix D

Physical Information

- Topography Map
- Geologic Information
- Soil Information



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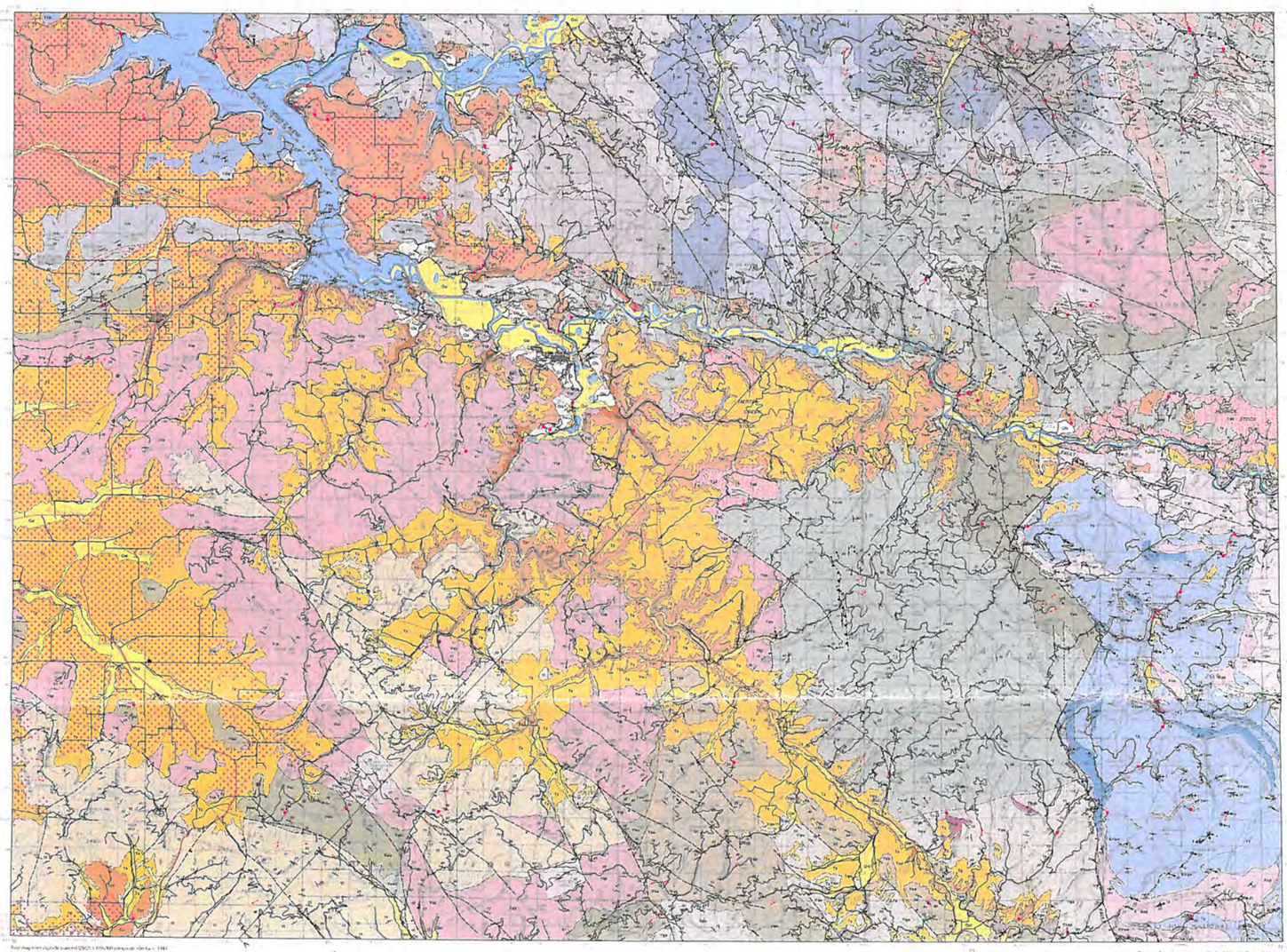
Fernwood Sewer

Topography

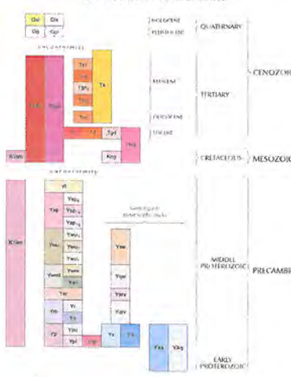
Sources:
ESRI, Inc.
Idaho State Tax Commission

PROJECT NO.....43007
DRAWN BY.....AW
FILENAME.....FernwoodSewer_Topo.mxd
DATE.....6/13/12



Prepared in cooperation with the U.S. Geological Survey
National Cooperative Geologic Mapping Program
Digital cartography by Lisa Dent, Leslie Sawyer, Stanford Sawyer, Ray Ralphs, and Mark Gilbert
Geologic map data are available in Geographic Information System (GIS) format
Manuscript 2000-3

CORRELATION OF MAP UNITS



GEOLOGIC MAP OF THE ST. MARIES 30 x 60 MINUTE QUADRANGLE, IDAHO

Compiled and mapped by Reed S. Lewis, Russell F. Burmester, John D. Kauffman, and Thomas P. Frost

2000

MAP UNITS

UNCONSOLIDATED DEPOSITS

- Qha — Alluvial deposits (Holocene)
- Qls — Landslide deposits (Holocene)
- Qp — Palouse Formation (Pleistocene) (loess unit)
- Qd — Glacial deposits (Pleistocene)
- Ts — Sediments (Miocene and Younger)

COLUMBIA RIVER BASALT GROUP

Wanapum Formation

- Tpr — Priest Rapids Member (Miocene)
- Tyk — Yakima Basalt Member (Miocene)
- Tro — Roza Member (Miocene)

Grande Ronde Formation

- Tgr — Grande Ronde R2 (augite-phyric unit) (Miocene)
- Tgr — Grande Ronde R1 (augite-phyric unit) (Miocene)

OLDER VOLCANIC ROCKS

- Tvo — Volcanic basalt (Miocene)

INTRUSIVE ROCKS

- Kbd — Rhyolite dikes (Eocene)
- Td — Diorite dikes (Eocene)
- Tgr — Biotite quartzolite and hornblende-biotite granodiorite (Eocene)
- Tbd — Diabase and dolerite dikes (Tertiary or Cretaceous)
- Tlm — Lamprophyre dikes (Tertiary or Cretaceous)
- Tmd — Gabbro (Tertiary or Cretaceous)
- Kug — Ultramafic (Cretaceous)
- Kbm — Amphibolite (Cretaceous or Precambrian)

BELT SUPERGROUP

- Yl — Libby Formation (Middle Proterozoic)
- Ync — Ninemile Creek Formation, pelite shelf (Middle Proterozoic)
- Ynu, Ynu$_a$ — Snowslide Creek Formation, member Ynu (Middle Proterozoic)
- Ynu$_b$, Ynu$_c$ — Ninemile Creek Formation, argillite part of member Ynu (Middle Proterozoic)
- Ynu$_d$ — Ninemile Creek Formation, quartzite, gray to secondary tan (Middle Proterozoic)
- Ynu — Wallace Formation, upper member, undifferentiated (Middle Proterozoic)
- Ynu$_e$ — Wallace Formation, upper member Ynu (Middle Proterozoic)
- Ynu$_f$ — Wallace Formation, upper member Ynu (Middle Proterozoic)
- Ynu$_g$ — Wallace Formation, upper member Ynu (Middle Proterozoic)
- Ynwd — Wallace Formation, middle and lower members, undivided (Middle Proterozoic)
- Ynwb — Wallace Formation, middle member (Middle Proterozoic)
- Ynwf — Wallace Formation, lower member (Middle Proterozoic)
- Ynw — Wallace and phyllite of the Wallace formation (Middle Proterozoic)
- Ynw — Quartzite of the Wallace Formation (Middle Proterozoic)
- Ynr — St. Regis Formation (Middle Proterozoic)
- Ynn — Striped of the Revett Group (Middle Proterozoic)
- Ynb — Revett and Burke Formations, undivided (Middle Proterozoic)
- Yr — Revett Formation (Middle Proterozoic)
- Yb — Burke Formation (Middle Proterozoic)
- Ypv — Quartzite of the Prichard Group, undivided (Middle Proterozoic)
- Yp — Prichard Formation, undivided (Middle Proterozoic)
- Ypu — Prichard Formation, upper part (Middle Proterozoic)
- Ypl — Prichard Formation, lower part (Middle Proterozoic)
- Yq — Quartzite of the Prichard Formation (Middle Proterozoic)

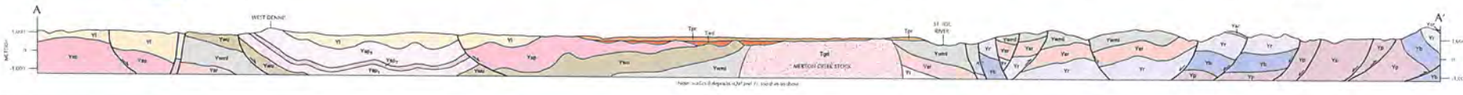
Revett Group

BELT SUPERGROUP OR PRE-BELT METAMORPHIC ROCKS

- Ym — Quartzite (Middle Proterozoic)
- Yx — Schist (Middle Proterozoic)
- Ytq — Schist of the Priest River metamorphic complex (Proterozoic)
- Yxq — Quartzite of the Priest River metamorphic complex (Proterozoic)

MAP SYMBOLS

- Contact, dashed where approximately located, dotted where concealed
- High-angle fault, dashed where approximately located, dotted where concealed
- Normal fault, dashed where approximately located, dotted where concealed. Ball and bar on downthrown side
- Detachment fault, dashed where approximately located, dotted where concealed. Teeth on downthrown side
- Strike-slip fault, dashed where approximately located, dotted where concealed. Arrows indicate relative direction of displacement
- Thrust fault, dashed where approximately located, dotted where concealed. Teeth on upper plate, on flatter dip segments fault
- Fold axis, dashed where concealed, arrow indicates plunge direction
- Syncline
- Anticline
- Overturned syncline
- Overturned anticline
- Strike and dip of composite or bedding parallel to axial plane
- Strike and dip of overturned bedding
- Horizontal bedding
- Strike and dip of foliation
- Strike and dip of joints
- Bearing and plunge of lineation, type unknown
- Bearing and plunge of mineral lineation
- Bearing and plunge of intersection lineation
- Bearing and plunge of intersection lineation
- Bearing and plunge of lineation on a fault plane
- Bearing and plunge of small fold axes
- Bearing and plunge of asymmetrical small fold of uncertain relative direction of movement
- Bearing and plunge of asymmetrical small fold of uncertain relative direction of movement
- Strike and dip of vertical foliation
- Strike and dip of vertical bedding
- Contact mapped, queried where uncertain, dashed where concealed. Ticks point toward younger rocks
- Bedded mineral or ultramafic pod
- Mine
- Sample location
- Well location


A
A'
BELT GROUP
ST. JOE RIVER
MERTON CREEK STOCK
Tgr
Tpd
Yl
Ynwd
Ynu
Ynw
Yr
Yb
Yp
Ym
Ytq
Yxq
Kug
Td
Tbd
Tlm
Tmd
Kbd
Tvo
Qha
Qls
Qp
Qd
Ts
Tpr
Tyk
Tro
Kbm
Ynr
Ynn
Ypv
Ypu
Ypl
Yq
Ync
Ynb
Ynwb
Ynwf
Ynu$_a$
Ynu$_b$
Ynu$_c$
Ynu$_d$
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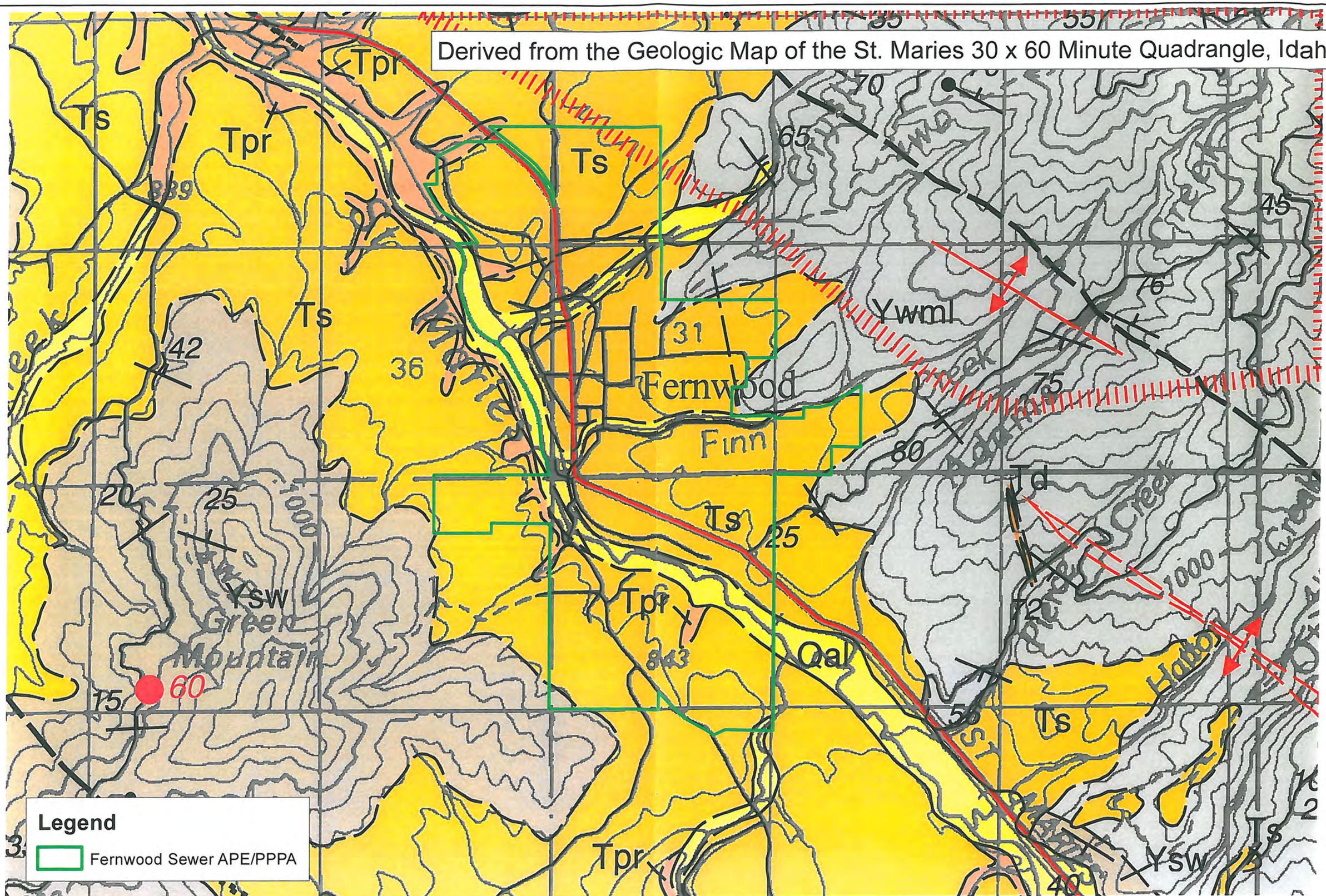

Derived from the Geologic Map of the St. Maries 30 x 60 Minute Quadrangle, Idaho
Tpr
Ts
Tpr
Ts
Ts
Ywml
Fernwood
Finn
Td
Ts
Tpr
Qal
Ts
Ysw
Tpr
Ysw
Legend
Fernwood Sewer APE/PPPA

Geologic Map of the St. Maries 30 X 60 Minute Quadrangle, Idaho

Reed S. Lewis, Russell F. Burmester,
John D. Kauffman, and Thomas P. Frost

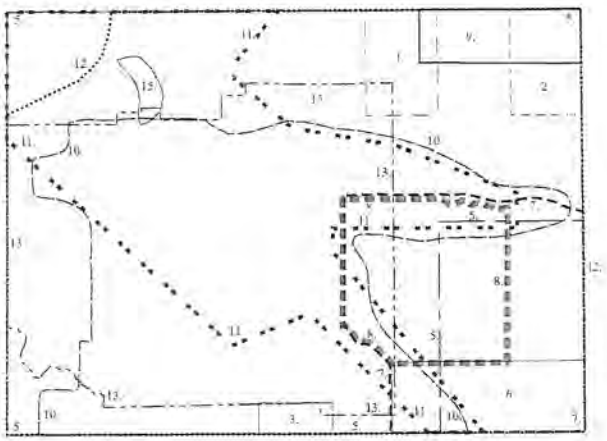
2000

INTRODUCTION

Preparing the geology of the 1:100,000-scale St. Maries 30' x 60' quadrangle relied extensively on previous mapping, and we supplemented that with twelve weeks of field work in 1998. The principal source was the 1:250,000-scale map of Griggs (1973) and included his unpublished 1:62,500-scale field maps that formed the basis of his research. All sources and their areal extent are shown on Figures 1 and 2. The geology of the St. Maries quadrangle is also available in a digital version.

The distribution of the Columbia River Basalt Group was taken largely from work by Swanson and others (1979a) and unpublished mapping by Margaret Jenks (written commun., 1998). Basalt stratigraphy, chemistry, and magnetic polarity were based on work by Wright and others (1973) and Swanson and others (1979b). Chemical types and polarity were confirmed by field sampling. The location of Tertiary sediment overlying the basalt is largely taken from unpublished mapping by Margaret Jenks (written commun., 1998) and Carl Savage (Idaho Geological Survey, unpublished files, 1979).

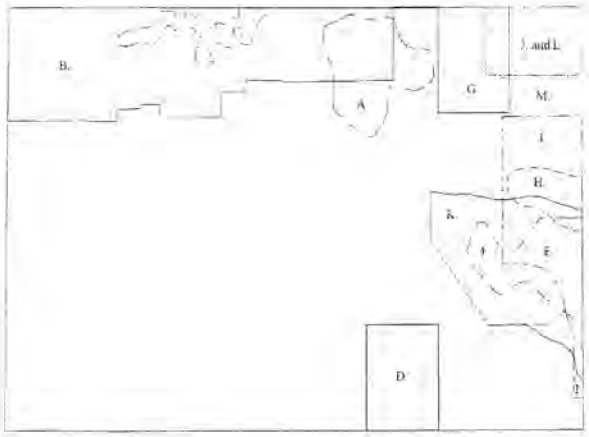
The oldest and most abundant rocks in the St. Maries quadrangle are Precambrian in age. These are low-grade metasedimentary rocks of the Belt Supergroup and high-grade (amphibolite facies) metamorphic rocks whose protolith may have been the Belt Supergroup. The high-grade rocks are exposed in uplifted regions in the northwest and southeast corners of the map area. Included in the uplifted regions is amphibolite as well as deformed granitic rock (orthogneiss) of probable Cretaceous age. Younger intrusive rocks of probable Eocene age include two granodiorite stocks and several rhyolite and dacite dikes. The Onaway basalt of Oligocene age is exposed in the southwest corner of the map area. Flows of Miocene Columbia River basalt are widely exposed in the central and northwestern part of the map area. In many places these flows are covered with sediments, and loess deposits blanket much of the lower elevations in the western part of the area.



1. Campbell and Good, 1963
2. Clough, 1981
3. Cunningham, unpublished geologic map
4. Griggs, 1973 (entire map area)
5. Griggs, unpublished geologic maps
6. Hietanen, 1963a
7. Hietanen, 1967 (plate 1)
8. Hietanen, 1967 (plate 2)
9. Hobbs and others, 1965
10. Jenks, unpublished parent material maps
11. Kauffman, 1998 field mapping
12. Lewis and Burmester, 1998 field mapping
13. Savage, unpublished geologic maps
14. Swanson and others, 1979a (entire map area)
15. Breckenridge and Othberg, unpublished geologic map

Figure 1. *Previous mapping used as primary sources of data.*

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.



A. Appelgate, unpublished geologic maps
B. Anderson, 1940
C. Bookstrom and others, 1999
D. Clark, 1963
E. Cockrum, 1986
F. Harrison, unpublished geologic maps
G. Hayden, 1992
H. Holland, 1947
I. Pardee, 1911
J. Ransome and Calkins, 1908
K. Reid and others, 1981
L. Umpleby and Jones, 1923
M. Wagner, 1949

Figure 2. *Previous mapping used as secondary sources of data.*

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

Qal—Alluvial deposits (Holocene)—Stream deposits in modern drainages. Most deposits are composed of stratified and laterally discontinuous beds of pebbles, cobbles, sand, and silt. Includes reworked loess in the western part of the area near Tensed.

Qls—Landslide deposits (Holocene)—Unconsolidated poorly sorted rubble, typically as boulders of basalt in a finer grained matrix. Includes large blocks of Columbia River Basalt Group near St. Maries interpreted by Griggs (1973) as landslide deposits, but which lack hummocky topography and other obvious landslide features. Few deposits are known with certainty to be landslides, perhaps because they are relatively old features without recent movement.

Qp—Palouse Formation (Pleistocene)—Loess deposits of silt in the western part of the area. Shown only as an overlay pattern without well-defined boundaries. Map distribution taken directly from Griggs (1973), who noted the presence of buried soil horizons, some of which have well-developed clay layers. May include Tertiary sediment (*Ts*) in places or may be only a thin mantle over *Ts* deposits.

Qg—Glacial deposits (Pleistocene)—Unsorted boulders and finer grained unconsolidated material in the valleys of the highest drainages. Possibly outwash.

Ts—Sediment (Oligocene? and Miocene)—Mostly deeply weathered yellow to orange silt and clay, but also quartzite pebbles and cobbles, and sand. Clasts derived primarily from the Belt Supergroup. Near Clarkia, lakebeds of clay and silt contain extremely well-preserved leaf fossils (Smiley and Rember, 1979; Rember, 1991). Locations taken largely from unpublished maps of M.D. Jenks (written commun., 1998) and C.N. Savage (Idaho Geological Survey, unpublished files, 1979). Most deposits overlie flows of the Columbia River Basalt Group or rocks of the Belt Supergroup at elevations well above present stream levels, but several ages of deposits are preserved in the area. Younger (late Miocene? or Pliocene?), more bouldery terrace remnants are present at lower elevations along the major rivers. These remnants are deeply eroded and lack subhorizontal upper surfaces that would be expected if they were Quaternary terraces. Thickness of *Ts* is varied, but a well in the Tensed area passed through 265 feet (81 m) of sediment before intersecting basalt (well 44/4-18N1; Ko and others, 1974). Typical thickness is about 30 feet (10 m).

COLUMBIA RIVER BASALT GROUP

Wanapum Formation

Tpr—Priest Rapids Member (Miocene)—Medium gray to dark gray basalt that typically has a grainy, felty texture caused by abundant small plagioclase and olivine phenocrysts and by microvesicles and diktytaxitic cavities. The denser parts of the flows are dark gray to black and fine grained; they lack the grainy texture, although small plagioclase phenocrysts are apparent. Outcrops weather gray-brown to reddish brown. In thick flows, large, poorly defined basal columns 3-6 m thick change upward to slabby, platy zones that are typically medium bluish gray on fresh surfaces. Above the platy zones, flows commonly have a thick blocky to hackly entablature that is 15 m or more thick, and in places well-developed thin, vertical to radiating columns. The top of the entablature grades into an increasingly vesicular, rubbly in places, flow top. Thin flows are more vesicular throughout and generally have only weakly developed basal columns and a vesicular flow top. Pillow-palagonite complexes are locally common at the base of

flows or flow units (series of chemically similar thin flows that grade laterally into a single flow). Hyaloclastic material is also present locally at the top of some units; this material is well exposed on a logging road built in 1998 on the southeast side of Trout Creek, about 4 miles west of Calder.

The Priest Rapids Member typically consists of one or more flows of Rosalia chemical type and has reverse magnetic polarity. A flow of Lolo chemical type is present in the Clarkia area. The Priest Rapids Member is the uppermost unit in the Plummer-St. Maries-St. Joe River area and directly overlies basement rocks in the upper St. Joe River drainage, where it partly fills the prebasalt topography. In the St. Maries area, it overlies the *Ted* unit, and near Harrison it overlies Tgn_2 flows. Thicknesses of individual flow units range from 8 to 25 m for thin units to >180 m for thick, valley-filling sequences in the St. Joe River drainage.

Eckler Mountain Member

Ted—Basalt of Dodge (Miocene)—Medium gray, coarse-grained and highly plagioclase-phyric basalt to dark gray and dense basalt with fewer but still abundant plagioclase phenocrysts. Freshly broken fragments have a coarse, irregular surface texture. Phenocrysts range in size from less than 1 mm to at least 5 mm. The smaller phenocrysts are typically lath shaped, and the larger ones are more equant. Most exposures are of the massive basal columnar part of the unit. The well-formed basal columns are 1-2 m in diameter and in places 7 m or more in length. The unit commonly weathers gray-brown to dark gray. Hyaloclastic material is associated with the Dodge basalt exposed in the railroad tunnel portal north of Benewah Lake campground.

The basalt of Dodge is a valley- and basin-filling unit of normal magnetic polarity exposed around the southern end of Coeur d'Alene Lake and near and south of St. Maries. The Dodge basalt was not found in the basalt section south of Harrison along State Highway 97, although it is present on the west side of the lake south of Browns Bay. A probable Dodge vent is at Cedar Creek campground 3 miles north of Clarkia (Swanson and others, 1979a). The Dodge basalt overlies Tgn_2 basalt and is overlain by Tpr flows. Maximum thickness is approximately 40 m.

Grande Ronde Formation

Tgn_2—Grande Ronde N_2 magnetostratigraphic unit (Miocene)—Dark gray to black, fine-grained aphyric to very sparsely plagioclase-phyric basalt. Locally at least one flow near the top of this unit has a Priest Rapids-like grainy, felty texture. Large columns of the basal colonnade are generally exposed only in quarry cuts. Natural exposures are typically of the thick entablature, consisting of either thin, well-developed and commonly radiating columns, or poorly developed columns with a blocky, hackly character. These entablature exposures are typically cliff-forming masses that can be traced laterally for several miles. Individual flows are usually over 30 m thick and may be more than 60 m thick. Locally, hyaloclastic material is associated with the top of individual flows, especially near contacts with basement rocks. In the Hells Gulch section north of St. Maries, an extensive hyaloclastic unit, with incorporated pods of ropy spatter and other ejecta-like debris, is at least 25 m thick and forms erosional hoodoo pillars at several locations. In other areas, the hyaloclastic material has crude stratification.

Grande Ronde N2 has normal magnetic polarity and is the lowermost basalt unit exposed on most of the St. Maries quadrangle; generally, its base is either not exposed or lies directly on prebasalt basement rocks. However, on the east side of Coeur d'Alene Lake near the north edge of the St. Maries quadrangle, the top of a Tgr_2 flow is exposed along the shoreline beneath the base of Tgn_2. This Tgr_2 flow is also present beneath the Tgn_2 along the west shoreline at Rockford Bay, but is too thin to show at map scale. Tgn_2 is overlain by either *Ted* or *Tpr* flows.

Tgr_2—Grande Ronde R_2 magnetostratigraphic unit (Miocene)—Dark gray to black, fine-grained aphyric to very sparsely plagioclase-phyric basalt similar to Tgn_2. One flow, with reverse magnetic polarity, is the lowermost basalt unit exposed in the map area. Only the vesicular flowtop and upper part of the entablature are exposed along the east shoreline of Coeur d'Alene Lake north of Harrison.

OLDER VOLCANIC ROCKS

Ton—Onaway basalt (Oligocene)—Dark gray, fine-grained porphyritic basalt. Mapped south of the study area by Duncan (1998) who noted a distinctive brown weathering rind in places and plagioclase phenocrysts that average 1 cm in length but may exceed 5 cm. Flows have normal magnetic polarity. Originally thought to be either the upper part of the Wanapum Formation (Camp, 1981) or part of the Saddle Mountains Formation (Bush and others, 1995) of the Columbia River Basalt Group. Recent work by John Bush (oral commun., 1999) indicates that these flows are actually older than the Columbia River Basalt Group. Extruded from local vents and flowed into valleys. May also have flowed over and intruded into sediments (*Ts*). Thickness uncertain but may locally exceed 60 m.

INTRUSIVE ROCKS

Tr—Rhyolite dikes (Eocene)—Light gray, aphanitic to very fine-grained rhyolite with sparse (2-10 percent) phenocrysts of quartz and rare potassium feldspar. Large mass along the St. Joe River east of St. Maries is a composite body containing dikes of sparsely porphyritic rhyolite and subordinate dikes of porphyritic rhyolite (or dacite?) with conspicuous K-feldspar, quartz, and plagioclase phenocrysts.

Td—Dacite dikes (Eocene)—Gray dacite, typically porphyritic, with an aphanitic groundmass. Phenocrysts, where present, include quartz (up to 8 mm in diameter, commonly embayed) as well as plagioclase, biotite, and hornblende. Present east of Fernwood as well as north of the Merton Creek stock.

Tgd—Biotite granodiorite and hornblende-biotite granodiorite (Eocene)—Gray, medium-grained, porphyritic biotite granodiorite of the Merton Creek stock, and hornblende-biotite granodiorite and biotite granodiorite of the Herrick stock (Holland, 1947). Potassium feldspar phenocrysts, 1 to 2 cm in length, compose 5 to 10 percent of the rock in some areas. Contains mafic inclusions and sparse aplite and pegmatite dikes. Weathers to coarse grus. Plagioclase in Merton Creek stock is compositionally zoned (An_{16} to An_{28}); most zoning is oscillatory. The southern margin of the Herrick stock is compositionally diverse and includes intermingled hornblende-rich phases, some of which are well foliated. Foliation there is subhorizontal and may result from igneous flow. Foliation at Mud Cabin Creek near the northern margin is mylonitic. Age unknown, but rock resembles the Roundtop pluton to the southeast that has been dated at 52 ± 7 Ma by U-Pb methods (Marvin and others, 1984).

TKdd—Diabase and diorite dikes (Tertiary or Cretaceous)—Mafic dikes mapped by Hobbs and others (1965) and Campbell and Good (1963) in and near the Coeur d'Alene mining district.

TKla—Lamprophyre dikes (Tertiary or Cretaceous)—Mafic dikes with biotite phenocrysts mapped in and near the Coeur d'Alene mining district by Hobbs and others (1965) and Campbell and Good (1963). Single dike analysis indicates high K_2O content (6.15 percent).

TKgb—Gabbro (Tertiary or Cretaceous)—Black to dark gray, medium- to fine-grained pyroxene gabbro. Typically has red weathering rind and develops red soil. Largest body northeast of Clarkia has squarish outline, perhaps because its emplacement was controlled by orthogonal faults or fractures; smaller intrusions are dike-like elsewhere in the south-central part of the map area. Includes diabase and gabbro dikes of Clark (1963) and Hietanen (1963a), who report plagioclase compositions of An_{47} and An_{53}. Major-element concentrations similar to those of *Tpr*, but trace-element concentrations dissimilar to any known Columbia River basalt.

Kog—Orthogneiss (Cretaceous)—Gray, strongly foliated, moderately lineated hornblende-biotite tonalite, biotite tonalite, granodiorite, and quartz diorite. Exposed on the eastern, upthrown side of the White Rock fault in the southeast quarter of the map area. Orthogneiss is medium grained and contains allotriomorphic granular to recrystallized mosaics of quartz and feldspar between larger biotite flakes. Hornblende typically blocky. Contains euhedral epidote interpreted as a magmatic phase. Rocks mapped as *Kog* are heterogeneous and samples contain a range of SiO_2 from 57 to 74 percent; K_2O varies from 0.75 to 4.25 percent. Some of the compositional variation may have originated as schlieren or mafic inclusions. Contains amphibolite bodies up to 100 m wide with contacts approximately parallel to foliation. Intercalated with muscovite schist. Foliation is overprinted locally by s-c fabric (Simpson and Schmid, 1983) with top-to-the-west sense of shear. Cut by irregular masses of pegmatite that lack flattening fabric, and on Freezeout Ridge, by a north-striking undeformed rhyolitic dike. Includes Marble Creek gneiss bodies of Reid and others (1981) and Cockrum (1986). Age is poorly known but orthogneiss is considered to be Cretaceous based on similarities with approximately 94 Ma deformed phases of the Cretaceous Idaho batholith near Lowell (Toth and Stacey, 1992).

KYam—Amphibolite (Cretaceous or Proterozoic)—Black to dark gray, fine- to medium-grained, foliated to lineated hornblende-plagioclase rock. Mostly garnetiferous, with garnets up to 2 cm in diameter locally; some contain biotite instead of or in addition to hornblende. Present in schist correlated as metamorphosed Prichard Formation (Hietanen, 1967; Cockrum, 1986) and thus may be metamorphosed Proterozoic sills. However, those associated with *Kog* unit and those with pyroxene are probably Cretaceous.

BELT SUPERGROUP

Yl—Libby Formation (Middle Proterozoic)—Light green to dark gray siltite, darker green argillite, dolomitic siltite, and white, very fine-grained quartzite. Rocks low in the unit have mudchips and mudcracked and rippled surfaces in siltite. Quartzite increases upward. Minor dark gray argillite, alone and as carbonate-free caps on reddish weathering ferroan calcitic or dolomitic siltite and quartzite northwest

of Emida, possibly in the middle of the unit. Locally, one or more stromatolite horizons occur in this interval. Siltite and white quartzite dominate the upper part to the erosional top. The presence of carbonate led Savage (1973) to assign these rocks to the Wallace Formation. Stratigraphic relations are more consistent with the carbonate being part of the Libby Formation, as mapped by Griggs (1973).

Ysp—Striped Peak Formation, undivided (Middle Proterozoic)—Gray to white to pale red quartzite with lesser amounts of siltite and argillite. Shown where a lack of mapping or poor exposure prevented subdivision. Consists largely of Ysp_1 and Ysp_4 as defined by Harrison and Jobin (1963) near Clark Fork. Thin intervals of carbonate (Ysp_2) and dark gray, thinly laminated argillite (Ysp_3) were noted at a few localities but not mapped as separate units. Includes rocks along Renfro Creek northeast of Santa previously mapped as Striped Peak Formation (Griggs, 1973), but which are more highly deformed and possibly at higher metamorphic grade than Striped Peak rocks to the southwest. An alternative explanation is that these are quartzitic rocks of the Ravalli Group in thrust contact with the Wallace Formation.

Ysp_4—Striped Peak Formation, member four (Middle Proterozoic)—Light gray to red, medium- to fine-grained arkosic quartzite. Beds up to 1 m thick with some intervening siltite and argillite. Fine-grained beds are similar to the Ysp_1 quartzites but have less magnetite, more yellow rusty spots, and more K-feldspar. Characteristic, however, are well-rounded, medium-size (0.3-0.5 mm) quartz grains, either as isolated grains (floaters) in a finer grained matrix or as major constituents of the rock. Ripple cross lamination and rippled surfaces more abundant than cross lamination. Includes plane lamination, some of which has hematite concentrations. Rocks are characteristically but not ubiquitously feldspathic. Visual estimates of twelve etched and stained hand specimens indicate 9 to 23 percent K-feldspar (mean of 17 percent) and 5-15 percent plagioclase (mean of 8 percent). Some K-feldspar appears detrital, but much is present as diagenetic(?) rims on plagioclase. Common yellow-brown spots may result from weathering of ferroan calcite. Equivalent to Ysp_4 near Clark Fork (Harrison and Jobin, 1963) and to the Bonner Quartzite in the Missoula area (Nelson and Dobell, 1961). Thickness uncertain but may be as much as 1,000 m in the southwestern part of the area.

Ysp_{1a}—Striped Peak Formation, argillitic part of member one (Middle Proterozoic)—Purplish red and subordinate green siltite and argillite. Layering typically 1 to 3 cm thick, with some rippled and mudcracked surfaces. Salt casts present in western part of area south of Plummer, but unit not subdivided in that region. Minor carbonate occurs within and at the top of the member in the northeastern part of the area. This uppermost carbonate interval thickens north of the area and is mapped as Ysp_2 by Harrison and Jobin (1963) near Clark Fork. Unit is equivalent to member three of the Mount Shields Formation, described to the northeast (Harrison and others, 1986). Thickness uncertain but probably about 90 to 120 m in the northeastern part of the area and 300 m in the east-central part (north of Calder at Spooky Butte) and in the western part (southwest of Emida at West Dennis).

Ysp_{1q}—Striped Peak Formation, quartzitic part of member one (Middle Proterozoic)—Pale purplish red, fine-grained, flat-laminated quartzite, and subordinate argillite and siltite. Rare ripple cross lamination and even rarer trough cross lamination in 10-to-30-cm-thick beds. Commonly contains macroscopic magnetite octahedra and some mud flakes. Base of unit is placed at lowest quartzite beds. Above them is an interval of very thinly laminated green argillite-siltite similar to that of the Ywu_3 unit below, with color grading upward from dark to light and the reverse. This argillite-siltite gives way upward to the quartzite-dominated part of the unit. Visual estimates of eleven etched and stained hand specimens indicate 12-20 percent plagioclase (mean of 17 percent). Only three of these samples contain K-feldspar (7 percent or less), in contrast to the K-feldspar-rich Ysp_4 quartzite. Equivalent to the lower part of Ysp_1 mapped by Harrison and Jobin (1963) near Clark Fork. Also equivalent to the lower two members of the Mount Shields Formation to the northeast described by Harrison and others (1986). Thickness at Striped Peak, immediately east of the map area, is about 820 feet (250 m; Vance, 1981). Thickens to 300 m at Spooky Butte north of Calder and to more than 450 m at West Dennis southwest of Emida.

Ywu—Wallace Formation, upper member, undivided (Middle Proterozoic)—Predominantly dark gray siltite and argillite, but locally contains unmapped carbonate intervals equivalent to member two. Shown where a lack of mapping or poor exposure prevented subdivision. Includes rocks at Lolo Pass 6 miles northeast of Tensed mapped as *Ywu* by Griggs (1973) but which could alternatively be Ysp_3 of Harrison and Jobin (1963) mapped to the north near Clark Fork. Total thickness at Striped Peak, immediately east of area, is 1,500 feet (460 m; Shenon and McConnel, 1939). Thickens to about 1,200 m in south-central part of area at Baby Grand Mountain southeast of Emida.

Ywu_3—Wallace Formation, upper member three (Middle Proterozoic)—Microlaminated and thinly laminated light green siltite and darker green argillite, green siltite, and black argillite. Subordinate 10 to 20 cm thick, locally carbonate-bearing siltite and very fine-grained quartzite.

Bedding commonly uneven and wavy. Weathers yellowish brown. Thickness about 500 feet (150 m) on north side of Striped Peak just east of area (Shenon and McConnel, 1939). Thickens to the southwest, with approximately 230 m at Spooky Butte north of Calder, 335 m at St. Maries, and 490 m in the area south of Bald Mountain Lookout south of Emida.

Ywu_2—Wallace Formation, upper member two (Middle Proterozoic)—Green dolomitic siltite that weathers orange, green thinly laminated and microlaminated siltite and argillite, and thin lenticular quartzite beds. Contains mudcracks and ripple marks, which are uncommon in the other two members of the upper Wallace Formation. Equivalent to the Shepard Formation present in western Montana (Lemoine and Winston, 1986). Thickness about 500 feet (150 m) on the north side of Striped Peak immediately east of the area (Shenon and McConnel, 1939). Thickens to approximately 335 m at St. Maries, but apparently thins to the southwest where it has not been mapped separately.

Ywu_1—Wallace Formation, upper member one (Middle Proterozoic)—Dark gray to white, thinly laminated siltite and black argillite. Lower and upper parts have uneven, wavy laminations with graded bedding and rare ripple lamination. Middle(?) part is typically parallel laminated without grading. It commonly contains pyrite (or pyrrhotite?) and weathers rusty brown. Scapolite occurs low in the unit, mostly south of the St. Joe River, as 2-5 mm diameter poikiloblastic white ovoids and more rarely as green-brown prisms with square cross sections (Hietanen, 1967; Mora and Valley, 1989). Thickness about 500 feet (150 m) on northeast side of Striped Peak (Shenon and McConnel, 1939) and 450 to 900 m to the southwest.

Ywml—Wallace Formation, middle and lower members, undivided (Middle Proterozoic)—Quartzite and siltite, typically carbonate-bearing, and argillite. Shown where lack of mapping or poor exposure prevented subdivision. Equivalent to the lower Wallace unit of Griggs (1973) and Hobbs and others (1965).

Ywm—Wallace Formation, middle member (Middle Proterozoic)—White quartzite, siltite, and black argillite. Siltite and quartzite commonly contain dolomite and calcite. Characterized by uneven bedding (pinch and swell sediment type of Winston, 1986a) that consists of graded couples or couplets of quartzite or siltite-argillite in which scours and loads of quartzite cut or deform tops of subjacent black argillite. Argillite caps commonly contain ptygmatically folded siltite-filled cracks that taper downward. Carbonate typically confined to coarsest parts of bases; some carbonate-bearing quartzites develop open cross fractures that do not continue into the bounding argillite. White quartzite also occurs as hummocky cross-stratified planar beds 15-30 cm thick. Similarly thick siltite beds with the highest concentration of carbonate in the unit contain calcite ribbons, pods, and molar tooth structures. Rare stromatolites and brecciation are associated with carbonate-rich zones. Argillite in this material is typically gray instead of black and lacks siltite-filled cracks. South of the St. Joe River, scapolite is also commonly spatially associated with these zones. Where contact metamorphosed by the Herrick stock along the St. Joe River in the eastern part of the area, quartzites commonly contain abundant fine-grained epidote, and argillite is converted to hornfels. Equivalent to the middle member of the Wallace Formation as mapped by Harrison and others (1986). Thickness highly uncertain but probably as much as 1200-1500 m.

Ywl—Wallace Formation, lower member (Middle Proterozoic)—Massive green siltite and thinly laminated green siltite-argillite couplets with lesser amounts of carbonate, commonly as pods in siltite. Subdivided only in a few localities northwest of Calder. Equivalent to the lower member of the Wallace Formation as mapped by Harrison and others (1986). Thickness uncertain but probably as much as 250-300 m.

Ysw—Schist and phyllite of the Wallace Formation (Middle Proterozoic)—Gray muscovite and muscovite-biotite phyllite and schist, and fine-grained biotite-feldspar quartzite or granofels. Schistosity at small to large angle to relict bedding. Commonly contains pale lavender to more opaque red garnet and is the source for the Emerald Creek garnet deposits northwest of Clarkia. Is continuous with *Ywu* along the west boundary of the garnet zone, with distinction drawn at the garnet isograd. Toward the south also contains normally small, rarely 1-2 cm long, staurolite porphyroblasts, perhaps confined to certain layers. Also retains 1-2 cm wide, 10-to 30-cm-long muscovite concentrations with square cross sections interpreted as pseudomorphs after andalusite (Hietanen, 1963a). Atypical garnet-poor schist east of Clarkia may be metamorphosed *Ywu_3*, *Ywl*, or *Ysr*.

Yqw—Quartzite of the Wallace Formation (Middle Proterozoic)—Fine-grained white quartzite, biotite quartzite, granofels, and calc-silicate horizons. Most of unit probably is a metamorphic equivalent of *Ywm*; some in Emerald Creek drainage northwest of Clarkia may be metamorphosed *Ywu_2*, and that east of Clarkia possibly represents more carbonate-rich parts of *Ywl*. Metamorphic grade increases southward, as indicated by a southward progression from small muscovite porphyroblasts to phlogopite or biotite clots around 1 to 4

mm void spaces, and then to amphibole and rare diopside. Tremolite-actinolite is more common toward the east and hornblende toward the west. Voids are interpreted as former calcite grains. Red-brown weathering, carbonate-rich siltite zones persist at this grade. Scapolite occurs in some of the biotite-rich (black argillite protolith) layers as poikiloblastic white, stubby, irregular prisms and ovoids. At the highest metamorphic grade, stubby, ragged prisms of light green tremolite occur in calc-silicate granofels.

Ysr—St. Regis Formation (Middle Proterozoic)—Pale purple to gray siltite, argillite, and quartzite. Also light green siltite and darker green argillite or dark green siltite-light green argillite couplets. Typically mudcracked 1-cm-thick siltite-argillite couplets, but with thin (2-5 cm) and rarer thick (10-20 cm) fine-grained quartzite beds with green argillite caps, similar to those of the Revett Formation. Thickness uncertain but probably as much as 450 to 600 m.

Ysrv—Schist of the Ravalli Group (Middle Proterozoic)—Muscovite-rich schist, thin quartzite intervals, and minor calc-silicate rocks. Exposed only in the extreme eastern part of map. Unit is probably equivalent to the St. Regis Formation of the Ravalli Group but may include part of the Revett Formation. Tentatively assigned to the Ravalli Group on the basis of stratigraphic position.

Yrb—Revett and Burke Formations, undivided (Middle Proterozoic)—A combined unit utilized by Griggs (1973) where rocks are poorly exposed in isolated hills and ridges. Mostly light gray to greenish gray siltite and white vitreous quartzite.

Yr—Revett Formation (Middle Proterozoic)—Quartzite with siltite and argillite. Characteristically 20-cm to rare 1-m-thick beds of fine-grained to rare medium-grained quartzite. Some vitreous; most feldspathic with orange-brown spots. Much is flat laminated. Rippled tops and cross lamination more common than trough cross lamination. Rare mud clasts 2-10 cm long occur in lower parts of some thicker beds; also rare load casts and convolute bedding. Zones of white-weathering quartzite 10-50 m thick alternate with zones of brown-stained, thinner bedded quartzite and siltite with mud cracked surfaces; thickest beds appear low in the unit. Brown color associated with higher density of brown spots, perhaps the residue from weathering of ferroan calcite. Visual estimates of nine etched and stained hand specimens indicate 5 to 12 percent K-feldspar (mean of 10 percent) and 8-17 percent plagioclase (mean of 12 percent). One sericitized(?) sample from along Big Creek in the northeastern corner of the area lacks feldspar. Some K-feldspar appears detrital, but much is present as diagenetic(?) rims on plagioclase. Thickness ranges from 1,800 feet (550 m) at the junction of Calusa Creek and Pine Creek in the northeast part of the map area (Campbell and Good, 1963) to 3,400 feet (1,035 m) for a nearby(?) section along Pine Creek (Shenon and McConnel, 1939).

Yb—Burke Formation (Middle Proterozoic)—Pale green siltite, typically with macroscopic magnetite octahedra, in 10-20-cm thick beds. Darker green argillite partings. Includes flat-laminated, fine-grained, gray to white quartzite. Total thickness of partial sections in the Twin Crags area is about 3,000 feet (915 m; Campbell and Good, 1963). Clough (1981) reports a thickness of about 2,600 feet (800 m) at a location west of Silver Hill in the northeast part of map area.

Yqrv—Quartzite of the Ravalli Group, undivided (Middle Proterozoic)—Fine- to medium-grained, commonly foliated to lineated micaceous to feldspathic quartzite with muscovitic parting spaced at 2-30 cm intervals. Garnets occur on some parting surfaces. Unit occurs within the southeastern metamorphic complex, but most or all is probably equivalent to the Burke and Revett formations. Mapped where metamorphic grade, deformation, or lack of exposure makes internal division difficult.

Yp—Prichard Formation, undivided (Middle Proterozoic)—Gray, rusty-weathering siltite and minor quartzite. Minor discontinuous carbonate layers. Rare mudcracks. See Griggs (1973) or Cressman (1989) for more detail.

Ypu—Prichard Formation, upper part (Middle Proterozoic)—Map unit of Griggs (1973) described as dark to medium gray, very thinly bedded argillite commonly interlaminated with light gray siltite and also containing some siltite beds. Grades upward into interbedded and interzoned argillite, siltite, and quartzite sequence. Griggs (1973) suggests a range in total thickness of 2,500 to 3,500 feet (760-1,070 m).

Ypl—Prichard Formation, lower part (Middle Proterozoic)—Map unit of Griggs (1973) described as predominantly medium to light gray, thin- and regularly bedded siltite, and laminated in part; some argillite laminae and beds. Some beds or zones of gray to white quartzite have been subdivided locally (*Yqp* unit). Thickness 7,500+ feet (2,290+ m) according to Griggs (1973); base not exposed.

Yqp—Quartzite of the Prichard Formation (Middle Proterozoic)—Nearly white to light gray impure to pure quartzite mapped by Hobbs and others (1965) in the northeast part of the area. Individual quartzite zones may be as much as 50 feet thick and are discontinuous. Contains about 5 percent plagioclase and no K-feldspar on the basis of two etched and stained samples.

BELT SUPERGROUP OR PRE-BELT METAMORPHIC ROCKS

Yq—Quartzite (Middle Proterozoic)—Gray to dark gray, white to brown weathering, medium- to coarse-grained micaceous quartzite. Most is foliated, some highly lineated. Some has lighter (muscovitic) and darker (biotitic) layers 1-2 cm thick. Parting on micaceous layers 1 to 40 cm. Micaceous interlayers contain flattened and elongated garnet in highly lineated and sheared rocks.

Ys—Schist (Middle Proterozoic)—Dark brown, muscovite-quartz, biotite-muscovite-quartz, and muscovite-biotite-feldspar-quartz schist. Includes some biotite quartzite and locally preserves compositional layering that reflects probable siltite-argillite protolith. Schistosity is locally axial planar to folds in compositional layering and is itself commonly folded and crenulated. Farthest southeast exposures are migmatitic and multiply deformed. Rarely contains garnet, but northeast of Grandmother Mountain, east of Clarkia, porphyroblasts are 1-2 cm in diameter and in close association with kyanite(?). Includes schists correlated with Prichard and St. Regis formations (Hietanen, 1967; Cockrum, 1986).

YXs—Schist of the Priest River metamorphic complex (Proterozoic)—Fine-grained garnetiferous schist. Meta-igneous rocks to the north and northwest within this complex have been dated at about 1580 Ma, indicating a pre-Belt age (Evans and Fischer, 1986; Armstrong and others, 1987). However, the unit may include younger overlying Belt rocks (Prichard?) as well. Mapped as Prichard Formation by Griggs (1973).

YXq—Quartzite of the Priest River metamorphic complex (Proterozoic)—Strongly lineated and foliated light gray to white quartzite. Coarsely recrystallized and feldspar-poor (2 percent plagioclase).

STRUCTURE, TECTONICS, AND METAMORPHISM

Relatively low-grade metasedimentary rocks of the Belt Supergroup underlie much of the St. Maries quadrangle (Figures 3 and 4), but high metamorphic grade (amphibolite facies) and highly strained rocks are present in its northwest and southeast corners. Exposure of the high-grade rocks has been attributed to unroofing of two metamorphic core complexes: the Priest River complex in the northwest and the Boehls Butte complex in the southeast (Rehrig and Reynolds, 1981; Seyfert, 1984; Sheriff and others, 1984;

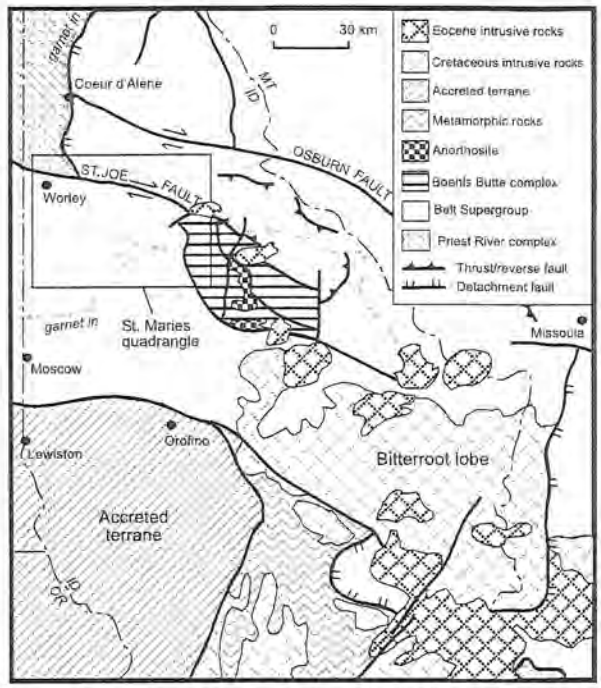


Figure 3. *Regional geologic map of pre-Miocene rocks in northern Idaho and western Montana.*

Rehrig and others, 1987; Doughty and others, 1990, Doughty and Price, 1999). Both complexes have been considerably uplifted relative to the surrounding rocks, but the mechanics of this uplift are not well understood. While the Priest River complex may well represent a metamorphic core complex of the type described in Crittenden and others (1980), the bounding fault for the Boehls Butte complex appears to be steep, and we did not map it as a detachment fault. The central part of the St. Joe fault appears to connect the Priest River and Boehls Butte complexes and may have acted as a transform fault during uplift of the two areas. However, the St. Joe fault may have had an earlier history along its entire length. The following discussion explores the history of the area from oldest events to youngest.

Little is known of the tectonic setting of the area during the Precambrian. Archean basement and younger (1576 Ma) augen gneiss have been recognized north of the area near Sandpoint (Clark, 1973; Evans and Fischer, 1986; Doughty and others, 1998). The Archean basement is overlain by high-grade metasedimentary rocks whose protolith may be the Belt Supergroup. Deposition of the lower and middle parts of the Belt Supergroup occurred from about 1470 to 1440 Ma (Anderson and Davis, 1995; Evans and others, 2000) and was probably controlled at least in part by block faulting. Winston (1986b) recognized significant thickness differences across an east-west line (Jocko line) coincident

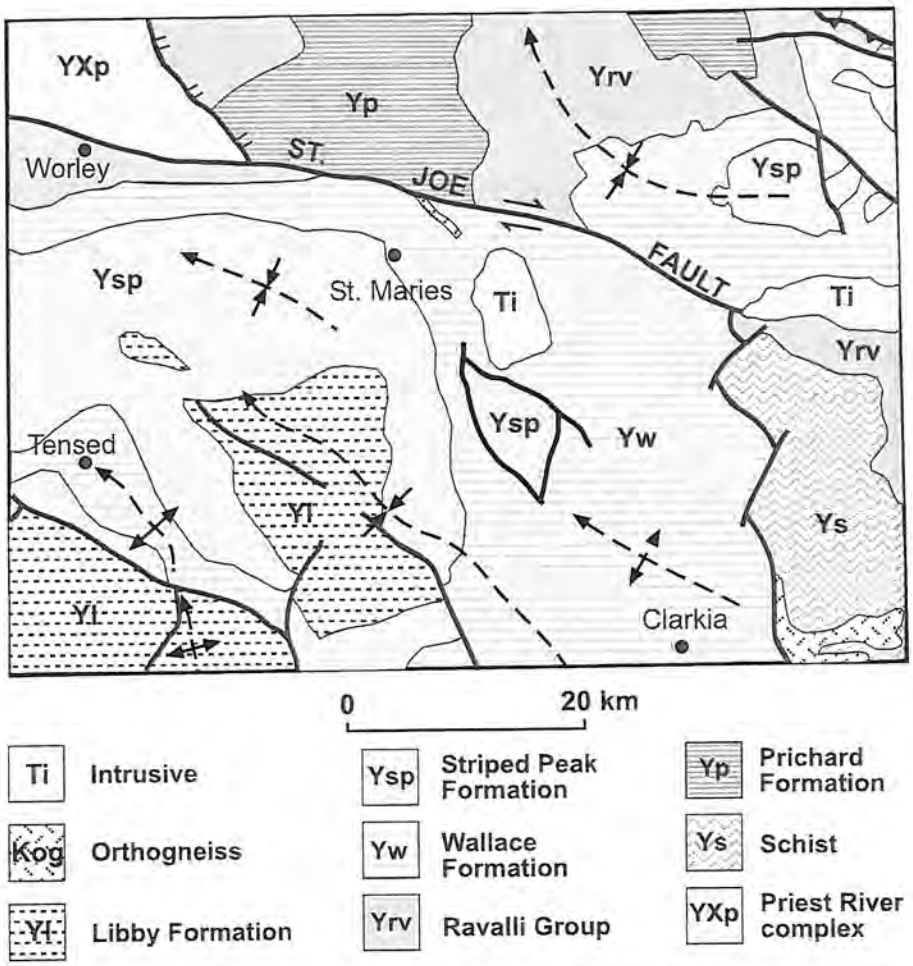


Figure 4. *Simplified geologic map of pre-Miocene rocks in the St. Maries quadrangle.*

with the Osburn fault (Figure 3) and suggested it was a down-to-the-south growth fault during deposition of the Ravalli Group and Wallace Formation. The postulated growth fault may actually be slightly south of the Osburn fault in the western part of the Coeur d'Alene mining district because the section is thin as far south as Striped Peak (center column in Figure 5). The section thickens from Striped Peak south and west across the St. Maries quadrangle. Thickness does not appear to change across the St. Joe fault, but it is difficult to find comparable sections with which to document this. The East Kootenai orogeny at about 1300-1350 Ma affected rocks to the north in Canada (McMechan and Price, 1982) and may have affected rocks in the study area as well. The western part of the Belt basin is thought to have rifted away during the Late Proterozoic, perhaps forming part of eastern Australia (Ross and others, 1992; Doughty and others, 1998).

The first recognized metamorphic-tectonic event appears related to contraction in the Cretaceous. This resulted in development of schistosity (S1), folds, including rarely seen isoclinal folds (F1), and some early (M1) metamorphic mineral assemblages (Hietanen, 1963a ,1963b, 1967; Lang and Rice, 1985a, 1985b; Carey and others, 1992; Grover and others, 1992). Large-scale northwest-trending folds in the less metamorphosed rocks (Figure 4) probably formed during this time. Open folds and poorly developed cleavage with inconsistent attitudes in the southwest part of the area indicate low strain there. Tighter folds with well-developed cleavage that dips steeply southwest in the northeast corner of the map indicate higher northeast-southwest shortening strain there. Contractional faults also formed in the northeast part of the area, and at the present level of exposure all of these faults are relatively steep (i.e., reverse faults). We believe these structures are related to regional thrusting in the Cretaceous and refer to them as thrust faults regardless of dip angle. Significant north-northeast-directed faulting

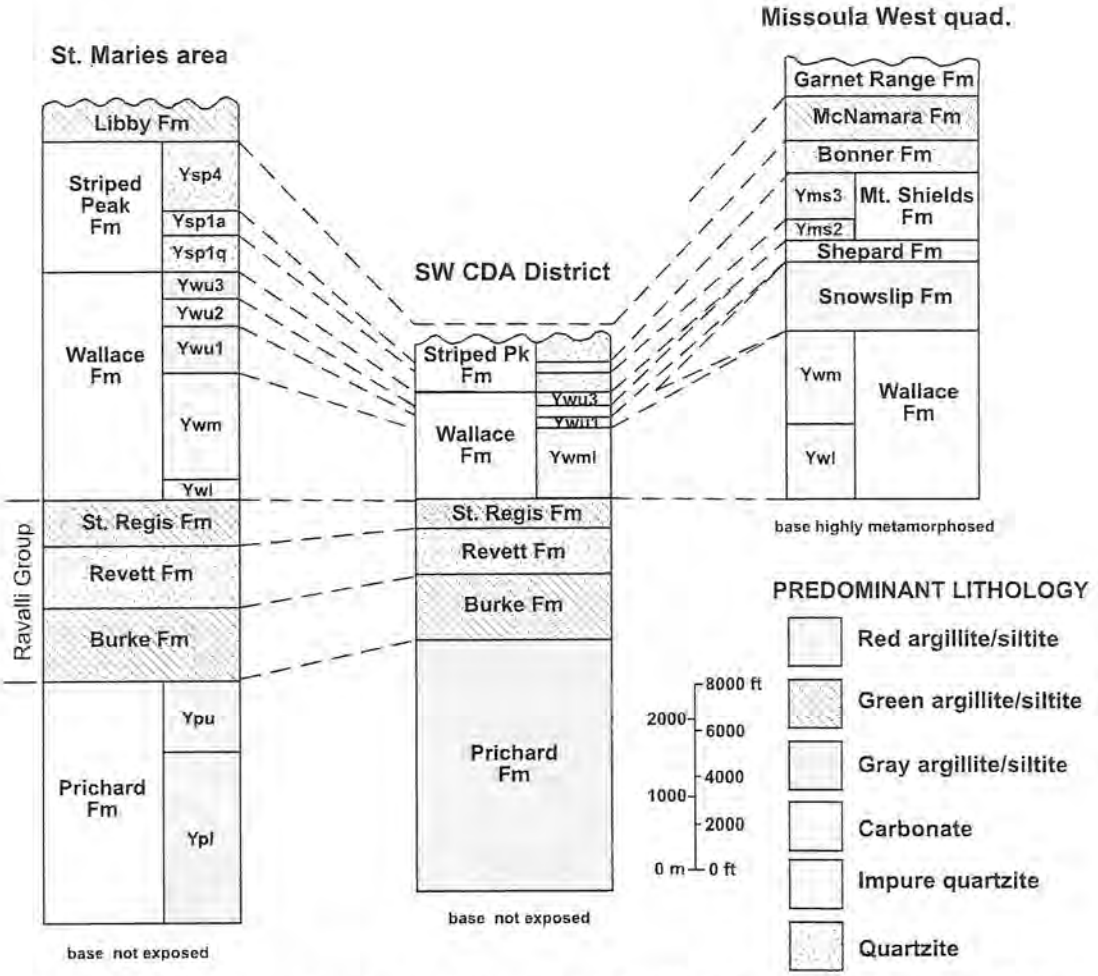


Figure 5. *Belt Supergroup stratigraphic sections for the St. Maries area, the southwest part of the Coeur d'Alene mining district (SW CDA district) and the area west of Missoula, Montana (Missoula West quad.). Thickness estimates for the Coeur d'Alene district are from Hobbs and others (1965), Griggs (1973), and Lewis and others (1999). Those for the Missoula West quadrangle are from Lewis (1998).*

occurred along two of these faults (Big Creek and Striped Peak). Southward-verging small-scale parasitic folds common to the southeast part and an expanse of overturned strata just to the east (Reid and Greenwood, 1968; Reid and others 1981; Lewis and others, 1999) suggest that local southward-directed thrusting accompanied folding. The St. Joe fault may have been active as a south-directed thrust during this time and exposed older rocks on the north side of the fault. Postulated thrusting along a north-striking fault east of Santa is speculative, but helps explain the highly deformed rocks in this area.

A strong, subhorizontal flattening fabric in the southeastern part of the area is especially well developed in the orthogneiss (*Kog*). It is cut by undeformed pegmatite-aplite bodies. If the orthogneiss is correlative with deformed hornblende-bearing tonalite in and around the Idaho batholith and if the crosscutting bodies are correlative with the undeformed main phase of the batholith, then this fabric was produced in the mid-Cretaceous, perhaps 90-72 Ma. The strain reflected in the flattening fabric is most easily attributed to Sevier-Laramide contraction. Alternatively, that fabric and the lineation-dominated fabric in overlying quartzite might result from extension, as Hodges and Walker (1992) suggested for other core complexes of the Cordillera after contractional thickening. Apparent static growth of M2 porphyroblasts (garnet and andalusite) must postdate this. A likely cause of M2 is regional heating by the later stages of the batholith (Lang and Rice, 1985a; Carey and others, 1992; Grover and others, 1992).

After M2, the entire region was affected by extension during the Eocene (Harms and Price, 1992). The Coeur d'Alene-Purcell fault and White Rock fault were active, and they facilitated the uplift of the Priest River complex and the Boehls Butte complex. Movement on these two faults may have been accompanied by dextral motion along the central connecting part of the St. Joe fault. The Purcell-Coeur d'Alene fault on the east side of the Priest River complex is nowhere exposed; however, mineral lineations plunge 15-35°E east in the footwall of the fault along the west shore of Coeur d'Alene Lake, indicating that it may be a low-angle detachment fault as suggested by Rehrig and Reynolds (1981). Alternatively, the Coeur d'Alene-Purcell fault may be a normal fault that cuts an earlier mylonite zone (Doughty and Price, 1999).

How much of the fabric in rocks east of the White Rock fault dates from Eocene deformation is uncertain. Garnets on foliation surfaces of some quartzite are elongated or smeared parallel to the lineation and perpendicular to extension joints. If these garnets are from M2, at least some of the lineation probably dates from the Eocene. These lineated rocks may be mylonites formed during unroofing of a core complex. Structurally lower schist and orthogneiss units in the southeast part of the area also are locally mylonitized. Kinematic sense from s-c relations is top-to-the-west relative motion consistent with the map sense of tectonic unroofing. East of the map area (near Monumental Buttes), top-to-the-east sense of motion marks the eastern side of the overall structure (Lewis and others, 1999).

The contrast in metamorphic grade and lithology varies along the White Rock fault. The most striking contrast in grade is near the north end along Mica Creek, where the weakly metamorphosed upper Wallace Formation is faulted against mica schist and lineated quartzite. There, the garnet isograd is offset approximately 10 miles (16 km) along the White Rock fault (Hietanen, 1967). Although the metamorphic contrast across the White Rock fault decreases to the south, younger rocks (Wallace Formation) continue on the west side of the structure, indicating significant stratigraphic offset. Also exposed along Mica Creek west of mylonitized quartzite is brecciated quartzite, which resembles chlorite breccia found in other metamorphic core complexes in the western U.S. However, similar breccia was not found elsewhere along the fault. Lineations near the fault typically have shallow plunges, but the straight trace of the fault gives the appearance of a relatively steep dip. In this way the White Rock fault is similar to the Coeur d'Alene fault and may be a normal fault that cuts an earlier detachment fault.

The presence of epidote-bearing orthogneiss (*Kog*) east of the White Rock fault, along with mineral compositions indicating pressures up to 11 kb (Grover and others, 1992), attest to the deep crustal levels now exposed at the surface. Uplift of these deep rocks may have been protracted. Postkinematic (M3) minerals include cordierite, corundum, and andalusite that formed at 4 to 6 kb (Grover and others, 1992). They probably formed during, or immediately before, Eocene uplift and unroofing, suggesting about half the uplift could have been in the Late Cretaceous. Early phases of uplift may have included strike-slip motion on the eastern part of the St. Joe fault from Calder east to the Roundtop pluton. There, a band of strongly lineated quartzite (L tectonite) within the *Yqrv* unit has shallow ESE- or WNW-plunging lineation consistent with strike slip parallel to the direction of extension. This band is present along the southern part of the Herrick stock and is interrupted by the Eocene Round Top pluton (east of the map area). The Round Top pluton may fill a trans-tensional gap, but the lack of tectonic fabric in the pluton, except for its southern border, indicates that most strike-slip motion was over before its intrusion. This northern margin of the Boehls Butte uplift appears to expose a more intact stratigraphic section than does the western margin, perhaps because it is oriented parallel to the Eocene extensional direction.

The trace of the St. Joe fault along the northern margin of the Boehls Butte complex was intruded by the Herrick stock. In general the stock is not deformed, but a subhorizontal flow(?) fabric is well developed in some places. Protomylonite was developed locally and is present along the upper part of Mud Cabin Creek. The Herrick stock intrudes the Wallace Formation on the north, perhaps as a sill, and apparently includes some subhorizontal metasedimentary screens as well. Lineated quartzitic metasediment (*Yqrv*) with ESE-plunging lineation is present along the southern margin of the stock. These observations suggest that the stock intruded the WNW-trending boundary (St. Joe fault) that separates the Wallace Formation from more highly deformed Ravalli Group rocks after most of the deformation and juxtaposition. If the stock is Eocene, its composition suggests it is related to the earlier, intermediate phase of Challis magmatism. Juxtaposition of the more deformed rocks to the south with less deformed ones to the north must have predated that and could have been coincident with the formation of the L tectonite farther east. Although there is a contrast in fabric across the fault, stratigraphic offset is not great. Another structure that may have had Eocene motion is the Hoodoo fault, which offsets the garnet isograd in the south-central part of the map area.

Dacite and rhyolite dikes related to the Eocene extensional event intruded NW- to NNW-trending faults both north and south of the St. Joe fault. Their orientation is consistent with right-lateral slip along the fault during WNW-ESE regional extension. Involvement of the rhyolite suggests that faulting persisted during the later phase of Challis magmatism. Associated with these is pervasive iron staining, brecciation, and argillic(?) or sericitic(?) alteration. The age and tectonic significance of NNW-striking mafic dikes in the Clarkia area (unit *TKgb*) are less clear. The orientation and relative freshness of these dikes suggests they may be related to the Columbia River Basalt Group, but the dikes differ chemically from the flows in the area, as discussed in the following section. These mafic dikes may instead be Eocene or Cretaceous in age. Flows of Miocene Columbia River basalt cover parts of many of the faults in the area and do not appear to have been offset. Recent dip-slip fault activity thus appears to have been minimal. Strike-slip motion on structures like the St. Joe fault is more difficult to discount, but no evidence of significant post-Middle Miocene offset has been found.

GEOCHEMISTRY

Over 100 samples from the St. Maries 30' x 60' quadrangle and an additional 13 samples from the Wallace 30' x 60' quadrangle were analyzed for major and trace element concentrations at Washington State University as part of this study. Major elements and selected trace elements were determined for all samples by X-ray fluorescence (XRF) methods. Sixteen samples of metasedimentary rocks were analyzed for additional trace elements, including rare-earth elements, using inductively coupled plasma mass spectroscopy (ICP-MS). Results for igneous intrusive rocks are presented in Table 1; those for metasedimentary rocks are listed in Table 2 (XRF) and Table 3 (ICP-MS), and those for basalts are listed in Table 4. Locations for samples in the St. Maries quadrangle are shown on the map. Latitude and longitude are listed in the tables for all samples, including those outside the map area in the Wallace quadrangle.

Chemical compositions of argillite-siltite from different formations of the Belt Supergroup were found to largely overlap; these results are consistent with those of previous workers (e.g., Harrison and Grimes, 1970; Harrison and Hamilton, 1971). One exception is Sr content. Average Sr concentrations are higher in noncarbonate rocks of the Prichard Formation than those of other formations, a feature previously recognized by Jack Harrison (written commun., 1992). However, Sr is apparently mobilized during metamorphism and can be found in elevated amounts in more schistose rocks. Concentrations of K_2O are highest in the argillite, as expected, but quartzite of the Revett and Striped Peak formations contain significant potassium (1.46-2.01 percent K_2O) given the high SiO_2 contents of these rocks.

Six orthogneiss samples (*Kog*) were found to have a wide compositional range (Table 1). SiO_2 ranges from 57 to 74 percent, and K_2O from 0.75 to 4.25 percent. One sample from Marble Creek (98TF819) with low Al_2O_3, Na_2O_3, and Sr concentrations was mapped as *Kog*, but in some respects resembles feldspathic quartzite. The unusual chemical composition is perhaps the result of intense deformation and elemental mobilization of an original granitic body. Seven amphibolite samples are more uniform in composition (SiO_2 range of 49-52 percent). The three samples of *Tgd* from the Merton Creek and Herrick stocks are also similar chemically, but the Herrick stock contains more mafic lithologies that were not sampled. A biotite lamprophyre from the dump at the Palisade mine has an elevated K_2O content (6.15 percent), as expected.

All analyses of Columbia River basalt (Table 4) match well with previously published results (Swanson and others, 1979b; Wright and others, 1973, 1979, 1980). Significant differences exist in both major- and trace-element contents of the different units, but variation within a unit is minimal. For example, Tgn_2 flows are higher in CaO and MgO and lower in TiO_2 than Tgr_2 flows, but TiO_2 only ranges from 1.86 to 1.94 percent in six samples of Tgn_2. One important result was from sample BRETC collected on Titley Creek east of Clarkia. This sample of Priest Rapids basalt has Lolo chemical type (Wright and others, 1973: Swanson and others, 1979b) in contrast to the Rosalia chemical type present in the St. Maries, Worley, and Harrison areas. This confirms the Lolo type chemistry of sample 78-122 (Wright and others, 1980) collected at the mouth of Emerald Creek. A map showing the two chemical types of the Priest Rapids in the St. Maries quadrangle could be produced with additional sampling.

Two pyroxene gabbro samples (98RB004 and 98SC001) and one diabase sample (GC) from near Clarkia were sampled to check if they represented intrusive equivalents of the Columbia River Basalt Group. The pyroxene gabbro most resembles Priest Rapids flows with Lolo chemical type (such as sample BRETC), but the gabbro has lower P_2O_5 and Ba concentrations and higher Cu concentrations. Although the diabase dike has major- and trace-element concentrations somewhat similar to the basalt of Dodge (*Ted*), The TiO_2 Ni, Cr, Ba, and Sr concentrations are higher than any known *Ted* flow in the area. It seems unlikely that these gabbro and diabase dikes represent feeders to the Columbia River basalts.

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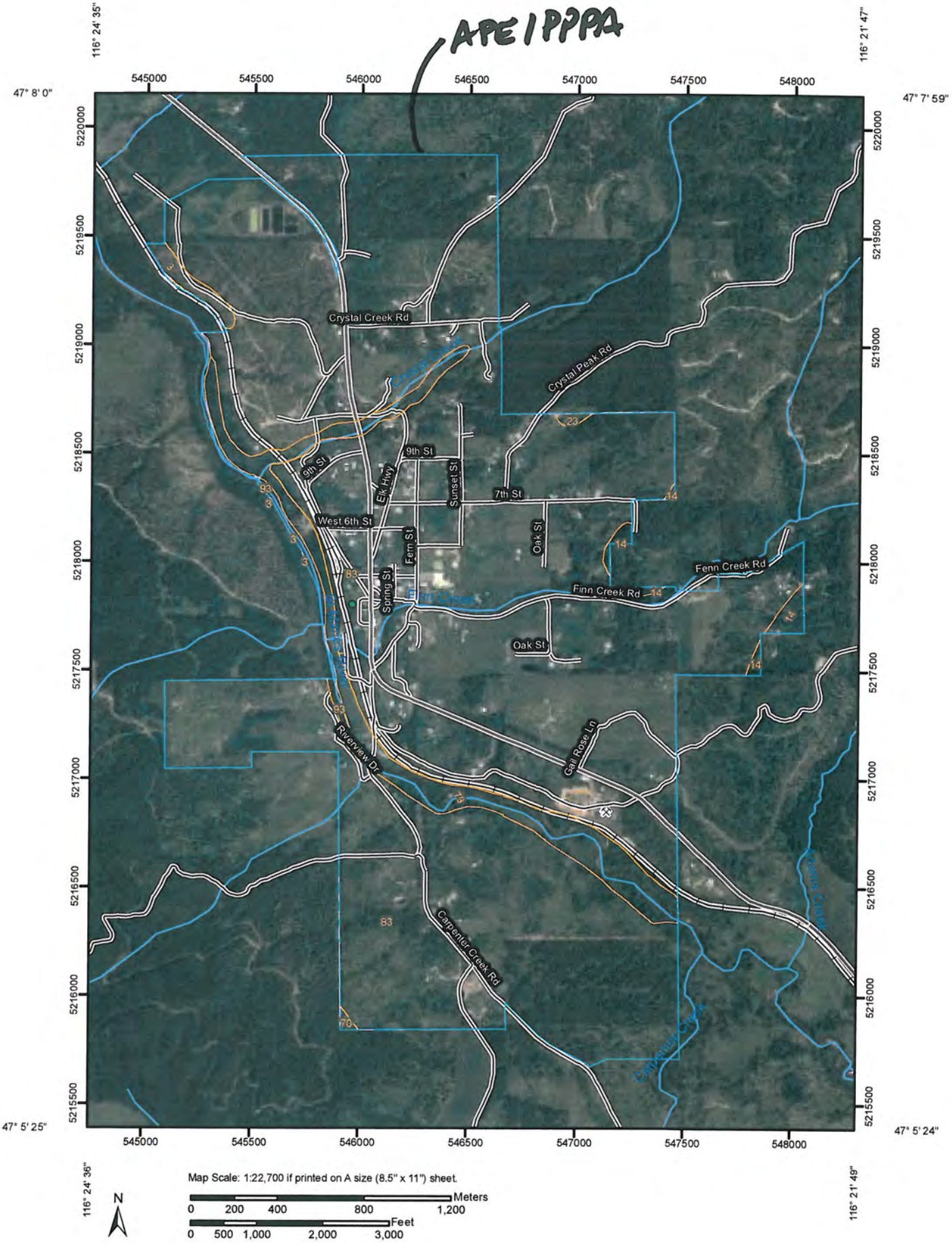
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Elk Hwy
Sunset St
7th St
West 6th St
Fern St
Oak St
Spring St
Fenn Creek Rd
Finn Creek Rd
Finn Creek
Oak St
Riverview Dr
Gail Rose Ln
Carpenter Creek Rd
Carpenter Creek
Adams Creek
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Map Scale: 1:22,700 if printed on A size (8.5" x 11") sheet.
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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

- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:22,700 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 11N NAD83

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

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

Date(s) aerial images were photographed: 6/23/2004

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

Map Unit Legend

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties (ID608)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Agatha-Bobbitt stony loams, 35 to 65 percent slopes	10.1	0.6%
14	Bouldercreek-Marblecreek association, 15 to 35 percent slopes	11.6	0.7%
23	Flewsie-Helmer silt loams, 15 to 35 percent slopes	1.7	0.1%
70	Nakarna silt loam, 15 to 35 percent slopes	1.1	0.1%
79	Pokey-Typic Fluvaquents complex, 0 to 4 percent slopes	98.1	5.7%
83	Reggear silt loam, 3 to 20 percent slopes	1,579.5	92.2%
93	Water	11.4	0.7%
Totals for Area of Interest		**1,713.4**	**100.0%**

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

3—Agatha-Bobbitt stony loams, 35 to 65 percent slopes

Map Unit Setting

Elevation: 2,150 to 3,200 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Agatha and similar soils: 45 percent
Bobbitt and similar soils: 30 percent

Description of Agatha

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over colluvium over bedrock derived from basalt

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 7 inches: Stony loam
7 to 29 inches: Very cobbly loam
29 to 50 inches: Extremely stony clay loam
50 to 60 inches: Unweathered bedrock

Description of Bobbitt

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Volcanic ash and/or loess over colluvium over bedrock derived from basalt

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 14 inches: Stony loam
14 to 34 inches: Very cobbly clay loam
34 to 44 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

14—Bouldercreek-Marblecreek association, 15 to 35 percent slopes

Map Unit Setting

Elevation: 2,600 to 5,000 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 60 to 110 days

Map Unit Composition

Bouldercreek and similar soils: 45 percent
Marblecreek and similar soils: 30 percent

Description of Bouldercreek

Setting

Landform: Mountain slopes
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over mixed colluvium

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 14 to 27 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 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 4 inches: Silt loam
4 to 17 inches: Silt loam
17 to 28 inches: Very gravelly loam
28 to 62 inches: Extremely gravelly sandy loam

Description of Marblecreek

Setting

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

Parent material: Volcanic ash over colluvium derived from schist and/or quartzite and/or granite

Properties and qualities

Slope: 15 to 35 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 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.0 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Gravelly silt loam
5 to 13 inches: Gravelly silt loam
13 to 27 inches: Very gravelly sandy loam
27 to 46 inches: Extremely gravelly sandy loam
46 to 62 inches: Extremely cobbly loamy sand

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

23—Flewsie-Helmer silt loams, 15 to 35 percent slopes

Map Unit Setting

Elevation: 2,140 to 4,700 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 70 to 110 days

Map Unit Composition

Flewsie and similar soils: 50 percent
Helmer and similar soils: 35 percent

Description of Flewsie

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium derived from gneiss and/or quartzite

Properties and qualities

Slope: 15 to 35 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 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.1 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 3 inches: Moderately decomposed plant material
3 to 7 inches: Silt loam
7 to 18 inches: Silt loam
18 to 40 inches: Fine sandy loam
40 to 63 inches: Loamy fine sand

Description of Helmer

Setting

Landform: Hillslopes, terraces
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Volcanic ash over loess and/or alluvium and/or colluvium

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 14 to 20 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 5 inches: Silt loam
5 to 17 inches: Silt loam
17 to 20 inches: Silt loam
20 to 40 inches: Silt loam
40 to 62 inches: Silt loam

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

70—Nakarna silt loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 2,800 to 5,000 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Nakarna and similar soils: 75 percent

Description of Nakarna

Setting

Landform: Mountain slopes, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium over residuum weathered from mica schist

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.1 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 4 inches: Silt loam
4 to 16 inches: Silt loam
16 to 36 inches: Loam
36 to 49 inches: Cobbly fine sandy loam
49 to 59 inches: Weathered bedrock

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

79—Pokey-Typic Fluvaquents complex, 0 to 4 percent slopes

Map Unit Setting

Elevation: 2,200 to 3,100 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days

Map Unit Composition

Pokey and similar soils: 50 percent
Typic fluvaquents and similar soils: 35 percent
Minor components: 7 percent

Description of Pokey

Setting

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

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 18 to 36 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 1.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 4w

Typical profile

0 to 15 inches: Loam
15 to 27 inches: Loam
27 to 60 inches: Loamy sand

Description of Typic Fluvaquents

Setting

Landform: Flood plains, depressions, channels, stream terraces
Down-slope shape: Concave
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: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: Moderate (about 6.4 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 3 inches: Fine sandy loam
3 to 37 inches: Stratified loamy coarse sand to silt loam
37 to 60 inches: Stratified gravelly coarse sand to extremely gravelly coarse sand

Minor Components

Mazie

Percent of map unit: 4 percent
Landform: Flood plains

Udarents, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

83—Reggear silt loam, 3 to 20 percent slopes

Map Unit Setting

Elevation: 2,500 to 3,400 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days

Map Unit Composition

Reggear and similar soils: 85 percent

Description of Reggear

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess

Properties and qualities

Slope: 3 to 20 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
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 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.7 inches)

Interpretive groups

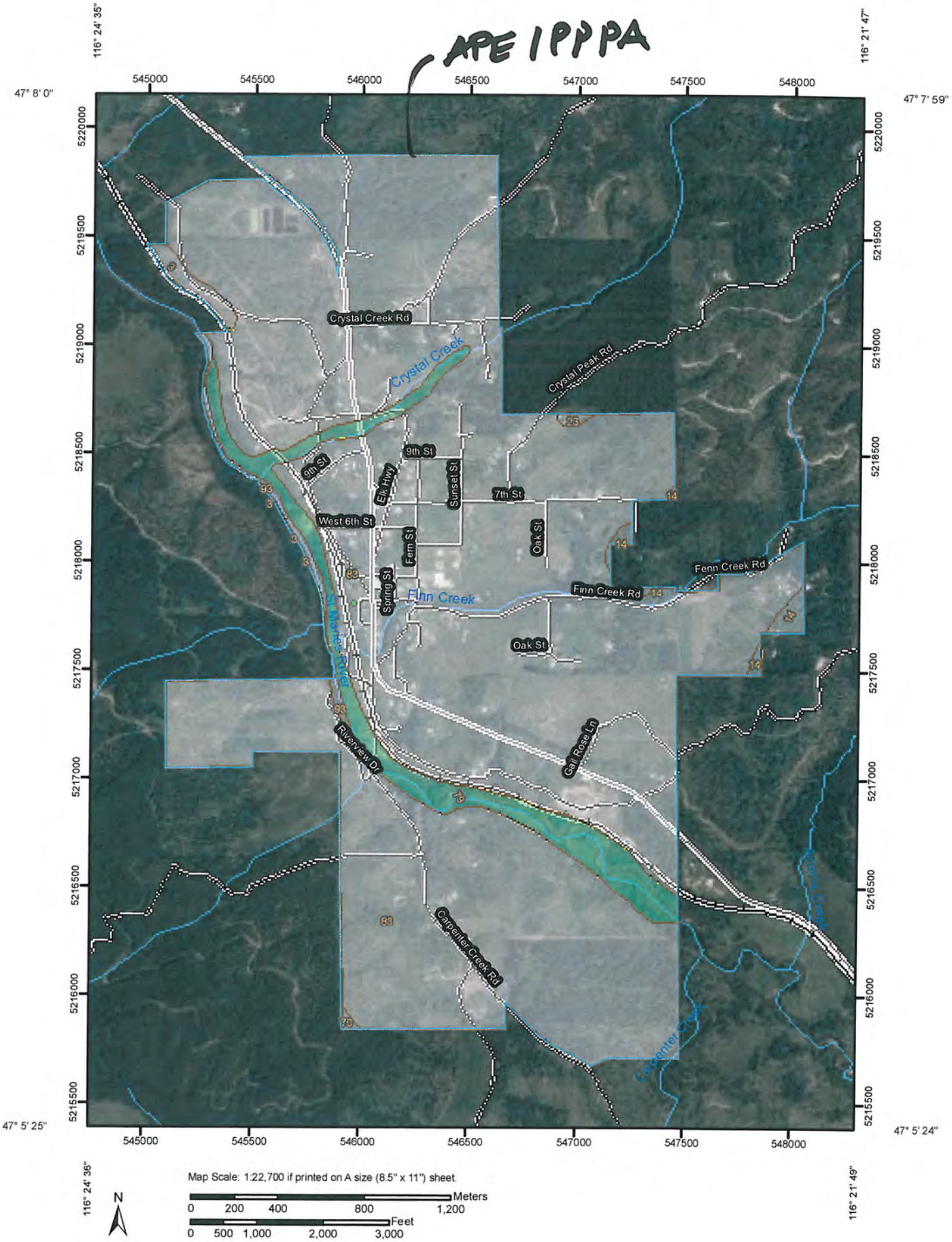
Land capability (nonirrigated): 4e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 13 inches: Silt loam
13 to 20 inches: Silt loam
20 to 26 inches: Silt loam
26 to 62 inches: Silty clay loam

Data Source Information

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008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Map Scale: 1:22,700 if printed on A size (8.5" x 11") sheet.
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MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

.02

.05

.10

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Not rated or not available

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:22,700 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 11N NAD83

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

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 7, Aug 12, 2008

Date(s) aerial images were photographed: 6/23/2004

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

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties (ID608)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
3	Agatha-Bobbitt stony loams, 35 to 65 percent slopes		10.1	0.6%
14	Bouldercreek-Marblecreek association, 15 to 35 percent slopes		11.6	0.7%
23	Flewsie-Helmer silt loams, 15 to 35 percent slopes		1.7	0.1%
70	Nakarna silt loam, 15 to 35 percent slopes		1.1	0.1%
79	Pokey-Typic Fluvaquents complex, 0 to 4 percent slopes	.28	98.1	5.7%
83	Reggear silt loam, 3 to 20 percent slopes		1,579.5	92.2%
93	Water		11.4	0.7%
Totals for Area of Interest			**1,713.4**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

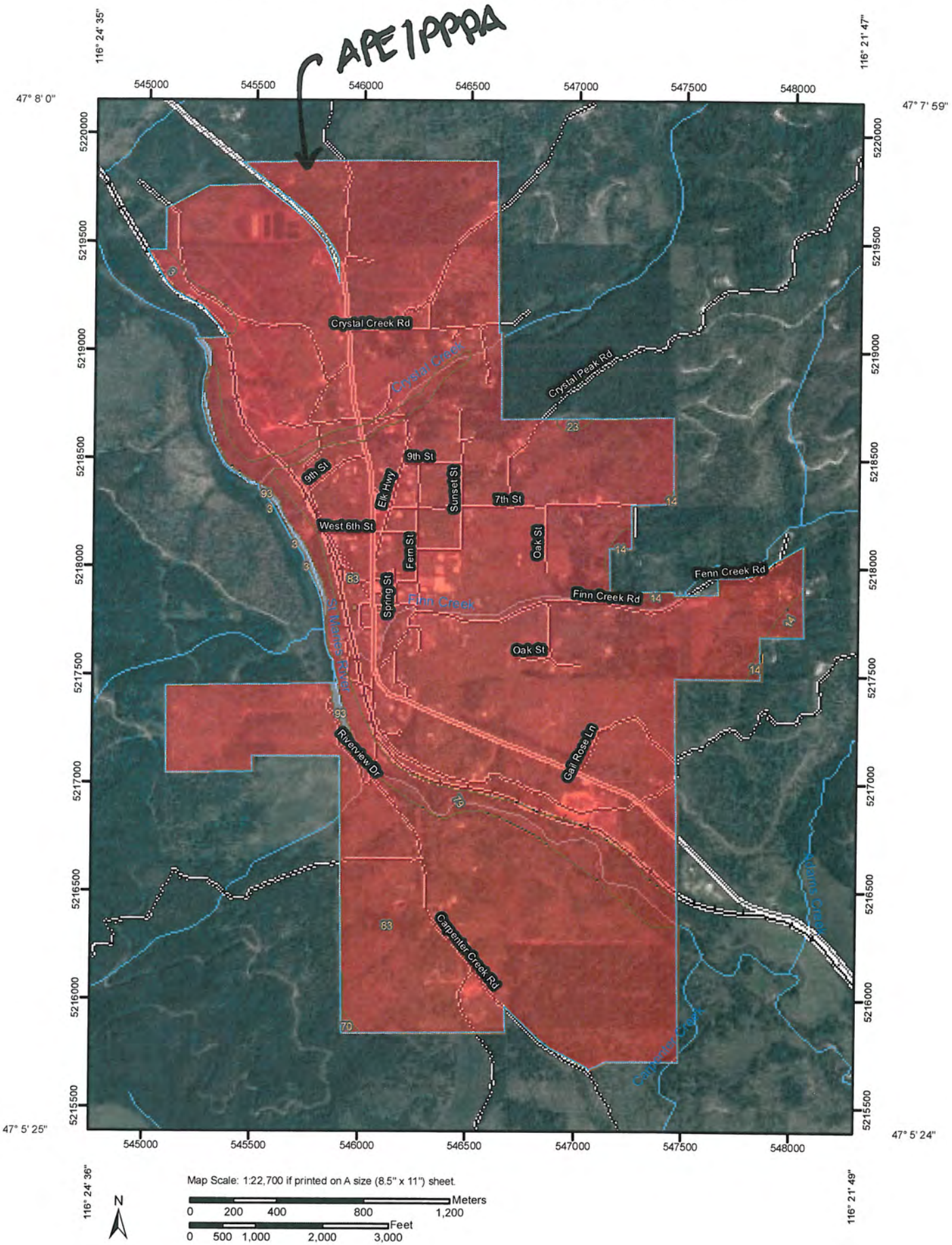
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options: Surface Layer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Crystal Creek
Crystal Peak Rd
9th St
6th St
Elk Hwy
Sunset St
7th St
West 6th St
Fern St
Oak St
Spring St
Fenn Creek Rd
Finn Creek Rd
Finn Creek
St Maries River
Oak St
Riverview Dr
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0 200 400 800 1,200
Feet
0 500 1,000 2,000 3,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:22,700 if printed on A size (8.5" × 11") sheet.

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

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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Survey Area Data: Version 7, Aug 12, 2008

Date(s) aerial images were photographed: 6/23/2004

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Shallow Excavations

Shallow Excavations— Summary by Map Unit — St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties (ID608)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
3	Agatha-Bobbitt stony loams, 35 to 65 percent slopes	Very limited	Agatha (45%)	Slope (1.00)	10.1	0.6%
				Depth to hard bedrock (0.42)		
				Large stones content (0.36)		
				Cutbanks cave (0.10)		
			Bobbitt (30%)	Depth to hard bedrock (1.00)		
				Slope (1.00)		
				Large stones content (0.18)		
				Cutbanks cave (0.10)		
14	Bouldercreek-Marblecreek association, 15 to 35 percent slopes	Very limited	Bouldercreek (45%)	Slope (1.00)	11.6	0.7%
				Cutbanks cave (1.00)		
			Marblecreek (30%)	Slope (1.00)		
				Cutbanks cave (1.00)		
23	Flewsie-Helmer silt loams, 15 to 35 percent slopes	Very limited	Flewsie (50%)	Slope (1.00)	1.7	0.1%
				Cutbanks cave (1.00)		
			Helmer (35%)	Slope (1.00)		
				Depth to saturated zone (1.00)		
				Cutbanks cave (0.10)		
70	Nakarna silt loam, 15 to 35 percent slopes	Very limited	Nakarna (75%)	Slope (1.00)	1.1	0.1%
				Cutbanks cave (0.10)		

Shallow Excavations— Summary by Map Unit — St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties (ID608)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
79	Pokey-Typic Fluvaquents complex, 0 to 4 percent slopes	Very limited	Pokey (50%)	Depth to saturated zone (1.00)	98.1	5.7%
				Cutbanks cave (1.00)		
				Flooding (0.60)		
			Typic Fluvaquents (35%)	Depth to saturated zone (1.00)		
				Cutbanks cave (1.00)		
				Flooding (0.80)		
			Mazie (4%)	Depth to saturated zone (1.00)		
				Flooding (0.80)		
				Cutbanks cave (0.10)		
			Udarents, frequently flooded (3%)	Cutbanks cave (1.00)		
				Flooding (0.80)		
				Depth to saturated zone (0.73)		
83	Reggear silt loam, 3 to 20 percent slopes	Very limited	Reggear (85%)	Depth to saturated zone (1.00)	1,579.5	92.2%
				Slope (0.63)		
				Cutbanks cave (0.10)		
93	Water	Not rated	Water (100%)		11.4	0.7%
Totals for Area of Interest					**1,713.4**	**100.0%**

Shallow Excavations— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Very limited	1,702.1	99.3%
Null or Not Rated	11.4	0.7%
Totals for Area of Interest	**1,713.4**	**100.0%**

Description

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Appendix E

Climate Information

RIFLE AIRPORT, CO (KRIL). W	S	S	W	W	W	W	W	W	W	W	S	S	W
SPRINGFIELD AP, CO (KSPD).	W	S	S	S	S	S	S	S	S	S	S	W	S
TRINIDAD AP, CO (KTAD). WIN	W	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	WSW
WOLF CREEK PASS, CO (KCPW).	W	W	SSW	SSW	SSW	SSW	NE	SW	SW	SSW	SSW	SW	SSW

HAWAII

PREVAILING WIND DIRECTION

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
BRADSHAW AAF, HI (PHSF). WI	W	W	W	W	W	W	W	W	W	W	W	SE	W
HILO INT'L AP, HI (PHTO). W	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
HONOLULU INT'L AP, HI (PHNL)	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE
KAHULUI AP, HI (PHOG). WIND	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
KAILUA-KONA INT'L AP, HI (PH	E	E	W	W	W	SSW	SSW	WSW	WSW	SW	S	ESE	WSW
KANEOHE MCAS, HI (PHNG). WI	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	E	ENE
KAPOLEI-KALEALOA AP, HI (PHJ	NE	NE	NE	ENE	NE	ENE	ENE	ENE	NE	ENE	NE	ENE	ENE
LAHAINA-KAPALUA AP, HI (PHJH	NE	NE	NE	ENE	ENE	ENE	NE	ENE	ENE	ENE	NE	NE	NE
LANAI CITY AP, HI (PHNY). W	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
LIHUE AP, HI (PHLI). WIND R	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	ENE	ENE
MOLOKAI AP-KAUNAKAKAI, HI (P	ENE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE
WAHIAWA-WHEELER AAF, HI (PHH	E	E	E	E	E	E	ENE	E	ENE	E	ENE	E	E

IDAHO

PREVAILING WIND DIRECTION

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
BOISE AP, ID (KBOI). WIND R	SE	SE	SE	NW	NW	NW	NW	NW	SE	SE	SE	ESE	SE
BURLEY AP, ID (KBYI). WIND	W	W	W	W	W	W	W	W	W	W	W	W	W
CALDWELL AIRPORT, ID (KEUL).	SSE	SSE	SSE	WNW	WNW	WNW	WNW	WNW	WNW	WNW	SSE	SE	WNW
CHALLIS AIRPORT, ID (KLLJ).	S	S	N	N	W	W	W	W	W	N	S	S	WNW
CHALLIS AP, ID (KU15). WIND	S	S	N	N	N	N	N	W	N	N	N	S	N
COEUR D'ALENE AP, ID (KCOE).	NNE	NNE	S	S	S	S	S	S	S	S	NNE	NNE	NNE
ELK CITY, ID (KP69). WIND R	N	NNE	NNE	NNE	NNE	NNE	NNE	N	N	NNE	NNE	N	NNE
HAILEY-SUN VALLEY AP, ID (KS	NNW	NNW	N	N	S	S	S	S	S	N	N	N	N
IDAHO FALLS AP, ID (KIDA).	N	N	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	N	N	SSW
JEROME AIRPORT, ID (KJER).	NE	NE	W	W	W	W	W	W	E	W	ENE	NE	W
LEWISTON AIRPORT, ID (KLWS).	S	E	E	E	WNW	E	E	WNW	E	E	E	S	E
MCCALL AIRPORT, ID (KMYL).	S	S	S	N	N	NW	S	SSW	S	S	S	S	S
MOUNTAIN HOME AFB, ID (KMUO)	ESE	ESE	ESE	NW	NW	NW	NW	NW	NW	NW	ESE	ESE	ESE
MULLAN PASS VOR, ID (KMLP).	S	S	S	SW	NW	NW	NW	NW	SW	S	S	S	S
POCATELLO AP, ID (KPIH). WI	SW	S	SW	SW	WSW	WSW	W	W	W	SW	SW	SW	SW
REXBURG AP, ID (KRXE). WIND	SSW	S	S	S	S	S	S	S	S	S	S	S	S
SALMON AIRPORT, ID (KSMN).	N	N	N	N	N	N	N	N	N	N	N	N	N
STANLEY RNGR STN, ID (KSNT).	SSE	SSE	SSE	N	S	S	S	S	S	S	S	SSE	S
TWIN FALLS AP, ID (KTWF). W	SSW	W	W	W	W	W	SSW	SSW	SSW	SSW	SSW	S	SSW

MONTANA

PREVAILING WIND DIRECTION

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
BAKER MUNI AP, MT (KBHK). W	W	W	SE	SE	W	W	SE	SE	ESE	W	W	W	W
BILLINGS AP, MT (KBIL). WIN	SW	SW	SW	SW	N	N	N	SW	SW	SW	SW	SW	SW
BOZEMAN-BELGRADE AP, MT (KBZ	S	SSE	SSE	W	SE	W	SSE	SSE	SE	SE	SSE	SSE	SSE
BUTTE AP, MT (KBTM). WIND R	S	S	S	N	N	N	N	S	S	S	S	S	S
CUT BANK AP, MT (KCTB). WIN	WSW	WSW	WSW	W	W	W	W	W	W	WSW	WSW	WSW	WSW
DILLON AP, MT (KDLN). WIND	S	S	S	S	S	S	S	S	S	S	S	S	S
GLASGOW AIRPORT, MT (KGGW).	ESE	ESE	E	E	E	E	E	E	E	ESE	E	ESE	E
GLENDIVE AIRPORT, MT (KGDV).	S	S	S	NW	NW	W	NW	S	NW	S	S	S	S
GREAT FALLS AP, MT (KGTF).	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
GREAT FALLS-MALSTROM AFB, MT	SW	SW	SW	SW	SW	W	W	W	SW	SW	SW	SW	SW
HAVRE AIRPORT, MT (KHVR). W	SW	SW	SW	E	E	E	E	E	SW	SW	SW	SW	SW
HELENA AIRPORT, MT (KHLN).	W	W	W	W	W	W	W	W	W	W	W	W	W
JORDAN AIRPORT, MT (KJDN).	W	W	W	W	W	W	W	W	W	W	W	W	W
KALISPELL AP, MT (KFCA). WI	S	S	SSE	SSE	SSE	SSE	SSE	S	S	S	S	S	S

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GET WEATHER ON MY PHONE PUT WEATHER ON MY DESKTOP

Home Forecasts Monthly Weather for Fernwood

RSS Share Email Bookmark Print

Local Weather Alerts

> See all ID alerts

Air Stagnation Advisory

Today | Hourly | Tomorrow | Weekend | 5 day | 10 day | Monthly | Map

Monthly Averages for
Fernwood, ID
[English | Metric]

Monthly Averages

Table Display Graph Display

Month	Avg. High	Avg. Low	Mean	Avg. Precip	Record High	Record Low
Jan	36°F	24°F	30°F	4.14 in.	59°F (2005)	-26°F (1950)
Feb	42°F	25°F	34°F	2.96 in.	66°F (1988)	-23°F (1950)
Mar	51°F	31°F	41°F	2.98 in.	79°F (1986)	-10°F (1955)
Apr	59°F	36°F	48°F	2.21 in.	95°F (1987)	16°F (1979)
May	67°F	42°F	55°F	2.41 in.	95°F (1993)	20°F (1954)
Jun	74°F	48°F	61°F	2.11 in.	100°F (1990)	29°F (1951)
Jul	84°F	52°F	68°F	0.99 in.	105°F (1984)	33°F (1979)
Aug	84°F	51°F	68°F	0.87 in.	109°F (1961)	30°F (1980)
Sep	74°F	44°F	59°F	1.33 in.	104°F (1988)	21°F (1983)
Oct	58°F	35°F	47°F	2.29 in.	88°F (1963)	9°F (2002)
Nov	42°F	30°F	36°F	4.17 in.	69°F (1975)	-14°F (1955)
Dec	35°F	24°F	30°F	4.17 in.	57°F (1962)	-29°F (1968)

Fernwood, ID Weather Facts

- The average warmest month is July.
- The highest recorded temperature was 109°F in 1961.
- On average, the coolest month is January.
- The lowest recorded temperature was -29°F in 1968.
- December is the average wettest month.

Details | Video | Text | **Averages**

FREE Trial: Larger Radar Maps & No Ads - Learn More

More Resources

Today's Top Picks

- Let's Talk Temperatures
- Winter Weather Snapshots
- Check Your Driving Conditions
- Latest Ski Conditions
- Best Cities for Foodies
- Check Flu Activity in Your Area
- Plan a Trip Around the World
- New Snow Across the U.S.
- Disney's Holiday Favorites

NOWData - NOAA Online Weather Data

SAINT MARIES (108062)
Monthly Totals/Averages
Snowfall (inches)
Years: 1981-2011

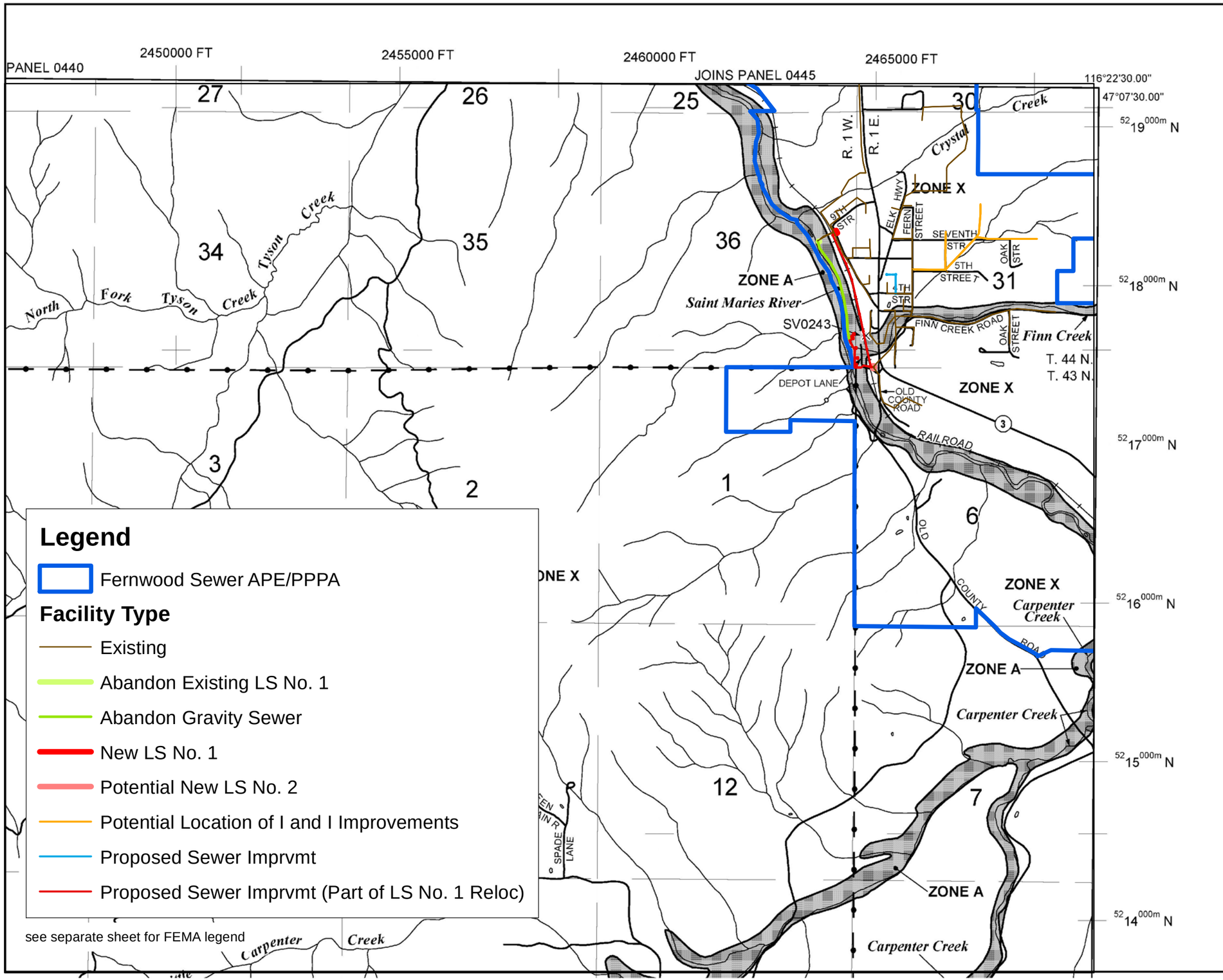
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Season
Average	0.0	0.0	0.0	0.1	6.3	16.5	15.3	7.3	4.0	0.7	0.1	0.0	50.3

Official data and data for additional locations and years are available from the Regional Climate Centers and the National Climatic Data Center.

Appendix F

Floodplains and Wetlands Maps

- FEMA Floodplain Map
- Wetlands Map



Legend

Fernwood Sewer APE/PPPA

Facility Type

- Existing
- Abandon Existing LS No. 1
- Abandon Gravity Sewer
- New LS No. 1
- Potential New LS No. 2
- Potential Location of I and I Improvements
- Proposed Sewer Imprvmt
- Proposed Sewer Imprvmt (Part of LS No. 1 Reloc)

see separate sheet for FEMA legend

MAP SCALE 1" = 2000'

000 0 2000 4000 FEET

0 600 1200 METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0600D

FIRM

FLOOD INSURANCE RATE MAP

BENEWAH COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 600 OF 625

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BENEWAH COUNTY	160014	0600	D

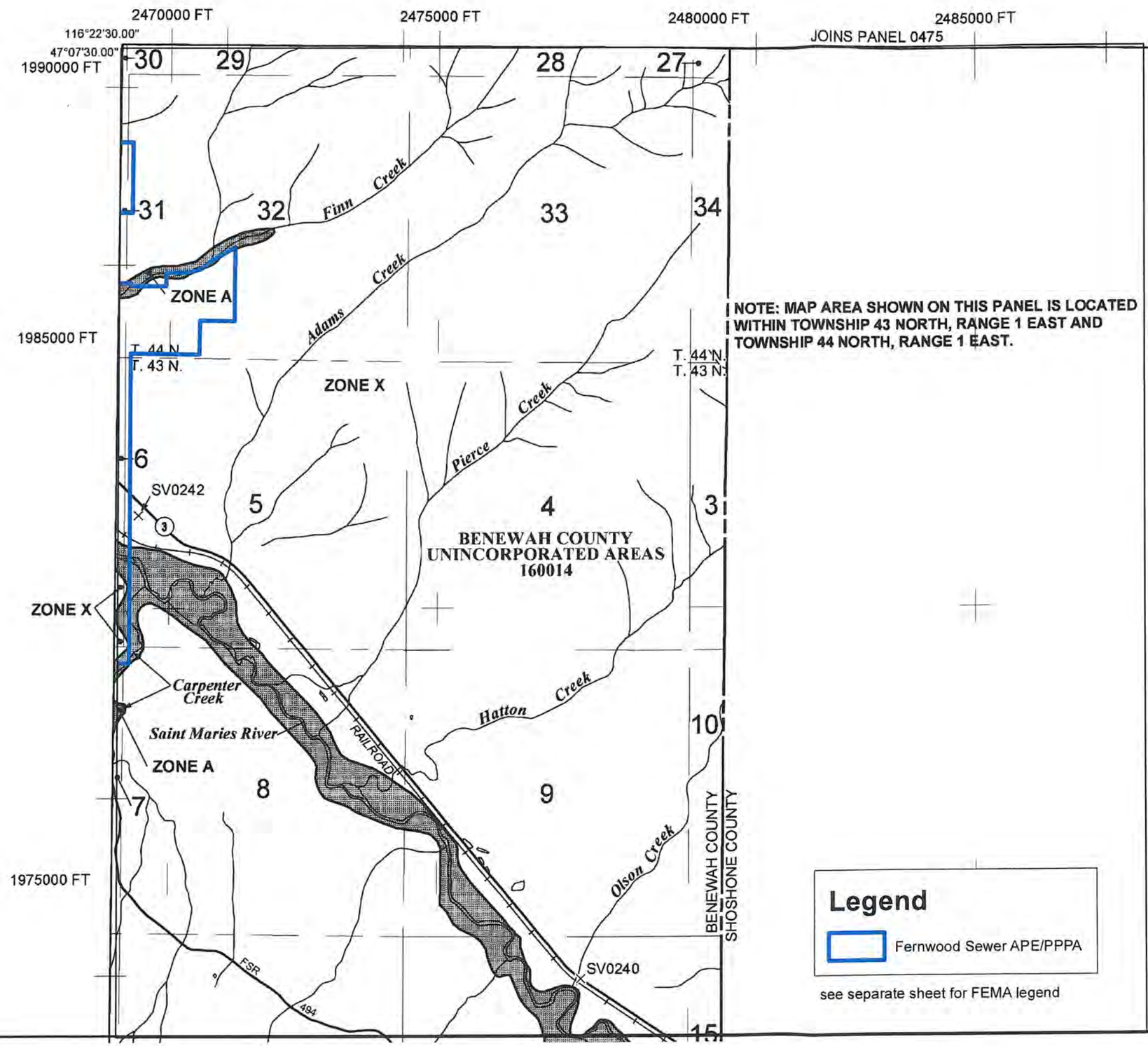
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16009C0600D

EFFECTIVE DATE
SEPTEMBER 25, 2009

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



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 43 NORTH, RANGE 1 EAST AND TOWNSHIP 44 NORTH, RANGE 1 EAST.

Legend

Fernwood Sewer APE/PPPA

see separate sheet for FEMA legend

MAP SCALE 1" = 2000'

000 0 2000 4000 FEET

METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0625D

FIRM

FLOOD INSURANCE RATE MAP

BENEWAH COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 625 OF 625

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BENEWAH COUNTY	160014	0625	D

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

MAP NUMBER
16009C0625D

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency

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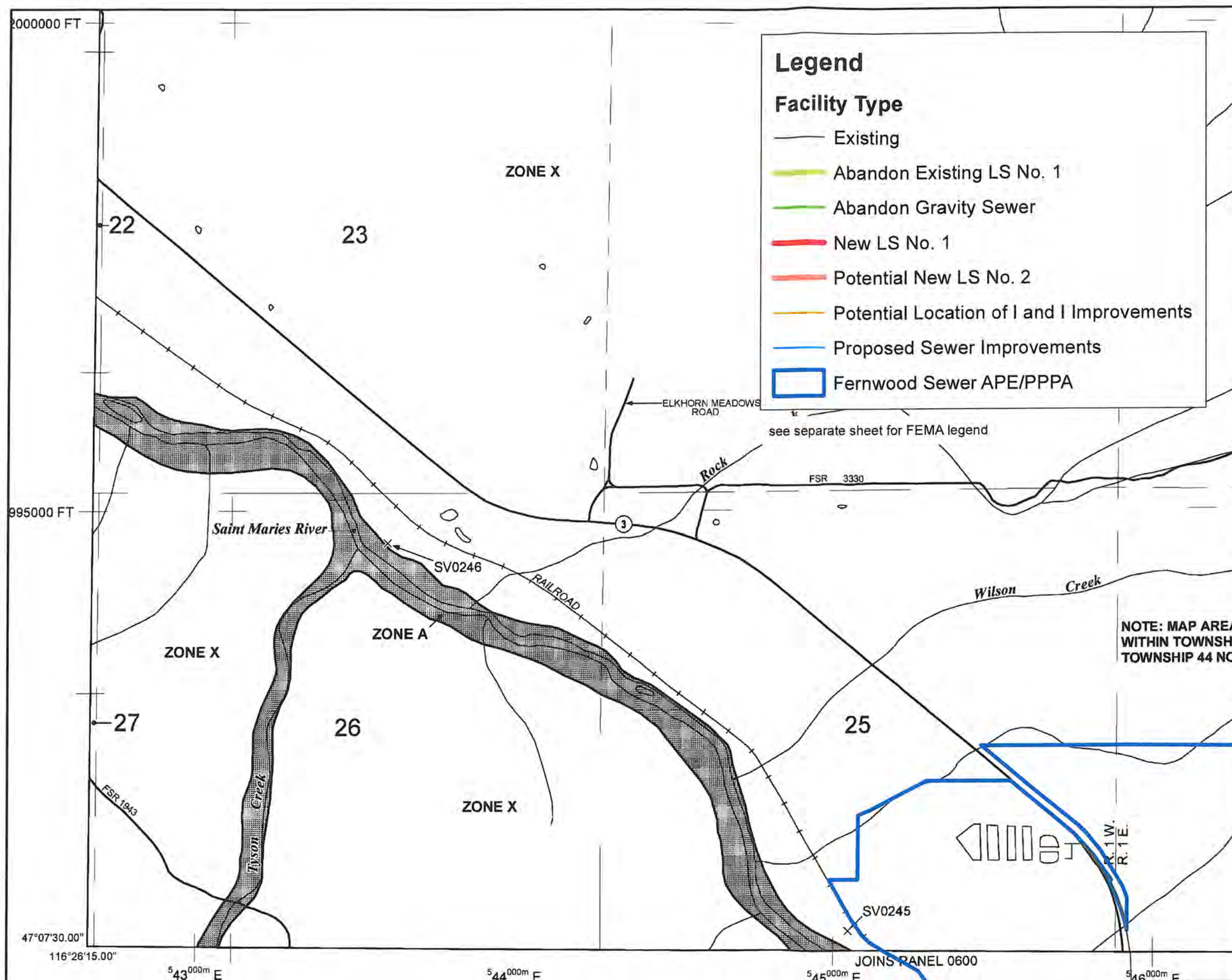

Legend

Facility Type

- Existing
- Abandon Existing LS No. 1
- Abandon Gravity Sewer
- New LS No. 1
- Potential New LS No. 2
- Potential Location of I and I Improvements
- Proposed Sewer Improvements
- Fernwood Sewer APE/PPPA

see separate sheet for FEMA legend

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

0 300 600 METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0445D

FIRM

FLOOD INSURANCE RATE MAP

BENEWAH COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 445 OF 625

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BENEWAH COUNTY	150014	0445	D

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

MAP NUMBER
16009C0445D

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT	5000-foot grid ticks: Idaho State Plane coordinate system, west zone (FIPSZONE 1103), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 25, 2009
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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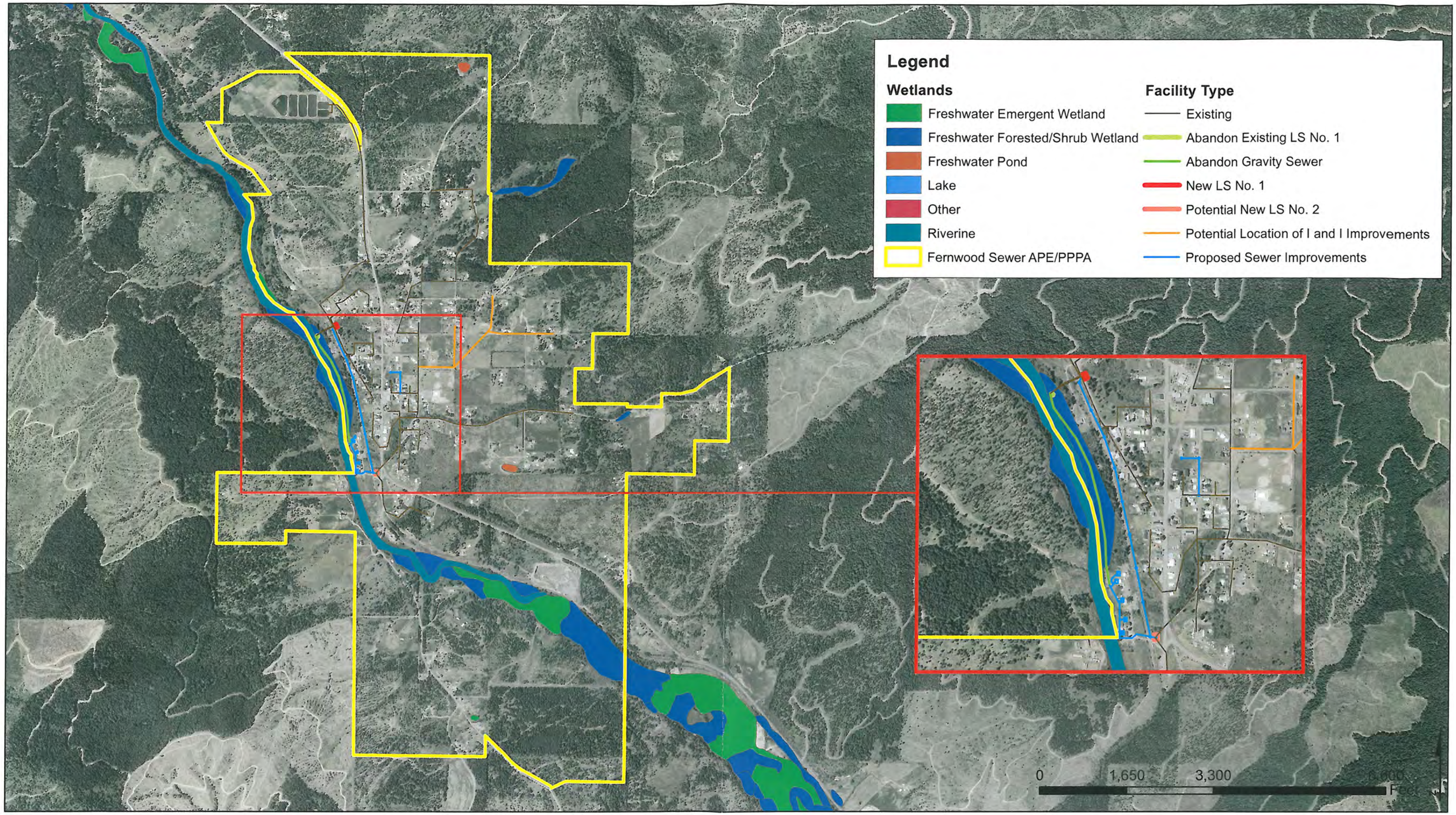
FEMA FLOOD PLAIN
LEGEND

PROJECT NO.:	41032
DESIGNED BY:	A.M.W.
DRAWN BY:	J.A.L.
DWG NAME:	41032DS03.DWG
DATE:	12-14-11
SHEET NO:	

\\Nas-01\cad\CAD Projects\41032\dwg\41032DS03.dwg, 12/14/2011 8:19:52 AM, julie, 1:1



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Fernwood Sewer

Wetlands

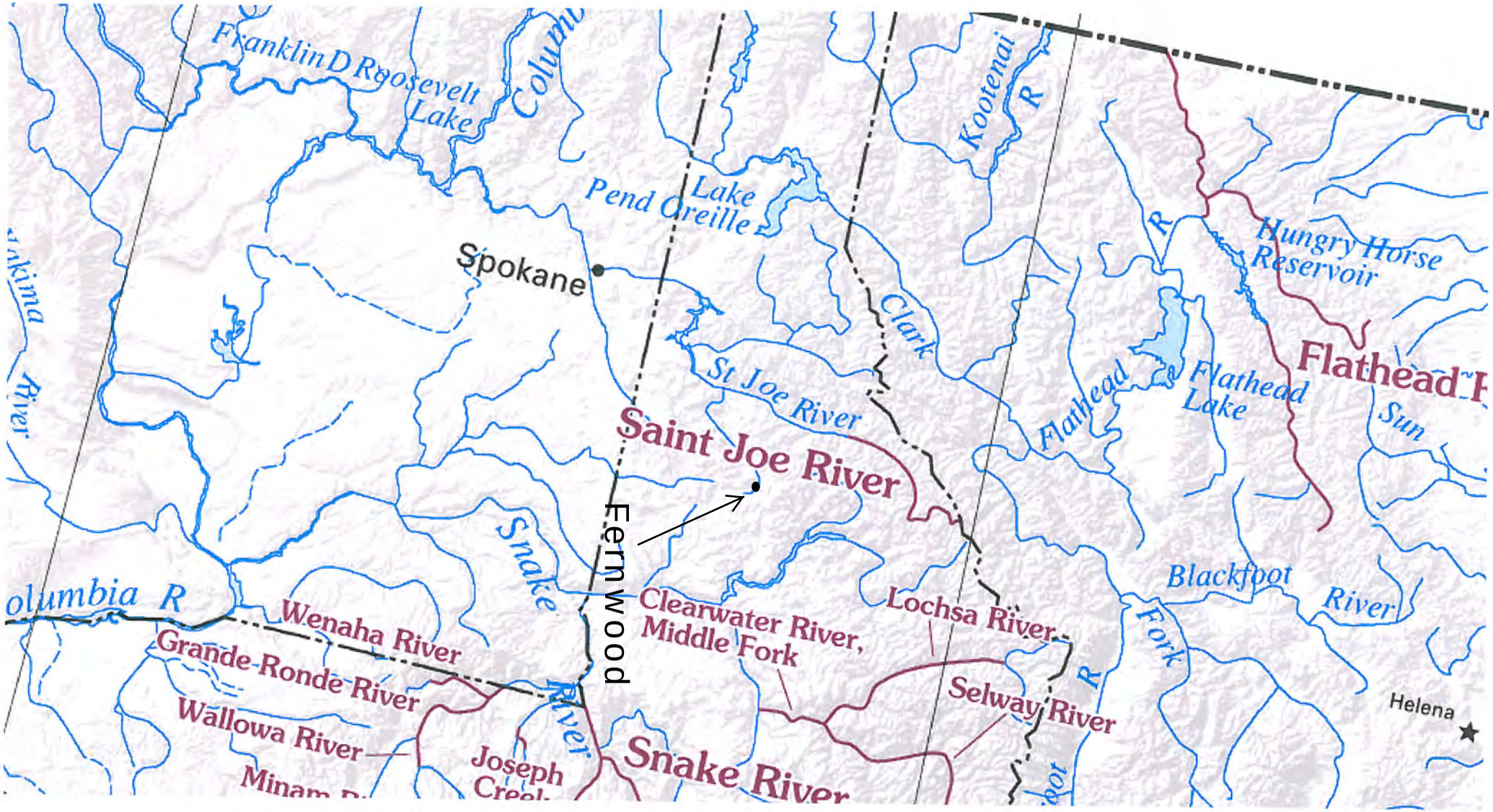
Sources:
USDA, NAIP 2009
US Fish and Wildlife, National Wetland Inventory

PROJECT NO.....43007
DRAWN BY.....AW
FILENAME.....FernwoodSewer_Topo&Wetlands.mxd
DATE.....6/15/12

Appendix G

Wild and Scenic River Information

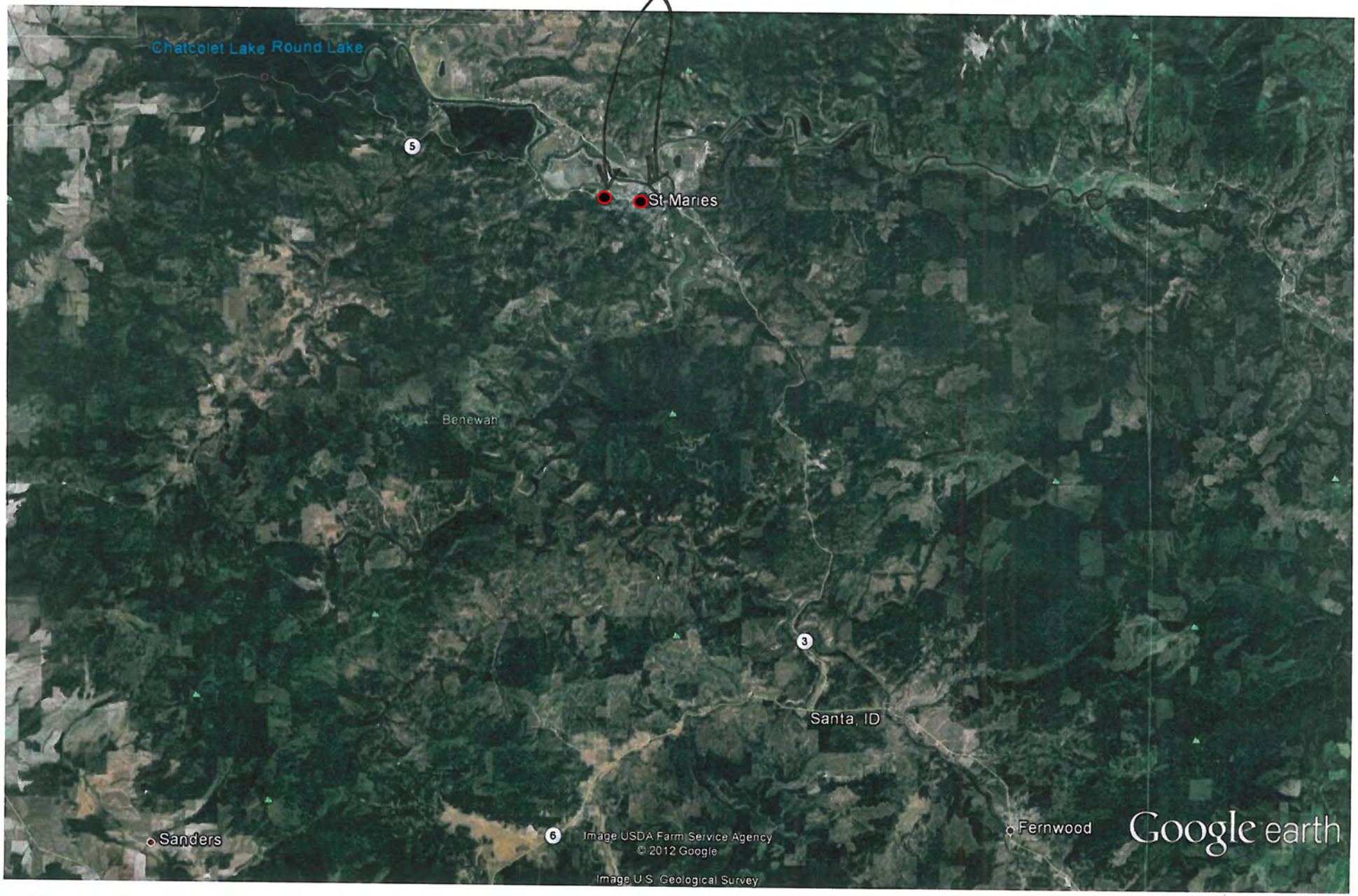
NATIONAL WILD AND SCENIC RIVERS SYSTEM
SEPTEMBER 2009
CONTINENTAL UNITED STATES
SCALE 1:5,000,000
Albers Equal Area Projection
PUERTO RICO
THE NATIONAL WILD AND SCENIC RIVERS SYSTEM
www.rivers.gov
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Seattle
Portland
San Francisco
San Jose
Los Angeles
San Diego
Phoenix
Las Vegas
Salt Lake City
Denver
Albuquerque
El Paso
Dallas
Fort Worth
San Antonio
Austin
Houston
New Orleans
Jacksonville
Miami
Memphis
Oklahoma City
Wichita
Kansas City
Omaha
Minneapolis
St. Paul
Milwaukee
Chicago
Indianapolis
Columbus
Detroit
Cleveland
Pittsburgh
Philadelphia
Baltimore
Washington
Richmond
Raleigh
Nashville
Atlanta
Birmingham
Boston
New York
Buffalo
Albany
Portland
Bangor
Honolulu
San Juan


Franklin D Roosevelt Lake
Columbia
Kootenai R
Pend Oreille Lake
Spokane
Clark
Hungry Horse Reservoir
Flathead Lake
Flathead
Flathead R
Sun
St Joe River
Saint Joe River
Fernwood
Snake
Clearwater River, Middle Fork
Lochsa River
Selway River
Blackfoot River
Fork
Helena
olumbia R
Wenaha River
Grande Ronde River
Wallowa River
Joseph Creek
Snake River
River

Appendix H

Historic Locations Map

Historic Places ●



Google earth

miles 10
km 30

⑤ = Hwy 5
③ = Hwy 3
⑥ = Hwy 6

Appendix I

Endangered Species and Critical Habitat Information

- Endangered Species Information
- Critical Habitat Map

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	Yellow-billed Cuckoo (Coccyzus americanus)	Western U.S. DPS	Candidate	Sacramento Fish And Wildlife 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 the Coastal-Puget Sound Distinct Population Segment of Bull Trout	Draft
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)	Draft
Fishes	Bull Trout (Salvelinus confluentus)	U.S.A., conterminous, lower 48 states	Threatened	Idaho Fish And Wildlife Office	Draft Recovery Plan for the Jarbidge River Distinct Population Segment of Bull Trout	Draft
Flowering Plants	Spalding's Catchfly (Silene spaldingii)		Threatened	Idaho Fish And Wildlife Office	Spalding's Catchfly Final Recovery Plan	Final
Flowering Plants	Water howellia (Howellia aquatilis)		Threatened	Montana Ecological Services Field Office	Water Howellia (Howellia aquatilis) Recovery Plan, Public and Agency Review Draft	Draft
Mammals	Gray wolf (Canis lupus)	Northern Rocky Mountain DPS (delisted, except WY)	Recovery	Office Of The Regional Director		
Mammals	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)	Outline
Mammals	North American wolverine (Gulo gulo luscus)		Candidate	Montana Ecological Services Field Office		

Critical Habitat Map

Santa and Fernwood Water and Sewer Districts

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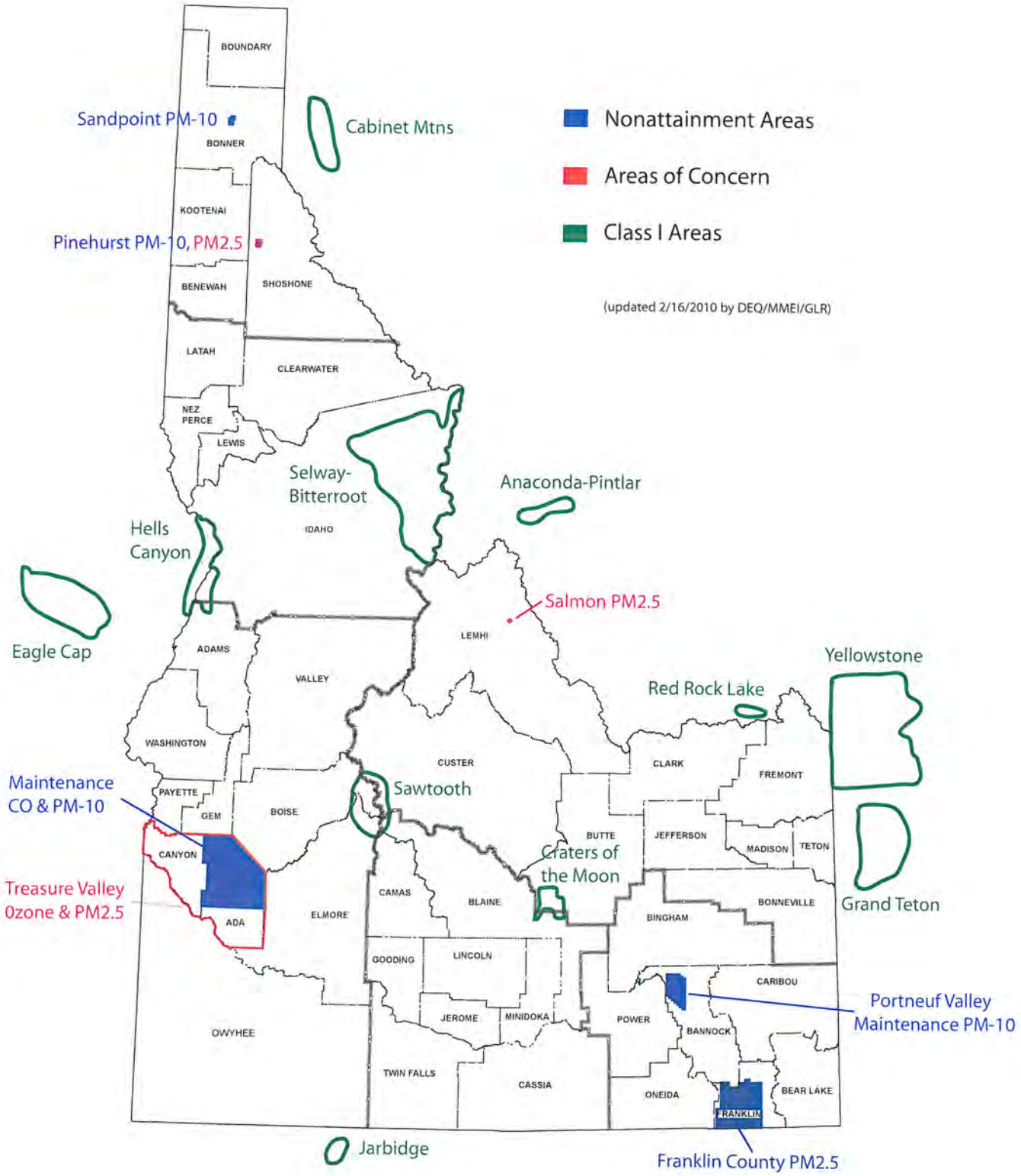
Appendix J.

Air Quality Map

Idaho Air Quality Planning Areas



Appendix K

St. Maries River Subbasin TMDL

St. Maries River Subbasin Assessment and Total Maximum Daily Loads

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

July 2003

St. Maries River Subbasin Assessment and Total Maximum Daily Loads

July 2003

Prepared by:
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Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC § 1251.101). States and tribes, pursuant to Section 303 of the CWA are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list of impaired waters, currently every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. This document addresses the water bodies in the St. Maries Subbasin that have been placed on what is known as the "303(d) list."

This subbasin assessment and TMDL analysis has been developed to comply with Idaho's TMDL schedule. This assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the St. Maries Subbasin located in northern Idaho. The first part of this document, the subbasin assessment, is an important first step in leading to the TMDL. The starting point for this assessment was Idaho's current 303(d) list of water quality limited water bodies. Eighteen segments of the St. Maries Subbasin were listed on this list. The subbasin assessment portion of this document examines the current status of 303(d) listed waters, and defines the extent of impairment and causes of water quality limitation throughout the subbasin. The loading analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards.

Subbasin at a Glance

Hydrologic Unit Code 17010304

Water Quality Limited Segments.....18

Beneficial Uses Affected.....Cold water, salmonid spawning, primary and secondary contact recreation

Pollutants of Concern.....Sediment, nutrients, bacteria, dissolved oxygen, temperature

Known Land Uses.....Forestry, agriculture, recreation

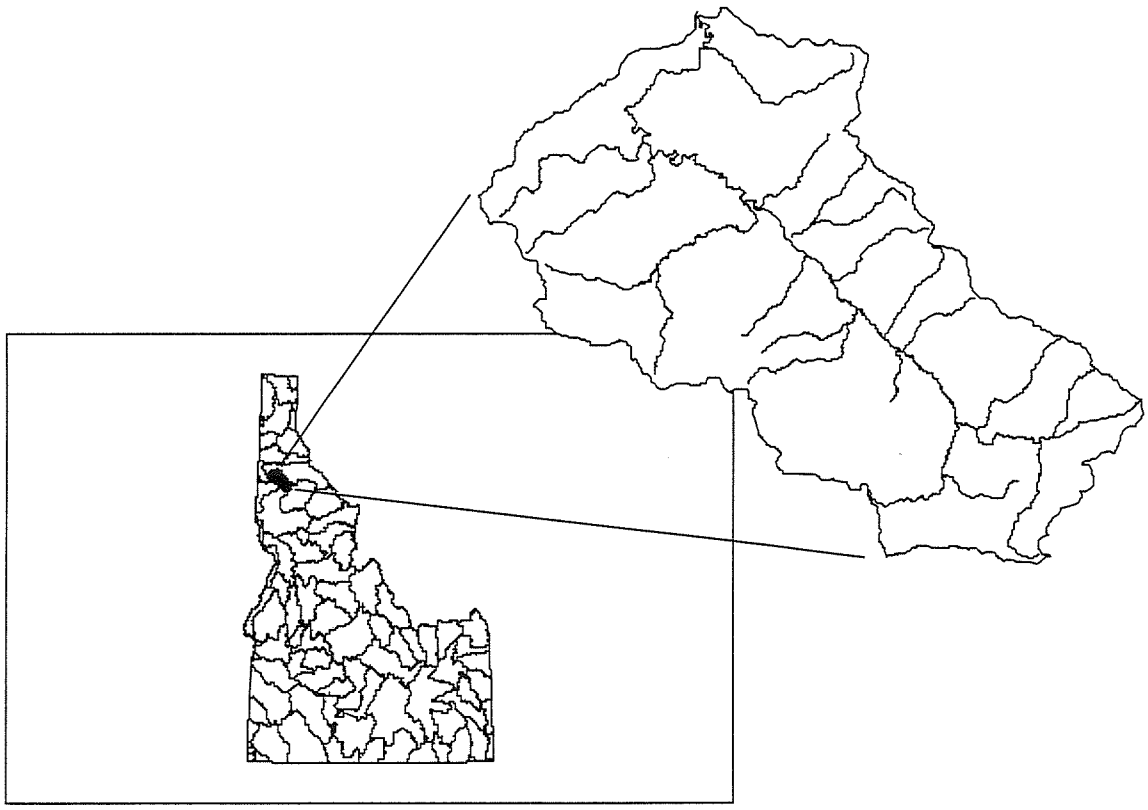


Figure A. Location of St. Maries Subbasin

Key Findings

The St. Maries River watershed remained in a relatively natural condition until the early twentieth century when miners, loggers, and ranchers began to settle the area. It has a history of timber harvest, grazing, and placer recovery of garnets and gold. Streams in the subbasin are 303(d) listed for sediment, temperature, habitat alteration, nutrients, bacteria and dissolved oxygen. Sixteen of the eighteen segments are listed for sediment, while nine are listed for temperature, eight are listed for habitat alteration, four for nutrients, and one each are listed for dissolved oxygen and bacteria. Sediment originates in the basin primarily from eroding banks, road crossings, and encroachments. Temperature is most affected by stream shading. Nutrients and bacteria arise from livestock and human wastes, while dissolved oxygen is affected by discharge of oxygen demanding materials that, in the St. Maries Subbasin, are discharged from wastewater treatment facilities. Impairment of cold water aquatic life has been demonstrated by composite scores of fish, macroinvertebrate and habitat indices. These scores generally indicate full support in the headwaters, but reveal use impairment in the downstream reaches of the both the tributaries and the river itself.

An assessment of temperature data indicates that all streams assessed exceed temperature standards. Dissolved oxygen was not found to be a limiting factor in Santa Creek, while bacteria were not found to limit contact recreation in Gramp Creek. Although segments are listed for habitat alteration, habitat alteration is not an effect that can be allocated in a TMDL. An assessment of nutrient data indicates that none of the stream segments listed for nutrients are impaired by nutrients. Sediment data and model results were assessed. Residual pool volumes generally indicate that many of the downstream reaches of the tributaries and the river have relatively low residual pool volumes. Sediment yield monitoring indicates that Alder, Charlie, Santa, Tyson, and Carpenter Creeks and the St. Maries River including its West and Middle Forks have yields well in excess of thresholds expected to cause water quality impairment. John, Emerald, Renfro, Crystal, and Thorn Creeks have sediment yields close to or slightly above the threshold found on streams supporting the cold water aquatic life.

Since the main stem of the St. Maries River is sediment limited, a sediment TMDL is required for the entire St. Maries Subbasin. Temperature TMDLs are required for Gold Center Creek, including Gramp, Flewsie, Emerald, and Santa Creeks as well as the St. Maries River and its West and Middle Forks.

Table A. Streams and pollutants for which TMDLs were developed.

Stream	Segment ID Number	1998 303(d) Boundaries	Pollutant(s)
St. Maries River	3579	Town of Mashburn to St. Joe River	Sediment, temperature
St. Maries River	3580	Town of Clarkia to town of Mashburn	Sediment, temperature
West Fork St. Maries River	3581	Headwaters to St. Maries River	Sediment, temperature
Middle Fork of the St. Maries River	3594	Headwaters to St. Maries River	Sediment, temperature
Santa Creek	3585	Headwaters to St. Maries River	Sediment, temperature
Carpenter Creek	3591	Headwaters to St. Maries River	Sediment
Emerald Creek	3593	East Fork – Headwaters to St. Maries River	Sediment, temperature
Gold Center Creek	3596	Windy Creek to Middle Fork of the St. Maries River	Temperature
Flewsie Creek	3596	Headwaters Creek to Middle Fork of the St. Maries River	Temperature
Alder Creek	3583	Headwaters to St. Maries River	Sediment
Tyson Creek	3589	North Fork Tyson Creek to St. Maries River	Sediment
Thorn Creek	3582	Headwater to St. Maries River	Sediment
Renfro Creek	3588	Headwaters to Davis Creek	Sediment
Crystal Creek	3590	Headwaters to St. Maries River	Sediment
Charlie Creek	3587	Headwaters to Santa Creek	Sediment
John Creek	3584	Unnamed tributary 7.5km upstream to St. Maries River	Sediment
Gramp Creek	3598	Headwaters to Gold Center Creek	Temperature

Table B. Summary of assessment outcomes.

Waterbody Segment	Assess-ment Unit	Pollutant	TMDL(s) Completed	Recommended Changes to 303(d) List	Recommended Schedule Changes	Justification/ Notes[1]
St. Maries River 17010304 3579 17010304 3580	PN015 _05	Sediment	1 (for entire watershed)	Change unknown pollutant to temperature and/or sediment	None	N/A
St. Maries River 17010304 3579 17010304 3580	PN015 _05	Temperature	1 (for entire watershed)	Change unknown pollutant to temperature and/or sediment	None	N/A
St. Maries River 17010304 3579 17010304 3580	PN015 _05	Nutrients	0	Delist for nutrients	None	Periphyton data do not indicate nuisance levels
West Fork St. Maries River 17010304 3581	PN017 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
West Fork St. Maries River 17010304 3581	PN017 _02	Temperature	1	None	None	N/A
Middle Fork St. Maries River 17010304 3594	PN018 _02/ 04/05	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Middle Fork St. Maries River 17010304 3594	PN018 _02/ 04/05	Temperature	1	None	None	N/A
Thorn Creek 17010304 3582	PN026 _02	Nutrients	0	Delist for nutrients	None	Periphyton data do not indicate nuisance levels
Thorn Creek 17010304 3582	PN026 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Alder Creek 17010304 3583	PN08_ 02	Nutrients	0	Delist for nutrients	None	Periphyton data do not indicate nuisance levels

Table B, continued.

Waterbody Segment	Assess-ment Unit	Pollutant	TMDL(s) Completed	Recommended Changes to 303(d) List	Recommended Schedule Changes	Justification/ Notes[1]
Alder Creek 17010304 3583	PN08_ 02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
John Creek 17010304 3584	PN09_ 02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Santa Creek 17010304 3585	PN010 _04	Dissolved oxygen	0	Delist for dissolved oxygen	None	Dissolved oxygen data meet standard
Santa Creek 17010304 3585	PN010 _04	Nutrients	0	Delist for nutrients	None	Periphyton data do not indicate nuisance levels
Santa Creek 17010304 3585	PN010 _04	Temperature	1	None	None	N/A
Santa Creek 17010304 3585	PN010 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Charlie Creek 17010304 3587	PN011 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Renfro Creek 17010304 3588	PN024 _02/03	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Tyson Creek 17010304 3589	PN013 _02/03	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Crystal Creek 17010304 3590	PN023 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Carpenter Creek 17010304 3591	PN014 _02	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL

Table B, continued.

Waterbody Segment	Assess-ment Unit	Pollutant	TMDL(s) Completed	Recommended Changes to 303(d) List	Recommended Schedule Changes	Justification/ Notes[1]
Emerald Creek 17010304 3593	PN016 _03	Sediment	1	None	None	Covered by St. Maries River Sediment TMDL
Emerald Creek 17010304 3593	PN016 _03	Temperature	1	None	None	N/A
Gold Center Creek 17010304 3596	PN019 _02/03	Sediment	0	Delist for sediment	None	WBAGII and sediment model results
Gold Center Creek 17010304 3596	PN019 _02/03	Temperature	1	None	None	N/A
Flewsie Creek 17010304 7596	PN018 _02	Sediment	0	Delist for sediment	None	WBAGII and sediment model results
Flewsie Creek 17010304 7596	PN018 _02	Temperature	1	None	None	N/A
Gramp Creek 17010304 7598	PN019 _02	Bacteria	0	Delist for bacteria	None	Bacteria standard not exceeded
Gramp Creek 17010304 7598	PN019 _02	Sediment	0	Delist for sediment	None	WBAGII and sediment model results
Gramp Creek 17010304 7598	PN019 _02	Temperature	1	None	None	Covered by Gold Center Creek Temperature TMDL

[1] WBAGII – *Water Body Assessment Guidance*, Version II.

1. Subbasin Assessment – Watershed Characterization

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 USC § 1251.101). States and tribes, pursuant to section 303 of the CWA are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list of impaired waters, currently every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. This document addresses the water bodies in the St. Maries River Subbasin that have been placed on what is known as the "303(d) list."

The overall purpose of this subbasin assessment and TMDL is to characterize and document pollutant loads within the St. Maries River Subbasin. The first portion of this document, the subbasin assessment, is partitioned into four major sections: watershed characterization, water quality concerns and status, pollutant source inventory, and a summary of past and present pollution control efforts (Chapters 1 – 4). This information was used to develop a TMDL for each pollutant of concern for the St. Maries River Subbasin (Chapter 5).

1.1 Introduction

In 1972, Congress passed public law 92-500, the Federal Water Pollution Control Act, more commonly called the Clean Water Act. The goal of this act was to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Water Pollution Control Federation 1987). The act and the programs it has generated have changed over the years as experience and perceptions of water quality have changed. The CWA has been amended 15 times, most significantly in 1977, 1981, and 1987. One of the goals of the 1977 amendment was protecting and managing waters to insure "swimmable and fishable" conditions. This goal, along with a 1972 goal to restore and maintain chemical, physical, and biological integrity, relates water quality with more than just chemistry.

Background

The federal government, through the U.S. Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the country. The Idaho Department of Environmental Quality (DEQ) implements the CWA in Idaho, while the EPA oversees Idaho and certifies the fulfillment of CWA requirements and responsibilities.

Section 303 of the CWA requires DEQ to adopt, with EPA approval, water quality standards and to review those standards every three years. Additionally, DEQ must monitor waters to identify those not meeting water quality standards. For those waters not meeting standards, DEQ must establish TMDLs for each pollutant impairing the waters. Further, the agency

must set appropriate controls to restore water quality and allow the water bodies to meet their designated uses. These requirements result in a list of impaired waters called the "303(d) list." This list describes water bodies not meeting water quality standards. Waters identified on this list require further analysis. A subbasin assessment and TMDL provide a summary of the water quality status and allowable TMDL for water bodies on the 303(d) list. *St. Maries River Subbasin Assessment and Total Maximum Daily Loads* provides this summary for the waters currently listed in the St. Maries River Subbasin.

The subbasin assessment section of this report (Chapters 1 – 4) includes an evaluation and summary of the current water quality status, pollutant sources, and control actions in the St. Maries River Subbasin to date. While this assessment is not a requirement of the TMDL, DEQ performs the assessment to ensure impairment listings are up to date and accurate. The TMDL is a plan to improve water quality by limiting pollutant loads. Specifically, a TMDL is an estimation of the maximum pollutant amount that can be present in a waterbody and still allow that waterbody to meet water quality standards (40 CFR, Part 130). Consequently, a TMDL is waterbody- and pollutant-specific. The TMDL also includes individual pollutant allocations among various sources discharging the pollutant. The EPA considers certain unnatural conditions, such as flow alteration, a lack of flow, or habitat alteration, that are not the result of the discharge of a specific pollutants as "pollution." A TMDL is not required for water bodies impaired by pollution, but not specific pollutants. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.

Idaho's Role

Idaho adopts water quality standards to protect public health and welfare, enhance the quality of water, and protect biological integrity. A water quality standard defines the goals of a waterbody by designating the use or uses for the water, setting criteria necessary to protect those uses, and preventing degradation of water quality through antidegradation provisions.

The state may assign or designate beneficial uses for particular Idaho water bodies to support. These beneficial uses are identified in the Idaho water quality standards and include:

- Aquatic life support – cold water, seasonal cold water, warm water, salmonid spawning
- Contact recreation – primary (swimming), secondary (boating)
- Water supply – domestic, agricultural, industrial
- Wildlife habitats, aesthetics

The Idaho legislature designates uses for water bodies. Industrial water supply, wildlife habitat, and aesthetics are designated beneficial uses for all water bodies in the state. If a waterbody is unclassified, then cold water and primary contact recreation are used as additional default designated uses when water bodies are assessed.

A subbasin assessment entails analyzing and integrating multiple types of waterbody data, such as biological, physical/chemical, and landscape data to address several objectives:

-- Determine the degree of designated beneficial use support of the waterbody (i.e., attaining or not attaining water quality standards).

-- Determine the degree of achievement of biological integrity.

-- Compile descriptive information about the waterbody, particularly the identity and location of pollutant sources.

-- When water bodies are not attaining water quality standards, determine the causes and extent of the impairment.

1.2 Physical and Biological Characteristics

The St. Maries River and its major tributaries (Middle Fork of the St. Maries River; West Fork of the St. Maries River and Emerald, Carpenter, Crystal, Renfro, Tyson, Santa, Charlie, John, Alder, and Thorn Creeks) drain the entire St. Maries Subbasin into the St. Joe River (Figure 1).

Climate

Northern Idaho is located in the Northern Rocky Mountain physiographic region to the west of the Bitterroot Range. The Clearwater Mountains, which the St. Maries River drains, are a part of the Bitterroot Range. The local climate is influenced by both Pacific maritime air masses from the west as well as continental air masses from Canada to the north and the Great Basin to the South. The annual weather cycle generally consists of cool to warm summers with cold and wet winters. The relative warmth of winters depends on the dominance of the warmer, wetter Pacific or cooler dryer continental air masses. The relative warmth of summers depends on the dominance of the warmer, drier Great Basin or cooler, wetter Pacific air masses. Precipitation is greatest during the winter months.

In the city of St. Maries, for a period of record from 1897 to 2001, the average annual maximum temperature was 59.6 °F and the average annual minimum temperature was 35.5 °F (Inside Idaho 2002). For the same time period, the month with the lowest average maximum (49.3 °F) and lowest average minimum (22.2 °F) temperature was January. July had the highest average annual minimum temperature (34.8°F) and the highest average annual maximum temperature (84.8 °F). In the town of Clarkia, for a period of record from 1948 to 1975, the annual minimum temperature was 30.1 °F and the average annual maximum temperature was 54.8 °F (Inside Idaho 2002). For the same time period, the month with the lowest average minimum (21.1 °F) and the lowest average maximum (41.7 °F) temperature was January. July had the highest average annual minimum temperature (31.1 °F) and the highest average annual maximum temperature (83.3 °F).

Although intervening mountain ranges progressively dry the Pacific maritime air masses, these air masses deposit appreciable moisture as rain and snow on the St. Maries watershed. Maritime air masses originating in the mid-Pacific are relatively warm, often yielding their precipitation as rain. Relief of the watershed is generally between 2,150 and 4,500 feet. Forty-one percent of the

watershed's land mass consists of slopes in the rain-on-snow elevation range of 3,300 to 4,500 feet. Below 3,300 feet the snow pack is transitory, while above 4,500 feet the snow pack is sufficiently cool that warming by a maritime front is insufficient to cause a significant thaw. Much of the watershed is below 3,300 feet elevation. In the rain-on-snow elevation range (3,300 - 4,500 feet), a heavy snow pack accumulates each winter. A warm maritime front can sufficiently warm the snow pack making it isothermal and capable of yielding large volumes of water to a runoff event.

Data from the city of St. Maries shows that the 105-year average annual precipitation from 1897 to 2001 was reported at 28.4 inches (Inside Idaho 2002). December exhibited the largest amount of precipitation at 3.93 inches and July the lowest amount of precipitation at 0.98 inches. Data from Clarkia shows that the 27-year average annual precipitation from 1948 to 1975 was reported at 37.5 inches. January exhibited the largest amount of precipitation at 7.06 inches and August the lowest amount of precipitation at 1.07 inches.

Subbasin Characteristics

The St. Maries River drains the western flank of the Clearwater Mountains, a subset of the Bitterroot Mountains. The river flows from the southeast to the northwest to enter the St. Joe River at the town of St. Maries, Idaho (Figure 1). The watershed encompasses 481 square miles (307,840 acres) above St. Maries.

-- Hydrography

The U.S. Geological Survey has continuously operated the Santa Gauging Station on the St. Maries River since October 1965. A weather station has operated at the St. Maries Ranger Station near the city of St. Maries since 1897, while a weather station operated at the Clarkia Ranger Station from 1948 to 1975. Data from these stations are included in this assessment.

-- Geology and soils

The general land form in the St. Maries River Subbasin is steep, but generally stable. Mass failures are not a typical feature of the land form development, but are specific to a few land types located primarily on granitic and lacustrine land forms. Historically, the Clearwater Mountains were glaciated, but not covered by ice sheets. In the broad floodplain of the lower St. Maries, alluvial materials worked by the river comprise the valley bottoms. Some reaches of the St. Maries River are located on lacustrine deposits of a late Eocene Lake. Lower reaches of the St. Maries River are located on lacustrine deposits of Miocene Coeur d'Alene Lake. Wetlands and a few lateral lakes occur in the lower river valley above St. Maries.

Bedrock in the subbasin is primarily composed of metasedimentary rocks of the Proterozoic Belt Supergroup. The Belt formations of St. Maries River valley are mud and sandstone of the younger Missoulian series. Columbia Plateau basalt flows are common from the city of St. Maries to Fernwood. Granitic intrusions exist in a few areas. Bedrock underlying the upper end of the valley is likely Belt rock metamorphosed by emplacement of the Idaho Batholith to the south. Commercial placer deposits of garnet that have weathered from these materials are located in Carpenter and Emerald Creeks. Gold deposits were developed in Tyson Creek (Russell 1979).

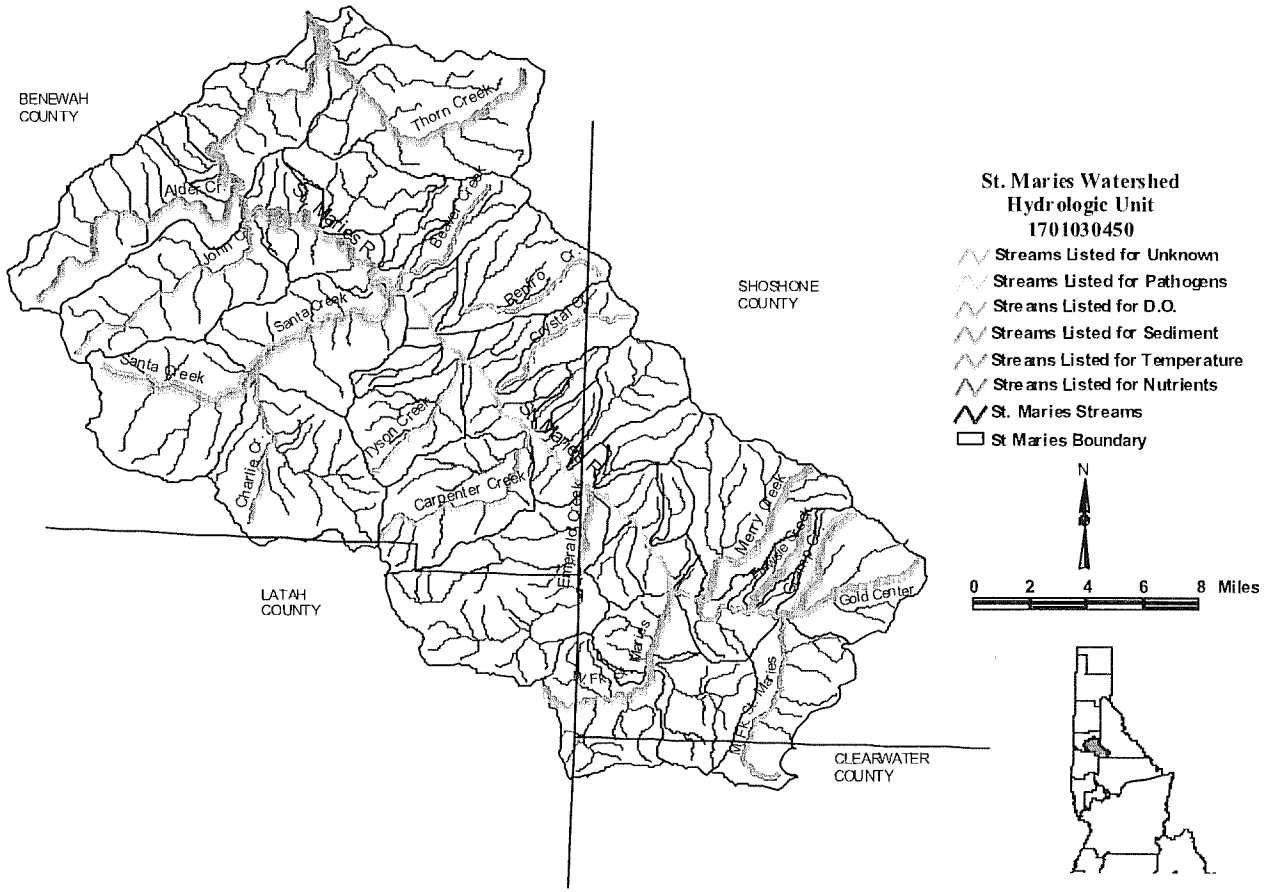


Figure 1. St. Maries Subbasin and 303(d) Listed Streams

The mountain slopes are generally underlain by silty to silt loam podsolic soils developed under cool conditions. Sandy granitic soils occur in a few areas. Palouse loess silt loam is found in the western watersheds of the subbasin. Volcanic ash deposits are variably found in the soil mantle. The soil mantle is thin to deep on slopes with A and B horizons of 3 to 4 inches. Soil mantle generally decreases with altitude. Soils in the bottomlands may be silty to sandy podsols developed under upland forest. Near streams and in some pockets, black mucky soils exist where western red cedar (*Thuja plicata*) stands are the dominant vegetation.

-- Topography

The western flank of the Clearwater Mountain range has low rounded mountains with relatively broad intermountain valleys. Valleys range down to 2,200 feet while most mountains reach over 4,000 feet. The slopes are moderately steep on the western flank of the valley and steeper on the east. The aspect of the St. Maries River valley is generally northwest facing. Tributary valleys have a predominance of north and south facing aspects.

-- Vegetation

The mountain slopes are mantled with a mixed coniferous forest of true fir (*Abies spp.*), Douglas fir (*Pseudotsuga menziesii*), larch (*Larix spp.*), and pine (*Pinus spp.*). Forest harvest has occurred at significant levels in all watersheds of the basin. Rivers and streams are flanked by riparian stands dominated by cottonwood (*Populus spp.*) at lower elevations and alder (*Alnus spp.*) in the higher valleys. The lower St. Maries valley floor is comprised of lands on lacustrine deposits. These lands have been converted to pasture to varying degrees. Lateral wetlands are found in the lower river floodplain. Aquatic vegetation species such as rush (*Juncus spp.*), sedges (*Carex spp.*), and cattail (*Typha latifolia*) are common in these wetlands. Some floodplain fields have been converted to the cultivation of wild rice (*Zizania spp.*).

-- Fisheries and aquatic fauna

The native salmonids of the streams of the subbasin are cutthroat trout (*Oncorhynchus clarki)* and mountain whitefish (*Prosopium williamsoni*). Sculpin (*Cottus spp.*) and shiners (*Notropis spp.*) are non-salmonid natives. The tailed frog (*Ascaphus truei*), Idaho giant salamander (*Dicamptodon aterrimus*), and painted turtle (*Chrysemys picta*) complete the vertebrate species living in the streams. The fish populations of the river and some of its tributaries have been altered by the introduction of rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*). Non-native pike (*Esox lucius*) and small mouth bass (*Micropterus dolomieu*) are present in the lower St. Maries River. The wide shallow nature of the St. Maries River channel results in high summer water temperatures. This situation depresses trout populations and favors warm water species. Macroinvertebrates, including the crayfish (*Pacifastacus spp.*), are common in the St. Maries River.

Idaho considers cutthroat trout a sensitive species. Bull trout (*Salvelinus confluentus*), a federally threatened species, have been reported on occasion in the basin. Idaho does not consider the St.

Maries River watershed as a key bull trout watershed (Batt 1996). No other sensitive, threatened or endangered species are known to exist in the subbasin.

Subwatershed Characteristics

The subwatershed characteristics are summarized in Table 1.

Table 1. Watershed characteristics of the fifth order watersheds of the St. Maries River Subbasin.

Fifth Order Watershed	Area (acres)	Land Form	Dominant Aspect	Relief Ratio[1]	Mean Elevation (m)	Dominant Slope (%)	Hydrologic Regimes	Estimated Water Yield (acre-feet/year)	Mass Wasting Potential
Middle Fork St. Maries River	16,190	Mountainous	West	0.0617	1,275	20%-30%	Spring snowmelt; rain-on-snow	24,053	low
Gold Center Creek	10,929	Mountainous	West	0.0939	1,307	>40%	Spring snowmelt; rain-on-snow	16,095	low
Flewsie Creek	2,049	Mountainous	West	0.0706	1,084	20%-30%	Spring snowmelt; rain-on-snow	3,017	low
Merry Creek	14,275	Mountainous	West	0.0726	1,797	20%-30%	Spring snowmelt; rain-on-snow	21,022	low
Cats Spur Creek	7,847	Mountainous	West	0.0658	1,140	20%-30%	Spring snowmelt; rain-on-snow	11,556	moderate
West Fork St. Maries River	15,902	Mountainous	East	0.0564	1,200	20%-30%	Spring snowmelt; rain-on-snow	23,420	moderate
Emerald Creek	11,137	Mountainous	East	0.0395	1,084	20%-30%	Spring snowmelt; rain-on-snow	16,401	moderate
Olsen-Childs Creeks	17,734	Mountainous	South	0.0598	959	0%-10%	Spring snowmelt; rain-on-snow	26,116	low
Carpenter Creek	12,852	Mountainous	East	0.0527	1,069	20%-30%	Spring snowmelt; rain-on-snow	18,928	moderate
Crystal Creek	5,340	Mountainous	West	0.0706	1,196	30%-40%	Spring snowmelt; rain-on-snow	7,864	low
Renfro Creek	11,165	Mountainous	West	0.0619	1,102	20%-30%	Spring snowmelt	16,443	low
Tyson Creek	8,035	Mountainous	East	0.0693	1,012	20%-30%	Spring snowmelt; rain-on-snow	11,834	low
Beaver Creek	8,677	Mountainous	West	0.0580	1,023	20%-30%	Spring snowmelt; rain-on-snow	7,330	low
Charlie Creek	17,385	Mountainous	West	0.0460	1,109	30%-40%	Spring snowmelt; rain-on-snow	25,603	low
Santa Creek	29,941	Mountainous	East	0.0409	991	20%-30%	Spring snowmelt; rain-on-snow	44,094	low
John Creek	16,209	Mountainous	East	0.0344	955	30%-40%	Spring snowmelt; rain-on-snow	23,871	low
Thorn Creek	11,925	mountainous	West	0.0404	956	0%-10%	Spring snowmelt; rain-on-snow	17,562	low
Lower St. Maries Sidewalls	23,514	mountainous	East	0.0322	874	>40%	Spring snowmelt; rain-on-snow	34,628	low

[1] $R_h = H/L$, where H is the difference between the highest and lowest point in the basin and L is the horizontal distance along the longest dimension of the basin parallel to the main stream line.

Stream Characteristics

Tributaries to the St. Maries River generally have V-shaped valleys as a result of the deeply dissected nature of the topography in their upper reaches. Near the valley bottoms the tributaries are of a lower gradient with meandering courses. The tributary valleys accommodate primarily Rosgen A and high gradient B channels in the upper watersheds and Rosgen C channels near their mouths. The tributaries are generally bound by boulder-bedrock substrate. The bedrock that underlies much of the subbasin weathers to soils fairly rich in fine fragments (70-80%) and rather poor in coarse materials (20-30%). There are exceptions where Belt Supergroup terrain predominates and coarse fragments constitute 50% of the soils. In the western subwatersheds where Palouse soils predominate, nearly all are fine grained. Silts dominate the valley bottom as the tributaries approach the river. In steep tributary gradients, boulders and cobble comprise the majority of the stream sediment particles. Width to depth ratios are low in these streams. The low gradient C channels of the tributaries have fine stream sediment particles and a higher width to depth ratio. Floodplains are narrow in most upper tributary channels. Broader floodplains are found in the lower reaches. Correspondingly, riparian communities are narrow in the narrow valleys and broader where valleys and floodplains widen.

The two forks of the St. Maries River above the town of Clarkia are primarily meandering Rosgen C channels except in their highest reaches. At Clarkia, the Middle and West Forks join to form the main stem of the St. Maries River. There the river traverses the bed of an Eocene lake. Consequently, the gradient generally accommodates a low (0.2-0.3%) Rosgen C channel, whose course meanders through a broad valley above the town of Mashburn. Miocene Columbia basalt flows constrict the river against Lindstrom Peak below Mashburn for approximately 10 miles. Although the river flows through this reach in a deep canyon, it maintains a meandering pattern that likely predates the basalt flows. In the canyon, the channel varies from a low gradient Rosgen B to a C channel (Rosgen 1985). The river valley widens progressively as the river swings northeast towards the town of St. Maries and its confluence with the St. Joe River. Here, the channel is a very low gradient (> 0.1%) Rosgen F channel that meanders through a broad floodplain with lateral wetlands. Sands dominate the river sediment throughout its upper course with the occasional cobble riffle, while silts are the dominant particle size of the lower river reach.

1.3 Cultural Characteristics

The St. Maries River Subbasin has timber, rangeland, and gemstone resources. These natural resources have been developed since the early 1900s. Timber harvest, placer garnet mining, and grazing of streamside pastures have affected nearly all of the tributaries and floodplains of the St. Maries Subbasin.

Additionally, the Coeur d'Alene Tribe's aboriginal territory takes in all of the St. Joe and St. Maries watersheds. Today, the Coeur d'Alene Tribal people return to this land just like their ancestors did to hunt, gather and practice cultural traditions. The Coeur d'Alene's used these waters for subsistence living in the past and will continue to do so in the future.

Land Use

Land use in the St. Maries Subbasin is divided between the uplands and the valley bottoms. The uplands are forested, while the valley bottoms are used for agriculture and grazing.

Forestlands are in multiple ownership (Figures 2a-h) with varying management direction. National Forest Lands are managed for multiple resource outputs (timber, water, and recreation). State Forest Lands are managed for timber values to support the state School Trust Fund. Commercial forestlands are managed primarily for timber production. Privately owned forestlands are managed for several resource outputs.

Farm and grazing lands are located in the lower reaches of the tributaries and in the bottomlands along the West Fork, Middle Fork and main stem of the St. Maries River. Land used for grazing is more common than cultivated farm fields.

Commercial placer mining of garnet-enriched sands occurs on the floodplains of Emerald and Carpenter Creeks. The mining activities have disrupted the channels and floodplains of these streams. In recent years, reclamation of mined lands and stream channel rehabilitation have occurred. Gold mining with hydraulic and placer methods occurred in Tyson Creek during the 1900s (Russell 1979).

Land Ownership, Cultural Features, and Population

Management of the 307,485-acre watershed is divided among land owned by private owners consisting primarily of timber companies (180,864 acres; 59%), the United States Forest Service (USFS) (66,467 acres; 22%), the State (54,939 acres; 18%), the Bureau of Land Management (BLM) (3,440 acres; 1%), and the Bureau of Indian Affairs (BIA) (1,552 acres; 0.5%). The remaining area consists of open water or riverbank (223 acres; 0.07%) (IDL GIS Database). Potlatch Corporation is the single largest commercial forest landowner, while Crown Pacific and Bennett Timber Companies have some holdings. A considerable amount of forestland is in small private tracts. Private properties, exclusive of those owned by timber companies, are situated on bottomland along the lower St. Maries River and tributaries such as Crystal, Flat, Santa, Charlie, Carpenter and Emerald Creeks. Many tributary watersheds supported large logging operations during the earlier part of the twentieth century.

Four recreation areas (three campgrounds and a recreational garnet panning area) are located in the watershed. There are three wastewater treatment facilities with National Pollutant Discharge Elimination System (NPDES) permits. These are the Santa-Fernwood, Emida, and Clarkia facilities. These permits were issued in the 1970s. The Emerald Creek Garnet Mill near Clarkia does not discharge. No dams are located in the watershed.

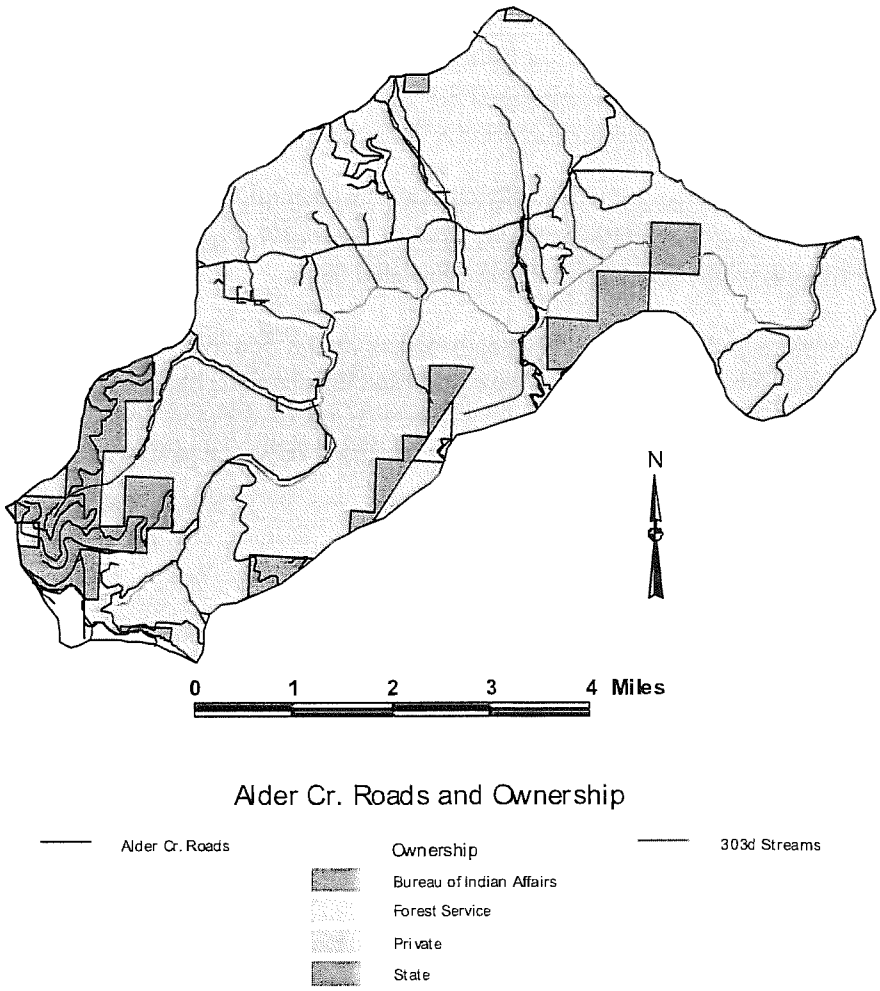


Figure 2-a. Roads and Ownership: Alder Creek

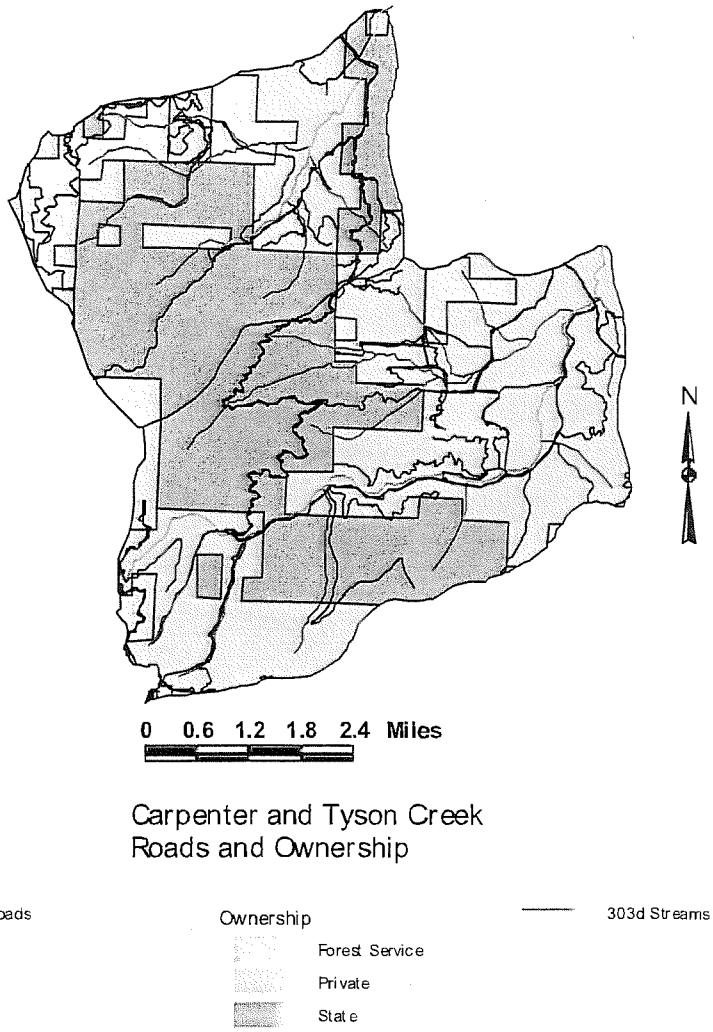
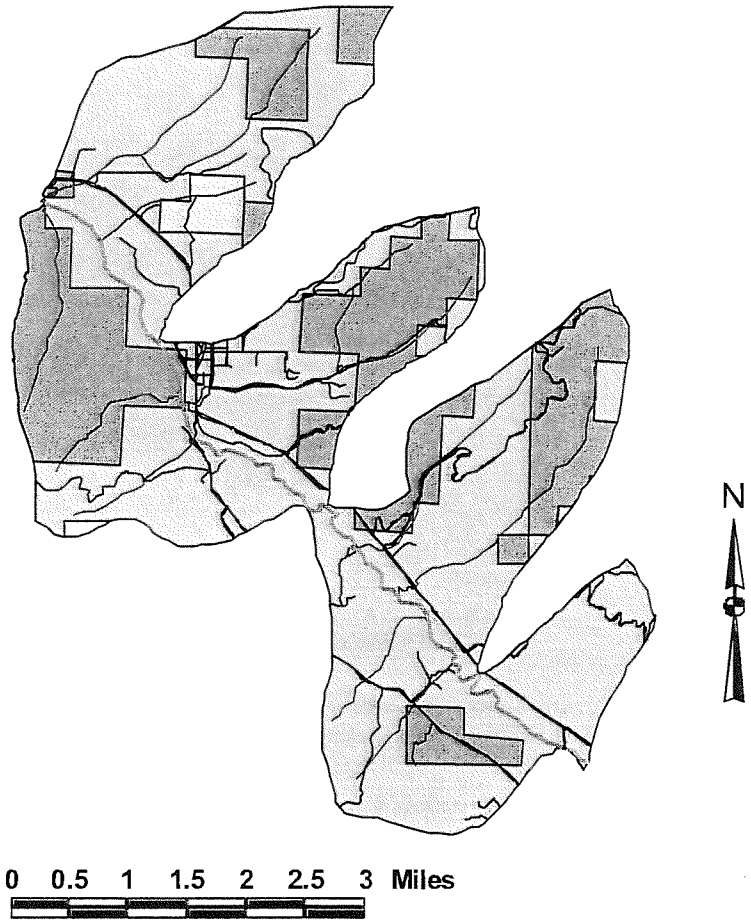


Figure 2-d. Roads and Ownership: Carpenter and Tyson Creeks



St. Maries R. - Childs Cr. to Tyson Cr. Roads and Ownership

St. Maries R. - Childs Cr to Tyson Cr. Roads
St. Maries R. - Childs Cr. to Tyson Cr. Ownership
Forest Service
Private
State
St. Maries R. - Childs Cr. to Tyson Cr. 303d Streams

Figure 2-e. Roads and Ownership: St. Maries River, Childs Creek to Tyson Creek

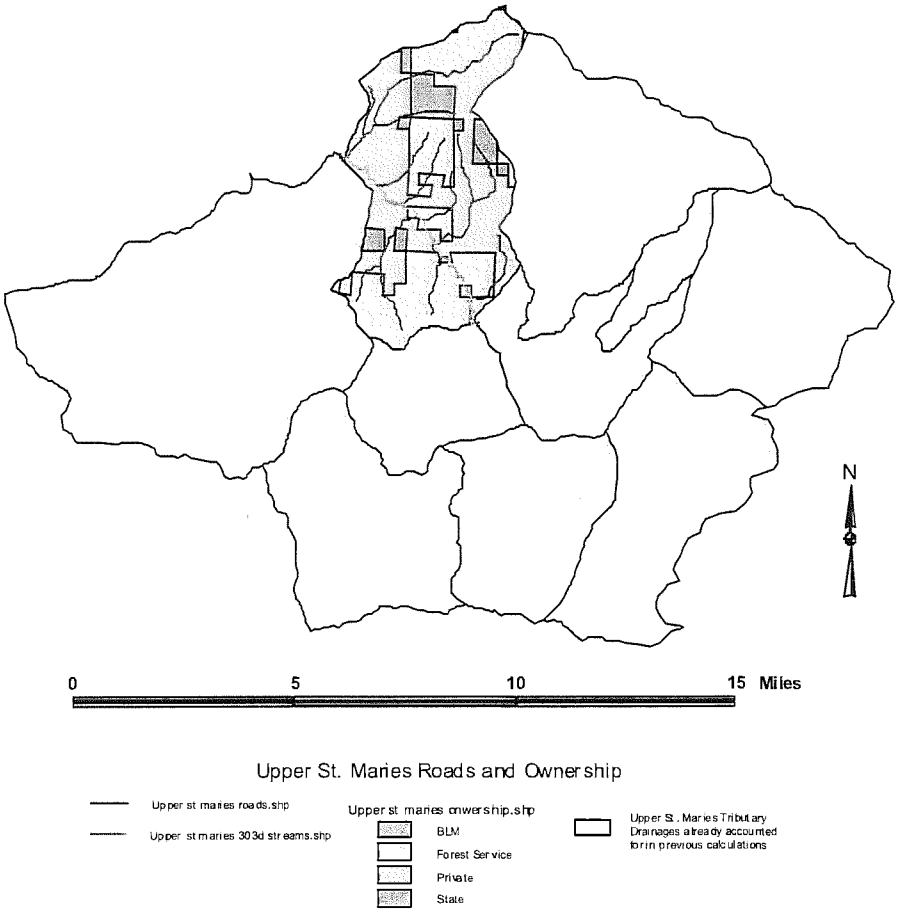


Figure 2-h. Roads and Ownership: Upper St. Maries River

Much of the St. Maries watershed is in Benewah County. The county's population is stable with approximately 9,200 residents. Roughly half of its residents live in the subbasin. St. Maries is the largest town in the subbasin and is the county seat. It has a population of 2,500. Additionally, five small towns are located in the St. Maries Subbasin: Mashburn, Fernwood, Santa, Emida, and Clarkia. None of these has a population in excess of 100. The resident and seasonal populations are sparse in the remainder of the watershed.

History and Economics

The St. Maries Subbasin was settled and developed during the early decades of the twentieth century (Russell 1979). Many watersheds within the subbasin have sustained appreciable timber harvest during the twentieth century. Logging companies initially used the waterways as the log transport system. Log flumes, some splash dams and log drives were used to move logs to mills near the city of St. Maries. Log transport by water was inefficient due to the low gradient of the river and ended by the early 1920s. However, splash dams and log drives caused some structural disruptions to the streams. Railroad logging was also practiced in some watersheds. Later, roads were built in the stream bottoms, fundamentally altering stream gradient and stability. From the 1940s to the 1970s, timber harvest depended on this extensive road network. Logging with the early jammer systems necessitated roads at approximately 100-yard intervals on the slopes. The result is a network of forgotten roads, which intercept the natural drainage system at numerous locations throughout its dendritic pattern. These mid-century harvests also relied heavily on clear-cut prescriptions.

Grazing in the St. Maries River Subbasin is restricted to the river valley and to the low gradient sections of tributary streams. Grazing impacts occur on Emerald Creek, Carpenter Creek, Santa Creek, Charlie Creek, West and Middle Forks, and the St. Maries River where cattle graze in large concentrations. Impacts typically include bank erosion caused by riparian vegetation damage.

Economically important deposits of garnet have been developed in Emerald and Carpenter Creeks. The garnet is processed for use in industrial abrasives. Garnets were mined by placer techniques in the past. In addition, stream courses were altered by dredge mining that was practiced on the floodplains. Altered stream courses are likely a source of sediment. Gold was mined by hydraulic and placer methods in Tyson Creek (Russell 1979). In recent years reclamation of stream channels and floodplains has occurred.

The Benewah Soil and Water Conservation District has been active in addressing soil and water conservation issues in the subbasin for many years. The agency has also been active in stream bank stabilization efforts. They have recently formed the core of the St. Joe Subbasin Watershed Advisory Group (WAG) along with representatives of the Coeur d'Alene Tribe, Idaho Department of Fish and Game, Idaho Department of Lands (IDL), Potlatch, Corporation, Emerald Creek Garnet, Corporation, and the USFS. The St. Joe WAG is providing input regarding the St. Joe and St. Maries Subbasin assessments and will advise DEQ on required TMDLs and implementation plans.

2. Subbasin Assessment – Water Quality Concerns and Status

The St. Maries River and nearly all of the stream segments in its watershed are listed as water quality limited under Section 303(d) of the CWA. Sediment is uniformly listed as the pollutant of concern. Nutrients, temperature, dissolved oxygen depletion, and bacteria are also listed as pollutants of concern for some segments. Fish and macroinvertebrate population surveys (DEQ Beneficial Use Reconnaissance Program [BURP]) data indicate that sediments may have contributed to the decline of trout populations in the St. Maries River and its tributaries.

2.1 Water Quality Limited Segments Occurring in the Subbasin

The St. Maries River Subbasin has 17 water quality limited 303(d) listed stream segments according to the 1998 303(d) list. These segments make up the river, its forks, and the majority of its tributary streams. Segment identification numbers, designated boundaries, and reasons for listing are shown in Table 2 and mapped in Figure 1.

Sediment, temperature, and habitat alteration are the three most prevalent reasons that segments are listed. All segments are listed for sediment with the exception of the St. Maries River between Clarkia and Mashburn, where the pollutant is unknown. Five segments are listed for temperature, while eight segments are listed for habitat alteration. While degraded habitat is evidence of impairment, the EPA does not consider a waterbody to be polluted if the pollution is not a result of the introduction or presence of a pollutant. TMDLs are not required to be established for waterbodies impaired by pollution but not pollutants.

Four segments are listed for nutrients responsible for aquatic plant growth, while one segment each are listed for bacteria and dissolved oxygen.

Table 2. 303(d) listed segments in the St. Maries Subbasin.

Waterbody Name	Segment ID Number	Assessment Unit	1998 303(d)[1] Boundaries	Pollutants	Listing Basis[2]
St. Maries River	3579	PN015_05	Mashburn (town) to St. Joe River	Habitat alteration, nutrients, sediment, and temperature	Appedix A, 305(b) report; EPA addition
St. Maries River	3580	PN015_05	Clarkia to Mashburn	Unknown, temperature	BURP Data; EPA addition to 303(d) list
West Fork of the St. Maries River	3581	PN017_02/03 /04	Headwaters to St. Maries River	Sediment and temperature	Appendix A, 305(b) report
Middle Fork of the St. Maries River	3594	PN018_02/ 03/04/05	Headwaters to St. Maries River	Habitat alteration, sediment, and temperature	Appendix A, 305(b) report; EPA addition
Thorn Creek	3582	PN026_02/03	Headwaters to St. Maries River	Nutrients and sediment	Appendix A, 305(b) report
Alder Creek	3583	PN08_02	Headwaters to St. Maries River (trans-tribal boundary)	Nutrients and sediment	Appendix A, 305(b) report
John Creek	3584	PN09_02	Unnamed tributary (7.5 km upstream) to St. Maries River	Sediment	Appendix A, 305(b) report
Santa Creek	3585	PN010_02/ 03/04	Headwaters to St. Maries River	Dissolved oxygen, habitat alteration, nutrients, sediment, and temperature	Appendix A, 305(b) report; EPA addition
Charlie Creek	3587	PN011_02/03	Headwaters to Santa Creek	Habitat alteration and sediment	Appendix A, 305(b) report
Renfro Creek	3588	PN024_02	Headwaters to Davis Creek	Sediment	Appendix A, 305(b) report
Tyson Creek	3589	PN013_02/03	North Fork Tyson Creek to St. Maries River	Habitat alteration and sediment	Appendix A, 305(b) report
Crystal Creek	3590	PN023_02	Headwaters to St. Maries River	Sediment	Appendix A, 305(b) report
Carpenter Creek	3591	PN014_02/03	Headwaters to St. Maries River	Habitat alteration and sediment	Appendix A, 305(b) report
Emerald Creek	3593	PN016_03	East Fork –West Fork Confluence to St. Maries River	Habitat alteration, sediment, and temperature	Appendix A, 305(b) report; EPA addition
Gold Center Creek	3596	PN019_02/03	Windy Creek to Middle Fork of the St. Maries River	Habitat alteration, sediment, and temperature	Appendix A, 305(b) report
Flewsie Creek	3596	PN018_02	Headwaters Creek to Middle Fork of the St. Maries River	Sediment and temperature	Appendix A, 305(b) report
Gramp Creek	3598	PN019_02	Headwaters to Gold Center Creek	Bacteria, sediment, and temperature	Appendix A, 305(b) report

[1]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 subsection "d" of the Clean Water Act.
[2]305(b) report - a report on the condition of all Idaho surface waters; EPA addition - refers to EPA additions to the list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use.

2.2 Applicable Water Quality Standards

Water quality standards prescribe the use of the waterbody and establish the water quality criteria that must be met to protect designated uses. Designated uses for the St. Maries Subbasin and the applicable water quality standards appear below.

Beneficial Uses

Idaho water quality standards require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and "presumed" uses as briefly described in the following paragraphs. The *Waterbody Assessment Guidance*, second edition (Grafe *et al.* 2002) gives a more detailed description of beneficial use identification for use assessment purposes.

Existing Uses

Existing uses under the CWA are "those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards." The existing in stream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.003.35, .050.02, and 051.01 and .053). Existing uses include uses actually occurring, whether or not the level of quality to fully support the uses exists. Practical application of this concept would be when a waterbody could support salmonid spawning, but salmonid spawning is not yet occurring.

Designated Uses

Designated uses under the CWA are "those uses specified in water quality standards for each waterbody or segment, whether or not they are being attained." Designated uses are simply uses officially recognized by the state. In Idaho these include things like aquatic life support, recreation in and on the water, domestic water supply, and agricultural use. Water quality must be sufficiently maintained to meet the most sensitive use. Designated uses may be added or removed using specific procedures provided for in state law, but the effect must not be to preclude protection of an existing higher quality use such as cold water aquatic life or salmonid spawning. Designated uses are specifically listed for waterbodies in Idaho in tables in the Idaho water quality standards (see IDAPA 58.01.02.003.22 and .100, and IDAPA 58.01.02.109-160 in addition to citations for existing uses).

The St. Maries River has designated beneficial uses (Table 3) of cold water aquatic life and primary contact recreation. The portion of the river from the confluence of the West Fork and Middle Fork of the St. Maries River to the Carpenter Creek reach of the river has the additional designated uses of domestic water supply and special resource water. Santa Creek has designated beneficial uses of cold water aquatic life, salmonid spawning and primary contact recreation (IDAPA 58.01.02.101.11). Beneficial uses have not been designated for the other tributaries of the St. Maries River.

Presumed Uses

In Idaho, most waterbodies listed in the tables of designated uses in the water quality standards do not yet have specific use designations. These undesignated uses are to be designated. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called "presumed uses," DEQ will apply the numeric criteria cold water and primary or secondary contact recreation criteria to undesignated waters. If in addition to these presumed uses, an additional existing use, (e.g., salmonid spawning) exists, because of the requirement to protect levels of water quality for existing uses, then the additional numeric criteria for salmonid spawning would additionally apply (e.g., intergravel dissolved oxygen, temperature). However, if for example, cold water is not found to be an existing use, a use designation to that effect is needed before some other aquatic life criteria (such as seasonal cold) can be applied in lieu of cold water criteria (IDAPA 58.01.02.101.01).

Table 3. St. Maries Subbasin designated beneficial uses.

Waterbody Unit	Waterbody	Designated Uses[1]			On 303(d) List[2]
		Aquatic Life	Recreation	Other	
P-15	St. Maries River	CW	PCR	DWS, SRW	†
P-12	St. Maries River	CW	PCR	-	†
P-7	St. Maries River	CW	PCR	-	†
P-10	Santa Creek	CW, SS	PCR	-	†

[1]CW- Cold Water, SS- Salmonid Spawning, PCR- Primary Contact Recreation, DWS- Domestic Water Supply, SRW- Special Resource Water.
[2]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 subsection "d" of the Clean Water Act.

Table 4. St. Maries Subbasin beneficial uses of impaired streams without standard designated uses.

Waterbody Unit	Waterbody	Beneficial Uses[1]		On 303(d) List[2]
		Aquatic Life	Recreation	
P-8	Alder Creek	CW,SS	SCR	†
P-9	John Creek	CW,SS	SCR	†
P-11	Charlie Creek	CW,SS	SCR	†
P-13	Tyson Creek	CW,SS	SCR	†
P-14	Carpenter Creek	CW,SS	SCR	†

Table 4, continued.

P-16	Emerald Creek	CW,SS	SCR	†
P-17	West Fork St. Maries River	CW,SS	PCR	†
P-18	Middle Fork St. Maries River	CW,SS	PCR	†
P-19	Gold Center Creek	CW,SS	SCR	†
P-18	Flewsie Creek	CW,SS	SCR	†
P-19	Gramp Creek	CW,SS	SCR	†
P-23	Crystal Creek	CW,SS	SCR	†
P-24	Renfro Creek	CW,SS	SCR	†
P-26	Thorn Creek	CW,SS	SCR	†

[1]CW- Cold Water, SS- Salmonid Spawning, PCR- Primary Contact Recreation, SCR- Secondary Contact Recreation.
[2]Refers to a list created in 1998 of water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 subsection "d" of the Clean Water Act.

Water Quality Standards

Water quality criteria supportive of beneficial uses are stated in the Idaho Water Quality Standards and Wastewater Treatment Requirements (DEQ 2000a). The standards supporting beneficial uses are outlined in Table 5. In addition to these standards, cold water and salmonid spawning are supported by sediment and nutrient narrative standards. The narrative sediment standard states:

Sediment shall not exceed quantities specified in section 250 and 252 or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Subsection 350 (IDAPA 58.01.02.200.08).

The excess nutrients standard states:

Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other aquatic growths impairing designated beneficial uses (IDAPA 58.01.02.200.06).

Table 5. Water quality standards supportive of beneficial uses (IDAPA 58.01.02.250).[1]

Pollutant	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Aquatic Life	Salmonid Spawning
pH	-	-	pH between 6.5 and 9.5	pH between 6.5 and 9.5
Coliforms and dissolved gas	126 E. coli/100mL geometric mean over 30 days	126 E. coli/100mL geometric mean over 30 days	Dissolved gas not exceeding 110%	Dissolved gas not exceeding 110%
Chlorine	-	-	Total chlorine residual less than 19 ?g/L/hr or an average 11 ?g/L/4 day period	Total chlorine residual less than 19 ?g/L/hr or an average 11 ?g/L/4 day period
Toxic substances	-	-	Less than toxic substances set forth in 40 CFR 131.36(b)(1) Columns B1, B2, D2	Less than toxic substances set forth in 40 CFR 131.36(b)(1) Columns B1, B2, D2
Dissolved oxygen	-	-	Exceeding 6 mg/L D.O.	Exceeding 5 mg/L intergravel D. O.; exceeding 6 mg/L surface
Temperature	-	-	less than 22 °C (72 °F) instantaneous; 19 °C (66 °F) daily average or natural background, if greater	Less than 13 °C (55 °F) instantaneous; 9 °C (48 °F) daily average or natural background, if greater
Ammonia	-	-	Low ammonia (see formula/tables for exact concentration)	Low ammonia (see formula/tables for exact concentration)
Turbidity[2]	-	-	Less than 50 NTU instantaneous; 25 NTU over 10 days greater than background	-

[1] pH –negative logarithm of the hydrogen ion concentration; E. coli - *Escherichia coli;* ?g/L – micrograms per liter; D.O. –dissolved oxygen; mg/L – milligrams per liter; °C – degrees Celsius; °F – degrees Fahrenheit; NTU – nephelometric turbidity units.
[2] The turbidity standard is a standard applied to the mixing zones of point discharges in the standards (IDAPA 58.01.02.250.01.d). However, the standard is technically based on the ability of salmonids to sight feed. For this, it is applicable through the narrative sediment standard (IDAPA58.01.02.200.08) to impacts on salmonids (cold water aquatic life) wherever these may occur.

2.3 Summary and Analysis of Existing Water Quality Data

There are relatively few sources of existing water quality data for the St. Maries Subbasin. The USGS has operated a discharge gage on the St. Maries River near Santa since October 1965. Water quality data have been collected at this station intermittently since the late 1980s. These data include temperature, pH, dissolved oxygen, and aquatic plant growth nutrient measurements. Idaho Soil Conservation Commission (SCC) staff collected aquatic plant growth nutrients, dissolved oxygen and bacteria data at various sites on the St. Maries River, Thorn Creek and Santa Creek during water year 2000. Additional bacteria data were collected on Gramp Creek by DEQ in water year 2001. Beneficial Use Reconnaissance Program data was collected on all water quality limited streams. These data include habitat data, macroinvertebrate and fisheries data. The IDL Cumulative Watershed Effects (CWE) program collected data on sediment sources during the summers of 2000 and 2001.

Discharge Characteristics

The average annual discharge hydrograph (Figure 3) of the Santa gaging station indicates that the spring snowmelt event dominates the pattern of stream discharge (USGS 1996-2000). The mean high flow discharge for the past five years occurred in April at 1,213 cubic feet per second (cfs) and mean low flow discharge occurred in September at 64 cfs. Bank full discharge is in the range of 1,200 cfs. Rain-on-snow conditions can result in large flood events (Figure 4), as occurred during winter 1995-1996 (USGS 1997). The majority of the slopes in the St. Maries River watershed exist between 3,330 to 4,500 feet in elevation. Consequently, the watershed is prone to rain-on-snow events. Peak discharges during the third largest flood on record (February 1996) were estimated at 11,000 cfs.

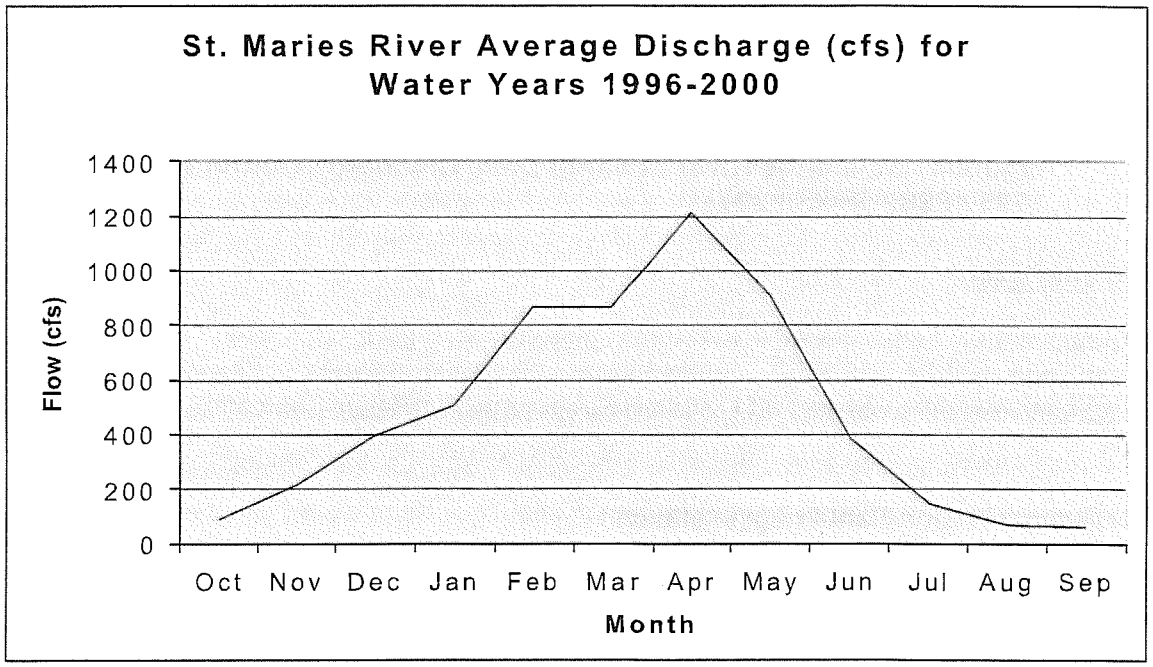


Figure 3. St. Maries River Discharge at Santa: Average Monthly Discharge for Water Years 1996-2000 (USGS 1996-2000)

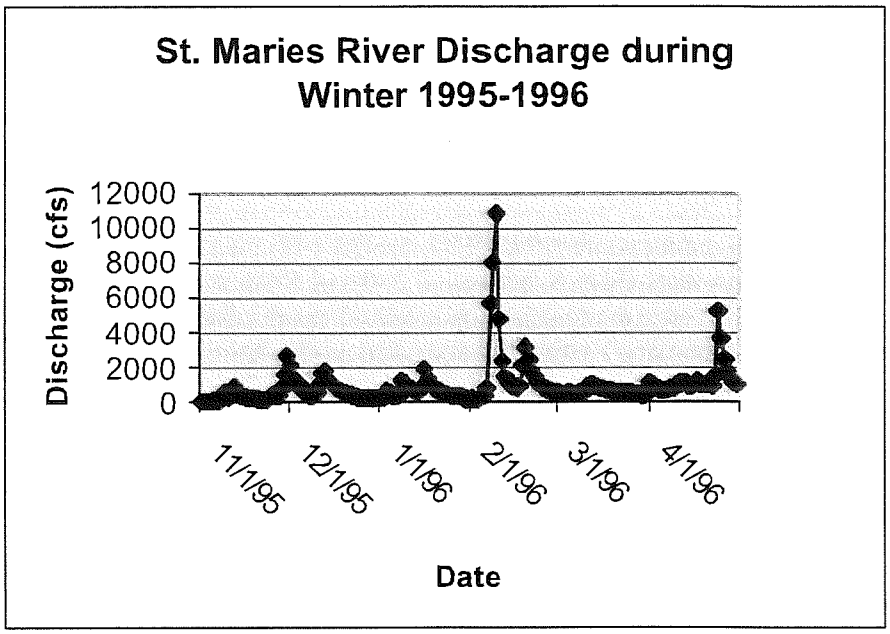


Figure 4. St. Maries River at Santa Daily Discharge During Winter 1995-1996 (USGS 1997)

Water Column Data

Water column data have been collected at the Santa gaging station by the USGS under contract with DEQ and EPA. The SCC collected aquatic plant growth nutrient and bacteria data at five locations in the subbasin. DEQ collected bacteria data at Gramp Creek to fill a data gap.

-- General data from the Santa gaging station

Selected water quality data collected by the USGS at the Santa gaging station between 1994 and 2000 are summarized in Table 7. The entire data set is provided in Appendix B.

-- Aquatic plant growth nutrients

The St. Maries River and Thorn, Alder, and Santa Creeks are listed for nutrients. Potential sources of nutrients in these watersheds include discharge from wastewater treatment facilities and livestock grazing. Three wastewater treatment facilities operate in the watershed at Clarkia, Emida, and Santa-Fernwood. The discharge monitoring records for water year 2000 from the Santa-Fernwood facility were examined. Clarkia and Emida do not assess discharge quality. Santa-Fernwood assesses total phosphorous and total Kjeldahl nitrogen in treated and receiving waters. Total phosphorous and Kjeldahl nitrogen concentrations in discharged water are low and the discharge volume is small. Stream concentration increases of phosphorous and nitrogen attributable to the discharge are negligible.

Water samples were collected on three dates during the summer of 2000 from two locations on the St. Maries River (both below the treated wastewater discharges), and at the mouths of Santa and Thorn Creeks. These samples were analyzed for total phosphorous, nitrate-nitrite and total Kjeldahl nitrogen. The analytical results are provided in Tables 8a-c. Nutrient concentrations were slightly higher at the Santa and Thorn Creek locations. Total Kjeldahl nitrogen data indicated that nitrogen was primarily in organic nitrogen forms.

The Coeur d'Alene Tribe has collected plant growth nutrient and other water column data on Alder Creek since 1997. Data is collected, on average, four to eight times a season. Nutrient data from Alder Creek is summarized in Table 9.

Gold Creek, Santa Creek, Thorn Creek, Alder Creek, and the St. Maries River were sampled for periphyton (benthic algae). High periphyton biomass may indicate eutrophic conditions. Periphyton biomass can be estimated by several methods, including determining chlorophyll *a* (chl *a*) and ash free dry mass (AFDM). The excess nutrients narrative standard requires that surface waters of the state be free from excess nutrients that can cause visible slime growths or other aquatic growths impairing designated beneficial uses. According to the EPA's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (1999), levels of algal biomass greater than 10 μg chl *a* cm^2 or greater than 5 mg AFDM cm^2 indicate nuisance levels of nutrients or organic enrichment. The periphyton samples collected from the St. Maries River and its tributaries showed levels of AFDM ranging from a low of 0.24 mg/cm^2 in Gold Creek to 1.89 mg/cm^2 in Thorn Creek. Chlorophyll *a* measured from .42 $\mu g/cm^2$ Gold Creek to a high of 6.68 $\mu g/cm^2$ in Alder Creek. All measurements were found to be well below levels causing visible slime growths or other aquatic growths impairing designated beneficial uses. It is therefore recommended that these streams be delisted for excess nutrients.

Table 6. Periphyton biomass in the St. Maries River and its tributaries.[1]

Waterbody	Sample Number	AFDM (mg/cm^2)	Chla (? /cm^2)
Gold Creek	1	0.24	0.42
Gold Creek	2	0.34	0.46
St. Maries River	1	1.83	2.68
St. Maries River	2	1.29	1.89
Santa Creek	1	1.05	2.23
Santa Creek	2	1.20	3.69
Thorn Creek	1	1.48	3.74
Thorn Creek	2	1.89	5.45
Alder Creek	1	1.11	6.68

[1]AFDM - ash free dry mass; Chla - Chlorophyll a.

Table 7. Water quality of the St. Maries River at the Santa gaging station.

Sample Date	Water Temp (?C)	Inst. Discharge (cfs)	Specific Conductance (microsiemens /cm)	pH (standard units)	Nitrogen, Ammonia Dissolved (mg/L as N)	Nitrogen, Ammonia + Organic Total (mg/L as N)	Nitrogen, nitrate, and nitrite Dissolved (mg/L as N)	Phosphorus Total (mg/L as P)	Phosphorus Ortho Dissolved (mg/L as P)	Alkalinity Water Dissolved FET Lab CaCO3 (mg/L)
10/27/93	2.0	56.1	58.0	-	-	-	-	-	-	-
12/15/93	0.0	98.6	53.0	-	-	-	-	-	-	-
02/23/94	0.0	84.9	58.0	-	-	-	-	-	-	-
02/24/94	0.0	91.9	58.0	-	-	-	-	-	-	-
04/20/94	8.0	605.0	34.0	-	-	-	-	-	-	-
07/19/94	25.5	45.6	59.0	8.6	0.06	0.5	0.05	0.02	0.01	-
10/23/95	6.0	83.4	58.0	-	-	-	-	-	-	-
11/30/95	5.5	2840.0	32.0	-	-	-	-	-	-	-
01/30/96	0	197.0	18.0	-	-	-	-	-	-	-
02/10/96	2.0	4060.0	26.0	-	-	-	-	-	-	-
03/14/96	5.5	868.0	38.0	-	-	-	-	-	-	-
05/17/96	7.5	957.0	38.0	-	-	-	-	-	-	-
06/19/96	9.0	209.0	43.0	-	-	-	-	-	-	-
-08/15/96	23.0	59.3	53.0	-	-	-	-	-	-	-
10/21/98	4.5	54.6	54.0	7.8	0.002	0.1	0.005	0.014	0.006	-
11/19/98	3.0	101.0	52.0	7.2	0.003	0.1	0.005	0.021	0.005	-
12/09/98	0.0	172.0	46.0	7.5	0.004	0.1	0.026	0.024	0.007	-
01/26/99	0.0	269.0	44.0	7.7	0.011	0.136	0.017	0.0306	0.011	-
02/09/99	0.5	428.0	40.0	7.0	0.009	0.205	0.013	0.0385	0.017	-
03/10/99	2.0	368.0	37.0	7.1	0.002	0.102	0.005	0.023	0.006	-
04/14/99	5.6	666.0	34.0	7.3	-	-	-	-	-	-
05/10/99	-	643.0	34.0	7.5	0.004	-	0.005	0.012	0.005	16.344
06/07/99	9.5	504.0	30.0	7.2	0.003	0.161	0.006	0.013	0.003	15.705
07/14/99	19.5	154.0	39.0	7.4	0.002	0.158	0.005	0.02	0.003	18.362
08/10/99	20.0	86.1	50.0	7.8	0.002	0.12	0.005	0.016	0.008	24.509
09/09/99	20.0	56.3	48.0	7.7	-	-	-	-	-	26.515
Average	**7.1**	**529.1**	**44.0**	**7.5**	**0.009**	**0.168**	**0.013**	**0.021**	**0.007**	**20.287**

Table 8. Plant growth nutrient concentrations at two locations on the St. Maries River, Santa Creek, and Thorn Creek.[1]

a) Total phosphorous (? g/L)

Waterbody	Location	7/29/00	8/29/00	9/13/00	Mean
St. Maries River	Near Mashburn	38	13	20	24
St. Maries River	Santa Bridge	26	15	20	20
Santa Creek	Near mouth	53	23	34	37
Thorn Creek	Near mouth	44	31	48	41

b) Total nitrite-nitrate (? g/L)

Waterbody	Location	7/29/00	8/29/00	9/13/00	Mean
St. Maries River	Near Mashburn	<10[1]	<10	<10	5
St. Maries River	Santa Bridge	<10	<10	<10	5
Santa Creek	Near mouth	<10	<10	<10	5
Thorn Creek	Near mouth	36	12	12	20

[1]Less than 10 treated as 5 ? g/L in means.

c) Total Kjeldahl Nitrogen (? g/L)

Waterbody	Location	7/29/00	8/29/00	9/13/00	Mean
St. Maries River	Near Mashburn	150	100	130	127
St. Maries River	Santa Bridge	190	80	120	130
Santa Creek	Near mouth	390	130	180	233
Thorn Creek	Near mouth	240	120	180	180

[1]Data collected by DEQ.

Table 9. Alder Creek nutrient levels (? g/L)[1]

Nutrient	1998	1999	2000	2001	Mean
Nitrate-Nitrite	27.5	19.8	9.5	48.9	26.4
Total Kjeldahl Nitrogen	109	104	101	331	116.3
Total Phosphorous	7.9	9.6	20.2	19.4	14.3

[1]Data collected by Coeur d'Alene Tribe.

?? Dissolved oxygen

Santa Creek is listed for a lack of dissolved oxygen. The dissolved oxygen concentrations of the stream were measured in late July, late August and mid September 2000 during and after a prolonged period of warm weather without precipitation. If oxygen deficiency occurs, it

would be expected under these conditions. The dissolved oxygen concentrations and percent saturation measured are provided in Table 10. The values are higher than the minimum standard of 6 mg/L dissolved oxygen or 90% saturation. Based on this data, Santa Creek is not limited by low dissolved oxygen concentrations.

Table 10. Dissolved oxygen and percent saturation measured in Santa Creek near its mouth.

Date	Dissolved oxygen (mg/L)	Percent saturation
July 31, 2000	9.0	95%
August 29, 2000	10.5	103%
September 13, 2000	9.4	100%

-- Temperature

The West Fork of the St. Maries River and Emerald, Gold Center, Flewsie, and Gramp Creeks are listed as limited by temperature standard exceedences. Summer-fall temperatures were continuously monitored on these and additional tributaries of the St. Maries River. Temperature data for monitored streams are summarized in Table 11. The temperature profiles and the analyses of the data for exceedences of federal and state bull trout standards and cutthroat and bull trout spawning standards are provided in Appendix B.

Table 11. Percentage of temperature standards exceedence from federal and state bull trout standards and cutthroat and bull trout spawning standards during the period for which the standards apply.

Stream	Federal Bull Trout Exceedence: May 1 to Oct 31 (percent of days)	State Bull Trout Exceedence: May 1 to Oct 31 (percent of days)	Cutthroat Trout Spawning Exceedence: Week Post Hydrograph Peak to July 31 (percent of days)	Bull Trout Spawning Exceedence: Sept 1 to Oct 31 (percent of days)
Gramp Creek	48.4	30.4	31.0	48.4
Gold Center Creek	42.4	33.7	23.0	54.1
Flewsie Creek	57.1	48.9	54.0	32.8
MF St. Maries River	53.8	43.5	39.1	32.7
Emerald Creek – 1	58.2	51.6	66.7	41.0
Emerald Creek – 2	58.2	51.6	66.7	41.0
Emerald Creek – 3	54.9	37.5	49.4	26.2

None of the listed streams meet temperature standards. Exceedences occur between 20% and 70% of the time, depending on the standard. The BURP results employed to develop the 1998 303(d) list indicated that these streams support cold water aquatic life and salmonid spawning uses to some extent. The nearly uniform exceedence of the state and federal temperature standards during July, August, and early September suggests the standards may not be realistic. However, based on the current temperature monitoring results and temperature standards,

Gramp, Gold Center, Flewsie, and Emerald Creeks, and the Middle Fork of the St. Maries River are limited by temperature. Given the results from these headwater streams, it is reasonable to assume that Santa Creek and the West Fork and main stem of the St. Maries River are also limited by temperature.

Biological and Other Data

Existing biological data include bacteria, macroinvertebrate and fisheries data. Habitat data, together with the macroinvertebrate and fisheries data, are available from the BURP database. Bacteria data were collected by the DEQ and SCC.

-- Bacteria

A single stream (Gramp Creek) is listed for bacteria. Discharge measurements of 1.3 cfs during mid-August 2000 and 1 cfs during mid-September 2001 indicate that the stream would support secondary contact recreation only. No evidence of a primary contact use was found. An assessment of *Escherichia coli* (*E. coli*) was conducted during August 2000 and September 2001. Results of the *E. coli* test indicated 13 and 17 colonies per 100 mL sample, respectively. These E. coli values are well below the criteria value of 126 E. coli/100mL for contact recreation (Table 12). Based on this data, the listing of Gramp Creek for bacteria is incorrect.

The SCC staff also collected bacteria samples in addition to nutrient samples. *E. coli* values are shown in Table 12 as *E. coli*/100 mL. These values are well below the criteria value for contact recreation of 126 *E. coli*/100 mL (Table 12). The data indicates that bacteria standards exceedence was not measured in the St. Maries River or two of its tributaries.

Table 12. *Escherichia coli* (*E. coli*/100 mL) at four locations in the St. Maries Subbasin.

Waterbody	Location	7/29/00	8/29/00	9/13/00	Mean
St. Maries River	Near Mashburn	9	62	28	33
St. Maries River	Santa Bridge	12	26	24	21
Santa Creek	Near mouth	50	24	10	28
Thorn Creek	Near mouth	10	17	42	23

-- Macroinvertebrate, fish, and habitat index data

Stream macroinvertebrate indices (SMI), stream fishery indices (SFI) and stream habitat index (SHI) scores are provided in Table 13. These data are available for several water bodies of the St. Maries River watershed. Fisheries data is the most limiting. The entire data set is provided in Appendix B. *Waterbody Assessment Guidance II* (Grafe et al. 2002) scores for the stream macroinvertebrate, fishery, and stream habitat indices based on the Northern Mountains Ecoregion are shown in the adjacent columns. These values are averaged to develop the score for the available indices. Average values of two or greater indicate support of the cold water aquatic life, while values less than two indicate nonsupport.

The data indicate that the upper reaches of the St. Maries River tributaries fully support the cold water aquatic life. Specifically, upper John, Charlie, middle Tyson, upper Carpenter, Gold Center, Gramp, Flewsie, upper Merry, upper Crystal and upper Renfro Creeks, along with the upper Middle Fork of the St. Maries River, support cold water aquatic life based on the indices and scoring system. Conversely, the following lower reaches of the tributaries and the St. Maries River do not support the cold water aquatic life: Santa, Emerald, and Thorn Creeks and the West Fork of the St. Maries River (Figure 5).

Table 13. Stream biotic indices and stream habitat index data of the St. Maries subbasin

STREAM	SMI[1]	SMI Score	SFI[2]	SFI Score	SHI	SHI[3] Score	Average SMI + SFI+ SHI	Supports Beneficial Uses
ALDER CREEK (UPPER)	35.7	0.0	-	-	52.0	1.0	0.5	No
ALDER CREEK (LOWER)	45.6	1.0	-	-	57.0	1.0	1.0	No
JOHN CREEK (UPPER)	40.1	1.0	79.0	2.0	71.0	3.0	2.0	Yes
JOHN CREEK (LOWER)	27.6	0.0	-	-	39.0	1.0	0.5	No
EAST FORK CHARLIE CREEK (UPPER)	40.7	1.0	-	-	73.0	3.0	2.0	Yes
EAST FORK CHARLIE CREEK (LOWER)	42.9	1.0	-	-	48.0	1.0	1.0	No
CHARLIE CREEK	61.4	2.0	82.0	3.0	59.0	2.0	2.3	Yes
CHARLIE CREEK	30.5	0.0	82.0	3.0	49.0	1.0	1.3	No
SANTA CREEK (UPPER)	44.7	1.0	-	-	45.0	1.0	1.0	No
SANTA CREEK (LOWER)	49.9	1.0	21.0	0.0	30.0	1.0	0.7	No
SANTA CREEK (LOWER)	42.5	1.0	21.0	0.0	37.0	1.0	0.7	No
TYSON CREEK (MIDDLE)	71.2	3.0	89.0	3.0	70.0	3.0	3.0	Yes
TYSON CREEK	33.0	0.0	-	-	33.0	1.0	0.5	No
CARPENTER CREEK (UPPER)	51.6	1.0	83.0	3.0	65.0	2.0	2.0	Yes
CARPENTER CREEK (UPPER)	46.3	1.0	83.0	3.0	71.0	3.0	2.3	Yes
CARPENTER CREEK (LOWER)	43.7	1.0	-	-	30.0	1.0	1.0	No
EMERALD CREEK (UPPER)	37.4	0.0	45.0	1.0	45.0	1.0	1.0	No
EMERALD CREEK (LOWER)	34.8	0.0	30.0	0.0	44.0	1.0	0.3	No
WFSAINT MARIES RIVER (UPPER)	82.1	3.0	67.0	2.0	44.0	1.0	2.0	Yes
MF SAINT MARIES RIVER (UPPER)	59.7	2.0	94.0	3.0	63.0	2.0	2.3	Yes
MF SAINT MARIES RIVER (UPPER)	68.4	3.0	63.0	1.0	55.0	1.0	1.7	No
MF SAINT MARIES RIVER (LOWER)	37.0	0.0	52.0	1.0	49.0	1.0	0.7	No
MF SAINT MARIES RIVER (LOWER)	59.8	2.0	48.0	1.0	46.0	1.0	1.3	No
MF SAINT MARIES RIVER (MIDDLE)	45.3	1.0	-	-	56.0	1.0	1.0	No
MF SAINT MARIES RIVER	70.0	3.0	-	-	42.0	1.0	2.0	Yes
GOLD CENTER CREEK (UPPER)	68.5	3.0	85.0	3.0	65.0	2.0	2.7	Yes
GOLD CENTER CREEK (UPPER)	82.9	3.0	91.0	3.0	68.0	3.0	3.0	Yes
GOLD CENTER CREEK (LOWER)	54.8	2.0	91.0	3.0	61.0	2.0	2.3	Yes
GOLD CENTER CREEK (LOWER)	60.6	2.0	91.0	3.0	30.0	1.0	2.0	Yes
GRAMP CREEK	42.8	1.0	91.0	3.0	75.0	3.0	2.3	Yes
FLEWSIE CREEK	60.3	2.0	84.0	3.0	68.0	3.0	2.7	Yes
MERRY CREEK (UPPER)	38.9	0.0	-	-	71.0	3.0	1.5	No
MERRY CREEK (UPPER)	70.7	3.0	88.0	3.0	27.0	1.0	2.3	Yes
MERRY CREEK (LOWER)	45.5	1.0	-	-	49.0	1.0	1.0	No
MERRY CREEK (LOWER)	75.0	3.0	95.0	3.0	58.0	1.0	2.3	Yes
OLSON CREEK	-	-	-	-	86.0	3.0	-	-
CRYSTAL CREEK (UPPER)	43.5	1.0	-	-	75.0	3.0	2.0	Yes

Table 13, continued.

STREAM	SMI	SMI Score	SFI	SFI Score	SHI	SHI Score	Average SMI + SFI+ SHI	Supports Beneficial Uses?
CRYSTAL CREEK (LOWER)	39.4	1.0	-	-	49.0	1.0	1.0	No
RENFRO CREEK (UPPER)	48.2	1.0	-	-	85.0	3.0	2.0	Yes
RENFRO CREEK (LOWER)	43.1	1.0	65.0	1.0	42.0	1.0	1.0	No
RENFRO CREEK	71.4	3.0	-	-	77.0	3.0	-	-
BEAVER CREEK (UPPER)	56.1	2.0	60.0	1.0	59.0	2.0	1.7	No
BEAVER CREEK (LOWER)	55.2	2.0	-	-	67.0	3.0	2.5	Yes
THORN CREEK (UPPER)	40.1	1.0	-	-	47.0	1.0	1.0	No
THORN CREEK (LOWER)	36.1	0.0	-	-	67.0	3.0	1.5	No
MAIN STEM ST. MARIES RIVER (CLARKIA TO MASHBURN)	-	-	-	-	52.0	1.0	-	-

[1] Stream Macroinvertebrate Index.
[2] Stream Fish Index (values provisional).
[3] Stream Habitat Index.

-- Additional fisheries data

Further analysis of fish populations and age class structures is shown in Table 14. John, upper Carpenter, Beaver, Tyson, upper Merry, Gramp, and Flewsie Creeks, as well as the West Fork of the St. Maries River have trout populations in the expected range of 0.1 – 0.3 trout per square meter per hour of electrofishing effort. Santa, Charlie, Renfro, Emerald, lower Merry, Gold Center, and the Middle Fork St. of the Maries River have low numbers of trout. Sculpin are present in most streams in numbers ranging from effort 0.1-0.4 fish per square meter per hour of electrofishing, with higher counts in tributary streams. Santa Creek, Charlie Creek, and the Middle and West Forks of the St. Maries river have lower than expected numbers of sculpin.

-- Sedimentation data

A visual inspection of the St. Maries River suggests bed load sediment is increased over natural background levels. The stream has a broad and shallow morphology with a very high width to depth ratio. Wetted width to depth ratios of 8.25 to 10.13 were measured at the lower and upper BURP stations, respectively, on the St. Maries River. Wetted width to depth ratios of 15.07 and 14.77 were measured at the lower Middle Fork and West Fork St. Maries River stations, respectively. A stream with a bank full flow of approximately 1,000 cfs should have a much lower width to depth ratio. Additional evidence of an increase in sediment includes a primary sediment class of fine sands on the stream bottom and point bars along the course of the river. Riffle armor stability has not been measured for streams of the St. Maries River Subbasin. However, the predominance of fine sand in the river suggests such measurement would reflect a high percentage of the bed material moving during two-year flow events.

The following sections examine quantitative information including pool volume and modeled sediment yield rates.

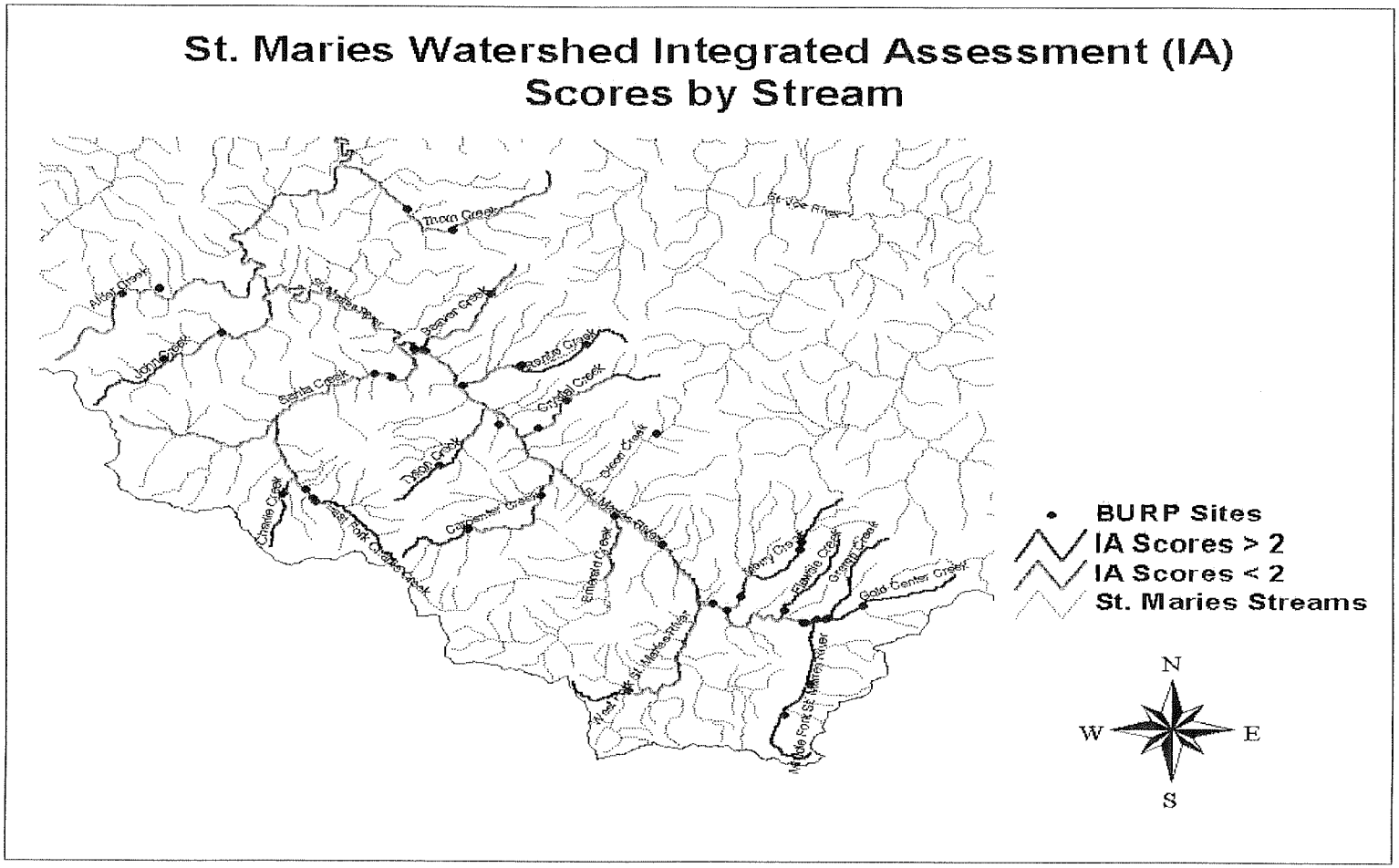


Figure 5. Stream Macroinvertebrate and Habitat Indices Scores at BURP Stations in the St. Maries Subbasin

Table 14. Fish population data in the St. Maries Subbasin.

Stream	Location	Date	Salmonids (fish/m^2/hr effort)	Sculpin (fish/m^2/hr effort)	Presence of Three Salmonid Age Classes	Presence of Tailed Frogs
John Creek	Upper	6/22/95	0.76	1.10	Yes	No
Emerald Creek	Lower	6/27/95	0.00	0.14	No	No
Emerald Creek	Upper	6/27/95	0.02	0.31	No	No
Carpenter Creek	Upper	9/9/95	0.19	0.29	Yes	No
Charlie Creek	-	7/9/96	0.04	0.07	Yes	No
Santa Creek	Lower	7/10/96	0.00	0.01	No	No
Renfro Creek	-	7/11/96	0.01	0.20	No	No
Beaver Creek	-	7/12/96	0.10	0.15	Yes	No
Tyson Creek	Middle	7/16/96	0.23	0.38	Yes	No
Merry Creek	Lower	7/18/96	0.02	0.10	Yes	No
Merry Creek	Upper	7/18/96	0.10	0.36	Yes	Yes
Middle Fork of the St. Maries River	-	7/17/96	0.00	0.01	No	No
Middle Fork of the St. Maries River	Lower	7/23/96	0.01	0.05	No	No
Middle Fork of the St. Maries River	Middle	7/23/96	0.02	0.12	Yes	Yes
Middle Fork of the St. Maries River	Upper	7/24/96	0.06	0.17	Yes	No
Middle Fork of the St. Maries River[1]	2 sites	10/7/95	0.05	0.07	No	N.D.
Gold Center Creek	Lower	7/24/96	0.01	0.14	Yes	Yes
Gold Center Creek	Upper	7/25/96	0.02	0.32	Yes	No
Gramp Creek	-	7/25/96	0.10	0.38	Yes	No
Flewsie Creek	-	7/25/96	0.83	1.09	Yes	No
West Fork St. Maries River	Upper	8/5/98	0.10	0.05	Yes	Yes

[1]Potlatch Corporation data.

Residual Pool Volume

Residual pool volume is a measure of the amount of the stream channel in pools. In theory, it is an estimate of the amount of the streambed that would hold water at zero discharge. Residual pool volume can be estimated from stream channel measurements collected by survey crews. The estimates are generally standardized on a volume per stream mile basis. Since the stream width affects the amount of pool volume possible, residual pool volume data are typically ordered based on the bank full width of the stream. Bank full width is the best measure of the typical stream discharge and ability to scour pools (DEQ 1989).

Residual pool data for the segments of the St. Maries Subbasin that are water quality limited are provided in Table 15. Streams are listed based on the bank full width of the streams. The larger the bank full width, the greater the possible residual pool

volume. These streams are listed in order of increasing bank full width. Residual pool volume can be used as an indicator of the presence of fish habitat.

Table 15. Residual pool volume of St. Maries River water bodies.

Stream	Bank Full Width (ft)	Residual Pool Volume (ft^3/mi)
Crystal Creek	7.50	2,760
John Creek	8.10	11,433
Alder Creek	9.10	19,324
West Fork of the St. Maries River	9.53	7,843
Tyson Creek	10.05	6,454
Cats Spur Creek	10.50	7,495
Thorn Creek	11.30	16,501
Flewsie Creek	11.48	1,128
Carpenter Creek[1]	12.00	25,997
Emerald Creek	12.00	9,357
Charlie Creek	13.40	9,693
West Fork Emerald Creek[1]	14.00	22,268
Gramp Creek	14.98	889
Renfro Creek	15.64	3,500
Beaver Creek	17.72	9,180
Olson Creek	17.88	5,887
Middle Fork of the St. Maries River[1]	18.10	4,510
Gold Center Creek	24.89	1,535
Merry Creek	28.57	15,340
Emerald Creek[1]	31.69	93,311
Santa Creek	31.81	39,039
Middle Fork of the St. Maries River	37.02	14,780
St. Maries River	54.86	64,041

[1]Potlatch Corporation data; all other data DEQ BURP data

Point Sources of Sediment

Three permitted discharges have total suspended solid limits (TSS). Santa-Fernwood and Clarkia are allowed discharges up to 200,000 and 150,000 gallons per day (GPD), respectively. Santa-Fernwood is restricted from discharge between November 1 and January 31. Both Santa-Fernwood and Clarkia have 30 mg/L (TSS) limits; however, they are limited to 34 and 6 pounds per day, respectively. The Emida facility does not have an NPDES permit that requires monitoring of discharge, but serves a sized population similar in size to the population served by the Clarkia facility. Based on the above limits, the fine sediment contribution of the point sources was estimated (Table 16). These sources discharge a total of 14.1 tons per year of sediment. All of this sediment is very fine material that does not cause pool filling.

Table 16. Permitted sediment discharges to the St. Maries River Subbasin.

Permitted Discharge	Average Discharge (million gallons/ day)	Total Suspended Solids Limit (mg/L)	Potential Daily Sediment Load (pounds/day)	Potential Annual Sediment Load (tons/year)
Santa-Fernwood[1]	0.2	30	34.0	6.2
Emida[2]	0.15	30	37.5	6.8
Clarkia	0.15	30	6.0	1.1
Total	0.5	-	77.5	14.1

[1]Santa-Fernwood is permitted to discharge 273 days per year maximum
[2]Emida discharges are estimated to be 30 mg/L total suspended solids and 150,000 gallons per day

Sediment Modeling

Sediment monitoring in-stream is a very time consuming and costly undertaking. In-stream sediment data collection costs estimated by URS Greiner for the Spokane River in 2001, show that in-stream sediment monitoring completed quarterly at five sites would cost $400,000 (2001). Sediment monitoring should be conducted at least annually at a site for seven years to develop a database that accounts for the variance of discharge effects on sediment yield and transport from year to year. From the URS Greiner figures, the investment required to conduct annual sediment monitoring for seven years is estimated at $140,000 per site. The time necessary and costs involved do not make sediment monitoring a viable approach for DEQ. A sediment modeling approach uses coefficients developed over long periods in paired watersheds. A sediment modeling approach is the most time and cost efficient approach to estimating sediment for the purposes of TMDLs.

Land Use Data

Sediment loading can be attributed to the entire watershed. It is not necessarily restricted to the water quality limited segments of the St. Maries River Subbasin. In

the following tables, sediment load is analyzed based on all contributing watersheds in the subbasin. Sediment yield is estimated from land use data developed by the USFS, Potlatch Corporation, and IDL. Fire and road coverages developed by the USFS and BLM were used to develop data for areas that had experienced two wildfires. The coverages also provided forest road mileage and road densities. After assessment by IDL specialists, CWE scores and land failure yield estimates were developed. Road land use acreage was estimated based on road length (GIS road coverage) and known right of way width. These values are reported in Table 17.

Table 17. Land use of the St. Maries River Subbasin.

Subwatershed[1]	Alder[2]	John	Santa	Santa Side Walls	Charlie	Tyson	Carpenter	Emerald	West Fork Side Walls	West Fork	Cats Spur	Carlin	Flat	Soldier	Sheep	Childs	Blair	Cedar
Agricultural land (acres)	1,080	0	2,379	825	952	303	1,129	1,125	0	774	0	0	0	0	0	0	0	0
Forest land (acres)	9,408	12,666	13,648	7,584	15,423	5,327	9,966	15,925	3,683.9	8,511	7,283	1,801	6,636	2,204	1,455	3,046	1,745	2,115
Unstocked forest (acres)	4,506	1,922	499	2,906	702	1,329	1,196	2,102	736	1,083	0	0	0	0	0	0	0	0
Double fires (acres)	0	0	0	0	2,046	172	0	350	0	0	0	0	0	0	0	0	0	0
Road (acres)	0	0	108	0	0	0	0	0	25	29	0	0	0	0	0	0	0	0
Total	14,994	14,588.5	16,634	11,315	19,123	7,131	12,291	19,502	4,444.9	10,397	7,283	1,801	6,636	2,204	1,455	3,046	1,745	2,115
Road Data																		
Forest roads (mi)	157.7	148.5	138.2	126.3	84.3	75.1	126.9	216	46.5	101.6	84	19	49	31	25.7	44.4	22.9	11.6
Ave. road density (mi/sq mi)	6.73122	6.51472	5.31730	7.14379	2.82131	6.74014	6.60776	7.08850	6.69531	6.25411	7.38157	6.75180	4.72573	9.00181	11.3044	9.32895	8.39885	3.5102
Road crossing number	176	217	532	360	273	192	290	392	60	429	103	14	49	35	8	68	19	12
Road crossing frequency	1.11604	1.46125	3.84949	2.85035	3.23843	2.55659	2.28526	1.81481	1.29032	4.22244	1.22619	0.73684	1	1.12903	0.31128	1.53153	0.82969	1.0345
Mass failure (tons/yr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encroaching forest roads (mi)	9.37	11.34	16.441	12.19	8.08	5.4	10.651	15.22	2.096	13.113	4.352	0.929	2.46	1.86	0.239	2.315	0.646	0.754
Mean bank full width + two 3' banks	21.4	9	16	12.7	12.7	9	9.3	13.3	9.3	13.3	13.3	21.4	10.3	10.3	12	19.9	18.3	18.3
Cumulative Watershed Effects (CWE[3]) Score	12 [4]	14	13	13	10	15	15	12	24	24	24	15	17	17	13	12	10	10

Table 17, continued.

Subwatershed	Thorn	Beaver	Renfro	Crystal	Merry	Flewsie	Gold Center	Middle Fork Side Walls	Middle Fork	Olson	Adams
Agricultural land (acres)	51	0	214	0	0	0	0	0	1,300	0	0
Forest land (acres)	9,373	3,242	10,096	4,632	9,310	1,604	9,121	4,816	6,824	5,720	1,670
Unstocked forest (acres)	1,390	1,052	276	371	2,239	187	967	1.7	2,628	0	0
Double fires (acres)	0	0	0	0	0	0	0	0	0	0	0
Road (acres)	33	0	0	0	0	0	0	0	0	0	0
Total	10,847	4,294	10,586	5,003	11,549	1,791	10,088	4,817.7	10,752	5,720	1,670
Road Data											
Forest roads (mi)	143	44.1	97.6	47.5	184.3	30.9	63.6	52	104	47	11.9
Av. road density (mi/sq mi)	8.437356	6.5728924	5.9006235	6.0763542	10.213179	11.041876	4.0348929	6.9078606	6.1904762	5.2587413	4.560479
Road crossing number	193	56	136	57	184	34	76	30	148	65	28
Road crossing frequency	1.3496503	1.2698413	1.3934426	1.2	0.9983722	1.1003236	1.1949686	0.5769231	1.4230769	1.3829787	2.3529412
Mass failure (tons/yr)	0	0	0	0	0	0	10	0	5	0	0
Encroaching forest roads (mi)	10.364	2.23	4.96	1.52	8.96	1.22	2.685	1.9	5.9	0.891	1.56
Mean bank full width + two 3' banks	10.3	10.3	11.3	9.3	16	9.3	14.2	12.7	16.5	13.5	13.5
Cumulative Watershed Effects (CWE) Score	18	14	13	26	12	16	16	16	13	22	22

Table 17, continued.

Subwatershed	Clarkia-Childs	Childs-Tyson	Tyson-Beaver	Beaver-Alder	Alder-Mouth
Agricultural land (acres)	87	845	0	0	515
Forest land (acres)	4,472	9,565	2,363	6,345	10,159
Unstocked forest (acres)	287.7	728	339	1783	1,297
Double fires (acres)	0	0	0	0	0
Road (acres)	37	54	20	45	13
Total	4,883.7	11,192	2,722	8,173	11,984
Road Data					
Forest roads (mi)	64.7	106.1	34.6	66.6	121.6
Ave. road density (mi/sq mi)	8.47881729	6.0671909	8.1351947	5.2152208	6.493992
Road crossing number	90	192	34	83	115
Road crossing freq.	1.391035549	1.8096136	0.982659	1.2462462	0.9457237
Mass failure (tons/yr)	0	0	0	0	20
Encroaching forest roads (mi)	3.747	7.244	2.1	4.178	4.9
Mean bank full width + two 3' banks	18.3	21.4	21.4	21.4	21.4
Cumulative Watershed Effects (CWE) Score	10	14	12	16	17

[1]Data taken from CDASTDS, IDPNFIRE, CDAROADS, Potlatch Corporation and IDL databases cut for specific subwatersheds.
[2]Acreage supplied by the Coeur d'Alene Tribal staff.
[3]Carlin Creek CWE Score and mean bank full width + 2 3' banks values estimated according to Alder Creek and Alder-Joe Watersheds. Flat and Soldier Creeks CWE Score and mean bank full width + 2 3' banks values estimated according to Thorn Creek and Beaver-Alder Watersheds. Sheep Creek CWE Score and mean bank full width +2 3' banks values estimated according to Tyson and Tyson-Beaver values. Childs Creek CWE Score and mean bank full width + 2 3' banks values estimated according to Clarkia-Childs and Childs-Tyson Watersheds. Blair and Cedar Creeks CWE Score and mean bank full width + 2 3' banks values estimated according to Clarkia-Childs Watershed.
[4] CWE values extrapolated from John Creek.

Sediment Yield and Export

Sediment yields were developed separately for agriculture and forest types (Table 18). Sediment contributions from road surfaces, mass failures, road encroachment, and stream bank erosion were modeled with a separate set of algorithms. Sediment yield to the stream system was assumed to be 100%. Revised Universal Soil Loss Equation (RUSLE) Model assumptions and documentation of the sediment model are provided in Appendix C.

Table 18. Estimated sediment yield coefficients.

a) Agriculture land use

Watershed	Average RUSLE[1] Coefficient
John Creek	0.030
Santa Creek and side walls	0.055
Charlie Creek	0.060
Tyson Creek	0.090
Carpenter Creek	0.090
Emerald Creek	0.020
West Fork and side walls	0.054
Cats Spur Creek	0.020
Thorn Creek	0.030
Renfro Creek	0.060
Merry Creek	0.020
Gold Center Creek	0.020
Middle Fork and side walls	0.055
Land immediate to river	0.060

[1]Revised Universal Soil Loss Equation.

b) Forestland and road uses for the St. Maries River Subbasin

Land Use Type Sediment Export Coefficient	Belt Supergroup Precambrian Meta Sediments	Metamorphosed Belt Supergroup[1]
Conifer forest (ton/acre/year)	0.023	0.032
Non-stocked forest and waste rock piles (tons/acre/year)	0.027	0.040
Double wildfire burn (ton/acre/year)	0.004	0.006
Roads (tons/acre/year)	0.019	0.026

[1] Based on export coefficients provided for West Fork St. Maries River and Cats Spur Creek.

Sedimentation Estimates

Sedimentation estimates were developed by addition of the various sediment yields prorated for delivery to the channels (Table 19). Copies of the Excel? model spreadsheets are available in Appendix D.

Sediment model results (Table 19) indicate that several tributaries to the St. Maries River and its two forks exceed background sediment yield by greater than 50%. Sediment yield greater than 50% above background is used as a coarse filter to segregate streams in which sediment may be impairing water quality (Washington Forest Practices Board 1995). Santa and Carpenter Creeks and the St. Maries River and its West and Middle Forks exceed sediment yield thresholds (Tables 19a and b). Emerald, Tyson, and Merry Creeks may have sediment yields in a range that causes water quality impairment.

Table 19. Estimated sediment delivery to the St. Maries River Subbasin.

a) Estimated sediment delivery of the west-side tributaries to the St. Maries River[1]

Watershed	Alder	John	Santa	Santa Sidewalls	Charlie	Tyson	Carpenter	Emerald	West Fork Sidewalls	West Fork	Cats Spur	Carlin	Flat	Soldier	Sheep	Childs	Blair	Cedar
Agriculture (tons/yr)(fine)	32.4	0.0	130.8	45.4	57.1	27.3	101.6	22.5	0.0	41.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conifer forest (tons/yr)(fine)	159.0	214.1	255.5	125.1	291.9	74.9	210.7	348.1	109.6	143.3	115.8	30.4	148.0	49.2	20.4	65.2	37.3	45.2
(coarse)	57.3	77.2	58.4	49.4	62.8	47.7	18.6	161.5	8.3	129.1	117.2	11.0	64.3	21.4	13.0	4.9	2.8	3.4
Unstocked forest (tons/yr)(fine)	89.4	38.1	11.0	56.3	15.6	21.9	29.7	57.4	27.4	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(coarse)	32.2	13.8	2.5	22.2	3.4	14.0	2.6	26.7	2.1	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Double fires (tons/yr)(fine)	0.0	0.0	0.0	0.0	6.7	0.4	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(coarse)	0.0	0.0	0.0	0.0	1.4	0.3	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road (tons/yr)(fine)	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(coarse)	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total yield (tons/yr)(fine)	280.9	252.3	398.9	226.7	371.4	124.5	341.9	429.4	137.6	208.2	115.8	30.4	148	49.2	20.4	65.2	37.3	45.2
(coarse)	89.6	91.0	61.3	71.6	67.6	61.9	21.2	188.9	10.4	150.0	117.2	11.0	64.3	21.4	13.0	4.9	2.8	3.4

County, forest and private road sediment yield:

Watershed	Alder	John	Santa	Santa Sidewalls	Charlie	Tyson	Carpenter	Emerald	West Fork Sidewalls	West Fork	Cats Spur	Carlin	Flat	Soldier	Sheep	Childs	Blair	Cedar
Forest road Surface fine sediment (tons/yr)	34.7	49.8	113.5	76.4	45.5	48.0	72.5	77.6	29.5	211.3	50.7	3.5	14.0	10.0	1.7	13.5	3.2	2.0
Road failure fines (tons/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road failure (coarse) (tons/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Encroachment fines (tons/yr)	131.5	66.9	191.0	99.0	75.3	26.5	81.2	123.3	16.2	81.8	25.7	13.0	15.8	11.9	1.6	38.2	9.8	11.4
Encroachment (coarse) (tons/yr)	47.4	24.1	43.6	39.1	16.2	16.9	7.2	57.2	1.2	73.7	26.0	4.7	6.8	5.2	1.0	2.9	0.7	0.9

Table 19-a, continued.

Watershed	Alder	John	Santa	Santa Sidewalls	Charlie	Tyson	Carpenter	Emerald	West Fork Sidewalls	West Fork	Cats Spur	Carlin	Flat	Soldier	Sheep	Childs	Blair	Cedar
Total fine yield (tons/yr)	166.1	116.7	304.5	175.4	120.8	74.5	153.7	200.9	45.7	293.1	76.4	16.5	29.8	21.9	3.3	51.7	13.0	13.5
Total coarse yield (tons/yr)	47.4	24.1	43.6	39.1	16.2	16.9	7.2	57.2	1.2	73.7	26.0	4.7	6.8	5.2	1.0	2.9	0.7	0.9
Total sediment (tons/yr)	584.0	484.1	808.3	512.7	576.0	277.7	524.0	876.4	194.9	725.0	335.4	62.6	249	97.6	37.7	124.6	53.9	63.0
Percent Fines[2]	0.735	0.735	0.814	0.717	0.823	0.611	0.919	0.683	0.93	0.526	0.497	0.735	0.69	0.697	0.611	0.93	0.93	0.93
Percent Coarse	0.265	0.265	0.186	0.283	0.177	0.389	0.081	0.317	0.07	0.474	0.503	0.265	0.30	0.303	0.389	0.07	0.07	0.07

[1]John Creek CWE scores, STATSCO Soils and ag coefficients applied to Alder Creek. Percent fines and percent coarse values for Carlin Creek are estimated based on Alder and John Creeks Watershed values. Percent fines and percent coarse values for Flat and Soldier Creeks are estimated based on Thorn Creek Watershed values. Percent fines and percent coarse values for Sheep Creek are estimated based on Tyson Creek Watershed values. Percent fines and percent coarse values for Childs, Blair, and Cedar Creeks are estimated based on Clarkia-Childs Watershed values.
[2] From weighted average of fines and stones in soils groups.

b) Estimated sediment delivery of the east-side tributaries to the St. Maries River

Watershed	Thorn	Beaver	Renfro	Crystal	Merry	Flewsie	Gold Center	Middle Fork Sidewalls	Middle Fork	Olson	Adams
Agriculture (tons/yr)(fine)	1.5	0.0	12.8	0.0	0.0	0.0	0.0	0.0	71.5	0.0	0.0
Conifer Forest (tons/yr)(fine)	150.3	57.9	129.3	56.5	199.1	34.3	195.1	103.0	91.2	69.7	20.4
(coarse)	65.3	16.6	102.9	50.1	15.0	2.6	14.7	7.8	65.8	61.8	18.1
Unstocked Forest (tons/yr)(fine)	26.2	22.1	4.2	5.3	56.2	4.7	24.3	0.0	41.2	0.0	0.0
(coarse)	11.4	6.3	3.3	4.7	4.2	0.4	1.8	0.0	29.7	0.0	0.0
Double Fires (tons/yr)(fine)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(coarse)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road (tons/yr)(fine)	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(coarse)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Yield (tons/yr)(fine)	178.4	80.0	146.3	61.8	255.4	39.0	219.4	103.1	203.9	69.7	20.4
(coarse)	76.9	23.0	106.2	54.8	19.2	2.9	16.5	7.8	95.5	61.8	18.1

County, forest and private road sediment yield:

Watershed	Thorn	Beaver	Renfro	Crystal	Merry	Flewsie	Gold Center	Middle Fork Sidewalls	Middle Fork	Olson[2]	Adams[2]
Forest road											
Surface fine sediment (tons/yr)	59.9	12.7	28.8	32.8	36.2	9.0	20.2	8.0	31.4	0.0	0.0
Road failure fines (tons/yr)	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.8	0.0	0.0
Road failure coarse (tons/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.6	0.0	0.0
Encroachment fines (tons/yr)#	66.4	15.9	27.8	6.7	118.9	9.4	31.6	20.0	50.4	5.7	10.0
Encroachment (coarse) (tons/yr)	28.8	4.6	22.1	5.9	9.0	0.7	2.4	1.5	36.4	5.0	8.8
Total fine yield (tons/yr)	126.3	28.6	56.7	39.5	155.2	18.4	58.9	28.0	82.7	5.7	10.0
Total coarse yield (tons/yr)	28.8	4.6	22.1	5.9	9.0	0.7	2.9	1.5	37.0	5.0	8.8
Total sediment (tons/yr)											
Percent Fines[1]	0.697	0.777	0.557	0.53	0.93	0.93	0.93	0.93	0.581	0.53	0.53
Percent Coarse	0.303	0.223	0.443	0.47	0.07	0.07	0.07	0.07	0.419	0.47	0.47

[1] From weighted average of fines and stones in soils groups.
[2]Percent fines and percent coarse values for Olson and Adams Creeks are estimates based on the adjacent Crystal Creek Watershed Values.

c) Estimated sediment delivery of the tributaries immediate to the St. Maries River

Watershed	Clarkia-Childs	Childs-Tyson	Tyson-Beaver	Beaver-Alder	Alder-Mouth
Agriculture (tons/yr)(fines)	5.2	50.7	0.0	0.0	30.9
Conifer Forest (tons/yr)(fine)	95.7	174.7	49.6	123.0	189.5
(coarse)	7.2	45.3	4.7	22.9	44.2
Unstocked Forest (tons/yr)(fine)	7.2	15.6	8.4	40.6	28.4
(coarse)	0.5	4.0	0.8	7.6	6.6
Double Fires (tons/yr)(fine)	0.0	0.0	0.0	0.0	0.0
(coarse)	0.0	0.0	0.0	0.0	0.0
Road (tons/year) (fine)	0.6	0.8	0.3	0.7	0.2
(coarse)	0.0	0.2	0.0	0.1	0.0

Table 19-c, continued.

Watershed	Clarkia-Childs	Childs-Tyson	Tyson-Beaver	Beaver-Alder	Alder-Mouth
Total Yield (tons/yr)(fine)	108.7	241.8	58.3	164.3	249.0
(coarse)	7.8	49.6	5.6	30.6	50.8

County, forest and private road sediment yield:

Watershed	Clarkia-Childs	Childs-Tyson	Tyson-Beaver	Beaver-Alder	Alder-Mouth
Forest road					
Surface fine sediment (tons/yr)	15.0	43.6	6.7	22.0	33.1
Road failure fines (tons/yr)	0.0	0.0	0.0	0.0	24.4
Road failure coarse (tons/yr)	0.0	0.0	0.0	0.0	5.7
Encroachment fines (tons/yr)	56.9	109.8	36.6	67.2	75.9
Encroachment coarse) (tons/yr)	4.3	28.5	3.5	12.5	17.7
Total fine yield (tons/yr)	71.9	153.4	43.3	89.2	133.3
Total coarse yield (tons/yr)	4.3	28.5	3.5	12.5	23.4
Total sediment (tons/yr)					
Percent fines[1]	0.93	0.794	0.913	0.843	0.811
Percent coarse	0.07	0.206	0.087	0.157	0.189

[1]From weighted average of fines and stones in soils groups.

Status of Beneficial Uses

Nutrients were found to be at non-nuisance levels in Gold Center Creek, Santa Creek, Thorn Creek, Alder Creek, and the St. Maries River. The dissolved oxygen concentration is not limiting in Santa Creek.

Temperature standards are exceeded for significant periods in Gramp, Gold Center, Flewsie, Emerald, and Santa Creeks. The West and Middle Forks of the St. Maries River also exceed temperature standards for significant periods. The main stem of the St. Maries River likely exceeds the standards for significant periods. The unknown pollutant of the St. Maries River is likely temperature. Bacteria are not limiting Gramp Creek.

Sediment model results indicate that streams supporting their fishery uses are in a range of zero to 50% above background sediment yield. Santa and Carpenter Creeks, the West and Middle Forks, and the St. Maries River exceed this threshold and are sediment impaired. Emerald, Tyson, and Alder Creeks may exceed the threshold as well. Modeling suggests that stream bank erosion is the primary source of sediment. This sediment is primarily coarse sand that fills pools in the streams. Since the St. Maries River segments are impaired by sediment, a TMDL that addresses sediment in the entire St. Maries River Subbasin will be required. The assessed support status of the listed water bodies based on available data is provided in Table 20.

Table 20. Results of the St. Maries River Subbasin assessment based on application of the available data.

Waterbody Name and HUC Number	Assessed Support Status	Reasons Segment is to be De-listed for Pollutant
St. Maries River 17010304 3579 17010304 3580	Sediment modeling and WBAGII[1] scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required; Nutrient monitoring indicates levels within guidelines, delist for nutrients; Temperature standard exceeded, temperature TMDL required.	Monitoring of total phosphorous, nitrite-nitrate, and total nitrogen indicates concentrations during critical summer months below nuisance weed growth guidelines. Periphyton sampling results reveal biomass below nuisance levels[2].
West Fork of the St. Maries River 17010304 3581	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL; Temperature standard exceeded, temperature TMDL required.	N/A
Middle Fork of the St. Maries River 17010304 3594	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL; Temperature standard exceeded, temperature TMDL required.	N/A
Thorn Creek 17010304 3582	Nutrient monitoring indicates levels within guidelines, delist for nutrients. Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required; included subbasin-wide sediment TMDL.	Monitoring of total phosphorous, nitrite-nitrate, and total nitrogen indicates concentrations during critical summer months below nuisance weed growth guidelines. Periphyton sampling results reveal biomass below nuisance levels.
Alder Creek 17010304 3583	Nutrient monitoring indicates levels within guidelines; Sediment modeling and WBAGII scores indicate cold water may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	Monitoring of total phosphorous, nitrite-nitrate, and total nitrogen indicates concentrations during critical summer months below nuisance weed growth guidelines[2]. Periphyton sampling results reveal biomass below nuisance levels.
John Creek 17010304 3584	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Santa Creek 17010304 3585	D.O.[3] standard supported, delist for D.O.; Nutrient monitoring indicates levels within guidelines, delist for nutrients; Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL; Temperature standard exceeded, temperature TMDL required.	D.O. above cold water aquatic life standard (Table 9); Monitoring of total phosphorous, nitrite-nitrate, and total nitrogen indicates concentrations during critical summer months below nuisance weed growth guidelines. Periphyton sampling results reveal biomass below nuisance levels.
Charlie Creek 17010304 3587	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Renfro Creek 17010304 3588	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Tyson Creek 17010304 3589	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Crystal Creek 17010304 3590	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Carpenter Creek 17010304 3591	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL.	N/A
Emerald Creek 17010304 3593	Sediment modeling and WBAGII scores indicate cold water aquatic life may not be supported by sediment levels, sediment TMDL required, included in subbasin-wide sediment TMDL; Temperature standard exceeded, temperature TMDL required.	N/A

Table 20, continued.

Waterbody Name and HUC Number	Assessed Support Status	Reasons Segment is to be De-listed for Pollutant
Gold Center Creek 17010304 3596	Temperature standard exceeded, temperature TMDL required. Sediment modeling and WBAGII scores indicate cold water aquatic life supported by sediment levels, sediment TMDL is not required.	Sediment modeling and WBAGII scores indicate cold water aquatic life is supported by sediment levels.
Flewsie Creek 17010304 3596	Temperature standard exceeded, temperature TMDL required. Sediment modeling and WBAGII scores indicate cold water aquatic life supported by sediment levels, sediment TMDL is not required.	Sediment modeling and WBAGII scores indicate cold water aquatic life is supported by sediment levels.
Gramp Creek 17010304 3598	Monitoring of bacteria indicates full support of contact recreation, delist for bacteria. Temperature standard exceeded, temperature TMDL required. Sediment modeling and WBAGII scores indicate cold water aquatic life supported by sediment levels, sediment TMDL is not required.	Monitoring of *E.coli* indicates full support of contact recreation standard (Table 12). Sediment modeling and WBAGII scores indicate cold water aquatic life is supported by sediment levels.

[1]*Water Body Assessment Guidance*, Version II.
[2]IDAPA 58.01.02.05-06; According to the EPA's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (1999), levels of algal biomass greater than 10 µg chlorophyll *a* cm^2 or greater than 5 mg ash-free dry mass (AFDM) cm^2 indicate nuisance levels of nutrients or organic enrichment.
[3]Dissolved oxygen.

Conclusions

The TMDLs currently required in the St. Maries Subbasin are listed in Table 21.

Table 21. TMDLs required for the St. Maries River Subbasin and general specifications.

Waterbody	TMDL Required	Critical flow	Boundaries of Exceedence	Critical Reaches	Key indicator
St. Maries River[1]	Sediment	Episodic high flow	Entire watershed, including all tributaries	Rosgen B and C channels	Tons/year
St. Maries River	Temperature	Low summer flow	Main stem Clarkia to Mouth	Main stem Clarkia to mouth	Full potential shade
West Fork St. Maries River	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Middle Fork St. Maries River	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Santa Creek	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Emerald Creek	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Gold Center Creek	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Flewsie Creek	Temperature	Low summer flow	Headwaters to St. Maries River	Entire length	Full potential shade
Gramp Creek	Temperature	Low summer flow	Headwaters to Gold Center Creek	Entire length	Full potential shade

[1]Since the lowest reach of the St. Maries River is water quality limited due to sediment, the sediment TMDL covers the entire subbasin, regardless of individual streams' listing status.

2.4 Data Gaps

Additional CWE data or data from an equivalent procedure for Cats Spur, Emerald, and Flewsie Creeks would be supportive of the sediment modeling and temperature TMDLs.

Additional temperature data are required for all the segments of the subbasin. Spatial temperature data would better improve the scope of temperature exceedences.

3. Subbasin Assessment – Pollutant Source Inventory

Several sources of sediment exist in the St. Maries River watershed, including natural sediment loads. All significant sources of sediment are nonpoint sources. Sources of thermal input are restricted to loss of stream canopy cover.

3.1 Sources of Pollutants of Concern

Pollutant sources of sediment are discussed in the following sections. Sediment is contributed to the subbasin by a large number of sources, including natural erosion.

Point Sources

Point sources of sediment include the Santa-Fernwood, Emida, and Clarkia wastewater treatment facilities. These facilities have TSS limits of 30 mg/L. They may potentially discharge 14.1 tons per year, which is 0.10% of the modeled sediment load (Table 19c). Since these dischargers do not often approach their discharge limits, the sediment estimate for these sources is likely liberal. Compared to sediment loads modeled, actual point source loads are very small.

There are three thermal point sources present in the subbasin including the Santa-Fernwood, Emida, and Clarkia wastewater treatment facilities. There are no power or manufacturing plant cooling water facilities.

There are no Superfund or Resource Conservation Recovery Act sites in the subbasin. Petroleum spills have been addressed at three locations in the subbasin.

Nonpoint Sources

The primary disturbances causing stream temperatures to rise is non-natural canopy modification by placer mining for garnets and silvicultural and agricultural practices. The attainment of natural full potential canopy shade is the most that can be done to lower stream temperatures.

Nonpoint sources of sediment include placer mining for garnets, silvicultural practices (especially forest roads), agriculture, and stream bank erosion triggered by grazing or in-stream effects. The majority of the land use in the subbasin is forestland (Figure 6). Agricultural and silvicultural features such as road crossings and encroaching roads are accounted for in the sediment model (Appendix C) and are documented in the GIS coverages that were used to load the model.

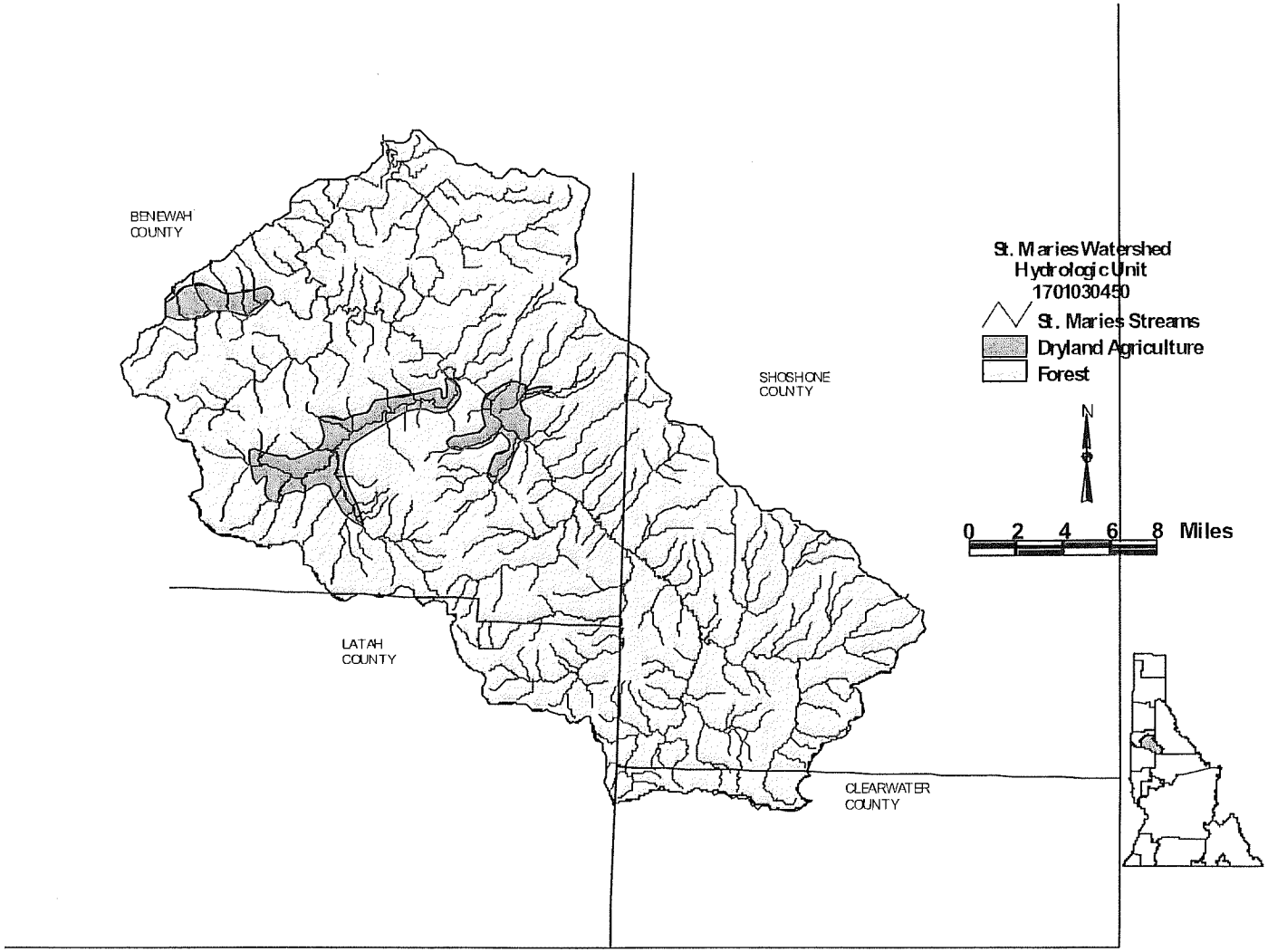


Figure 6. St. Maries Subbasin Land Use

Sediment sources can be described by land use category as follows:

-- The meta-sedimentary rocks of the Proterozoic Belt Supergroup and bed rock, as altered by extreme heat, form a terrain with a natural sediment yield rate of 0.026 – 0.040 tons per acre per year (17 – 26 tons per year per square mile). Mass wasting is not a typical feature of the terrain; however, it does occur on the lacustrine deposits of the late Eocene Lake bed in the vicinity of Clarkia and Miocene Lake Coeur d'Alene deposits. Mass wasting is directly estimated in the CWE process.

-- Timber harvest is a source of sediment, especially in the first year following the harvest when the cut area is void of cover. Forest ground cover regenerates rapidly in open areas where new plants are not competing with mature trees. Ground cover has been observed to return to 28-50% cover the first year after a harvest and near 75% in year two (Elliot and Robichaud 2001). Once vegetative cover is re-established to pre-harvest conditions, excess sedimentation associated with the harvest does not occur.

-- Timber harvest roads are a significant source of sediment. These can yield surface sediment, trigger mass wasting, constrain streams, and accelerate erosion. County and state roads, railroads, and highways can also constrain streams and accelerate erosion.

-- Stream bank erosion was assessed throughout the subbasin by the direct delivery method. Model results indicated that bank erosion was a significant source of sediment yield.

-- Placer-mined lands are a sediment source. Large areas of the Emerald and Carpenter Creek watersheds have been placer-mined for garnet. The relief of the mined areas is low, minimizing sediment yield from mined-over lands. Current surface mining best management practices also minimize erosion. However, raw banks are left from past mining and contribute to sediment yield. Hydraulic mining of gold occurred in Tyson Creek (Russell 1979). This activity occurred well before any surface mining rules or best management practices were in place.

Pollutant Transport

Pollutant transport is relevant only to sediment. Sediment is delivered to the stream system primarily during high precipitation/high discharge events or rapid snowmelt events. These are episodic events. Under these conditions, large volumes of sediment move in the stream systems. These conditions develop stream power and stage heights capable of channel alteration. Sediment trapped in upper low order watersheds moves quickly to the higher order streams of the subbasin. Areas where the stream gradient is constrained by roads have rapid erosion from bed and/or banks. The gradient of the St. Maries River and its two forks is insufficient to flush sediment larger than coarse sand from the stream channel. Coarse sand makes up a substantial percentage of the bed sediments found in the river. A sediment transport model is not available for the St. Maries River.

3.2 Data Gaps

The major data gap in temperature pollution is monitoring data from the entire length of the stream. The major data gap in sediment pollution stems from a lack of in-stream measurements of load and transport of sediment.

Point Sources

Point discharges of sediment have been identified in the subbasin. Three possible point discharges of heat have been documented, including the Santa-Fernwood, Emida, and Clarkia wastewater treatment facilities.

Nonpoint Sources

Nonpoint sources have been modeled rather than measured. In-stream monitoring of sediment load would be of value. Such monitoring is quite expensive (see Section 2.3, page 26), and is unlikely that this data gap will be filled. Model results continue to be the best available information at this time.

Current temperature data was collected through in-stream monitoring at set locations. Thermal imaging that provides a view of stream-wide temperatures would be of value, but is costly.

4. Subbasin Assessment – Summary of Past and Present Pollution Control Efforts

The wastewater point sources associated with community wastewater treatment in the watershed (Santa-Fernwood, Emida, and Clarkia wastewater treatment facilities) were permitted under NPDES during the 1970s. These permits were renewed last in 1988 and 1989. Renewal of these permits is currently underway.

All forest practices conducted in the subbasin are regulated under the Idaho Forest Practices Act rules and regulations. These rules are in part best management practices designed to abate erosion and retard sediment delivery to the streams. All USFS harvests must meet inland fish strategy (INFISH) guidelines. These guidelines prescribe 300 foot-wide buffers for streams with fishery uses. The USFS has relocated and obliterated approximately 55 road miles removing 187 stream crossings by roads from the subbasin (Patten 2002).

Most agricultural practices in the subbasin consist of livestock grazing and some hay harvesting. The USFS has installed riparian fencing to exclude 66 acres of its grazing allotments and planted these with riparian trees and shrubs (Patten 2002). The Benewah Soil and Water Conservation District has completed a stream bank erosion analysis on Santa Creek. The district has secured CWA Section 319 funding for additional riparian zone exclusion fencing and bank stabilization work, which was implemented during summer 2002.

The garnet mining operation in the subbasin has been brought under the Idaho Placer and Dredge Mining Rules and Regulations (IDAPA 16.01.02.350.03(f)). The operators have restored 3.7 miles of stream channels and have reclaimed 203 acres of mined floodplain lands.

These actions have been site- and project-specific. The actions are relatively few on a basin-wide perspective. None of these actions are part of an integrated program. It is unlikely that water quality will improve to a level of full beneficial use with current water quality improvement actions.

5. Total Maximum Daily Loads

A TMDL sets an upper limit on discharge of a pollutant from all sources so as to assure water quality standards are met. It further allocates this load capacity (LC) among the various sources of the pollutant. Pollutant sources fall into two broad classes: point sources, each of which receives a wasteload allocation (WLA); and nonpoint sources, which receive a load allocation (LA). Natural background (NB), when present, is considered part of the LA, but is often broken out on its own because it represents a part of the load not subject to control. Because of uncertainties regarding quantification of loads and the relation of specific loads to attainment of water quality standards, the rules regarding TMDLs (40 CFR, Part 130) require a margin of safety (MOS) be a part of the TMDL.

Practically, the margin of safety is a reduction in the load capacity that is available for allocation to pollutant sources. The natural background load is also effectively a reduction in the load capacity available for allocation to human made pollutant sources. This can be summarized symbolically as the equation: LC = MOS + NB + LA + WLA = TMDL. The equation is written in this order because it represents the logical order in which a loading analysis is conducted. First the LC is determined. Then the LC is broken down into its components: the necessary MOS is determined and subtracted; then NB, if relevant, is quantified and subtracted; and then the remainder is allocated among pollutant sources. When the breakdown and allocation are complete we have a TMDL, which must equal the LC.

Another step in a loading analysis is the quantification of current pollutant loads by source. This allows the specification of load reductions as percentages from current conditions, considers equities in load reduction responsibility, and is necessary in order for pollutant trading to occur. Also a required part of the loading analysis is that the LC be based on critical conditions – the conditions when water quality standards are most likely to be violated. If protective under critical conditions, a TMDL will be more than protective under other conditions. Because both LC and pollutant source loads vary, and not necessarily in concert, determination of critical conditions can be more complicated than it may appear on the surface.

A load is fundamentally a quantity of a pollutant discharged over some period of time, and is the product of concentration and flow. Due to the diverse nature of various pollutants, and the difficulty of strictly dealing with loads, the federal rules allow for "other appropriate measures" to be used when necessary. These "other measures" must still be quantifiable, and relate to water quality standards, but they allow flexibility to deal with pollutant loading in more practical and tangible ways. The rules also recognize the particular difficulty of quantifying nonpoint loads, and allow "gross allotment" as a load allocation where available data or appropriate predictive techniques limit more accurate estimates. For certain pollutants whose effects are long term, such as sediment and nutrients, EPA allows for seasonal or annual loads.

Some streams in the St. Maries River subbasin are impaired due to habitat alteration. While degraded habitat is evidence of impairment, the EPA does not consider a waterbody to be

polluted if the pollution is not a result of the introduction or presence of a pollutant. Since TMDLs are not required to be established for waterbodies impaired by pollution but not pollutants, a TMDL has not been established for these streams for habitat alteration.

5.1 St. Maries River Sediment TMDL

This TMDL addresses the St. Maries River. Since the lowest reach of the St. Maries River is water quality limited due to sediment, the sediment TMDL covers the entire subbasin, regardless of individual streams' listing status.

5.1.1 In-Stream Water Quality Target

The in-stream water quality target for the St. Maries River sediment TMDL is full support of cold water aquatic life and salmonid spawning (Idaho Code 39.3611, 3615). The TMDL will develop loading capacities in terms of mass per unit time. The interim goals are for sub-watersheds to support cold water aquatic life and the final goal is for bio-monitoring to reveal full support of cold water aquatic life throughout the subbasin and salmonid spawning where that use is either designated or existing. The sources yielding sediment to the system can be reduced, but a substantial period (30-50 years) will be required for the stream to clear its current coarse sand sediment bed load and to create pools.

Design Conditions

The predominant sources of sediment to the St. Maries River and its tributaries are nonpoint sources. Three minor point sources discharge suspended solids. The TMDL addresses the point and nonpoint sediment yields within the watershed. Sediment from the point source discharges is loaded on a rather constant basis, while sediment from nonpoint sources is loaded episodically, primarily during high discharge events. These critical events coincide with critical conditions and occur during the November through May period. However, they may not occur for several years. The critical stream reaches are the Rosgen B channel types that naturally harbor the most robust cold water communities, but have gradients sufficiently low for coarse sand bedload to accumulate and fill pools. The return time of the largest events is 10-15 years (DEQ 2001). The key to nonpoint source sediment management is implementing remedial activities prior to the advent of a large discharge event. Once sediment is loaded into the stream, large discharge events are required to transport coarse sediments downstream.

Target Selection

The TMDL applies sediment allocations in tons per year and calculates sediment reduction goals. Several tributaries, the Middle Fork, the West Fork, and the St. Maries River were listed as impaired by sediment in 1998 (Table 21). Sediment yield reduction will be required from the entire watershed in order for the impaired watersheds to meet full support status.

The load capacity rate at which full support is exhibited has been set at various levels within TMDL documents developed by DEQ. These have ranged from setting an interim load capacity at the background level for some watersheds in the Coeur d'Alene Lake subbasin

and the Pend Oreille basin, to over 200% above background in some areas of the state. Evidence is beginning to support that a target of 50% above background is protective of the beneficial uses. This target has already been used in the North Fork Coeur d'Alene TMDL (DEQ 2001) and the Priest River TMDL (Rothrock 2002). The rationale supplied in those TMDLs in support of the target was based on several premises (DEQ 2001).

-- Sediment yield below 50% above background will fully support the beneficial uses of cold water aquatic life and salmonid spawning,

-- The stream has some finite yet not quantified ability to process a sediment yield rate greater than 50% above background rates, and

-- Beneficial uses (cold water aquatic life and salmonid spawning) will be fully supported when the finite yet not quantified ability of the stream system to process (attenuate) sediment is met.

Data collected within the St. Joe and St. Maries Subbasins appear to support the target of 50% above background. A comparison of WBAGII scores of watersheds to modeled percent above background estimates is shown in Figure 7. Only watersheds that had WBAGII scores based on all three of the major components (macroinvertebrates, fish, and habitat) were included in the analysis. The green shaded area indicates the area of the graph where both the WBAG II score is full support and the modeled percent above background is less than 50%. The red area is the portion of the graph where the WBAGII scores shows that a stream is impaired and the modeled percent above background is greater than 50%. In all but two instances the WBAGII score and the target of 50% above background agree. The two watersheds that do not conform may be affected by conditions other than sediment and are therefore unresponsive to changes in sediment delivery to the stream. For instance, the St. Joe River's Blackjack Creek has a WBAGII score of less than 2, but has very little sediment being delivered to it. This is a first order watershed that is very small with a steep gradient. The low WBAG II scores are a result of poor macroinvertebrates and fish populations. The creek's habitat score was one of the highest in the subbasin. The poor macroinvertebrate score could be result of the small watershed size and relatively little disturbance making the system nutrient poor and therefore unable to support a good macroinvertebrate community. This low nutrient scenario could also affect the fish community due to a poor food base. The fish community may also be affected by the steep gradient of this watershed, which could make available fish habitat limited.

As such, the 50% above background target appears to be reasonable and very protective of the beneficial uses of the watersheds in the St. Joe and St. Maries Subbasins. Therefore, the target load capacity for the St. Maries River TMDL has been set at 50% above background.

The goal should be attained following three high flow events after implementation plan actions are in place. On average, three events occur every 50 years. This time is necessary to have the channel forming events to export sediment and to create pool structures.

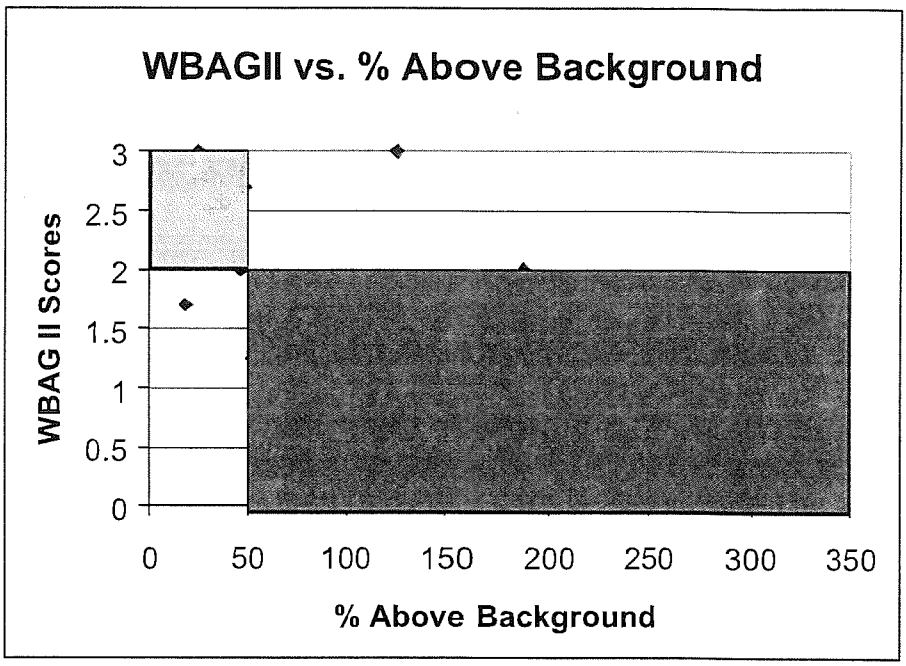


Figure 7. WBAGII Scores Versus Percent Above Background

Monitoring Points

Ten points of compliance are set. These are: the Middle Fork near the mouth (BURP site # 1996SCDAA040); the West Fork near the mouth (BURP site # 1998SCDAA021); Emerald Creek near the mouth (BURP site # 1995SCDAB008); the St. Maries River at Emerald Creek (BURP site # 1997SCDAA033); Carpenter Creek near the mouth (BURP site # 1995SCDAB054); the St. Maries River at Tyson Creek (BURP site to be established); Tyson Creek near the mouth (BURP site # 1995SCDAB055); Santa Creek near the mouth (BURP Site # 1995SCDAB005) Alder Creek near the mouth (BURP Site # 1995SCDAB004); and the St. Maries River below Thorn Creek (BURP Site to be established). Sediment load reduction from current levels toward the sediment yield reduction goal of 50% above background is expected to attain a sediment load that is not yet quantified, but will fully support the cold water beneficial use.

Beneficial use support status will be determined using the current assessment method accepted by DEQ at the time the waterbody is monitored. Monitoring will be completed using BURP protocols. When the final sediment load capacity is determined by these appropriate measures of full cold water aquatic life support, the TMDL will be revised to reflect the established supporting sediment yield.

5.1.2 Load Capacity

The load capacity for a TMDL designed to address a sediment-caused limitation to water quality is complicated by the fact that the state's water quality standard a narrative rather than quantitative. In the waters of the St. Maries River, the sediment interfering with the beneficial use (cold water) is most likely coarse sand bed load particles. Adequate

quantitative measurements of the effect of excess sediment have not been developed. Given this difficulty, an exact sediment load capacity for the TMDL is difficult to develop.

The natural background sedimentation rate is the sediment yield prior to human development of the watershed. It was calculated by multiplying the watershed acreage by the appropriate sediment yield coefficient (0.023 tons/acre/year) for Belt Supergroup terrain vegetated by coniferous forests and 0.032 tons/acre/year) for watersheds with predominantly metamorphosed Belt Supergroup terrain. The estimate assumes the entire watershed was vegetated by coniferous forest prior to development. The calculated estimated natural background sediment yield values for the subbasins of the St. Maries River are provided in Table 22, as are the 50% above background sediment yield goals. The goals are estimated goals that will be replaced by the final sediment goal when the criteria for full support of cold water aquatic life are met. The load capacity based on the projected goal at the point of compliance is provided in Table 22. Loading capacities were developed by calculating background sedimentation based on acreage above the point of compliance, then adding an additional 50% to the value.

Critical Conditions

Critical conditions are part of the analysis of load capacity. The beneficial uses in this subbasin are impaired due to chronic sediment conditions. Due to the chronic condition, this TMDL deals with yearly sediment loads. The concept of critical conditions is difficult to reconcile with the impact caused by sediment. The critical condition concept assumes that under certain conditions, chronic pollution problems become acute pollution problems and therefore we need to ensure that acute conditions do not occur. The proposed sediment reductions in the TMDL will reduce the chronic sediment load and also reduce the likelihood that an acute sediment loading condition will exist. It is in this way that we have accounted for critical conditions in the TMDL.

Table 22. St. Maries River sediment background and load capacity at the points of compliance.

Location	Acreage of watershed	Background (tons/year)	Load capacity at 50% above background (tons/year)
Middle Fork St. Maries River	43,316	996	1,494
West Fork St. Maries River	23,654	757	1,136
Emerald Creek	23,239	744	1,116
St. Maries River at Emerald Creek	103,912	2,390	3,585
Carpenter Creek	12,857	296	444
St. Maries River at Tyson Creek	150,102	3,452	5,178
Tyson Creek	8,042	185	278
Santa Creek	47,212	1,086	1,629
Alder Creek	15,875	365	548
St. Maries River below Thorn Creek	307,485	7,072	10,608

5.1.3 Estimates of Existing Pollutant Loads

Point sources of sediment are from the three permitted wastewater treatment facilities (Table 16). As stated in Section 2.3, the point sources at maximum permitted discharge account for 14.1 tons per year of fine sediment. This amount is potentially 0.10% of the load. The point sources are not a significant source of sediment and will be allocated their existing loads.

Nonpoint sources of sediment yield were estimated in Section 2.3 (Tables 19a-c). These estimates were made using the assumptions and model approach fully documented in Appendix C. The model spreadsheets are provided in Appendix D. Loading rates are based on land use and road impacts (see Section 2.3, Tables 17a-c, and Appendices B and C). Estimated sediment loads from the watersheds above the points of compliance are shown in Table 23.

The sediment loading occurs as a result of forestland activities, agricultural land activities and stream bank erosion. Stream bank erosion is the single largest source of sediment in the watershed. The estimated current percentage of sediment delivery by the acres of land holdings is provided in Table 24.

Table 23. St. Maries River and tributary sediment loads from nonpoint sources in St. Maries River watershed.

Load Type	Location	Estimated Existing Load (tons/year)	Background (tons/year)	Percent Over Background (%)	Estimation Method
Sediment	Middle Fork of the St. Maries River	1,610	996	62	Model
Sediment	West Fork St. Maries River	1,484	757	96	Model
Sediment	Emerald Creek	1,001	744	35	Model
Sediment	St. Maries River at Emerald Creek	5,098	2,390	113	Model
Sediment	Carpenter Creek	648	296	119	Model
Sediment	St. Maries River at Tyson Creek	7,468	3,452	116	Model
Sediment	Tyson Creek	316	185	71	Model
Sediment	Santa Creek	2,899	1,086	167	Model
Sediment	Alder Creek	574	365	57	Model
Sediment	St. Maries River below Thorn Creek	13,740	7,072	94	Model

Table 24. St. Maries River sediment loading proportion based on area in various land uses.

Landowner	Watershed							
	Middle Fork St. Maries River		West Fork St. Maries River		Emerald Creek		St. Maries River at Emerald Creek	
	acres	%	acres	%	acres	%	acres	%
U.S. Forest Service	11,899	27.5	12,207	51.6	13,508	58.1	4,360	31.8
Idaho Dept. of Lands	3,582	8.3	2,503	10.6	1,104	4.8	1,284	9.4
Bureau of Land Management	3,129	7.2	-	-	100	0.4	2	-
Private Land - Forest	24,706	57.0	8,944	37.8	8,527	36.7	8,057	58.8
Total	43,316	100	23,654	100	23,239	100	13,703	100
	Carpenter Creek		St. Maries River at Tyson Creek		Tyson Creek		Santa Creek	
	acres	%	acres	%	acres	%	acres	%
U.S. Forest Service	716	5.6	479	1.9	1,523	18.9	19,853	42.1
Idaho Dept. of Lands	4,398	34.2	10,496	41.5	4,075	50.7	1,927	4.1
Bureau of Land Management	-	-	11	-	-	-	2	-
Private Land - Forest	7,743	60.2	14,278	56.5	1,908	23.7	17,532	37.1
Private Land – Agriculture	-	-	27	0.1	536	6.7	7,898	16.7
Total	12,857	100	25,291	100	8,042	100	47,212	100
	Alder Creek		St. Maries River below Thorn Creek					
	acres	%	acres	%				
U.S. Forest Service	72	0.5	1,850	2.0				
Idaho Dept. of Lands	557	3.5	13,501	14.3				
Bureau of Land Management	-	-	196	0.2				
Private Land- Forest	10,909	68.7	63,656	67.5				
Bureau of Indian Affairs	1,380	8.7	172	0.2				
Idaho Dept. of Fish and Game	-	-	11,512	12.2				
Private Land- Agriculture	2,957	18.6	3,186	3.4				
Water	-	-	223	0.2				
Total	15,875	100	94,296	100				

5.1.4 Sediment Load Allocation and Wasteload Allocation

The sediment allocation is equal to the load capacity minus the margin of safety and background. It is comprised of the wasteload allocation of point sources and the load allocation of nonpoint sources.

Margin of Safety

A margin of safety is implicit in the model used. The model is estimated to be 231% conservative when applied on Belt terrain and 164% conservative on metamorphosed Border Belt terrain (Appendix C). This level of conservative assumptions provides an over-

estimation of sediment yield. The over-estimation is the implicit margin of safety. Given the conservatively high estimations developed by the model, no additional explicit margin of safety is deemed necessary.

Seasonal Variation

Sediment from nonpoint sources is not loaded seasonally. It is loaded episodically, primarily during high discharge events. These critical events coincide with the critical conditions and occur during November through May. However, they may not occur for several years. The return time of the largest events is 10-15 years (DEQ 2001).

Reasonable Assurance of TMDL Implementation

The sediment model identifies stream bank erosion and forest roads as primary sources of sediment in the subbasin. The federal government and IDL manage land in the subbasin. IDL has been directed by a gubernatorial executive order to directly implement state developed TMDLs on lands that they manage directly or to oversee implementation of the Forest Practices Act. Federal ownership and executive order should assure that implementation plans are developed for forest roads. A plan will be implemented for roads based primarily on the budgetary constraints of the federal and state agencies. Most eroding banks are on private land. Incentives provided to private landowners by the Benewah Soil and Water Conservation District might be necessary to address these eroding banks.

Background

Sediment background levels for the watersheds are shown above in Table 23. The backgrounds are allocated as part of the load capacity. Any unknown, unallocated point sources are included in the background portion of the allocation.

Reserve

No part of the load allocation is held for additional load. Any new infrastructure should be constructed or mitigated to allow no net increase in sediment yield to the watersheds.

Remaining Available Load

There is no remaining available load.

Wasteload Allocation

Sediment contribution from point sources is 0.10% of that estimated for the watershed. Since the contribution from point sources is negligible, the wasteload is set at current permit limits. These are provided below in Table 25.

Table 25. Wasteload allocation to the permitted point discharges of the St. Maries River Subbasin.

Permitted Discharge	Average Discharge (million gallons/day)	Total Suspended Solids Limit (mg/L)	Maximum Daily Sediment Load (pounds/day)	Maximum Annual Load (tons/year)
Santa-Fernwood	0.2	30	34.0	6.2
Emida	0.15	30	37.5	6.8
Clarkia	0.15	30	6.0	1.1
Total	0.5	-	77.5	14.1

Load Allocation

Load allocations required at the points of compliance are shown in Tables 26a-j. The allocation is based on a reduction to 50% above background and on the modeled estimate of nonpoint source sediment contribution in tons per year. The margin of safety is applied to the allocations at the points of compliance. The allocation includes background sediment yield. After implementation, the main channels of the tributaries and the St. Maries River are provided a 50-year time frame for meeting the allocations. This time frame allows for three large channel forming events to occur in the stream.

Table 26. Sediment load allocation and load reduction required at the points of compliance on the St. Maries River and its tributaries.

a) Middle Fork of the St. Maries River allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	27.5	411	32	50 years
Idaho Dept. of Lands	8.3	124	10	50 years
Private Land (Forest)	57.0	852	66	50 years
Bureau of Land Management	7.2	107	8	50 years
Total	100	1,494	116	-

b) West Fork St. Maries River allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	51.6	587	180	50 years
Idaho Dept. of Lands	10.6	120	37	50 years
Private Land (Forest)	37.8	429	131	50 years
Total	100	1,136	348	-

c) Emerald Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	58.1	648	0	50 years
Idaho Dept. of Lands	4.8	54	0	50 years
Private Land (Forest)	36.7	410	0	50 years
Bureau of Land Management	0.4	4	0	50 years
Total	100	1,116	0	-

d) St. Maries River at Emerald Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	31.8	1,140	481	50 years
Idaho Dept. of Lands	9.4	337	142	50 years
Private Land (Forest)	58.8	2,108	890	50 years
Total	100	3,585	1,513	-

e) Carpenter Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	5.6	25	11	50 years
Idaho Dept. of Lands	34.2	152	70	50 years
Private Land (Forest)	60.2	267	123	50 years
Total	100	444	204	-

f) St. Maries River at Tyson Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	1.9	98	44	50 years
Idaho Dept. of Lands	41.5	2,149	950	50 years
Private Land (Forest)	56.5	2,926	1,294	50 years
Private Land (Ag.)	0.1	5	2	50 years
Total	100	5,178	2,290	-

g) Tyson Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	18.9	52	7	50 years
Idaho Dept. of Lands	50.7	141	19	50 years
Private Land (Forest)	23.7	66	9	50 years
Private Land (Ag.)	6.7	19	3	50 years
Total	100	278	38	-

h) Santa Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	42.1	686	535	50 years
Idaho Dept. of Lands	4.1	67	52	50 years
Private Land (Forest)	37.1	604	471	50 years
Private Land (Ag.)	16.7	272	212	50 years
Total	100	1,629	1,270	-

i) Alder Creek allocation[1]

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
USFS	0.5	3	0.1	50 years
IDL	3.5	19	0.9	50 years
Private Land (Forest)	68.7	376	18	50 years
Private Land (Ag.)	18.6	102	5	50 years
Bureau of Indian Affairs	8.7	48	2	50 years
Total	100	548	26	-

[1]The allocation of the gross allocation and sediment reduction required is the responsibility of the EPA in consultation with the Coeur d'Alene Tribe.

j) St. Maries River below Thorn Creek allocation

Source	Percentage of load source	Load allocation (tons/year)	Load reduction required (tons/year)	Time frame for meeting allocations
U.S. Forest Service	2.0	212	63	50 years
Idaho Dept. of Lands	14.3	1,517	448	50 years
Private Land (Forest)	67.5	7,161	2,114	50 years
Private Land (Ag)	3.4	361	107	50 years
Bureau of Land Management	0.2	21	6	50 years
Bureau of Indian Affairs	0.2	21	6	50 years
Idaho Department of Fish and Game	12.2	1,294	382	50 years
Total	100	10,608	3,132	-
Water (included in Total)	0.2	21	6	

Monitoring Provisions

In-stream monitoring of beneficial use (cold water and salmonid spawning) support status during and after implementation of sediment abatement projects will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will determine if the threshold values identified in Section 5.1.1 (page 60) have been met, will be completed every year on a randomly selected 1% of the watershed's Rosgen B channel types. Independent monitoring parameters will be developed for the St. Maries River monitoring stations. Monitoring will assess stream reaches in length of at least 30 times bank full width. These reaches will be randomly selected from the total B type stream channels until at least

5% of these channels have been assessed after five years. Identical measurements will be made in appropriate reference streams where beneficial uses are supported. Data will be compiled after five years. The yearly increments of random testing that sum to 5% of the stream after five years should provide a database not biased by transit fish and macroinvertebrate population shifts. Based on this database the beneficial use support status will be determined.

Feedback Provisions

When beneficial use support meets the full attainment level, further sediment load reducing activities will not be required in the watershed. At that time a revised TMDL with an ambient sediment load will be developed. Best management practices for forest and surface mining operations will be prescribed by the revised TMDL with provisions to maintain erosion abatement structures. Regular monitoring of the beneficial uses will continue for an appropriate period to document maintenance of the full support of the use.

5.1.5 Conclusions

St. Maries River Subbasin assessment has revealed an array of fisheries, residual pool volume, and sediment modeling results that show the that the St. Maries River and several of its tributaries have sediment impairment of the cold water aquatic life.

A sediment TMDL was prepared for the entire St. Maries River watershed. The TMDL set a goal of 50% above natural background sediment yield based on an agreement between DEQ and EPA that recognizes the presence of watersheds fully supporting cold water beneficial use at levels well above natural background. The loading capacities were set for several points of compliance based on this goal. The load capacity was allocated on a gross land owner/manager basis. An implicit margin of safety of 231% was applied in the sediment model. Point sources of sediment are very minor (0.10%) and are negligible compared to the nonpoint sediment sources. The wasteload allocation was set at the level of the current NPDES permits for suspended solids.

5.2 St. Maries River Temperature TMDL

This TMDL addresses the St. Maries River and its tributaries that have been listed as water quality limited by temperature, including Gramp, Gold Center, Flewsie, Emerald, and Santa Creeks and the Middle and West Forks of the St. Maries River.

5.2.1 In-Stream Water Quality Targets

Neither the St. Maries River nor any of its tributaries listed for temperature are in the St. Joe bull trout recovery area (St. Joe River headwaters to Mica Creek) (Panhandle Bull Trout Technical Advisory Team 1998). The governing temperature standard for the watershed is Idaho's 9 °C daily maximum spawning standard from May through June. Prior to May, water temperature is expected to be well below 9 °C in the St. Joe Subbasin. In practice, the 10 °C seven-day running average from May 1 to September 1 and the state 9 °C daily maximum spawning standard are essentially the same (Dupont 2002). Monitoring of temperature in St.

Joe Subbasin streams with little or no human development and at relatively high elevation indicate that this standard is not attainable throughout the entire St. Joe Subbasin, including the St. Maries River (Table 12). Temperature assessments of Gramp, Gold Center, Flewsie, and Emerald Creeks and the Middle Fork of the St. Maries River indicates significant exceedences of the state salmonid spawning standards (Table 11; Appendix B). Similar exceedences are expected for the St. Maries River, West Fork of the St. Maries River, and Santa Creek. It is currently beyond technical ability to assess the sufficiency of cold water habitat during the late spring and early summer months.

Design Conditions

Stream temperature is affected by natural weather conditions and adjacent plant community potential, including disturbance and recovery. Vegetation manipulation to create access or as a result of timber harvest is the major anthropogenic cause of increased stream temperatures.

The environmental factors affecting stream temperature are local air temperature, stream depth, ground water inflow, and stream shading by riparian cover and/or topography (Sullivan and Adams 1990, Theurer *et al.* 1984, Beschta and Weatherred 1984). Topographic elevation affects ambient air temperature. Higher elevations have lower ambient air temperatures. In forest streams, ambient temperature and shading are believed to account for up to 90% of the stream temperature variability (Brown 1971). Of these two factors, riparian shade is the only one that can be modified by management.

Several models can be used to assess the impact of riparian shade on stream temperature. Heat Source (Boyd 1996) and the USGS Stream Segment Temperature Model (SSTEMP) (Theuer *et al.* 1984, Bartholow 1989) quantify the energy transfer mechanisms in streams. These models require extensive data inputs, many of which are not available for mountain streams. The use of process-based models was found a workable approach for the Upper North Fork Clearwater Temperature TMDLs (Dechert *et al.* 2001). It uses the IDL CWE Canopy Closure-Stream Temperature protocol. Energy loading values are developed using SSTEMP results as comparative data to the primary TMDL target measurement of percent canopy cover.

The CWE empirical model is based on continuous stream temperature measurements, topographic elevation, and the percent of vegetative canopy cover data collected throughout northern Idaho. The model calculation is as follows:

Equation (1) $MWMT = 29.1 - 0.00262*E - 0.0849*C$

where MWMT = maximum weekly maximum temperature (^{o}C)
E = stream reach elevation (feet)
C = riparian canopy cover (%)

The equation can be solved for canopy cover to predict the required canopy at a given elevation.

Equation (2) $C = (29.1/0.085) - (MWMT/0.085) - (E * 0.0026/0.085)$

To calculate required canopy cover for the water bodies, MWMT would be set at 10°C.

$$\text{Equation (3)} \quad C = 224.7 - 0.031 * E$$

To satisfy the requirement for an analysis of heat loading (energy per unit area per unit time) to a stream due to insolation, the method of Dechert *et al.* (2001) was used. The approach uses SSTEMP (Bartholow 1997) to derive data for August 1, 2000 (median hottest day), for insolation rates and calculates heat loading for different levels of percent shade. The amount of solar radiation incident on a stream and its immediate surroundings at different shade levels for three non-redundant stream orientations are presented in Table 27. The fixed conditions used in SSTEMP to develop the solar radiation numbers, in this case for the Upper North Fork Clearwater River, were 47? north latitude, 5,000 feet elevation, 10 foot stream width, 60 foot buffer height, 30 foot buffer width, and 30? topographic shade (Dechert *et al.* 2001). Under these conditions, incident solar radiation decreases regularly by 21 watts per square meter for every 10% increase in canopy density for north-south oriented streams and 26 watts per square meter for east-west oriented streams. The St. Maries Subbasin is near the Upper North Fork Clearwater Subbasin where the model calculations were made. The St. Maries watershed is at a lower elevation (2,100 to 5,800 feet) than the Upper North Fork Clearwater Subbasin. Since solar radiation is stronger at higher elevations, the modeled energy inputs are conservative for these water bodies.

The heat flux amounts shown in Table 27 do not represent the entire heat budget of the streams, but only that from direct sunlight (insolation). This is the portion of heat flux the TMDL and, ultimately, vegetation management can address. Land management cannot significantly affect other environmental factors affecting temperature.

Table 27. Average daily solar radiation incident on a stream related to canopy closure as developed for the Upper North Fork Clearwater River.[1]

Canopy Density (percent)	Stream Orientation		
	North-South (watts/m^2)	East – West (watts/m^2)	SE-NW or SW-NE (watts/m^2)
0	226	274	250
10	205	248	227
20	185	223	204
30	164	197	181
40	143	172	197
50	122	146	134
60	101	120	111
70	80	95	87
80	59	69	64
90	38	43	41
100	17	18	17.5

[1]SSTEMP model output (Dechert *et al.* 2001) based on the following calculations:
North-South = (100-target canopy percent)*2.1+1.7
East-West = (100-target canopy percent)*2.56+18
SE-NW or SW-NE = (100-target canopy percent)*2.33+17.5

Target Selection

The TMDL selects canopy cover by stream reach elevation as the target for load capacity goals for reducing heat load. Canopy cover can be allocated as a surrogate for heat load reduction that can be affected in part by vegetation management. It can also be related to thermal load reduction by the SSTEMP estimates provided in Table 27. Canopy cover can be mapped on a stream reach basis to facilitate management prescriptions in a TMDL implementation plan. It can easily be assessed using aerial photography techniques. Milestones in the implementation plan can be set on a 10-year basis to coincide with the normal frequency of aerial photographic surveys.

Applicable reference streams can be found in the St. Joe Subbasin above the Mosquito Creek confluence. This area was burned during the 1910 fires and has recovered seral timber stands. However, timber harvest has been less intensive than in watersheds of the St. Maries Subbasin. Bacon, Bean, and Yankee Bar Creeks are streams that could be used as reference. The streams of the upper St. Joe Subbasin currently support bull trout populations and most approach the 10 °C standard during August, when stream temperatures peak. These streams also approach full support of the salmonid spawning temperature standard.

Monitoring Points

Points of compliance were selected for temperature monitoring. These are provided below in Table 28. These sites can used to assess both rearing and spawning temperatures.

Table 28. Points of compliance for the St. Maries River temperature TMDLs.

Waterbody	Location	Beneficial Use Reconnaissance Program Monitoring Site
Gramp Creek	Near mouth	1996SCDAA047
Gold Center Creek	Near mouth	1996SCDAA045
Flewsie Creek	Near mouth	1996SCDAA048
Middle Fork of the St. Maries River	Near mouth	1996SCDAA040
West Fork St. Maries River	Near mouth	1998SCDAA021
Emerald Creek	Near mouth	1995SCDAB008
Santa Creek	Near mouth	1995SCDAB005
St. Maries River	At Cedar Creek	1997SCDAA033
St. Maries River	At Emerald Creek	To be Determined

Primary TMDL monitoring will be with aerial photography interpretation of canopy recovery over the streams. Aerial photography is currently repeated on a ten-year time frame. This time frame will allow a sufficient period to assess canopy recovery. In addition, a set number of representative sites should be assessed on the ground on a periodic basis using canopy densiometer methodology to ground truth and calibrate the aerial photograph interpretation. These monitoring issues should be further addressed and specified in the monitoring section of the implementation plan.

5.2.2 Load Capacity

Load capacity is stated in terms of canopy cover and the insolation rate required to maintain a maximum weekly maximum temperature (MWMT) of 10 °C (Table 28). A load capacity has been developed for each stream reach covering 200 feet of elevation. Equation 2 (page 72) is used to calculate the percent cover required for each stream reach. Under elevations of 4,000 feet the CWE model predicts greater than 100% canopy closure to maintain the 10 °C MWMT goal. Since this is not possible, canopy closure is defaulted to 100%. The St. Maries River watershed has an elevation range of 2,200 to 5,800 feet. A 100% canopy cover is required on all streams between 2,200 and 4,000 feet to achieve the10 °C MWMT goal. Even this goal may not be achievable on some stream reaches due to natural plant community type, stream width, or habitat type restrictions. Canopy cover goals are currently only met on a few of the 200 feet elevation increment reaches of the St. Maries River watershed.

Use of the CWE model and corroboration of its accuracy for predicting relationships between canopy cover, thermal input, and stream temperature has been developed in the *Upper North Fork Clearwater Temperature TMDLs* (Dechert *et al.* 2001). The application of the thermal model to the St. Maries River watershed is appropriate.

Critical Conditions

Critical conditions are a part of the load capacity analysis. For the St. Maries River Subbasin, critical conditions for temperature are low discharge conditions in August and early September (mid to late summer). The goal is set to meet 10 °C MWMT during this time

period and the manageable thermal input is modeled to achieve the goal. Acute and chronic violations of the 10 °C MWMT goal may contribute to the lack of sufficiently high trout numbers of trout in the St. Maries River watershed (Table 11; Appendix B).

Table 29. Cumulative watershed effect calculated canopy cover required at stated elevations to maintain the 10 °C maximum weekly maximum temperature and corresponding heat load capacity from insolation.

Elevation Range	CWE Target Canopy Cover (%)	Heat Load Capacity[2] North-South oriented stream (watts/sq m)	Heat Load Capacity[2] East-West oriented stream (watts/sq m)	Heat Load Capacity[2] SWNE or SENW oriented stream (watts/sq m)
4,800 – 4,999	71	79	93	86
4,600 – 4,799	77	66	77	71
4,400 – 4,599	83	53	62	57
4,200 – 4,399	89	40	46	43
4,000 – 4,199	95	27	30	28
3,800 –3,999	101	17	18	17.5
3,600 – 3,799	108	17	18	17.5
3,400 – 3,599	114[1]	17	18	17.5
3,200 – 3,399	120[1]	17	18	17.5
3,000 – 3,199	126[1]	17	18	17.5
2,800 – 2,999	132[1]	17	18	17.5
2,600 – 2,799	139[1]	17	18	17.5
2,400 – 2,599	145[1]	17	18	17.5
2,200 – 2,399	152[1]	17	18	17.5

[1] Below 4,000 feet elevation the CWE model predicts a need for greater than 100% canopy closure to protect a maximum stream temperature of 10 °C MWMT. Since this is not possible, 100% canopy closure is set as the surrogate heat load capacity. In some cases, 100% canopy closure may not be achievable because of plant community type or habitat type restrictions.
[2] SSTEMP predicts insolation rates of 17-18 watts/m^2 for 100% canopy closure.

5.2.3 Estimates of Existing Pollutant Loads

The Santa-Fernwood, Clarkia, and Emida wastewater treatment facilties are point sources of thermal input to the St. Maries River Subbasin. Natural inputs include ambient air temperature, inflow ground water temperature, and direct insolation. Of these factors, only direct insolation can be estimated and managed through the vegetation management of stream canopy cover.

Table 30. General canopy cover estimate guide for aerial photo interpretation.[1]

Visibility on Aerial Photographs	Percent Canopy
Stream surface not visible	>90%
Stream surface slightly visible	76-90%
Stream surface visible in patches	61-75%
Stream surface visible, but banks are mostly not visible	46-60%
Stream surface visible and banks visible in places	31-45%
Stream surface and banks visible in most places	16-30%
Stream surface and banks visible	0-15%

[1] Table from IDL.

Canopy cover was surveyed using aerial photometry, assessed using the guidelines in Table 30, and ground verified by CWE crews. Insufficient canopy cover is the primary manageable temperature input. Current canopy coverage of the reaches of the St. Maries River Subbasin is provided in Tables 31a-e.

5.2.4 Temperature Load Allocation and Wasteload Allocation

The temperature allocation is comprised of the wasteload allocation of point sources and the load allocation of nonpoint sources.

Margin of Safety

Between 2,200 and 4,000 feet elevation the required canopy cover is 100%. Much of the St. Maries River watershed does not exceed 4,000 feet elevation. For stream reaches above 4,000 feet, the margin of safety is the existing shade above that required to satisfy thermal equations. Canopy cover of 100% is both the requirement and the limit of management for temperature below 4,000 feet. The 10 °C MWMT standard used is the federal standard.

Seasonal Variation

Heat loading capacity applicable to the St. Maries River watershed in relation to the EPA bull trout temperature standard is primarily a consideration during August and early September. Because of the seasonal progression in stream temperature, if a stream's annual temperature peak is targeted, and this peak is brought down to within criteria limits, then it can safely be assumed that the criteria will also be met at cooler times of the year. This is the basis of using the MWMT metric for criteria. The 10 °C MWMT criteria calculations for bull trout translates closely to the 9 °C daily average criteria for cutthroat.

Wasteload allocations were determined with respect to salmonid spawning periods. Therefore, stream flow and effluent discharge during May through September were used in calculating maximum acceptable effluent temperature.

Reasonable Assurance

Reasonable assurance is provided by nonpoint source implementation of BMPs based on land management agencies' assurance that reductions will occur. Additionally, trend monitoring will be used to document relative changes in various aquatic organism populations and in physical and chemical water quality parameters. This data will be used to assess overall progress towards attainment of water quality standards and related beneficial uses.

Background

The background temperature and thermal input to the temperature-listed waters of the St. Maries Subbasin are not known. Pre-canopy removal stream temperature and stream canopy cover were not measured. Significant reaches of the St. Maries River are too broad and shallow to effectively shade with vegetation. This stream configuration may have existed prior to development. It would not have and will not support vegetation communities capable

of providing 100% canopy cover to the stream. Any TMDL implementation plan should note and account for these areas of natural thermal loading.

Reserve

No reserve is developed for this TMDL. The thermal capacity of the watershed has been exceeded by canopy removal. Canopy restoration, to the degree possible, is required to address the thermal loading.

Wasteload Allocation

There are three point sources of thermal input to the temperature-listed streams of the St. Maries Subbasin. These point sources are the Santa-Fernwood, Clarkia, and Emida wastewater treatment facilities. They were assigned wasteload allocations as follows.

Idaho water quality standards (IDAPA 58.01.02.401.03.a.v.) provide that in waters where stream temperature naturally exceeds criteria, point source must not increase stream temperature greater than 0.3 °C.

The following temperature limit equation was used to determine the impact of the wastewater treatment facilities on stream temperature:

$$T_E = \frac{[Q_E + (0.25 * Q_S)] * [T_C + 0.3\ ^{\circ}C] - [(0.25 * Q_S) * T_C]}{Q_E}$$

where
T_E = effluent temperature
Q_E = effluent flow (cfs)
Q_S = stream flow (cfs)
T_C = applicable temperature criteria (°C)
0.25 = 25% by volume mixing zone allowance

The 90th percentiles of effluent flows at each of the three locations were calculated using the facilities' Dishcarge Monitoring Reports. The Santa-Fernwood facility has an average high discharge of .278 cfs, while the Clarkia facility has an average high discharge of .130 cfs. Discharge values for the Emida facility were estimated from the Clarkia facility's discharge reports, as they are not required to monitor discharge. An average stream flow of 316 cfs, during the salmonid spawning period of May through September, was determined from Table 3 (page 27). The applicable temperature criteria of 9 °C was used. These values revealed that effluent temperatures of 95 °C and 188 °C for the Santa-Fernwood and Clarkia/Emida facilities, respectively, would be needed to cause an in-stream temperature increase of greater than 0.3 °C.

The St. Maries-area wastewater treatment facilities are not required to monitor and record effluent temperature, however, it was possible to examine maximum effluent temperatures at a nearby facility, Kootenai-Ponderay Sewer District. This system employs the same wastewater stabilization pond technology used by the St. Maries-area facilities. The maximum monthly effluent temperature for the time period examined (February 2002

through May 2003) was 30.32 °C. As such, the St. Maries-area wastewater treatment facilities are assigned wasteload allocations of 35 °C daily maximum effluent temperature. The facilities can be reasonably expected to meet this standard because, like the Kootenai-Ponderay facility, they are not likely to produce effluent at temperatures greater than 35 °C. Additionally, a 35 °C daily maximum allocation provides a built-in margin of safety as it is conservative when compared to the temperatures described above as necessary to increase stream temperature by 0.3 °C.

Load Allocation

Load allocations have been developed, establishing target load levels at which streams are expected to meet temperature criteria. The load allocations must result in 100 percent canopy cover in streams below 4,000 feet in elevation, with exceptions noted below. Load allocations for each steam segment in the subbasin are presented in Table 31.

Canopy Habitat Type Limitations

Some habitat types found along streams are not capable of sustaining sufficient stream canopy coverage. These habitat types either have physical limitations that preclude sufficient tree density to develop complete canopy coverage that do not support tree establishment to any significant degree. In addition, a stream may be too broad to be effectively shaded by trees. The St. Maries River below the Emerald Creek confluence has a broad and shallow channel that is sufficiently wide to preclude effective shading by vegetation during the mid-day hours. The channel morphology does not appear to be the result of sediment deposition. Accelerated sediment deposition would cause braiding in a generally low gradient stream like the St. Maries River. But no braiding is evident. The broad, shallow morphology between Emerald and Santa Creeks appears to be a natural feature. Although it is generally deep, the river is sufficiently broad to preclude effective shading below the Santa Creek confluence. Stream segments with canopy habitat type limitations are identified with a footnote in Table 31.

These segments were assigned interim target canopy cover levels. The actual maximum potential canopy for these streams will be determined by a committee of forest and riparian professionals during the implementation phase of TMDL development. After a determination is made, the temperature TMDL will be amended to reflect the new values.

Table 31. Watershed temperature TMDLs – Cumulative Watershed Effects (CWE) calculated percent canopy cover and heat loading.

a) Middle Fork of the St. Maries River including the tributaries: Gramp, Gold Center and Flewsie Creeks

Stream Segment	Elevation Range (ft)	Stream Segment length (ft)	Existing Canopy Cover Range (%)	CWE Target Canopy Cover (%)	Adjusted Target Canopy Cover (%)	Canopy Increase to Meet Target (%)	Stream Orientation	Target Heat Load (watts/m^2)	Current Heat Loading (watts/m^2)	Target Heat Load Reduction (%)
Upper MF St. Maries R.	3000-3200	5,502	50	126.2	100	50.0	NS	17.0	122.0	86.1
Upper MF St. Maries R.	3200-3400	2,339	50	120.0	100	50.0	NS	17.0	122.0	86.1
Upper MF St. Maries R.	3200-3400	8,010	50	120.0	100	50.0	NS	17.0	122.0	86.1
Upper MF St. Maries R.	3400-3600	3,390	50	113.8	100	50.0	NESW	17.5	134.0	86.9
Upper MF St. Maries R.	3400-3600	4,182	70	113.8	100	30.0	NESW	17.5	87.4	80.0
Upper MF St. Maries R.	3600-3800	3,638	70	107.7	100	30.0	NS	17.0	80.0	78.8
Upper MF St. Maries R.	3600-3800	3,448	50	107.7	100	50.0	NESW	17.5	134.0	86.9
Upper MF St. Maries R.	3800-4000	2,181	50	101.5	100	50.0	NESW	17.5	134.0	86.9
Upper MF St. Maries R.	3800-4000	2,666	15	101.5	100	85.0	NWSE	17.5	215.6	91.9
Upper MF St. Maries R.	4000-4200	898	15	95.3	95.3	80.3	NWSE	28.4	215.6	86.8
Upper MF St. Maries R.	3200-3400	1,346	80	120.0	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	3400-3600	1,024	80	113.8	100	20.0	NESW	17.5	64.1	72.7
Upper MF St. Maries R.	3400-3600	1,980	95	113.8	100	5.0	NESW	17.5	29.2	40.0
Upper MF St. Maries R.	3600-3800	496	95	107.7	100	5.0	NESW	17.5	29.2	40.0
Upper MF St. Maries R.	3600-3800	2,075	70	107.7	100	30.0	EW	18.0	94.8	81.0
Upper MF St. Maries R.	3800-4000	1,758	70	101.5	100	30.0	EW	18.0	94.8	81.0
Upper MF St. Maries R.	4000-4200	1,478	95	95.3	95.3	0.3	EW	30.0	30.8	2.7
Upper MF St. Maries R.	4200-4400	913	95	89.1	95.0	0.0	EW	30.8	30.8	0.0
Upper MF St. Maries R.	3600-3800	322	95	107.7	100	5.0	NWSE	17.5	29.2	40.0
Upper MF St. Maries R.	3800-4000	2,033	95	101.5	100	5.0	NWSE	17.5	29.2	40.0
Upper MF St. Maries R.	4000-4200	1,837	95	95.3	95.3	0.3	NWSE	28.4	29.2	2.6
Upper MF St. Maries R.	4200-4400	444	95	89.1	95.0	0.0	NWSE	29.2	29.2	0.0
Upper MF St. Maries R.	4200-4400	1,288	95	89.1	95.0	0.0	NWSE	29.2	29.2	0.0
Upper MF St. Maries R.	4400-4600	834	95	83.0	95.0	0.0	EW	30.8	30.8	0.0
Upper MF St. Maries R.	3200-3400	634	80	120.0	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	3400-3600	480	80	113.8	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	3400-3600	1,140	95	113.8	100	5.0	EW	18.0	30.8	41.6
Upper MF St. Maries R.	3600-3800	1,668	95	107.7	100	5.0	NWSE	17.5	29.2	40.0
Upper MF St. Maries R.	3800-4000	734	95	101.5	100	5.0	EW	18.0	30.8	41.6
Upper MF St. Maries R.	3800-4000	1,214	95	101.5	100	5.0	EW	18.0	30.8	41.6
Upper MF St. Maries R.	4000-4200	1,383	95	95.3	95.3	0.3	EW	30.0	30.8	2.7
Upper MF St. Maries R.	3400-3600	1,521	70	113.8	100	30.0	EW	18.0	94.8	81.0
Upper MF St. Maries R.	3600-3800	222	70	107.7	100	30.0	NWSE	17.5	87.4	80.0
Upper MF St. Maries R.	3600-3800	1,404	70	107.7	100	30.0	NESW	17.5	87.4	80.0
Upper MF St. Maries R.	3400-3600	2,666	50	113.8	100	50.0	NWSE	17.5	134.0	86.9
Upper MF St. Maries R.	3600-3800	1,790	65	107.7	100	35.0	EW	18.0	107.6	83.3
Upper MF St. Maries R.	3600-3800	1,515	65	107.7	100	35.0	NWSE	17.5	99.1	82.3
Upper MF St. Maries R.	3800-4000	396	65	101.5	100	35.0	EW	18.0	107.6	83.3
Upper MF St. Maries R.	3800-4000	1,922	80	101.5	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	4000-4200	1,156	80	95.3	95.3	15.3	EW	30.0	69.2	56.7
Upper MF St. Maries R.	3400-3600	1,668	70	113.8	100	30.0	EW	18.0	94.8	81.0
Upper MF St. Maries R.	3400-3600	3,337	50	113.8	100	50.0	NWSE	17.5	134.0	86.9
Upper MF St. Maries R.	3600-3800	581	50	107.7	100	50.0	EW	18.0	146.0	87.7
Upper MF St. Maries R.	3600-3800	3,406	70	107.7	100	30.0	NWSE	17.5	87.4	80.0
Upper MF St. Maries R.	3800-4000	1,177	80	101.5	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	3800-4000	1,874	50	101.5	100	50.0	NWSE	17.5	134.0	86.9
Upper MF St. Maries R.	3600-3800	612	80	107.7	100	20.0	EW	18.0	69.2	74.0
Upper MF St. Maries R.	3800-4000	634	80	101.5	100	20.0	EW	18.0	69.2	74.0
Gold Center Ck.	3000-3200	10,766	15	126.2	100	85.0	EW	18.0	235.6	92.4
Gold Center Ck.	3200-3400	6,737	20	120.0	100	80.0	NESW	17.5	203.9	91.4
Gold Center Ck.	3400-3600	634	20	113.8	100	80.0	EW	18.0	222.8	91.9
Gold Center Ck.	3400-3600	3,728	40	113.8	100	60.0	EW	18.0	171.6	89.5

Table 31-a, continued.

Gold Center Ck.	3600-3800	2,212	70	107.7	100	30.0	EW	18.0	94.8	81.0
Gold Center Ck.	3600-3800	935	95	107.7	100	5.0	EW	18.0	30.8	41.6
Gold Center Ck.	3800-4000	1,647	95	107.7	100	5.0	EW	18.0	30.8	41.6
Gramp Ck.	3000-3200	4,842	15	126.2	100	85.0	NESW	17.5	215.6	91.9
Gramp Ck.	3200-3400	5,137	20	120.0	100	80.0	NESW	17.5	203.9	91.4
Gramp Ck.	3400-3600	3,099	40	113.8	100	60.0	NS	17.0	143.0	88.1
Gramp Ck.	3600-3800	660	40	107.7	100	60.0	NS	17.0	143.0	88.1
Gramp Ck.	3600-3800	1,473	50	107.7	100	50.0	NESW	17.5	134.0	86.9
Gramp Ck.	3800-4000	824	50	101.5	100	50.0	NESW	17.5	134.0	86.9
Gramp Ck.	3800-4000	1,209	50	101.5	100	50.0	NESW	17.5	134.0	86.9
Placer Ck.	3200-3400	887	70	120.0	100	30.0	NS	17.0	80.0	78.8
Placer Ck.	3400-3600	496	70	113.8	100	30.0	NESW	17.5	87.4	80.0
Placer Ck.	3400-3600	2,545	70	113.8	100	30.0	NESW	17.5	87.4	80.0
Placer Ck.	3600-3800	2,561	70	107.7	100	30.0	NESW	17.5	87.4	80.0
Placer Ck.	3800-4000	275	70	101.5	100	30.0	NESW	17.5	87.4	80.0
Gold Center Ck.	3800-4000	2,255	50	101.5	100	50.0	NESW	17.5	134.0	86.9
Gold Center Ck.	4000-4200	1,800	65	95.3	95.3	30.3	NESW	28.4	99.1	71.3
Gold Center Ck.	4200-4400	275	65	89.1	89.1	24.1	NESW	42.8	99.1	56.8
Windy Ck.	3200-3400	2,365	95	120.0	100	5.0	NWSE	17.5	29.2	40.0
Windy Ck.	3400-3600	2,360	80	113.8	100	20.0	EW	18.0	69.2	74.0
Windy Ck.	3600-3800	1,135	95	107.7	100	5.0	EW	18.0	30.8	41.6
Flewsie Ck.	2800-3000	2,186	75	132.3	100	25.0	NS	17.0	69.5	75.5
Flewsie Ck.	3000-3200	1,816	75	126.2	100	25.0	NS	17.0	69.5	75.5
Flewsie Ck.	3000-3200	4,377	80	126.2	100	20.0	NESW	17.5	64.1	72.7
Flewsie Ck.	3200-3400	2,957	80	120.0	100	20.0	NESW	17.5	64.1	72.7
Flewsie Ck.	3200-3400	5,724	75	120.0	100	25.0	NESW	17.5	75.8	76.9
Flewsie Ck.	3400-3600	2,651	70	113.8	100	30.0	NS	17.0	80.0	78.8
Flewsie Ck.	3600-3800	3,532	70	107.7	100	30.0	NS	17.0	80.0	78.8
Lower MF St. Maries R.	2600-2800	3,031	10	138.5	100	90.0	NWSE	17.5	227.2	92.3
Lower MF St. Maries R.	2800-3000	17,889	10	132.3	100	90.0	EW	18.0	248.4	92.8
Lower MF St. Maries R.	2800-3000	4,140	20	132.3	100	80.0	EW	18.0	222.8	91.9
Lower MF St. Maries R.	2800-3000	3,612	10	132.3	100	90.0	EW	18.0	248.4	92.8
Lower MF St. Maries R.	3000-3200	2,751	10	126.2	100	90.0	EW	18.0	248.4	92.8

b) West Fork St. Maries River including its tributary, Cats Spur Creek

Stream Segment	Elevation Range (ft)	Stream Segment length (ft)	Existing Canopy Cover Range (%)	CWE Target Canopy Cover (%)	Adjusted Target Canopy Cover (%)	Canopy Increase to meet target (%)	Stream Orientation	Target Heat Load (watts/ sq m)	Current Heat Load (watts/sq m)	Target Heat Load Reduction (%)
Upper WF St. Maries River	2800-3000	19,995	20	132.3	100	80.0	EW	18.0	222.8	91.9
Upper WF St. Maries River	3000-3200	3,163	20	126.2	100	80.0	EW	18.0	222.8	91.9
Wood Ck.	2800-3000	3,648	80	132.3	100	20.0	NS	17.0	59.0	71.2
Wood Ck.	3000-3200	385	80	126.2	100	20.0	NS	17.0	59.0	71.2
Hidden Ck.	2800-3000	2,988	50	132.3	100	50.0	NWSE	17.5	134.0	86.9
Hidden Ck.	3000-3200	6,030	50	126.2	100	50.0	NWSE	17.5	134.0	86.9
Hidden Ck.	3000-3200	1,130	80	126.2	100	20.0	NWSE	17.5	64.1	72.7
Hidden Ck.	3200-3400	2,402	80	120.0	100	20.0	NWSE	17.5	64.1	72.7
Unnamed Trib 2	2800-3000	1,959	15	132.3	100	85.0	NS	17.0	195.5	91.3
Unnamed Trib 2	3000-3200	10,914	15	126.2	100	85.0	NS	17.0	195.5	91.3
Long Slim Ck.	2800-3000	3,062	40	132.3	100	60.0	NWSE	17.5	157.3	88.9
Long Slim Ck.	3000-3200	2,883	40	126.2	100	60.0	EW	18.0	171.6	89.5
Long Slim Ck.	3000-3200	2,101	70	126.2	100	30.0	NWSE	17.5	87.4	80.0
Long Slim Ck.	3200-3400	2,756	70	120.0	100	30.0	NS	17.0	80.0	78.8
Long Slim Ck.	3200-3400	2,207	80	120.0	100	20.0	NESW	17.5	64.1	72.7
Long Slim Ck.	3400-3600	2,022	80	113.8	100	20.0	NS	17.0	59.0	71.2
Long Slim Ck.	3400-3600	1,647	80	113.8	100	20.0	NS	17.0	59.0	71.2
Long Slim Ck.	3600-3800	1,098	80	107.7	100	20.0	NWSE	17.5	64.1	72.7
Unnamed Trib 1	2800-3000	2,049	80	132.3	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 1	3000-3200	3,912	80	126.2	100	20.0	NS	17.0	59.0	71.2
Unnamed Trib 1	2800-3000	312	80	132.3	100	20.0	NS	17.0	59.0	71.2
Unnamed Trib 1	3000-3200	1,204	80	126.2	100	20.0	NWSE	17.5	64.1	72.7

Table 31-b, continued.

Lower WF St. Maries R.	2800-3000	23,148	10	132.3	100	90.0	NESW	17.5	227.2	92.3
Cats Spur Ck.	2800-3000	10,571	20	132.3	100	80.0	NWSE	17.5	203.9	91.4
Cats Spur Ck.	3000-3200	2,260	20	126.2	100	80.0	EW	18.0	222.8	91.9
Cats Spur Ck.	3000-3200	3,860	50	126.2	100	50.0	EW	18.0	146.0	87.7
Cats Spur Ck.	3000-3200	1,399	60	126.2	100	40.0	EW	18.0	120.4	85.0
Cats Spur Ck.	3200-3400	5,777	70	120.0	100	30.0	NESW	17.5	87.4	80.0
Cats Spur Ck.	3400-3600	2,804	70	113.8	100	30.0	NS	17.0	80.0	78.8
Cats Spur Ck.	3600-3800	2,497	70	107.7	100	30.0	NESW	17.5	87.4	80.0
Cats Spur Ck.	3600-3800	771	80	107.7	100	20.0	NESW	17.5	64.1	72.7
Cats Spur Ck.	3800-4000	771	80	101.5	100	20.0	NESW	17.5	64.1	72.7
Log Ck.	2800-3000	1,969	30	132.3	100	70.0	NESW	17.5	180.6	90.3
Log Ck.	3000-3200	3,717	50	126.2	100	50.0	NESW	17.5	134.0	86.9
Log Ck.	3200-3400	4,066	50	120.0	100	50.0	NWSE	17.5	134.0	86.9
Log Ck.	3400-3600	2,006	60	113.8	100	40.0	EW	18.0	120.4	85.0
Log Ck.	3600-3800	834	60	107.7	100	40.0	NWSE	17.5	110.7	84.2
Log Ck.	3600-3800	2,318	70	107.7	100	30.0	EW	18.0	94.8	81.0
Log Ck.	3800-4000	1,378	80	101.5	100	20.0	NWSE	17.5	64.1	72.7
Log Ck.	4000-4200	1,162	80	95.3	95.3	15.3	NWSE	28.4	64.1	55.7
Unnamed Trib 1	3600-3800	1,626	60	107.7	100	40.0	NWSE	17.5	110.7	84.2
Unnamed Trib 1	3800-4000	1,758	70	101.5	100	30.0	NWSE	17.5	87.4	80.0
Unnamed Trib 1	4000-4200	1,156	70	95.3	95.3	25.3	NS	26.8	80.0	66.5
Unnamed Trib 1	4000-4200	602	10	95.3	95.3	85.3	NWSE	28.4	227.2	87.5
Unnamed Trib 1	4200-4400	1,209	10	89.1	89.1	79.1	NS	39.8	206.0	80.7
Kitten Ck.	3000-3200	3,015	40	126.2	100	60.0	EW	18.0	171.6	89.5
Kitten Ck.	3200-3400	3,258	50	120.0	100	50.0	NESW	17.5	134.0	86.9
Kitten Ck.	3400-3600	2,307	50	113.8	100	50.0	NS	17.0	122.0	86.1
Kitten Ck.	3600-3800	2,508	50	107.7	100	50.0	NS	17.0	122.0	86.1
Kitten Ck.	3800-4000	1,077	50	101.5	100	50.0	NESW	17.5	134.0	86.9
Kitten Ck.	3800-4000	2,930	40	101.5	100	60.0	NS	17.0	143.0	88.1
Kitten Ck.	4000-4200	1,626	40	95.3	95.3	55.3	NS	26.8	143.0	81.2
Kitten Ck.	4200-4400	697	40	89.1	89.1	49.1	NS	39.8	143.0	72.2
Kitten Ck.	4400-4600	908	40	83.0	83.0	43.0	NS	52.7	143.0	63.1
Unnamed Trib 2	3000-3200	787	80	126.2	100	20.0	NWSE	17.5	64.1	72.7
Unnamed Trib 2	3200-3400	1,420	80	120.0	100	20.0	NWSE	17.5	64.1	72.7
Unnamed Trib 2	3400-3600	1,774	80	113.8	100	20.0	NS	17.0	59.0	71.2
Unnamed Trib 2	3600-3800	1,695	80	107.7	100	20.0	NWSE	17.5	64.1	72.7
Unnamed Trib 3	3200-3400	2,038	70	120.0	100	30.0	NESW	17.5	87.4	80.0
Unnamed Trib 3	3400-3600	834	70	113.8	100	30.0	NS	17.0	80.0	78.8
Unnamed Trib 3	3400-3600	2,038	50	113.8	100	50.0	NWSE	17.5	134.0	86.9
Unnamed Trib 3	3600-3800	1,341	50	107.7	100	50.0	NS	17.0	122.0	86.1
Unnamed Trib 3	3800-4000	1,146	30	101.5	100	70.0	NWSE	17.5	180.6	90.3
Unnamed Trib 4	3000-3200	507	80	126.2	100	20.0	NS	17.0	59.0	71.2
Unnamed Trib 4	3200-3400	3,395	80	120.0	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 4	3400-3600	2,466	80	113.8	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 4	3600-3800	1,748	80	107.7	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 4	3800-4000	1,441	80	101.5	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 5	3000-3200	1,024	70	126.2	100	30.0	NS	17.0	80.0	78.8
Unnamed Trib 5	3200-3400	1,162	70	120.0	100	30.0	NS	17.0	80.0	78.8
Unnamed Trib 5	3400-3600	2,777	80	113.8	100	20.0	NESW	17.5	64.1	72.7
Unnamed Trib 5	3600-3800	1,167	80	107.7	100	20.0	NS	17.0	59.0	71.2

c) Emerald Creek

Stream Segment	Elevation Range (ft)	Stream Segment length (ft)	Existing Canopy Cover Range (%)	CWE Target Canopy Cover (%)	Adjusted Target Canopy Cover (%)	Canopy Increase to meet target (%)	Stream Orientation	Target Heat Load (watts/ sq m)	Current Heat Load (watts/sq m)	Target Heat Load Reduction (%)
Emerald Ck.	2600-2800	23,823	15	138.5	100	85.0	NS	17.0	195.5	91.3
Emerald Ck.	2800-3000	602	15	132.3	100	85.0	EW	18.0	235.6	92.4
Emerald Ck.	2800-3000	21,965	15	132.3	100	85.0	EW	18.0	235.6	92.4
Emerald Ck.	2800-3000	3,485	85	132.3	100	15.0	EW	18.0	56.4	68.1
Emerald Ck.	3000-3200	3,992	85	126.2	100	15.0	NESW	17.5	52.5	66.6
Emerald Ck.	3200-3400	3,437	85	120.0	100	15.0	NESW	17.5	52.5	66.6
Emerald Ck.	3200-3400	4,990	20	120.0	100	80.0	NESW	17.5	203.9	91.4
Emerald Ck.	3400-3600	6,769	20	113.8	100	80.0	EW	18.0	222.8	91.9
Emerald Ck.	3600-3800	1,299	20	107.7	100	80.0	NWSE	17.5	203.9	91.4
Emerald Ck.	2600-2800	972	15	138.5	100	85.0	NS	17.0	195.5	91.3
Emerald Ck.	2800-3000	16,732	15	132.3	100	85.0	NESW	17.5	215.6	91.9
Emerald Ck.	2800-3000	15,602	20	132.3	100	80.0	NESW	17.5	203.9	91.4
Emerald Ck.	3000-3200	8,796	75	126.2	100	25.0	EW	18.0	82.0	78.0
Emerald Ck.	3200-3400	3,136	70	120.0	100	30.0	EW	18.0	94.8	81.0
Emerald Ck.	3400-3600	1,067	70	113.8	100	30.0	NESW	17.5	87.4	80.0
Emerald Ck.	3400-3600	3,960	75	113.8	100	25.0	NESW	17.5	75.8	76.9

d) Santa and Charlie Creeks, including tributaries

Stream Segment	Elevation Range (ft)	Stream Segment length (ft)	Existing Canopy Cover Range (%)	CWE Target Canopy Cover (%)	Adjusted Target Canopy Cover (%)	Canopy Increase to meet target (%)	Stream Orientation	Target Heat Load (watts/ sq m)	Current Heat Load (watts/sq m)	Target Heat Load Reduction (%)
Santa Creek	2400-2600	1,610	15	144.7	100	85.0	NS	17.0	195.5	91.3
Santa Creek	2600-2800	39,088	15	138.5	100	85.0	NESW	17.5	215.6	91.9
Santa Creek	2600-2800	2,635	15	138.5	100	85.0	EW	18.0	235.6	92.4
Santa Creek	2800-3000	4,858	15	132.3	100	85.0	NESW	17.5	215.6	91.9
Santa Creek	2600-2800	1,827	70	138.5	100	30.0	NS	17.0	80.0	78.8
Santa Creek	2800-3000	1,642	70	132.3	100	30.0	NS	17.0	80.0	78.8
Unnamed Trib 1	2600-2800	591	20	138.5	100	80.0	NWSE	17.5	203.9	91.4
Unnamed Trib 1	2800-3000	2,629	20	132.3	100	80.0	NWSE	17.5	203.9	91.4
Unnamed Trib 1	2800-3000	2,550	20	132.3	100	80.0	NWSE	17.5	203.9	91.4
Peterson Ck.	2600-2800	480	20	138.5	100	80.0	NESW	17.5	203.9	91.4
Peterson Ck.	2800-3000	4,884	20	132.3	100	80.0	NS	17.0	185.0	90.8
Peterson Ck.	3000-3200	4,171	15	126.2	100	85.0	NS	17.0	195.5	91.3
Peterson Ck.	3200-3400	1,061	45	120.0	100	55.0	NWSE	17.5	145.7	88.0
Unnamed Trib 2	2600-2800	861	20	138.5	100	80.0	NS	17.0	185.0	90.8
Unnamed Trib 2	2800-3000	7,540	20	132.3	100	80.0	NWSE	17.5	203.9	91.4
Santa Ck.	2800-3000	24,642	15	132.3	100	85.0	EW	18.0	235.6	92.4
Santa Ck.	2800-3000	9,884	50	132.3	100	50.0	EW	18.0	146.0	87.7
Santa Ck.	3000-3200	1,251	50	126.2	100	50.0	EW	18.0	146.0	87.7
Deep Ck.	2800-3000	2,043	15	132.3	100	85.0	NWSE	17.5	215.6	91.9
Deep Ck.	2800-3000	5,349	70	132.3	100	30.0	NS	17.0	80.0	78.8
Ramskill Ck.	2800-3000	4,694	20	132.3	100	80.0	NESW	17.5	203.9	91.4
Ramskill Ck.	2800-3000	7,635	45	132.3	100	55.0	NS	17.0	132.5	87.2
Willow Ck.	2800-3000	7,846	75	132.3	100	25.0	EW	18.0	82.0	78.0
Santa Ck.	3000-3200	1,399	85	126.2	100	15.0	EW	18.0	56.4	68.1
Santa Ck.	2800-3000	4,256	75	132.3	100	25.0	NESW	17.5	75.8	76.9
Santa Ck.	3000-3200	338	75	126.2	100	25.0	NWSE	17.5	75.8	76.9
Santa Ck.	3000-3200	4,609	80	126.2	100	20.0	NESW	17.5	64.1	72.7
SF Santa Ck.	3200-3400	2,302	95	120.0	100	5.0	NESW	17.5	29.2	40.0
Santa Ck.	2800-3000	4,018	75	132.3	100	25.0	NESW	17.5	75.8	76.9
Santa Ck.	3000-3200	1,690	75	126.2	100	25.0	EW	18.0	82.0	78.0
Bob Ck.	2800-3000	5,919	70	132.3	100	30.0	EW	18.0	94.8	81.0
Charlie Ck.	2800-3000	16,199	40	132.3	100	60.0	NS	17.0	143.0	88.1
Charlie Ck.	2800-3000	8,237	70	132.3	100	30.0	NWSE	17.5	87.4	80.0

Table 31-d, continued.

Charlie Ck.	3000-3200	10,365	40	126.2	100	60.0	NWSE	17.5	157.3	88.9
Charlie Ck.	3200-3400	4,071	40	120.0	100	60.0	NWSE	17.5	157.3	88.9
Ellis Ck.	3400-3600	7,191	30	113.8	100	70.0	NS	17.0	164.0	89.6
Ellis Ck.	3000-3200	2,365	80	126.2	100	20.0	NWSE	17.5	64.1	72.7
Charlie Ck.	3200-3400	1,737	95	120.0	100	5.0	NWSE	17.5	29.2	40.0
Hume Ck.	2800-3000	6,985	15	132.3	100	100.0	NESW	17.5	250.5	93.0
Hume Ck.	3000-3200	5,370	15	126.2	100	100.0	NESW	17.5	250.5	93.0
Charlie Ck.	2800-3000	4,171	40	132.3	100	60.0	NESW	17.5	157.3	88.9
Preston Ck.	3000-3200	4,240	80	126.2	100	20.0	NS	17.0	59.0	71.2
Preston Ck.	3200-3400	2,703	95	120.0	100	5.0	NS	17.0	27.5	38.2
Preston Ck.	3400-3600	644	95	113.8	100	5.0	NS	17.0	27.5	38.2
Unnamed Trib 1	3000-3200	5,016	65	126.2	100	35.0	NESW	17.5	99.1	82.3
Unnamed Trib 2	3000-3200	3,379	70	126.2	100	30.0	NWSE	17.5	87.4	80.0
Unnamed Trib 2	3200-3400	3,786	80	120.0	100	20.0	NESW	17.5	64.1	72.7
Fagen Ck.	3000-3200	4,319	95	126.2	100	5.0	NWSE	17.5	29.2	40.0
Fagen Ck.	3200-3400	549	95	120.0	100	5.0	NS	17.0	27.5	38.2
Fagen Ck.	3200-3400	2,302	95	120.0	100	5.0	NWSE	17.5	29.2	40.0
Moolock Ck.	3000-3200	3,189	80	126.2	100	20.0	NESW	17.5	64.1	72.7
Moolock Ck.	3200-3400	1,510	95	120.0	100	5.0	NS	17.0	27.5	38.2

e) St. Maries River

Stream Segment	Elevation Range (ft)	Stream Segment length (ft)	Existing Canopy Cover Range (%)	CWE Target Canopy Cover (%)	Adjusted Target Canopy Cover (%)	Canopy Increase to meet target (%)	Stream Orientation	Target Heat Load (watts/ sq m)	Current Heat Load (watts/sq m)	Target Heat Load Reduction (%)
St. Maries River	2800-3000	11,051	40	132.3	100	60.0	NWSE	17.5	157.3	88.9
St. Maries River	2600-2800	38,312	40	138.5	100	60.0	NWSE	17.5	157.3	88.9
St. Maries River	2600-2800	27,181	15	138.5	100[1]	85.0	NWSE	17.5	215.6	91.9
St. Maries River	2400-2600	18,987	15	144.7	100[1]	85.0	NWSE	17.5	215.6	91.9
St. Maries River	2600-2800	75,942	15	138.5	100[1]	85.0	NWSE	17.5	215.6	91.9
St. Maries River	2400-2600	18,100	20	144.7	100[1]	80.0	NWSE	17.5	203.9	91.4
St. Maries River	2400-2600	68,513	40	144.7	100[1]	60.0	NWSE	17.5	157.3	88.9
St. Maries River	2200-2400	17,223	40	150.9	100[1]	60.0	EW	18.0	171.6	89.5
St. Maries River	2200-2400	15,101	40	150.9	100[1]	60.0	NWSE	17.5	157.3	88.9
St. Maries River	2200-2400	8,464	15	150.9	100[1]	85.0	NS	17.0	195.5	91.3
St. Maries River	2000-2200	138,595	15	157.0	100[1]	85.0	NESW	17.5	215.6	91.9

[1]Interim target canopy cover; physical habitat limitations in these segments make it unlikely that current target levels will be reached. Final target canopy cover to be determined during the implementation phase.

Remaining Available Load

The remaining load is allocated to segments of the watershed based on canopy requirements. The elevation range of the stream segments is used to develop the target canopy cover using the CWE temperature relationship (Tables 31a-e). These targets are in many cases greater than 100% because the St. Maries watershed exceeds 4,000 feet elevation in only its upper stream reaches. These target values were revised to 100% canopy cover. Segments over 4,000 feet require less than 100% canopy cover. The required canopy is subtracted from 100% and the existing amount of canopy cover restoration required is calculated. Using the SSTEMP model outputs for canopy cover and stream orientation, the target heat load capacity was calculated for each segment. Based on current canopy cover and the SSTEMP model outputs for percentage canopy cover, current heat loading is estimated. Subtraction and division provide the target heat load reduction required for each segment. The level of canopy cover currently present is provided in Figures 8a-c. The target canopy cover for all segments is provided in Figures 9a-c.

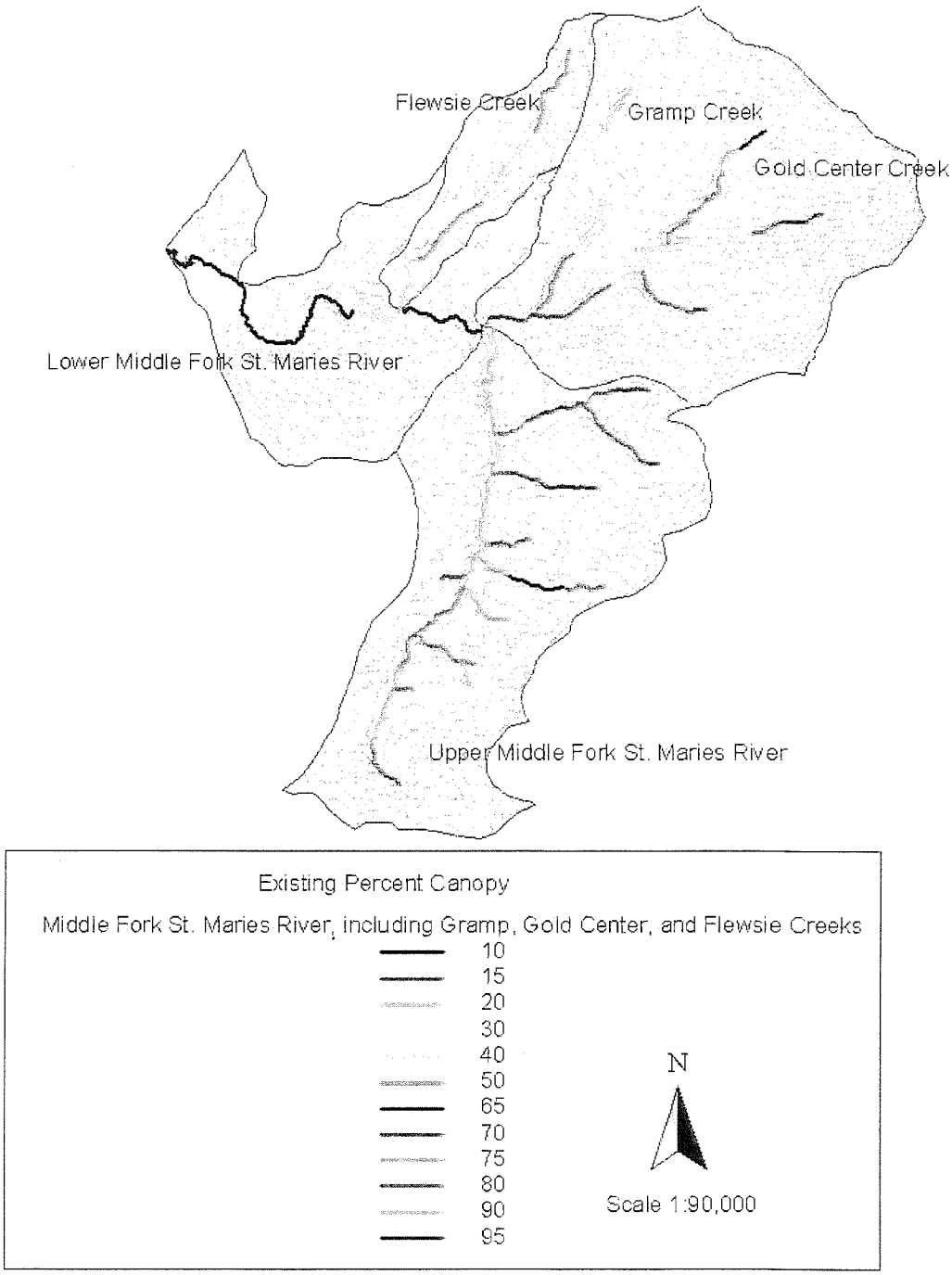


Figure 8-a. Existing Shade Canopy: Middle Fork of the St. Maries River Including Gramp, Gold Center, and Flewsie Creeks

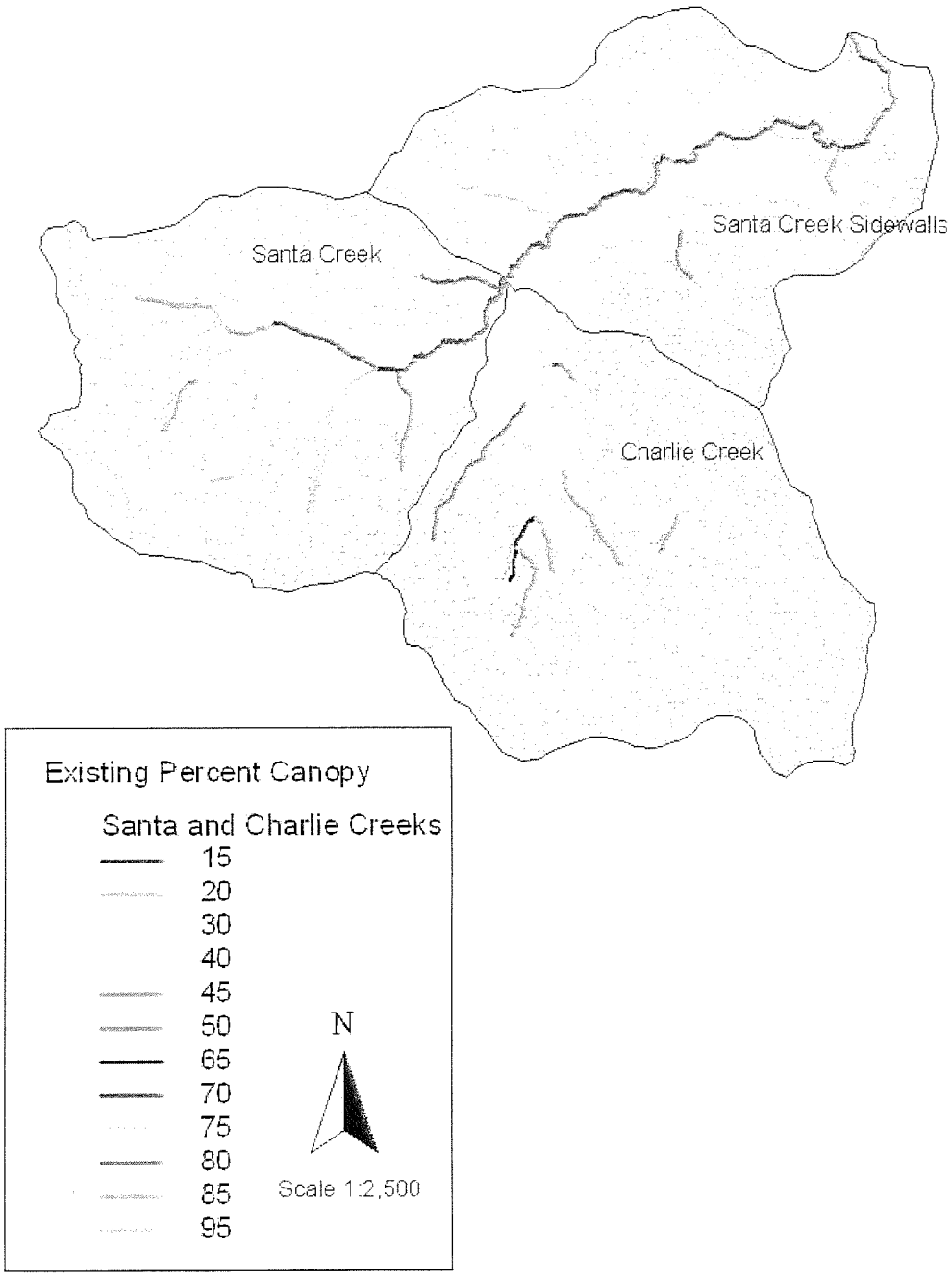


Figure 8-d. Existing Shade Canopy: Santa Creek Including its Tributary, Charlie Creek

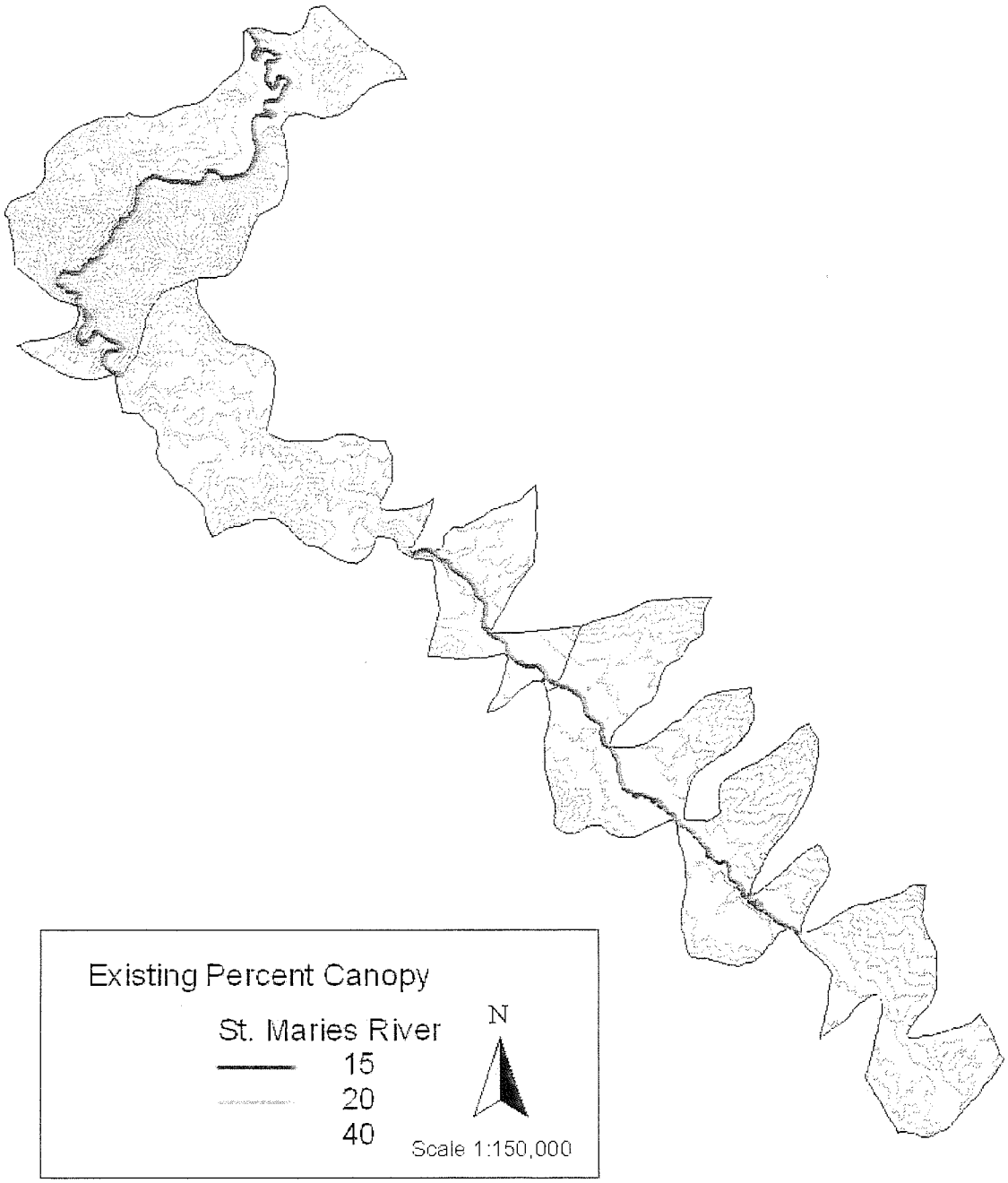


Figure 8-e. Existing Shade Canopy: St. Maries River

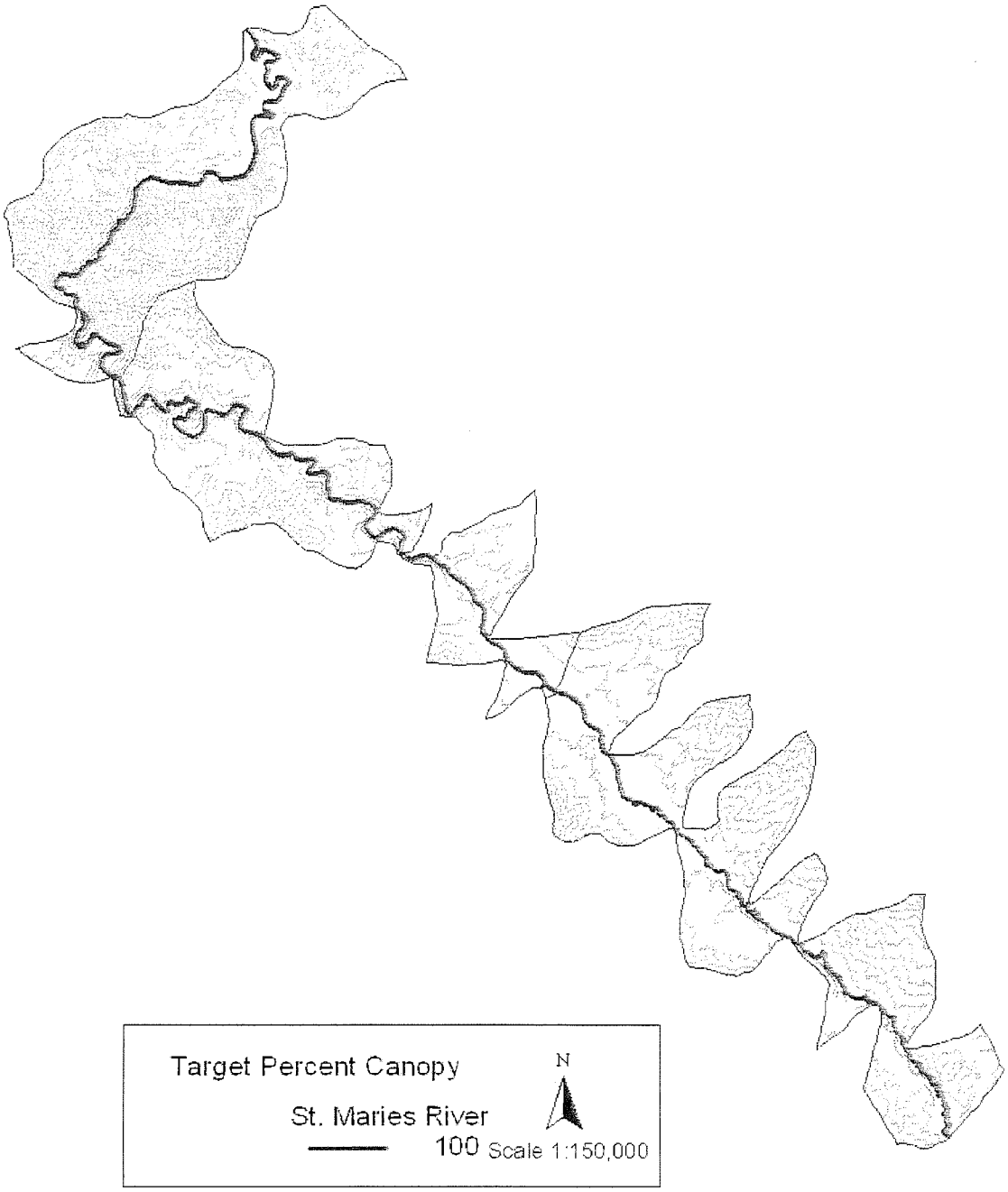


Figure 9-e. Target Shade Canopy: St. Maries River

Monitoring Provisions

Temperature will be monitored with continuous recorders in streams after the canopy has reached 70% of its potential in a given stream. Temperature recorders will be placed in representative locations on third order reaches of the streams as near as feasible to the points of compliance. Temperature data developed will be compared with the current temperature standards to assess temperature standard exceedences. Biomonitoring of macroinvertebrates and fish will be completed to assess the status of the cold water aquatic life.

Feedback Provisions

When temperatures meet the standard or natural background level, further canopy-increasing activities will not be required in the watershed. Best management practices will be prescribed by the revised TMDL with provisions to maintain and protect canopy cover of the streams. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the use (cold water).

5.2.5 Conclusions

The St. Maries River Subbasin is not in the St. Joe bull trout recovery area where the federal temperature standard of 10 °C MWMT applies. However, continuous temperature monitoring in tributaries of the St. Maries River demonstrates that the salmonid spawning standard is violated for significant periods of the critical season. A temperature TMDL based on the CWE relationship between canopy cover, elevation, and direct insolation input to the streams was developed. The watershed topography is between 2,200 and 5,800 feet elevation. The shade requirement between 2,400 and 4,000 feet is 100% or full potential shade. Lesser amounts of shade are progressively necessary above 4,000 feet. Figures 8a-e provide the current level of canopy cover provided the streams, while Figures 9a-e depict the canopy cover required. The St. Maries River below the Emerald Creek confluence is sufficiently broad that only 30% shading is possible, except in a 19 mile stretch, where 40% shading is possible (Figure 9-e).

5.3 Implementation Strategies

DEQ and designated lead agencies responsible for TMDL implementation will make every effort to address past, present, and future pollution problems in an attempt to link them to watershed characteristics and management practices designed to improve water quality and restore the beneficial uses of the water body. Any and all solutions to help restore beneficial uses of a stream will be considered as part of a TMDL implementation plan in an effort to make the process as effective and cost efficient as possible. Using additional information collected during the implementation phase of the TMDL, DEQ and the designated agencies will continue to evaluate suspect sources of impairment and develop management actions appropriate to deal with these issues.

DEQ recognizes that implementation strategies for TMDLs may need to be modified if monitoring shows that the TMDL goals are not being met or significant progress is not being made toward achieving the goals.

Time Frame

For sediment TMDLs, 30 years have been allotted for meeting load allocations. This time frame will permit two or three large channel forming events to occur in the stream.

Primary TMDL monitoring of temperature TMDLs will be with aerial photograph interpretation of canopy recovery over the streams. Aerial photography is repeated by the USFS on a 10-year time frame. This time frame will allow a sufficient period to assess canopy recovery. In addition, a set number of representative sites should be assessed on a periodic basis using canopy densiometer methodology to ground truth and calibrate the aerial photograph interpretation.

Approach

TMDLs will be implemented through continuation of ongoing pollution control activities in the subbasin. The designated agencies, WAG, and other appropriate public process participants are expected to:

- Develop BMPs to achieve load allocations
- Give reasonable assurance that management measures will meet load allocations through both quantitative and qualitative analysis of management measures
- Adhere to measurable milestones for progress
- Develop a timeline for implementation, with reference to costs and funding
- Develop a monitoring plan to determine if BMPs are being implemented, if individual BMPs are effective, if load allocations and waste load allocations are being met, and whether or not water quality standards are being met

The designated agencies will recommend specific control actions and will then submit the implementation plan to DEQ. DEQ will act as a repository for approved implementation plans.

Responsible Parties

Development of the final implementation plan for the St. Joe River TMDL will proceed under the existing practice established for the state of Idaho. The plan will be cooperatively developed by DEQ, the St. Joe WAG, the affected private landowners, and other "designated agencies" with input from the established public process. Of the three entities, the WAG will act as the integral part of the implementation planning process to identify appropriate implementation measures. In addition to the designated agencies, the public, through the WAG and other equivalent processes, will be provided with opportunities to be involved in developing the implementation plan to the maximum extent practical.

Monitoring Strategy

In-stream monitoring of the beneficial uses (cold water and salmonid spawning) support status during and after implementation of sediment abatement projects will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will determine

if the threshold values have been met, will be completed every year on randomly selected sites on each stream order in the subbasin after 70% of the plan has been implemented. Monitoring will be conducted using the DEQ-approved monitoring procedure at the time of sampling. Identical measurements will be made in appropriate reference streams where beneficial uses are supported.

Temperature will be monitored on the streams with continuous recorders after the canopy has reached 70% of its potential. Temperature recorders will be placed in representative locations on third order reaches of the streams as near as feasible to the points of compliance. Temperature data developed will be compared with the current temperature standards to assess temperature standard exceedences. Biomonitoring of macroinvertebrates and fish will be completed to assess the status of the cold water aquatic life.

5.4 Conclusion

Two TMDLs were developed for streams in the St. Maries River Subbasin. The TMDLs addressed sediment and temperature only, as no other pollutants were found to be limiting the support of beneficial uses in the subbasin.

DEQ recommends that Gramp Creek be delisted for bacteria and that Santa Creek be delisted for dissolved oxygen limitation.

None of the streams in the subbasin were found to be impaired by excess nutrients. As such, it is recommended that the St. Maries River and Thorn, Alder, and Santa Creeks be delisted for excess nutrients.

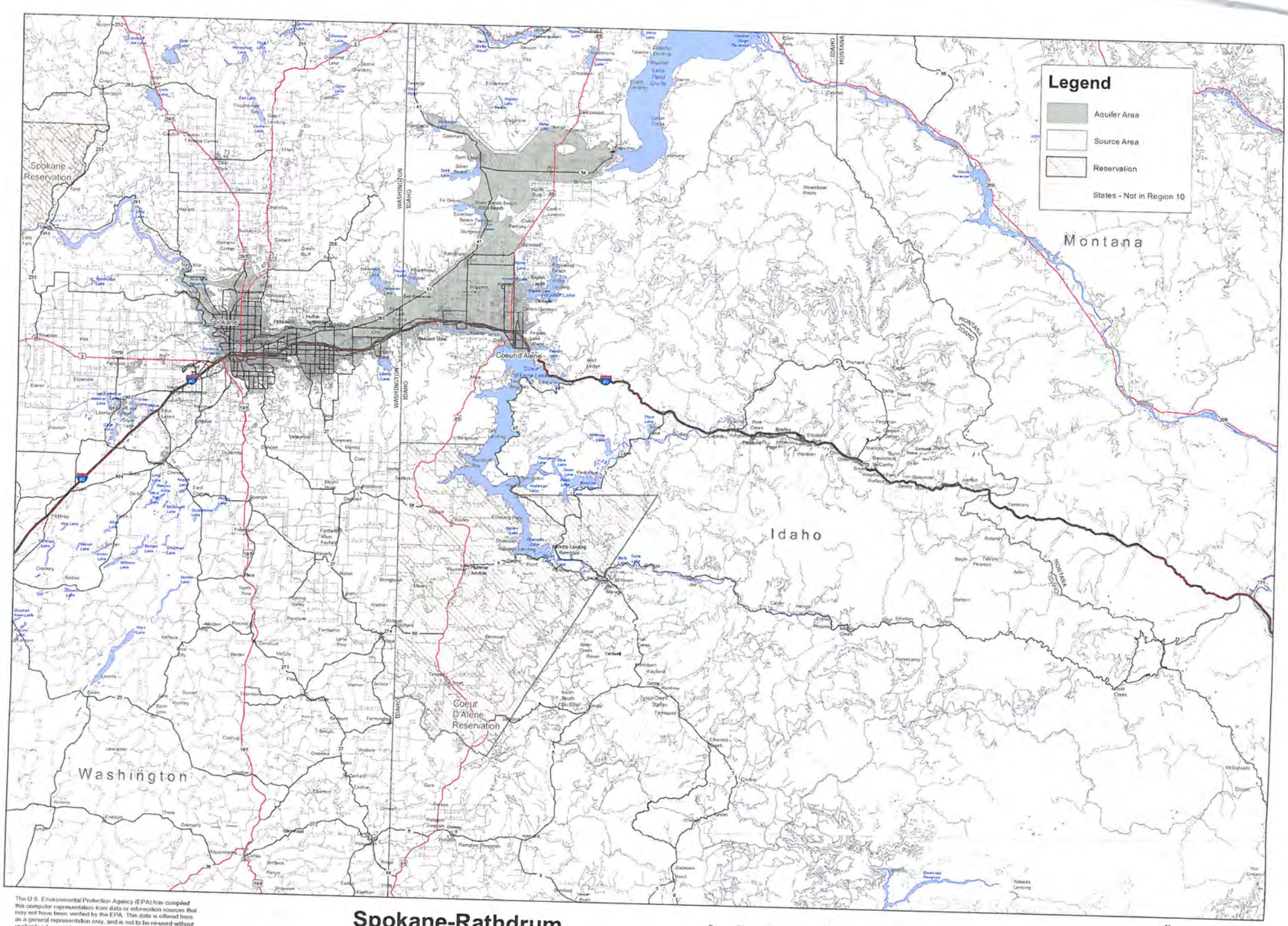
Sediment modeling and WBAGII score analysis revealed that the St. Maries River, including the West and Middle Forks, and Alder, John, Charlie, Santa, Tyson, Carpenter, Emerald, Renfro, Thorn, and Crystal Creeks are impaired by sediment. A single sediment TMDL was written for the entire subbasin. Gold Center, Flewsie, and Gramp Creeks were not found to be impaired by sediment. It is recommended that they be delisted for this pollutant.

A temperature TMDL was developed for the St. Maries River, including the West and Middle Forks, and Santa, Emerald, Gold Center, Flewsie, and Gramp Creeks.

Conditions in all of the water bodies listed above will be monitored on an ongoing basis. This will ensure that beneficial uses currently supported remain that way and that water bodies not in full support of their beneficial uses are making progress through the implementation process.

Appendix L

Sole Source Aquifer Map



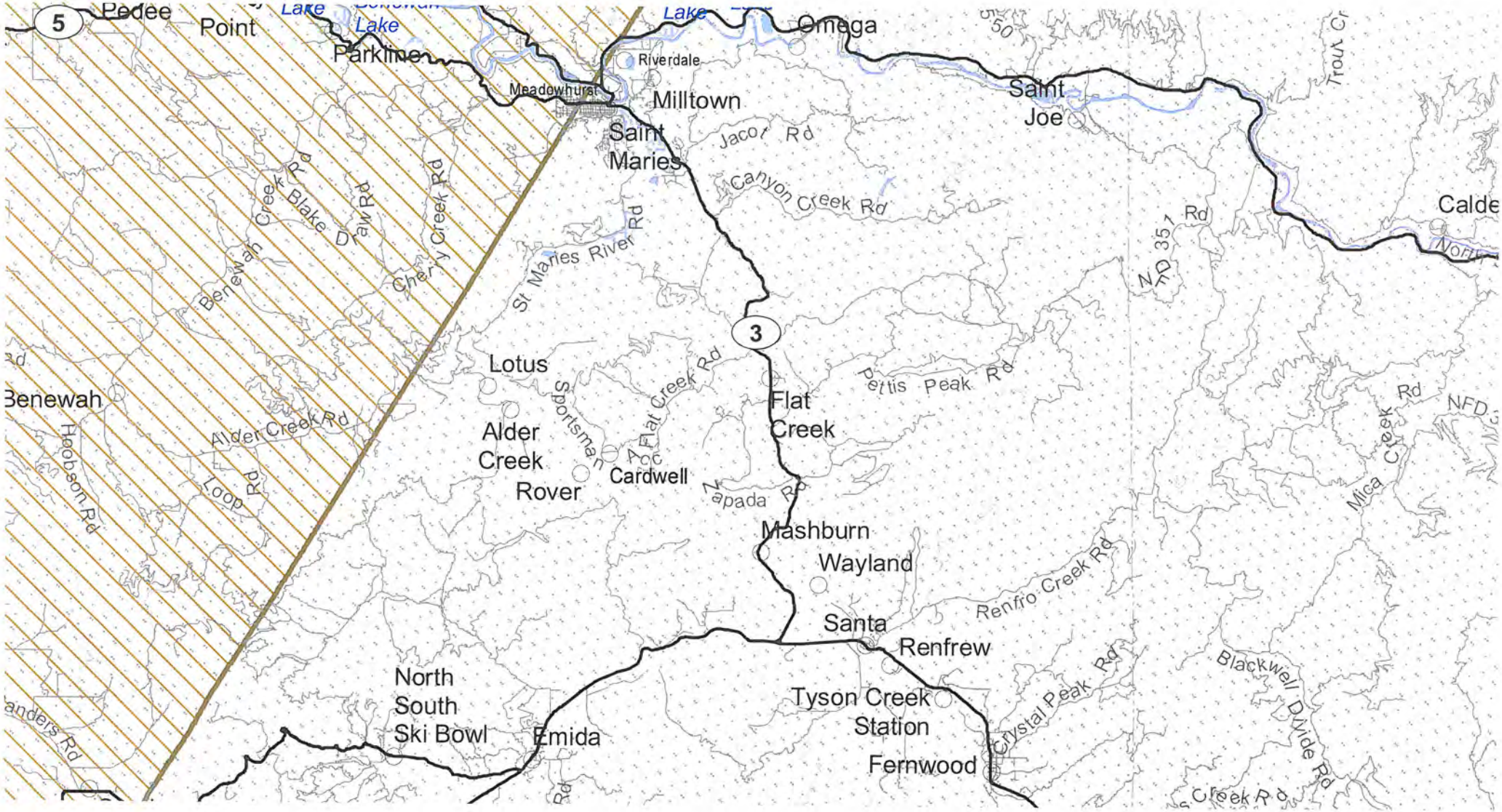
The U.S. Environmental Protection Agency (EPA) has compiled this computer representation from data or information sources that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be re-used without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

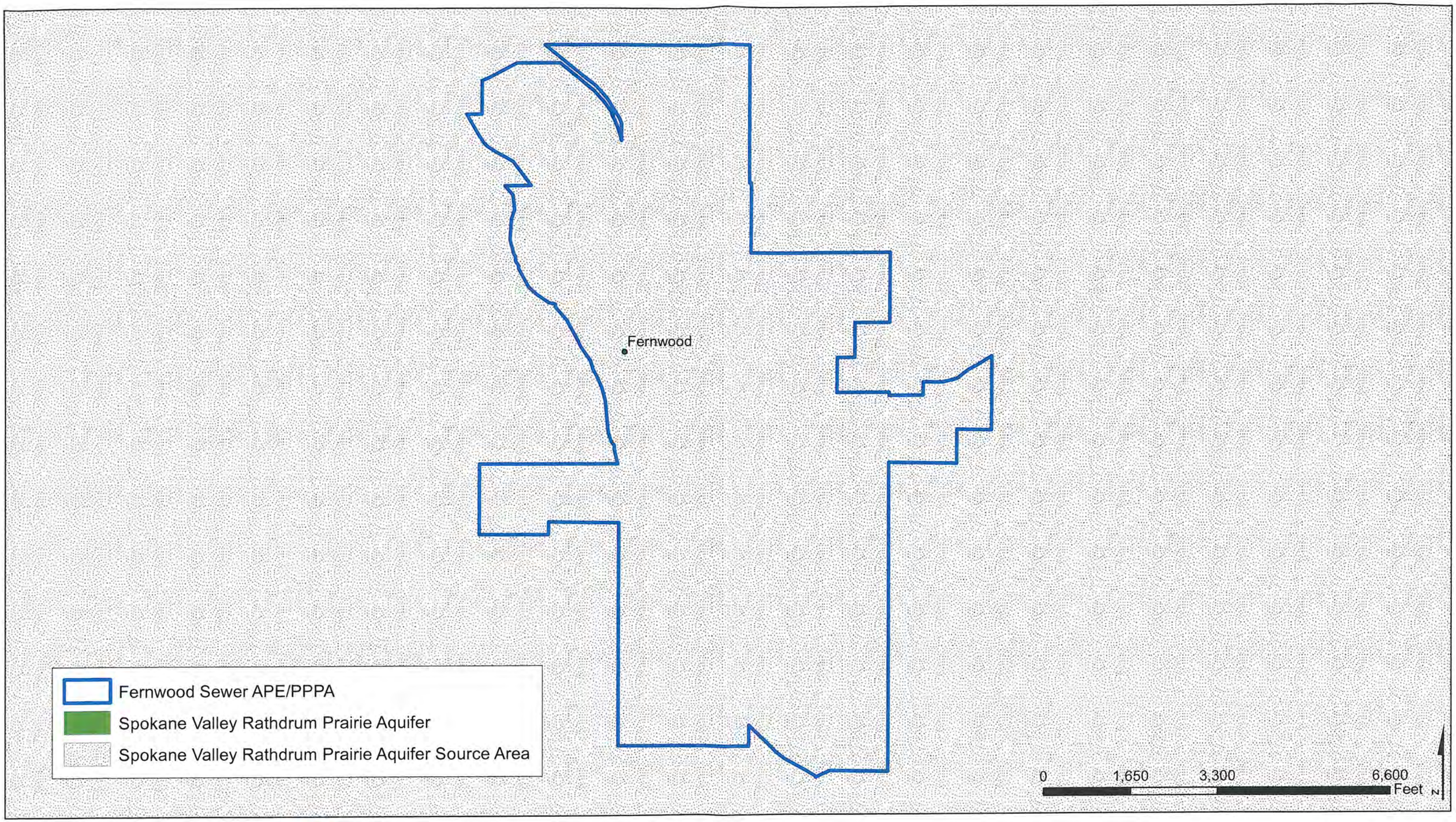
Spokane-Rathdrum Sole Source Aquifer

0 5 10 20 30 40 50 Kilometers

N W E S

Map Created 11/04/2008 EPA Region 10


5
Pedee
Point
Lake
Lake
Parkline
Lake
Omega
Riverdale
Meadowhurst
Milltown
Saint
Maries
Saint
Joe
Jacot Rd
Canyon Creek Rd
Calde
Trout Cr
NFD 351 Rd
St Maries River Rd
Benewah Creek Rd
Blake Draw Rd
Cherry Creek Rd
3
Lotus
Sportsman
Flat Creek Rd
Pettis Peak Rd
Flat
Creek
Benewah
Alder Creek Rd
Alder
Creek
Rover
Cardwell
Zapada Rd
Mica Creek Rd
NFD
Hoobson Rd
Loop Rd
Mashburn
Wayland
Renfro Creek Rd
Santa
Renfrew
Blackwell Divide Rd
North
South
Ski Bowl
Emida
Tyson Creek
Station
Crystal Peak Rd
Fernwood
Creek Rd



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350 E. Kathleen Ave.
Coeur d'Alene, ID
83815

208-664-9382
(toll free)
877-815-5762
(fax) 208-664-5946

Fernwood Sewer

Sole Source Aquifer

Sources:
ESRI, Inc.
Idaho State Tax Commission
Environmental Protection Agency, Sole Source Aquifer Program

PROJECT NO.....43007
DRAWN BY.....AW
FILENAME.....FernwoodSewer_Aquifer.mxd
DATE.....6/13/12

Appendix M

Public Participation Information

- May Newsletter and June Meeting Sign-Ins
- June Meeting Presentation
- Project Status Report
- September Meeting Information
- Revenue Bond Information
- Fernwood Mailing List
- DEQ Correspondence
- Public Comments Received

Fernwood

OCT 28 2011

Volume 1, Issue 1 May, 2011

Fernwood Water & Sewer District
Santa Water & Sewer District
Newsletter

Board of Directors:

Hank Lewis
Chairman

Santa
Mike Spray, Chairman
Lillian Gustin
Rebecca Brusseau
Lola Braden

Fernwood
Hank Lewis, Chairman
Judi Schaum
Dale Hawkins
Francine Mills

Fernwood Water & Sewer District
Santa Water & Sewer District
Informational Meeting

6:00 pm
on
June 14 , 2011
At the CAF building

Fernwood Water & Sewer District
Santa Water & Sewer District

P.O. Box 215
Fernwood, Idaho 83830

Phone: 208/245-3554
Email: santawood@cpcinternet.com

Introduction

In 2009, Idaho Department of Environmental Quality (IDEQ), awarded three grants to the Santa and Fernwood Water & Sewer Districts as follows:

- Santa Water & Sewer District — Sewer Facilities Plan
- Fernwood Water & Sewer District — Sewer Facilities Plan; Water Facilities Plan
- Santa & Fernwood Combined Facilities — Wastewater Facilities Plan

IDEQ now requires all water or wastewater systems proposing system modifications to complete a facility planning document. The Facility Plans analyze the ability of the existing water and wastewater systems to serve both current and anticipated future demands while complying with the Idaho Drinking Water Rules for Public Water Systems. The Facility Plans identified several deficiencies with the existing water and wastewater systems. Therefore, improvements to the system are necessary to bring the system up to current standards.

The Districts' Boards have evaluated several options for improving the water system and the Boards along with the Districts' engineer, Welch Comer Engineers, will present this information to customers at an informational meeting. **The purpose of this newsletter is to invite you to the informational meeting at 6:00 pm, on Tuesday, June 14, 2011 at the CAF building.**

Informational Meeting

The purpose of the informational meeting is to present information about the water and wastewater systems to customers and solicit feedback and answer questions. Welch Comer Engineers will make a brief presentation describing the facility plan process, existing system, deficiencies, proposed improvement options, costs and funding options. The recommended option will also be presented. The Districts' Boards encourages each of you to attend the meeting to learn more details about the existing system and proposed improvements, ask questions and provide feedback to the Boards.

The Boards are taking proactive steps to maintain and improve the ability of our water and wastewater systems to continue to provide safe and reliable service. It is important that the customers are part of that process. We look forward to seeing you at the meeting.

FERNWOOD WATER & SEWER DISTRICT

PHONE (208) 245-3554 Fax (208) 245-1005

SPECIAL MEETING

June 14, 2011

6:00 P.M.

PUBLIC INVITED

AT THE CAF BUILDING

AGENDA

6:00: The meeting will be called to order by Chairman

GUESTS: Katy Baker-Casile-IDEQ
Phil Boyd and Necia Maiani-Welch-Comer

NEW BUSINESS:

Public Informational Meeting Presenting Facility Plans

OPEN FORUM:

Santa water & Sewer District's meetings are handicapped accessible.
If you should need assistance, please call 245-3554
This institution is an equal opportunity provider.
Meetings are recorded.

SANTA –FERNWOOD SEWER PROJECT
REGULAR MONTHLY PUBLIC MEETING
June 14, 2011
SPECIAL INFORMATIONAL MEETING
OPEN TO THE PUBLIC
LOCATED AT THE CAF BUILDING
6:00 P.M.

Members Present: Hank Lewis, Francine Mills, Rebecca Brusseau, Judi Schaum, Lillian Gustin

Staff Present: John Sherman, Operator and Marzetta Reimann, Clerk

GUEST: Necia Maiani and Phil Boyd-Welch-Comer
Katy Baker-Casile-IDEQ
Refer to Public Attending on Sign-In Sheet

The meeting was called to order by Hank Lewis at 6:05

Necia, from Welch-Comer gave a presentation of the deficiencies in the water and sewer system in Fernwood, the deficiencies of Santa's sewer system, and suggestions for the needed improvement to the lagoons.

Necia also presented the "Number 1 Priority Repair Lists" of each entity, the cost to complete the projects, and the amount of time to complete the projects.

Katy was at the meeting to help explain the reasons, of DEQ's respect to the health and safety issues, and how the projects could be financed.

Katy also stated that we would not be allowed any more new connections to the system.

There was a question and answer period allowing the audience to verify/clarify the issues presented to the patrons.

The differences between LID (Land Improvement District) and Bond Levy were explained to the audience, so they could understand the impact on their billing and/or land. The general consensus was to go for the Bond Levy. The election would take place the first part of November, if the Bond Levy passed, we would still have time to apply for Block Grant.

A packet of information on the Facility Study was supplied by Welch-Comer and is included in this months' information

Signed By: Henry Lewis DATE: 6/28/11
Chairman of the Board

SANTA-FERNWOOD SEWER PROJECT

FERNWOOD WATER AND SEWER DISTRICT

SANTA WATER AND SEWER DISTRICT

June 14, 2011

GUESTS SIGN-IN SHEET

1. Doug Stroy
2. Kelly Machado
3. [illegible]
4. Darell [illegible]
5. Serenity Gustin
6. Pat Bashkill
7. Lannie Damiano
8. [illegible]
9. Bob Reinier
10. Peg Nelson
11. Mary Nelson
12. Candy Crocker
13. Linda Michael
14. Ken [illegible]
15.
16.

SANTA-FERNWOOD SEWER PROJECT

SANTA WATER AND SEWER DISTRICT

1. [illegible]
2. [illegible]
3. [illegible]
4. Mildred Sullivan
5. Donald Mills
6. Katy Baker-Basile
7. Freda Ferguson
8. Nico Moran
9. Mark Brusseau
10. Theresa Brusseau
11. Anne Hatter
12. Jill Dawson
13. Ron Hamburger
14. Judyth O'Day
15. Joanne O'Day
16. Roger O'Day

Santa Fernwood Water and Sewer Districts
P.O. Box 215
Fernwood, ID 83830

Addresses for June 14' 2011 meeting

Page One of sign in sheet

1. Mark Turkington
   P.O. Box 446
   Fernwood, ID 83830

2. Emma Williams
   P.O. Box 234
   Fernwood, ID 83830

3. Jimmy Williams
   P.O. Box 234
   Fernwood, ID 83830

4. Mildred Sullivan
   P.O. Box 13
   Santa, ID 83866

5. Donald Mills
   P.O. Box 67
   Fernwood, ID 83830

6. Katy Baker/Casile
   Department of Environmental Quality
   2110 Ironwood Parkway
   Coeur d' Alene, ID 83814

7. Alfreda Ferguson
   P.O. Box 278
   Santa, ID 83866

8. Necia Maiani
   350 E. Kathleen Ave.
   Coeur d' Alene, ID 83815

9. Mark Brusseau
   P.O. Box 295
   Fernwood, ID 83830

10. Theresa Brusseau
    P.O. Box 295
    Fernwood, ID 83830

11. Anna Hatton
    P.O. Box 38
    Fernwood, ID 83830

12. Jill Hanson
    500 E. Sheep Creek
    Santa, ID 83866

13. Ron Hamberger
    500 E. Sheep Creek
    Santa, ID 83866

14. Bridgett O'Dwryer
    P.O. Box 201
    Santa, ID 83866

15. Joanne O'Dwryer
    P.O. Box 183
    Fernwood, ID 83830

16. Roger O'Dwyer
    P.O. Box 183
    Fernwood, ID 83830

Page Two of sign in sheet

1. Doug Strong
   P.O. Box 115
   Fernwood, ID 83830

2. Kelly Machado
   P.O. Box 399
   Fernwood, ID 83830

3. Unknown
   Not legible

4. Not legible

5. Serenity Gustin
   P.O. Box 284
   Fernwood, ID 83830

6. Pat Gaskill
   P.O. Box 314
   Fernwood, ID 83830

7. Tammie Damiano
   P.O. Box 22
   Santa, ID 83866

8. Dave Resser
   P.O. Box 113
   Santa, ID 83866

9. Brian Primier
   468 Elkhorn Meadows Rd.
   Fernwood, ID 83830

10. Peg Nelson
    P.O. Box 56
    Fernwood, Id 83830

11. Marv Nelson
    P.O. Box 56
    Fernwood, ID 83830

12. Candy Crocker
    P.O. Box 128
    Fernwood, ID 83830

13. Linda Mitchell
    P.O. Box 238
    Fernwood, ID 83830

14. Ken Mitchell
    P.O. Box 387
    Fernwood, ID 83830

15. Bill Burke
    Idaho Rural Water Association
    6065 W. Corporal Lane
    Boise, ID 83704

Fernwood Water & Sewer District

Santa Water & Sewer District

Water & Wastewater System Plans Public Informational Meeting

June 14, 2011

WELCH-COMER

ENGINEERS | SURVEYORS

Introductions

- Fernwood Water & Sewer District Board Members
  - Hank Lewis, Chairman
  - Judi Schaum
  - Dale Hawkins
  - Francine Mills
- Santa Water & Sewer District Board Members
  - Mike Spray , Chairman
  - Lillian Gustin
  - Rebecca Brusseau
  - Lola Braden
- Santa/Fernwood Staff
  - John Sherman, Operator
  - Marzetta Reimann, District Secretary
- Necia Maiani, P.E. – Sr. Project Manager
- Phil Boyd, P.E. – President & Principal Engineer
- Katy Baker-Casile, P.E. – Department of Environmental Quality

WELCH-COMER ENGINEERS | SURVEYORS

Agenda

1. Background/Facility Planning Process
2. Deficiencies and Recommended Improvements
   - Santa Sewer
   - Fernwood Sewer
   - Santa/Fernwood Wastewater Treatment
   - Fernwood Water
3. District Financing
   - Review District Boundary and Service Area
   - Financing Methods
4. Potential Funding Sources and Scenarios (Grants and Loans)
5. Potential Schedule

WELCH-COMER
ENGINEERS | SURVEYORS

Background

- The Water and Sewer Districts applied for and received 50% Planning Grants in 2009 from the Idaho Department of Environmental Quality to complete Facility Plans for the Following:
  - Santa Water and Sewer District
    - Santa Sewer System
  - Fernwood Water and Sewer District
    - Fernwood Water System
    - Fernwood Sewer System
  - Santa and Fernwood Wastewater Treatment Plant

What is a Facility Plan?

- Evaluation of the existing system capacity to serve current and projected demands per Idaho Rules defined within IDAPA (Idaho Administrative Procedures Act).

Why Prepare a Facility Plan?

- Determine if existing facilities adequately serve existing customer base and meet IDAPA rules
- Determine if existing facilities can serve projected growth
- Determine what deficiencies exist with respect to the above
- Determine improvements to address deficiencies and when they may be required and how to implement/finance improvements
- IDEQ requires systems that plan to add connections or make substantial changes to prepare a Facility Plan

"Key" System Evaluation Criteria - Sewer

- Lift Stations (IDAPA)
  - Pumping capacity: Must provide peak hourly flow with any pump out of service
  - Site Access: Accessible during all weather conditions
- Collection System
  - Infiltration & Inflow (I&I): EPA guideline for excessive Infiltration and Inflow is 690 gpd/EDU
- Wastewater Treatment Plant
  - Discharge of:
    - E.Coli Bacteria – Disinfection (NPDES)
    - Flow Monitoring (NPDES)
    - Lagoon Seepage (IDAPA)
    - Lagoon Storage Capacity
- General: Depreciation (worn out components that require replacement)

"Key" System Evaluation Criteria - Water

- Source Capacity (IDAPA)
  - Groundwater Source Redundancy: Must supply maximum day demand with any source out of service
- Storage Capacity (IDAPA)
  - Operating Storage
  - Equalization Storage
  - Standby Storage
  - Fire Suppression Storage
- Distribution System (IDAPA)
  - Min Peak Hour Pressure: 40 psi
  - Min Fire Flow Pressure: 20 psi
  - Min Water Main Size: 3 inches
  - Min Water Main Size with Fire Hydrants: 6 inches
- General: Depreciation (worn out components that require replacement)

Santa Sewer

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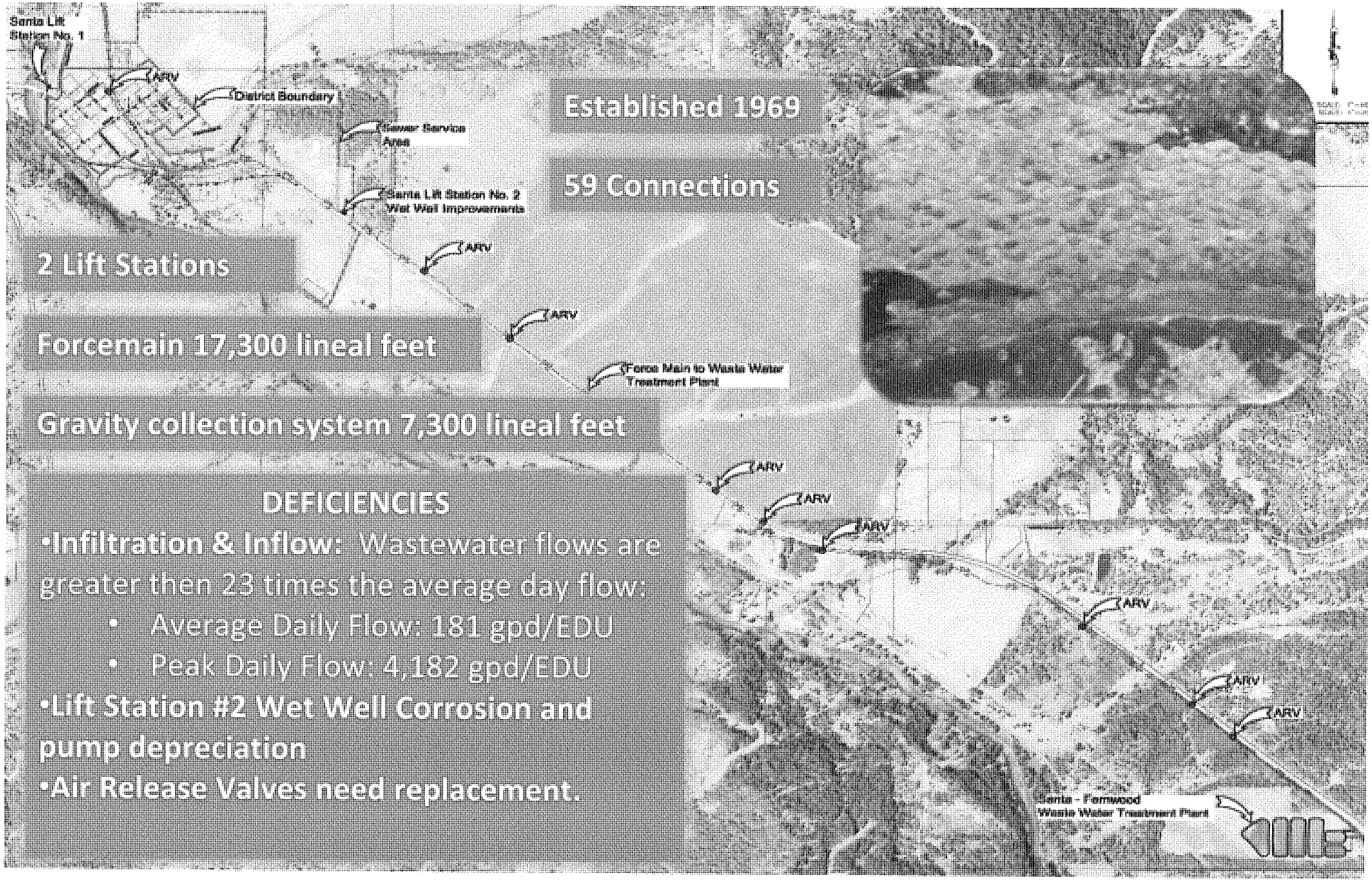
Santa Sewer



Established 1969

59 Connections

2 Lift Stations

Forcemain 17,300 lineal feet

Gravity collection system 7,300 lineal feet

DEFICIENCIES

- **Infiltration & Inflow:** Wastewater flows are greater then 23 times the average day flow:
  - Average Daily Flow: 181 gpd/EDU
  - Peak Daily Flow: 4,182 gpd/EDU
- **Lift Station #2 Wet Well Corrosion and pump depreciation**
- **Air Release Valves need replacement.**

Santa Sewer Improvement Alternative Capital Costs

Improvement	Purpose	Total Estimated Project
Block Manhole Replacement	Replacement of existing block manholes which are a source of I&I.	$103,800
Sewer Main Replacement	Replacement of old concrete sewer main that is contributing to I&I.	$361,200
Lift Station 2 Wet Well Replacement	The concrete wet well at Lift Station #2 is being corroded by the hydrogen sulfide gas.	$57,300
Force Main/Air Vac Valves	(8) ARV valves are 30 years old and very likely need repair/replacement.	$20,400
Annexations	Revise District boundary so all current customers are included in the District.	$19,000
Total Selected Improvements		**$561,700**

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» Fernwood Sewer

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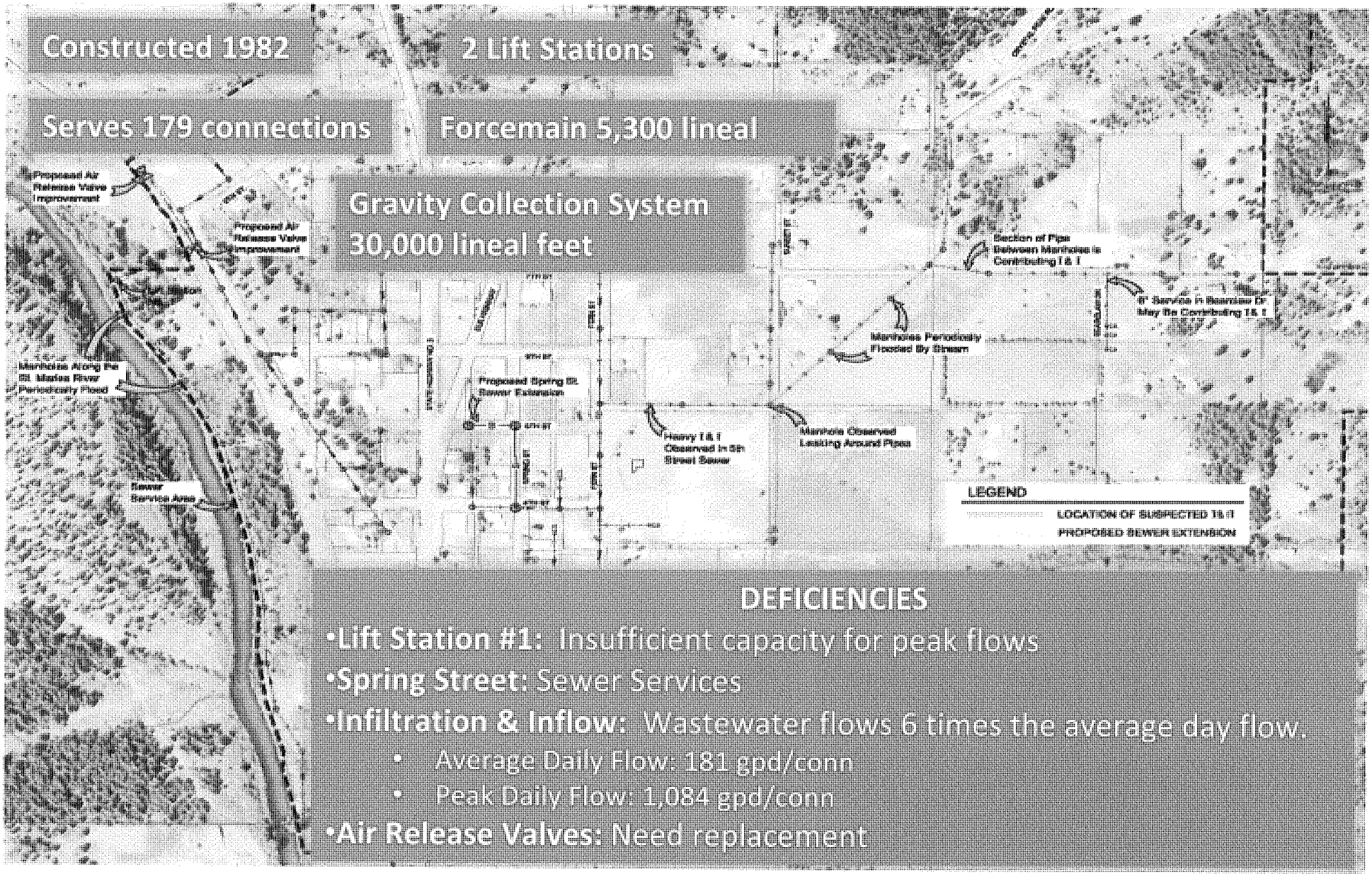
Fernwood Sewer Deficiencies and Recommendations



DEFICIENCIES

- **Lift Station #1:** Insufficient capacity for peak flows
- **Spring Street:** Sewer Services
- **Infiltration & Inflow:** Wastewater flows 6 times the average day flow.
  - Average Daily Flow: 181 gpd/conn
  - Peak Daily Flow: 1,084 gpd/conn
- **Air Release Valves:** Need replacement

Fernwood Sewer Improvement Alternative Capital Cost

Priority	Improvement	Purpose	Total Estimated Project
1	Fernwood Lift Station #1	Increase pumping capacity to meet peak wastewater flows and reduce flooding risk.	$563,200
2	Manhole Repair/Grouting	Repair manholes that are not properly sealed and are a significant source of I&I.	$30,900
	Sewer Main Replacement	Replacement of damaged and broken sewer main that is contributing to I&I.	$103,000
3	Force Main/Air Vac Valves	Two ARV valves are 30 years old and very likely need repair/replacement.	$6,800
	Spring Street Sewer Main Extension	Reconnect two existing services at adequate grade and provide for additional sewer connections.	$50,900
		Total Selected Improvements	**$651,800.00**

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Santa & Fernwood Wastewater Treatment

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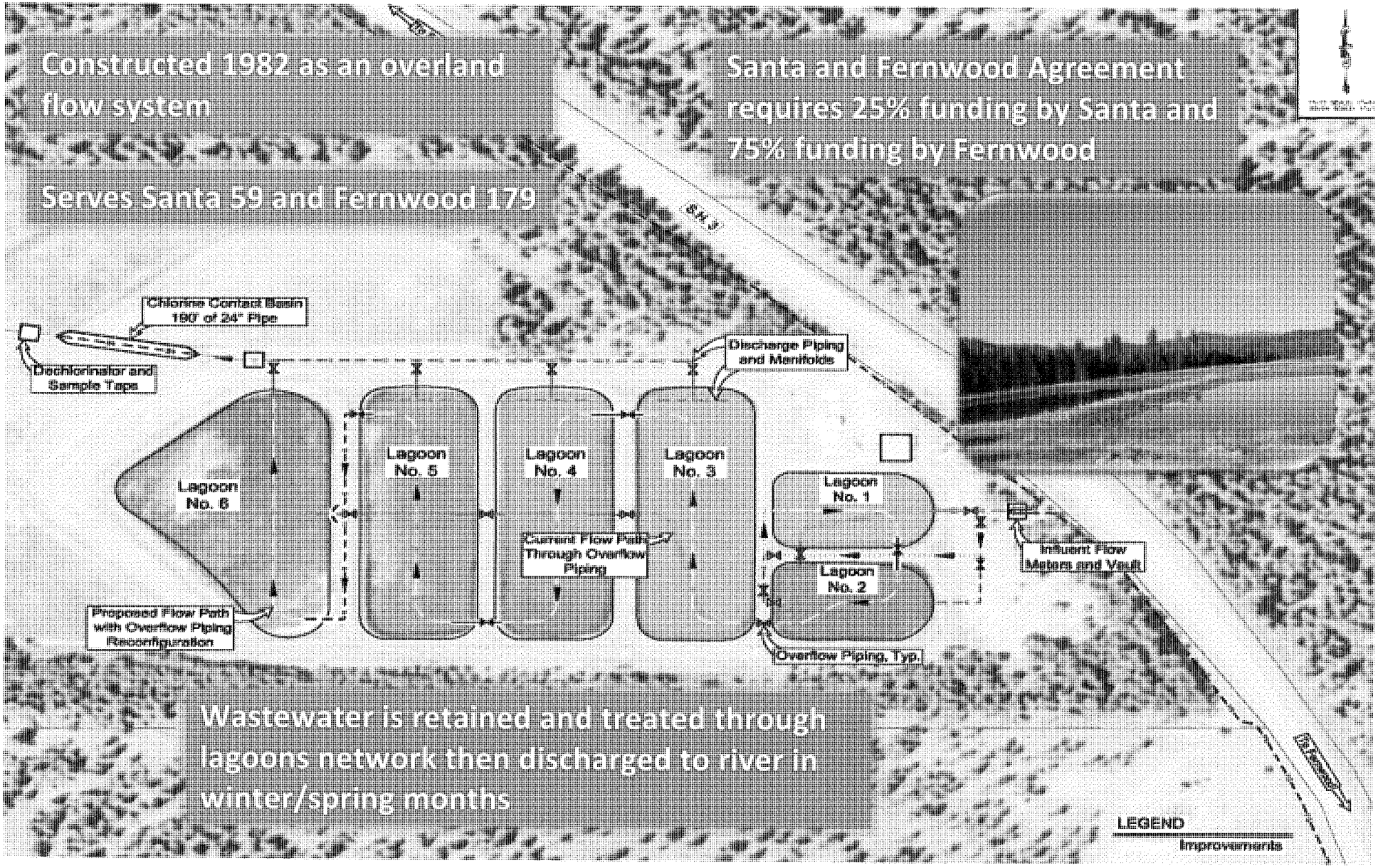
Santa/Fernwood Wastewater Treatment

Constructed 1982 as an overland flow system

Serves Santa 59 and Fernwood 179

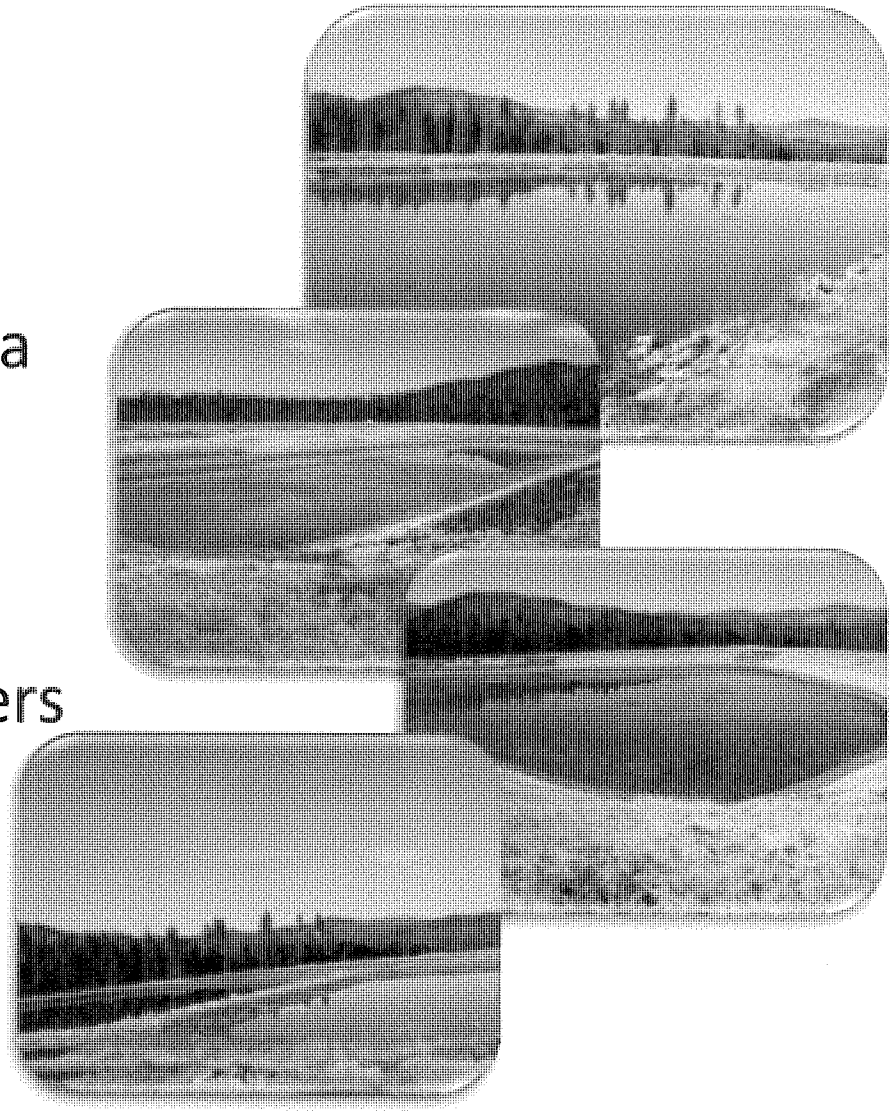
Santa and Fernwood Agreement requires 25% funding by Santa and 75% funding by Fernwood



Wastewater is retained and treated through lagoons network then discharged to river in winter/spring months

Santa & Fernwood Wastewater Treatment Facility Deficiencies

- Lagoon Short Circuiting
- Disinfection Contact Time: The system does not have a chlorine contact basin.
- No Influent Flow Meters
- Lagoon Seepage Tests/Liners



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Santa/Fernwood Wastewater Treatment Improvement Alternative Capital Costs

Priority	Improvement	Purpose	Total Estimated Project
1	Lagoon Overflow Piping Modifications	Reduce lagoon short circuiting to provide better treatment.	$69,800
	Lagoon Leak Test (Districts' Share)	Lagoon leak test as required by DEQ rules.	$5,200
	Influent Flow meters	Provide reliable influent flow monitoring as required by the NPDES Discharge Permit.	$32,300
	Chlorine Contact Basin	Additional chlorine contact time is necessary to provide adequate disinfection	$78,600
	Lagoon Lining (All Cells, Pending Results of Seepage Test)	Depending on the results of the seepage testing, some or all of the lagoons may need to be sealed with an HDPE liner.	$549,900
		Total Selected Improvements	**$735,800**
		Santa (25%)	**$183,950**
		Fernwood (75%)	**$551,850**

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Fernwood Water

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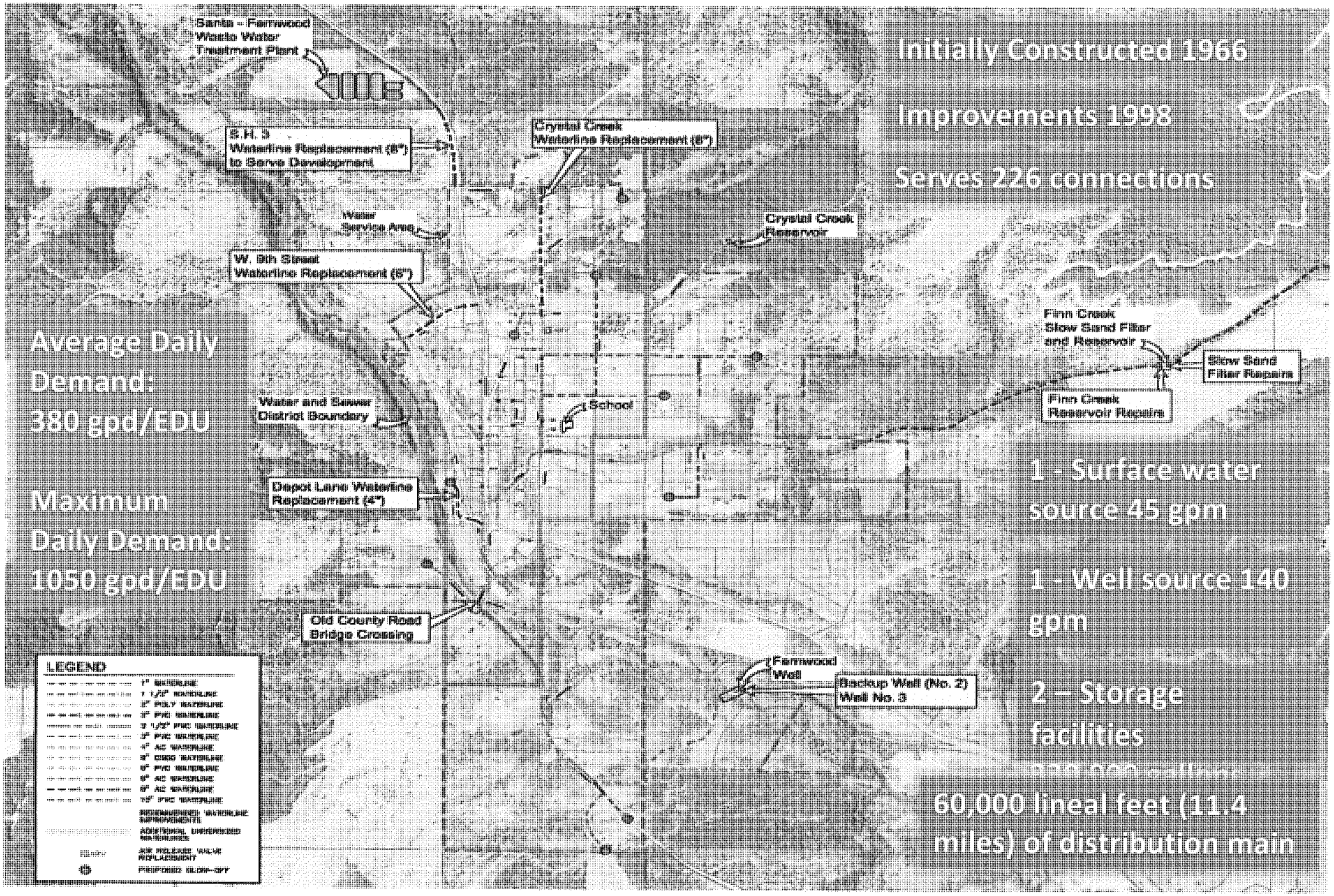
Fernwood Water Recommendations



Initially Constructed 1966

Improvements 1998

Serves 226 connections

Average Daily Demand: 380 gpd/EDU

Maximum Daily Demand: 1050 gpd/EDU

1 - Surface water source 45 gpm

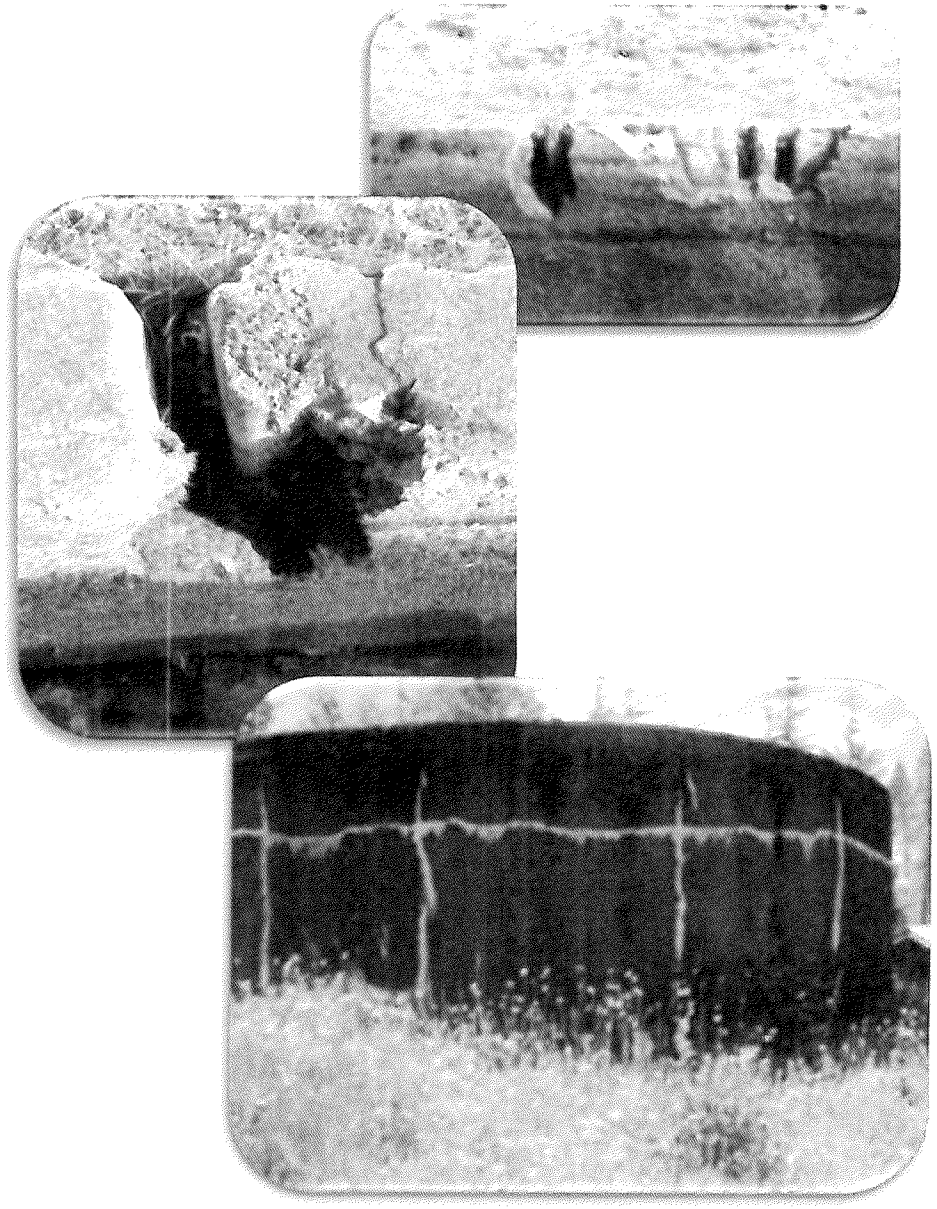
1 - Well source 140 gpm

2 – Storage facilities

60,000 lineal feet (11.4 miles) of distribution main

Fernwood Water Deficiencies

- Source:
  - A second (backup) well source is required to meet existing peak day demands. (No additional connections can be added until this is addressed)
  - Various repairs are needed at the slow sand filter.
- Storage:
  - Leak repair and access improvements at the Finn Creek reservoir



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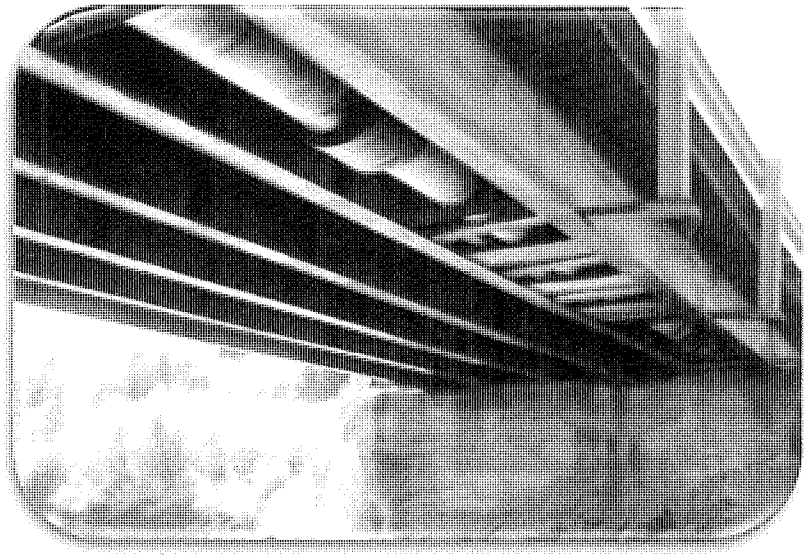
Fernwood Water Distribution "Deficiencies"

- River Crossing
- Air Release Valves and Dead End Mains
- Meters and Services
- Undersized Mains



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Fernwood Water Improvement Alternative Capital Cost

Priority	Improvement	Purpose	Total Estimated Project
1	Bridge Crossing	The county is relocating/replacing the Old County Road Bridge.	$140,100
	Back Up Source	Back up source capacity is required to meet DEQ groundwater source redundancy rule.	$195,700
2	ARV's	DEQ has identified several ARV's as potential sources of contamination.	$64,400
	Meters	Replacement of aging /inaccurate service meters (whole system)	$309,000
	Meters	Replacement of aging/inaccurate service meters (w/water main replacements)	$265,700
	Tank Repairs	Water is seeping through cracks in the reservoir. Access hatch improvements.	$77,300
	Sand Filter Repairs	The top rows of bricks around slow sand filter are deteriorated and need replaced.	$36,400
	Depot Lane	Waterline less than minimum size allowed by DEQ and is leaking (740 lf)	$55,500
	9th Street	Waterline less than minimum size allowed by DEQ and is partially blocked (1000 lf)	$87,100
3	Crystal Creek Waterline	Provide 1,000 gpm fire flow to Crystal Creek Rd. fire hydrants (currently 450 gpm)	$120,800
	Other Undersized Mains	Additional 8,600 lf of waterline is less than DEQ minimum.	$533,500
	Sand Filter Enclosure	DEQ highly recommends the filter be enclosed to improve performance and security.	$230,200
	Annexation	Revise District boundary to include all current customers.	$23,000
		Total Improvements	$2,138,700
		Total Selected Improvements	$988,500

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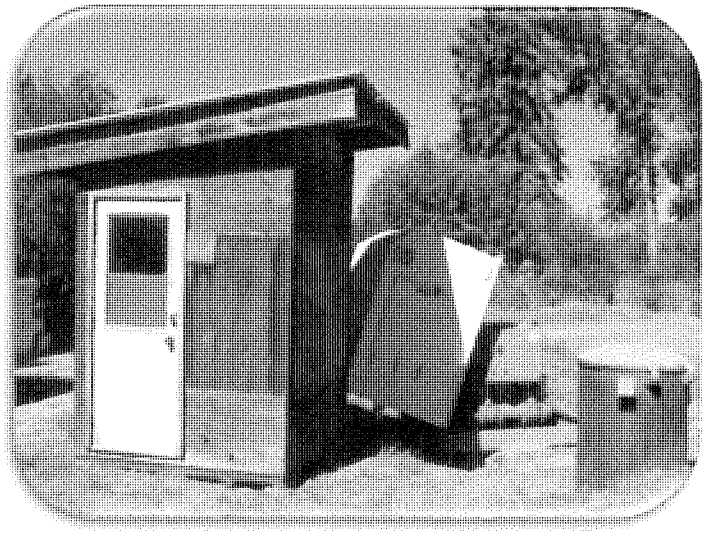
Benefits of Completing Improvements

- **Sewer**
  - Protection of public health
  - Comply with State and Federal permits and prevent enforcement action
  - Reduce I&I, operating and treatment free up system capacity
  - Improve system reliability



- **Water**
  - Bring system source capacity up to current state standards
  - Improve system reliability
    - Available back up source capacity to support maximum day demands if primary source fails
  - Improve fire flow to portions of the system
  - Repair/Replace depreciating system components

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Available Funding

- Both Districts have been placed on IDEQ's FY 2012 funding list
- Funding terms for the Districts are 2% for 30 years with principal forgiveness
- If Districts choose to move forward funding would be available after July 1, 2011. Must be obligated by June 30, 2012

SUMMARY COSTS FOR SELECTED IMPROVEMENTS BASED ON AVAILABLE FUNDING (DEQ Loan – 2% for 30 years with Principal Forgiveness)

		Total Project (Before Grants) (Selected Improvements)		Total Project (After Loan Forgiveness)
Santa-Fernwood				
WWTP	$	735,800	$	672,742
Santa	$	183,950	$	168,185
Fernwood	$	551,850	$	504,556
Santa				
Sewer	$	561,700	$	513,562
Fernwood				
Water	$	988,500	$	873,656
Sewer	$	651,800	$	595,941
Total Selected Improvements	$	2,937,800	$	2,655,901

Savings $282,000 or approximately 10% of project

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District Financing

- Review
  - District Boundaries
- Benefits of Matching Service Area
- Steps to Resolve Boundary
- District Financing Methods
  - Revenue Bond
  - Local Improvement District

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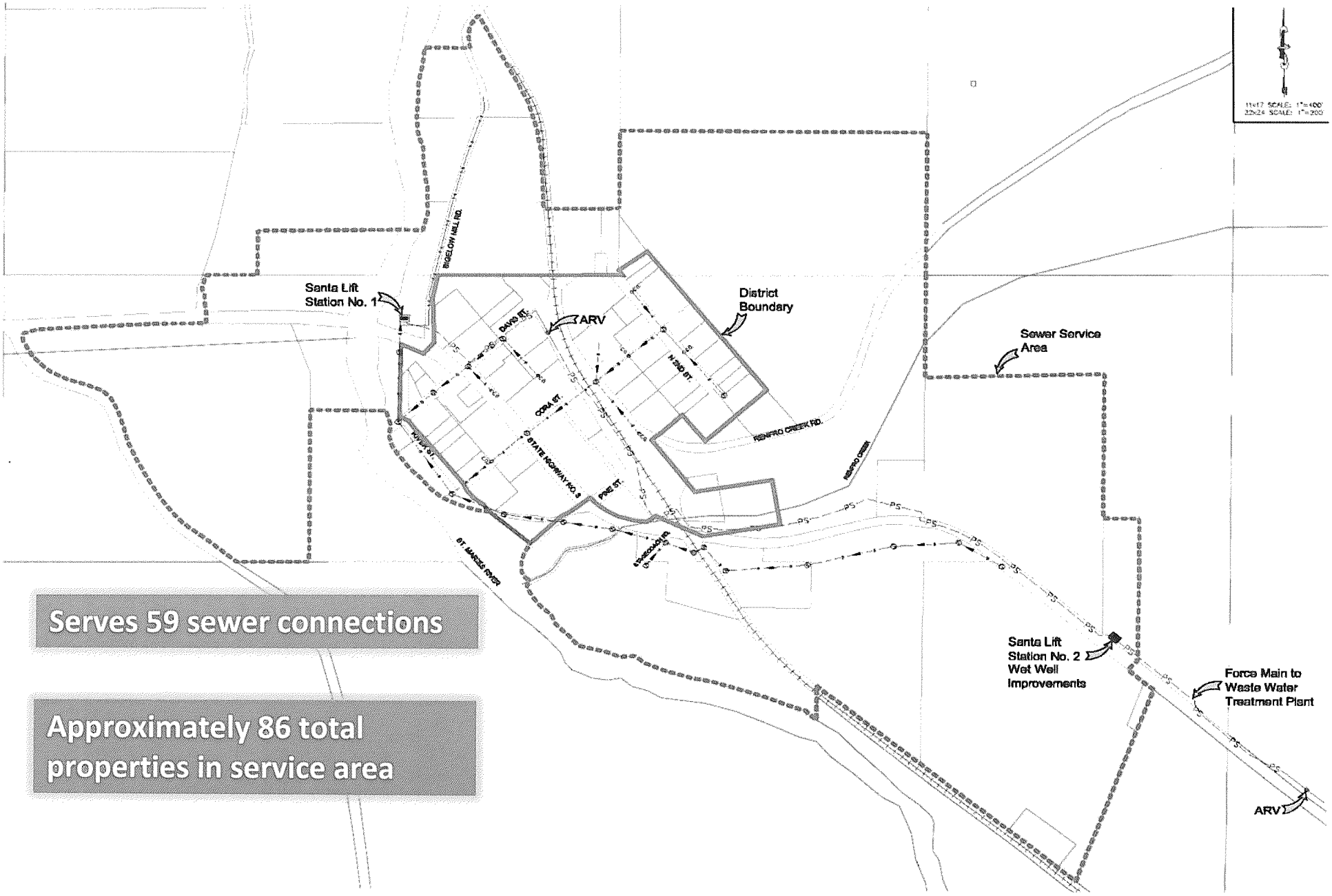
Santa Water and Sewer District Boundary

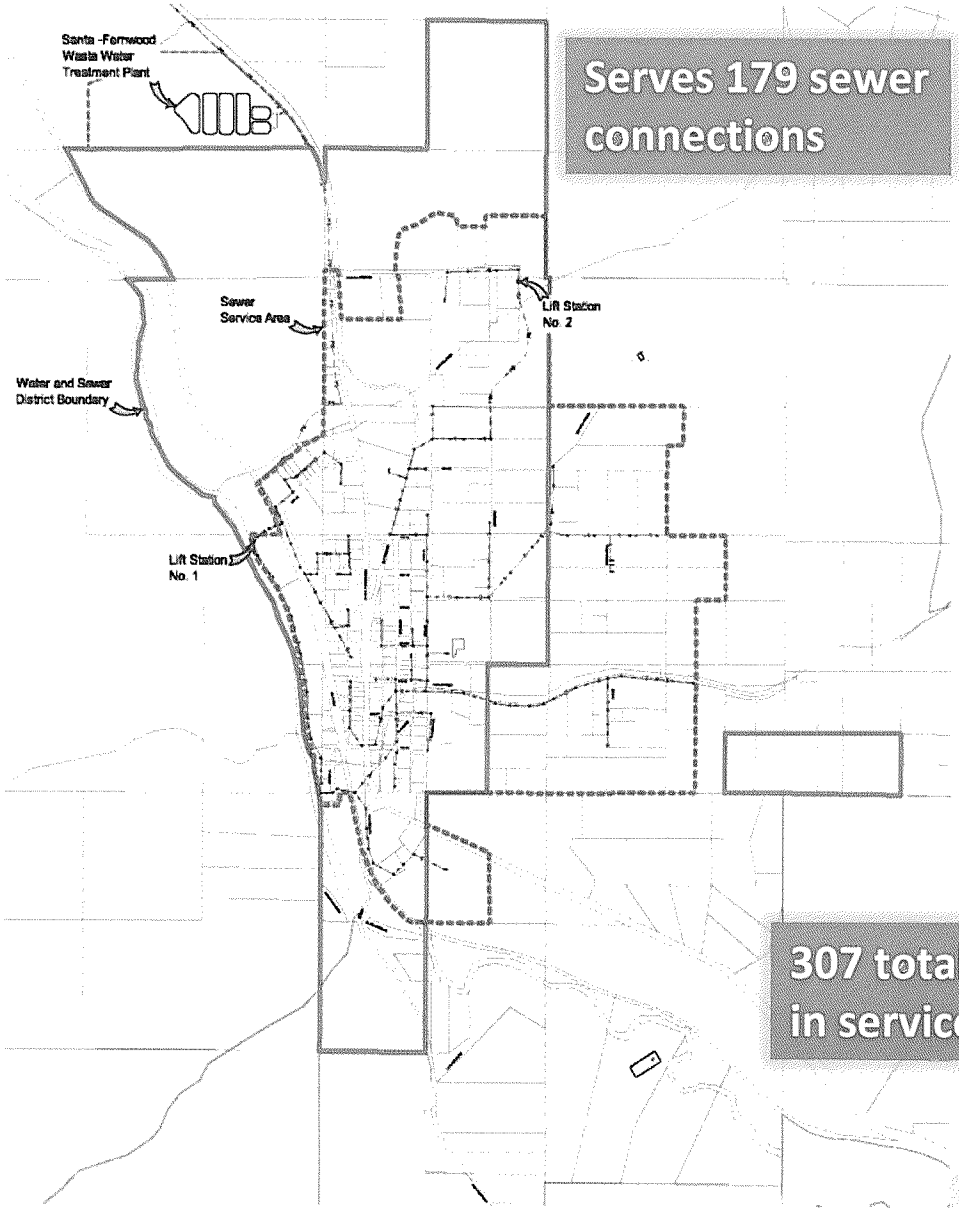


Serves 59 sewer connections

Approximately 86 total properties in service area

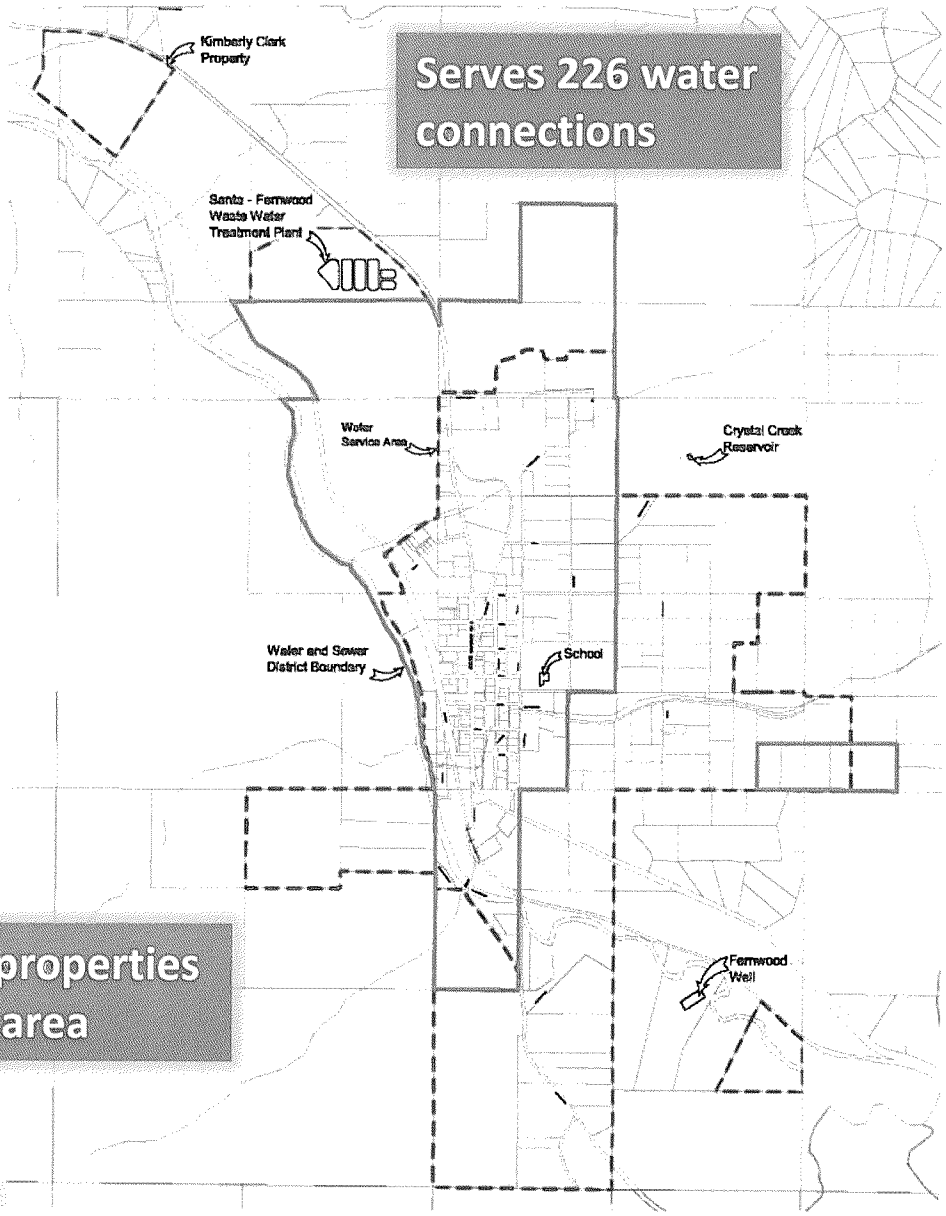
Fernwood Water and Sewer District Boundary

Sewer Service Area/Boundary



Serves 179 sewer connections

Water Service Area/Boundary



Serves 226 water connections

307 total properties in service area

Steps to Resolve Boundary

- Annexation Procedure
  - District receives land owner petitions from 60% of land area.
  - Board conducts hearing.
  - Board decides on whether to annex.

Note: Could also conduct an election if 20% of registered voters sign a petition to be annexed.

Benefits of Annexing into District

- Parcels currently served get voting rights
- Incorporate vacant parcels that front existing infrastructure and benefit and receive value from facilities (Distribute costs of improvements over more parcels)

District Financing Methods

- Revenue Bond
  - Requires voter authorization to borrow funds to complete major improvements
  - Only in-District eligible voters vote
  - Monthly rate increase to cover loan debt service
  - Out of District parcels still pay same (or higher) rates
- Local Improvement District
  - Formed only over District parcels
  - One time payment or annual payment option for in-District parcels
  - Outside parcels pay monthly at a potentially higher rate

Santa Estimated Rate Impact for Selected Improvements

	DEQ 2% OVER 30 YEARS WITH PRINCIPAL FORGIVENESS				
	Revenue Bond Santa	LID Santa		Revenue Bond Santa	LID Santa
WWTP EDU	59	72	Sewer EDU	59	72
Selected Improvements			Selected Improvements		
One Time Assessment	N/A	$2,336	One Time Assessment	N/A	$7,133
Annual Assessment	N/A	$104	Annual Assessment	N/A	$318
Monthly Payment (or Equivalent)	$10.61	$8.69	Monthly Payment (or Equivalent)	$32.39	$26.54
Total Rate Increase for Selected Improvements	$10.61	$8.69	Total Rate Increase for Selected Improvements	$32.39	$26.54

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Santa Selected Improvements Estimated Total Monthly Increase

(Based on IDEQ Loan – 2% for 30 years with Principal Forgiveness)

Total Rate Increase (Monthly Equivalent)		
	Revenue Bond	LID
Water	N/A	N/A
Sewer	$32.39	$26.54
WWTP	$10.61	$8.69
Total	$ 42.99	$ 35.23

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Fernwood Estimated Rate Impact for Selected Improvements

DEQ 2% OVER 30 YEARS WITH PRINCIPAL FORGIVENESS								
	Revenue Bond	LID		Revenue Bond	LID		Revenue Bond	LID
WWTP EDU	179	193	Sewer EDU	179	193	Water EDU	226	250
Selected Improvements			Selected Improvements			Selected Improvements		
One Time Assessment	N/A	$2,614	One Time Assessment	N/A	$3,088	One Time Assessment	N/A	$3,495
Annual Assessment	N/A	$117	Annual Assessment	N/A	$138	Annual Assessment	N/A	$156
Monthly Payment (or Equivalent)	$10.49	$9.73	Monthly Payment (or Equivalent)	$12.39	$11.49	Monthly Payment (or Equivalent)	$14.38	$13.00
Total Rate Increase for Selected Improvements	$10.49	$9.73	Total Rate Increase for Selected Improvements	$12.39	$11.49	Total Rate Increase for Selected Improvements	$14.38	$13.00

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Fernwood Selected Improvements Estimated Total Monthly Increase

(Based on IDEQ Loan – 2% for 30 years with Principal Forgiveness)

Total Rate Increase (Monthly Equivalent)

	Revenue Bond	LID
Water	$14.38	$13.00
Sewer	$12.39	$11.49
WWTP	$10.49	$9.73
Total	$ 37.26	$ 34.22

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Ways to Reduce Rate Increase/Impact for Proposed Improvements

- Consolidate outstanding loans
- Apply for additional/other funding/grants
- Board will look for ways to complete smaller improvements in-house to keep costs down
- Phase improvements over 3 – 4 years
- Phase rate increases over 4 – 5 years starting as early as 2011

* Additionally note that completion of proposed improvements will likely decrease operating and maintenance costs

Other - Additional Potential Funding Sources (Grants and Loans)

- Idaho Community Development Block Grant
  - 30% grants up to $500,000
  - County sponsors application
  - Can only sponsor one entity in a geographic area at a time
  - Applications are due in November of each year
  - Must have selected financing mechanism secured/in place
- USDA-Rural Development
  - 25% grant/75% loan, 40 year term, typically around 4% interest
  - Fiscal year 2012, begins October

Santa Selected Improvements Estimated Rate Increase (USDA Loan and Block Grant)

Total Increase (Monthly Equivalent)	Revenue Bond	LID
Water	$0.00	$0.00
Sewer	$22.63	$18.55
WWTP	$6.83	$5.60
Total	$29.47	$24.15

USDA – 4.5% for 40 years with 25% Grant funds
Block Grant – 30% grant

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Fernwood Selected Improvements Estimated Rate Increase (USDA Loan and Block Grant)

Total Increase (Monthly Equivalent)	Revenue Bond	LID
Water	$9.72	$8.79
Sewer	$8.66	$8.03
WWTP	$7.52	$6.98
Total	$25.90	$23.79

USDA – 4.5% for 40 years with 25% Grant funds
Block Grant – 30% grant

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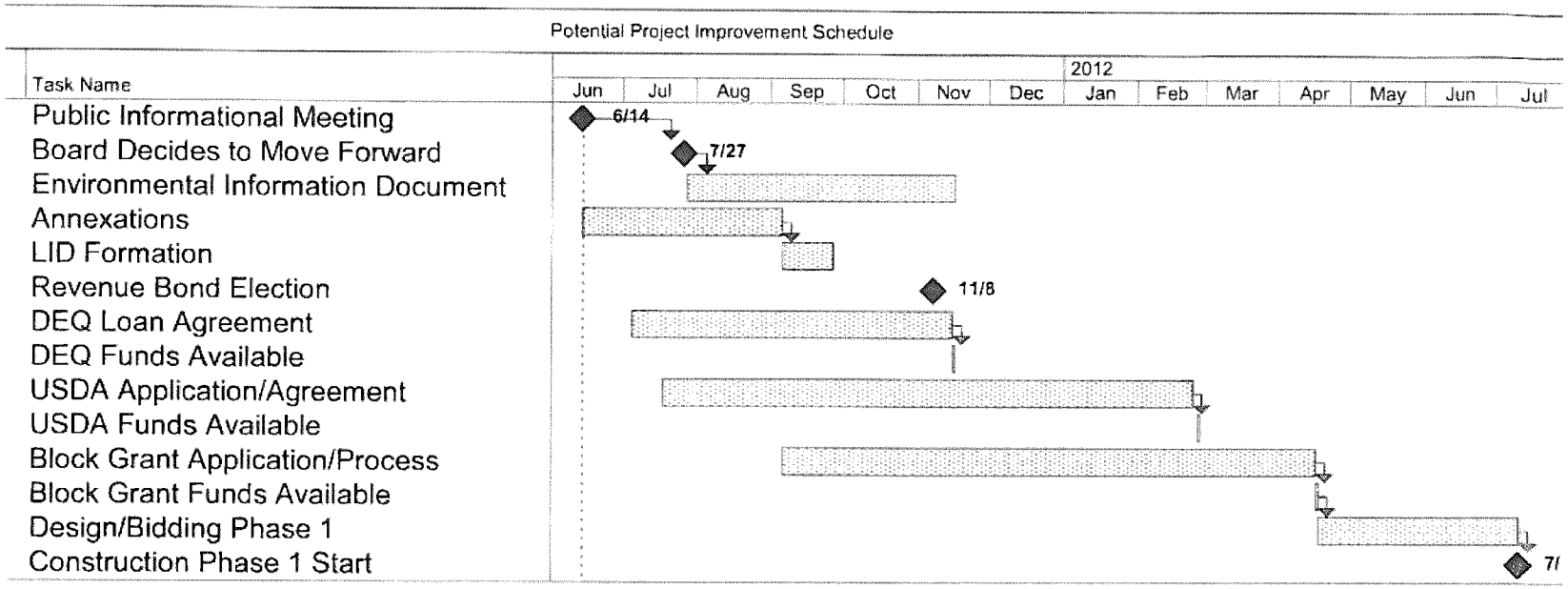
Potential Schedule



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Question and Answer

A copy of this presentation can be viewed online at
www.welchcomer.com/newsletter.html

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Revenue Bond vs. Local Improvement District

Revenue Bond	Local Improvement District
• Election held on Specified Election Dates Set by County • Registered Voters vote • Requires simple majority to pass	• Formed over District Boundary Only • Board passes Resolution of Intent to Form LID • LID Formation Hearing is Published then Held • Board Determines whether to Proceed with Formation Based after Hearing • Requires written protest by 60% of resident property owners or written protest by property owners of 2/3 of the lots and lands • If Protested, County Commissioners would review the formation • Reflected as a lien on the property
Payment:	**Payment:**
• Monthly debt service increase added to the monthly water base rate	• Typically a One-Time (paid right after the LID is closed) or Financed Annual Assessment

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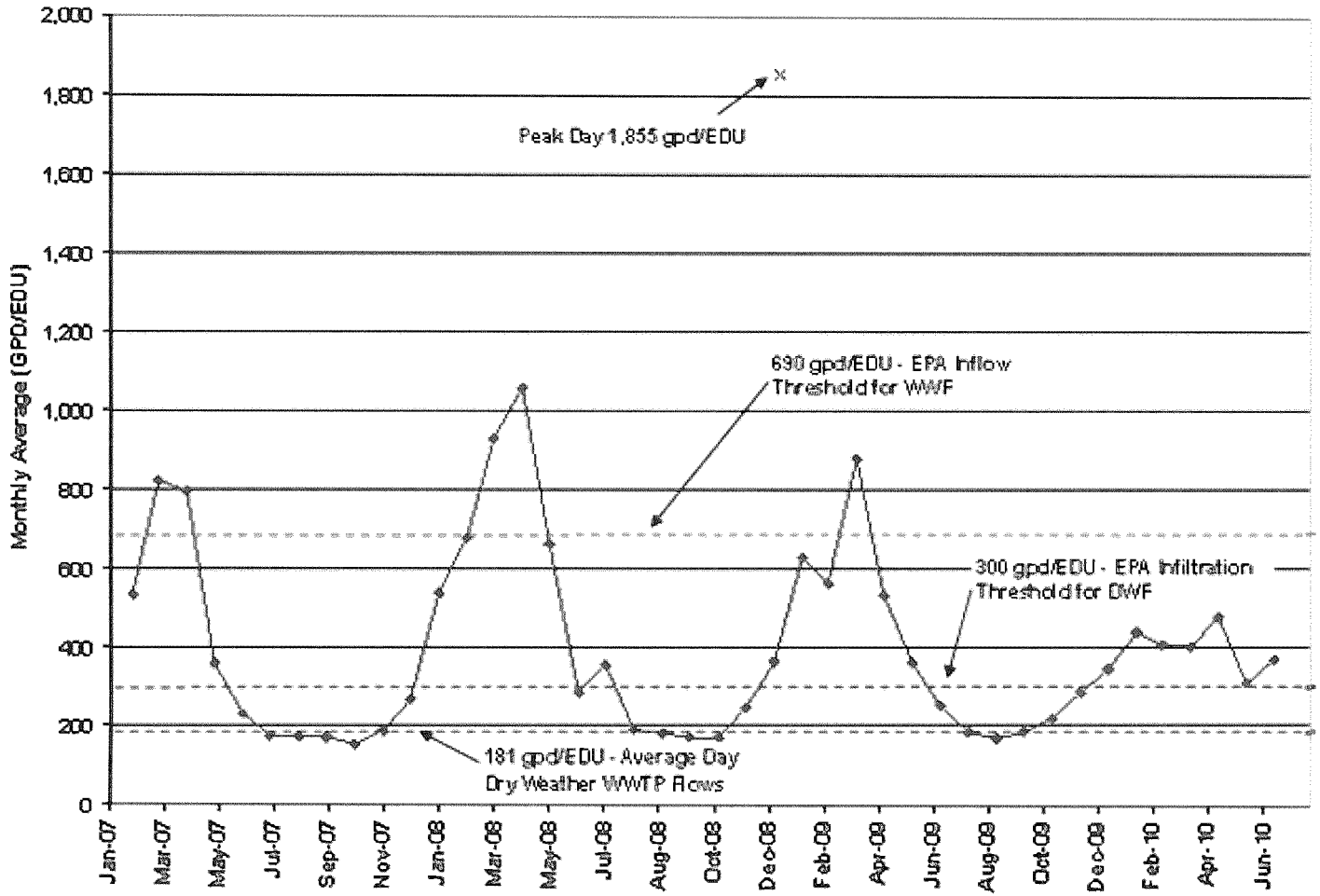
Treatment Facility Wastewater Flow per EDU



1. EPA Infiltration Threshold of dry weather flow (DWF) of 300 gpd/EDU is a 7-14 day average during periods of high groundwater but no rain.
2. EPA Inflow Threshold for wet weather flow (WWF) of 690 gpd/EDU is the peak day flow during a storm event.

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	Santa	Fernwood Water	Fernwood Sewer	Total Sewer
Total Connections (active and inactive) (Water)	N/A	226	N/A	
Total Connections (active and inactive) (Sewer)	59	N/A	179	238
Parcels in District Boundary	54	263	263	317
Parcels in Service Area (i.e. all Parcels fronted by a Water or Sewer Line)	86	307	307	393
minus unbuildable	9	31	31	40
minus potential consolidations or otherwise unbuildable (30% of "Buildable" Unserved Parcels	5	26	83	88
Total Parcels for Potential LID	72	250	193	265
Parcels Added by LID	13	24	14	27
		Limited by Capacity		

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Existing Loan Summary

	Annual Debt Payment	Number of Connections	Monthly $/Connection	Year to be Retired	Financing Organization	Remaining Principal	Current Interest Rate
Fernwood Loans							
Water System Improvement	$33,275	226	$12.30	2029	USDA	$423,315	4.38%
Sewer Project & WWTP	$7,977	179	$3.70	2012	Berkadia	$13,318	
Santa Loans							
Water System Improvements	$5,713	~ 60	~ $7.90	2018	USDA	$34,531	5%
Sewer Project & WWTP	$1,574	59	$2.20	2022	USDA	$13,680	5%

If Santa Loans were Recast at 4.5% for 30 years:

		Revised Monthly Debt Service
Water System Improvements	$34,531	**$2.65**
Sewer Project & WWTP	$13,680	**$1.05**
Total Debt Service:		**$3.70**

Reduction in Current Water and Sewer Debt Service: **$6.40**

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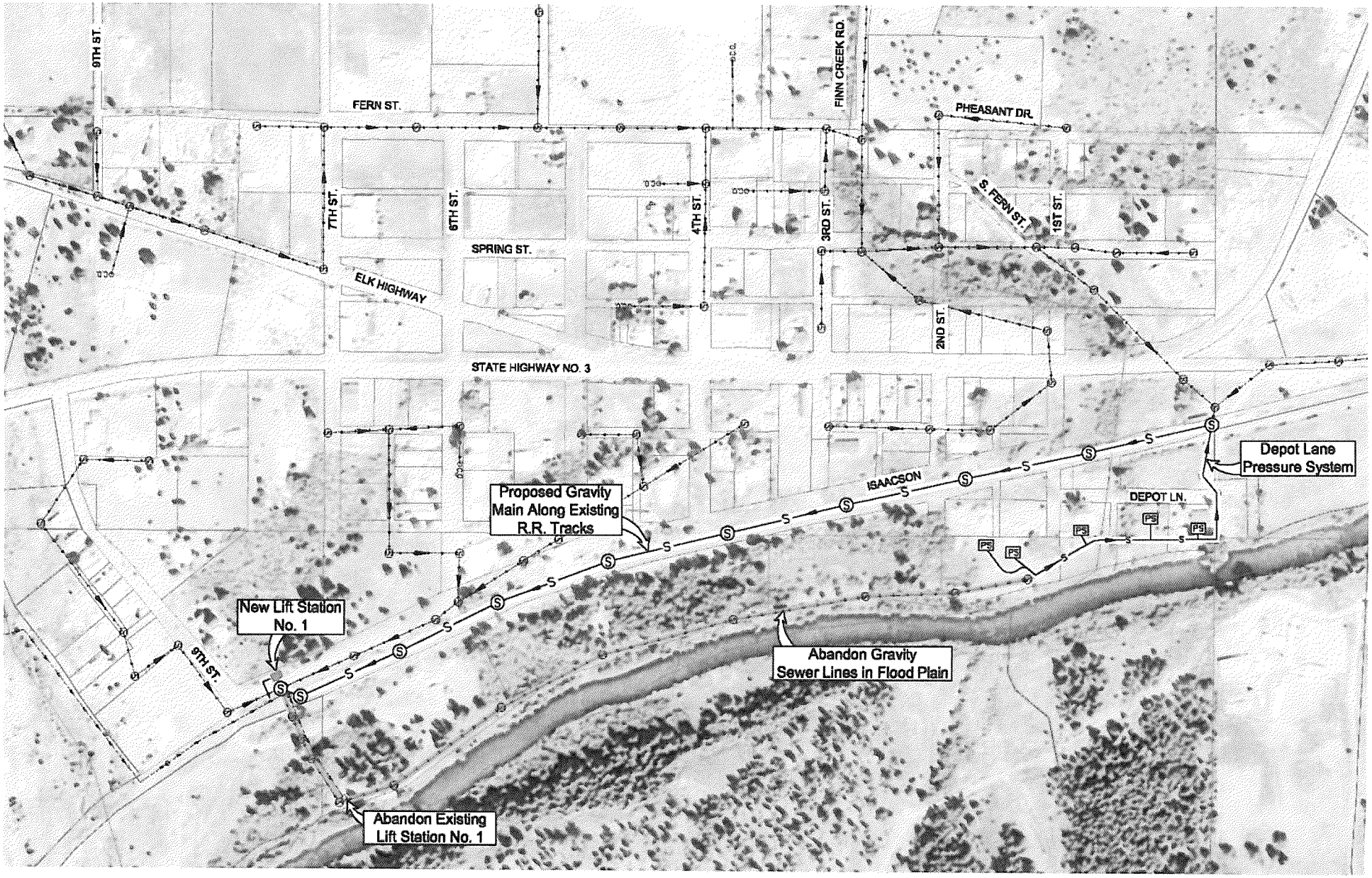
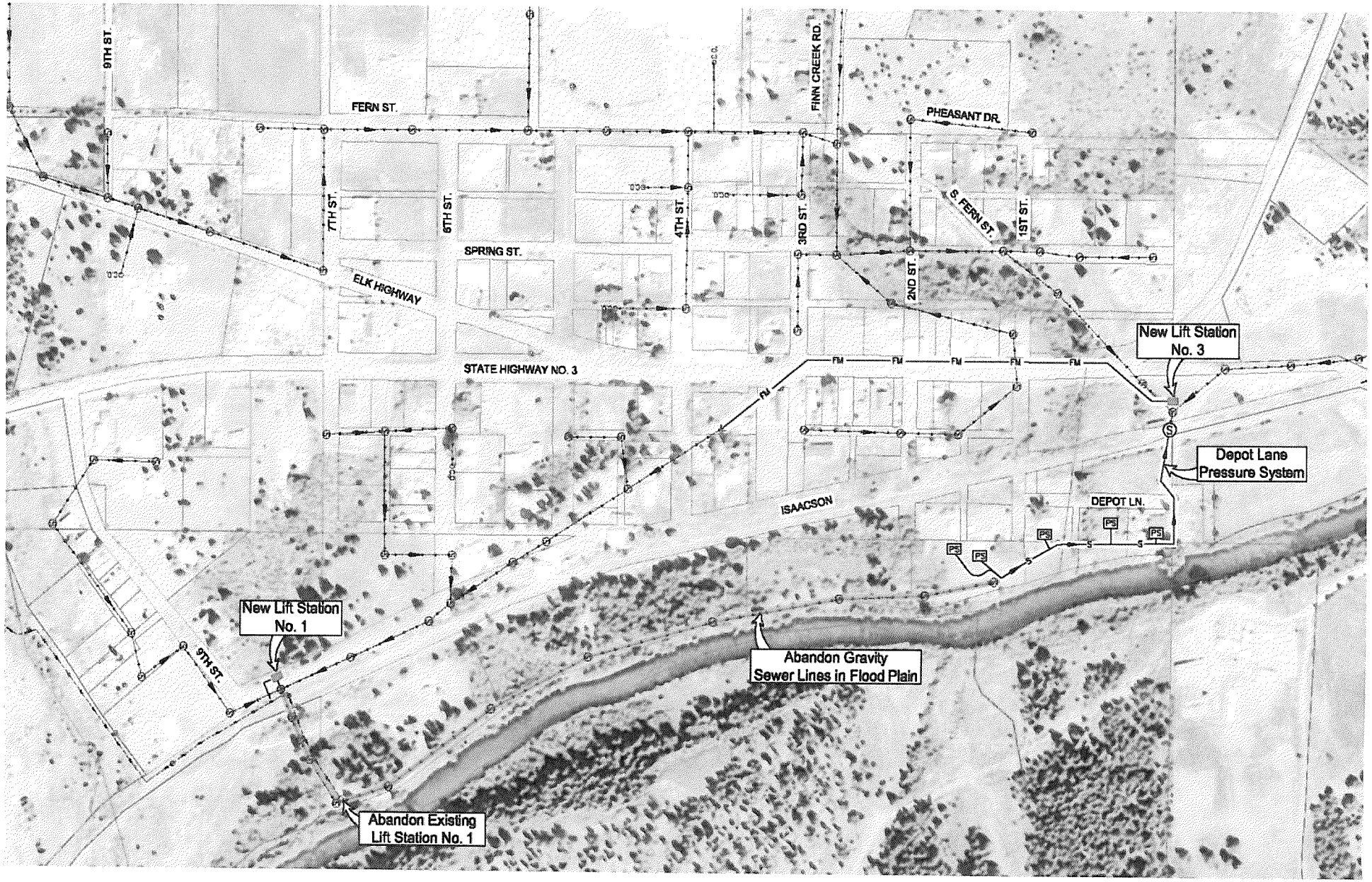
Fernwood Sewer Recommendations



Fernwood Sewer Recommendations



SANTA-FERNWOOD SEWER PROJECT

Fernwood Water and Sewer District

Santa Water and Sewer District

Tuesday, August 2nd

AGENDA

6:00 P.M.

AT THE CAF BUILDING

6:00 P.M.-Chairman Hank Lewis will call the meeting to order.

Guests: Bill Burke with Idaho Rural Water Assn., John Tindall and Katy Baker-Casile with Idaho Department of Environmental Quality and Necia Maiani with Welch-Comer.

- Round Table discussion identifying high priority projects in regards to the facility study and the affordability of the projects.

Open Forum:

The Santa-Fernwood Sewer Project meetings are handicapped accessible.
If you should need assistance, please call the clerk at 245-3554.
"This institution is an Equal Opportunity Provider."
Meetings are recorded.

SANTA-FERNWOOD SEWER PROJECT

1. JOHN TINDALL - DEQ
2. Kathy Baker-Casile - DEQ
3. Steve Coates - Welch Comer
4. Necia Mauch Welch Comer
5. Bill Burke - IRWA
6. Scott O'Leary
7. [illegible]
8. Nancy Corlett
9.
10.
11.
12.
13.
14.
15.
16.

Fernwood Water and Sewer District

Santa-Fernwood Sewer Project

P.O. BOX 215
Fernwood, Idaho 83830

Minutes from the Special Meeting Held August 02, 2011

Hank called the meeting to order at 6:15 P.M.

Board Member Present:
Hank Lewis, Dale Hawkins, Lillian Gustin, Mike Spray, and Rebecca Brusseau

Staff Present:
John Sherman and Marzetta Reimann

Guest: John Tindall and Katy Baker-Casile both from IDEQ, Steve Codes and Necia Maiani from Welch-Comer Engineers, Bill Burke from IRWA, Community Members Scott Whealy, Ray Woodbury and Nancy Corbin

Business:
The Districts discussed the ongoing facility study with IDEQ, Welch-Comer and IRWA making the following changes.

The Santa Water and Sewer District dropped the annexation project and added fixing the districts sewer pumps in pump stations one and two. Welch-Comer will send a revised project scope and an estimated costs schedule that will reflex the changes.

For The Fernwood Sewer system the restructuring of lift station 1's scope was discussed, the scope changed from moving the pump station; to putting a protective dike around it, raising the pump station and the access road to it, which would allow the district to meet the Twenty-Five Year, "Flood Requirement." The district also would do some major repair work to the pump station and pumps. These changes could potentially save the district from $154,700 to $257,000. The district also decided to do the force Main/ Air Vac. Valve Replacements in house.

For The Fernwood Water System the Bridge Project was scratched, the Air Release Valves were removed and the 9th street water line replacement was scratched. The districted requested that Necia from Welch-Comer remove the Depot Lane job and replace it with an Oak Street Water line Replacement. The Sand Filter has been repaired and thus was removed from the repair list.

The Subject of a Back-up Source Well was discussed in detail. John Tindall explained that in order for the District to move forward with expansion the district would need to have a second ground water well source. Mr. Tindall did say that perhaps if the District could show that the existing well could be accessed during a flood event, then perhaps this back-up source well would not be required. Mr. Tindall, made it clear however, that if the district wants to do any new hook-ups that would allow growth,(some in fill water hook-ups would be allowed as long as the" in fill," hook-ups were inside the existing service area with,(adequately sized lines and plenty of water available,) the district would have to address the back up well again or access to the existing well.

For The Santa-Fernwood Sewer Project, the Lagoon Lining Project was put on hold until leak testing of the first three lagoons can be done. Welch-Comer is reluctant to move forward with leak testing as it has not received all of its money from The Fernwood District. The Santa District has expressed a desire to move forward with the leak testing and pay for the first three if at all possible.

Mr. Tindall Said, "That if the districts did not accomplish leak testing by April, 15 of 2012, then the Districts would be out of Compliance.

Mr. Tindall wanted to make sure that the Districts understood that part of IDEQ's; Job in regards to the loans is to make sure that the Districts are in compliance with the IDAPA Rules.

Mr. Tindall and Katy Baker-Casile also said, "That if the district is replacing a water line, with a like kind in the exactly same place, that it would not need to be engineered, and that there is no limit on the footage that can be replaced.

The meeting adjourned at 9:15 P.M.

Chairman of the Board Signature: Henry Tenedo Date: 8/23/11

SANTA WATER & SEWER DISTRICT
FERNWOOD WATER & SEWER DISTRICT
SANTA-FERNWOOD SEWER PROJECT

SPECIAL MEETING
AUGUST 9, 2011
6:30 P.M.
AGENDA

6:00: The meeting will be called to order

GUESTS: NANCY WOLFF, ATTORNEY AT LAW

OLD BUSINESS:

- Choose Bond Attorney to Help With November 8, 2011 Bond Election
- Recap of project totals from Round Table Meeting on August 2, 2011
- Facility Study

NEW BUSINESS:

OPEN FORUM:

Santa water & Sewer District's meetings are handicapped accessible.
If you should need assistance, please call 245-3554
This institution is an equal opportunity provider.
Meetings are recorded.

1. Mary Ohoeff Morris Ohoeff

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Santa Water and Sewer District

Tuesday August 09, 2011

Special Meeting Minutes

6:30 P.M.

AT THE DISTRICT OFFICE

Board members present were: Mike Spray, Lillian Gustin, Rebecca Brusseau, Lola Braden, Dale Hawkins and Hank Lewis

The district chairmen Hank Lewis called the meetings to order @ 6:15 p.m.

Nancy Wolff an attorney, with the Morris and Wolff, firm was here to help the districts wade through the process of choosing Bond Counsel.

Nancy Wolff, reviewed each of the three companies that responded to the request for Proposal. The three companies were Hawley Troxell, Moore Smith Buxton & Turcke, Chartered and K and L Gates. Ms. Wolff explained how she was familiar with each of these firms as she had worked with them in the past. Ms. Wolff had available a score card with specific information and how each firm had responded to the RFQ. Nancy explained how specialized the bond attorneys are. Bond attorneys carry huge amounts of insurance.
Nancy Wolff, carefully explained how each firm responded to the RFQ. Nancy reviewed the pros and cons with each Bond Counsel Attorney Firm.
Nancy explained how the laws had changed regarding the county running the election vs the district running it.
The District decided to vote on whom, they wished to hire to represent them as Bond Counsel. Santa's voted as follows Rebecca made a motion to Hire K and L Gates for bond Counsel 2nd by Lillian motion carried. Fernwood called Judi to obtain her vote so Fernwood could have a quorum. Dale made motion to hire K and L Gates as Fernwood's Bond Counsel, Judi 2nd. The motion carried.

Nancy Wolff will send out a letter to the three Bond Attorney Firms, informing K and L Gates that they have been chosen and then letting the other two know that they were not chosen.

The boards talked about what the districts had requested to be removed from the projects at the August 02, 2011 round table meeting and were not removed from the list by Necia in the August 8th e-mail. The Santa Board had requested that the pump station, pumps be changed from replaced to repaired at the August 02, 2011 Meeting.
The Fernwood board had requested that the force Main/Air Vac. Valve replacement, the Air Release Valves and the 9th street water line replacement/ upsize be removed from the list. We will notify Welch-Comer and request again that these items be removed.

The Meeting adjourned at 7:30.

Minutes respectfully Submitted by Marzetta Reimann

Fernwood Water and Sewer District
Santa-Fernwood Sewer Project
August 2, 2011 Meeting Sign-In (Community Members)

Scott Whealy
P.O. Box 457
Fernwood, Idaho 83830
Ray Woodbury
10313 Theresa Place, NE
Albuquerque, New Mexico 87111-3558
Nancy Corbin
P.O. Box 457
Fernwood, Idaho 83830

Santa Water and Sewer District
Fernwood Water and Sewer District
Santa-Fernwood Sewer Project
August 9, 2011 Meeting Sign-In (Community Members)

N/A

PROJECT STATUS REPORT

Project Name:	Santa-Fernwood and Facility Planning Document
Client:	Santa and Fernwood Water and Sewer Districts
Project No:	43007, 43008, 43009
Date:	August 8, 2011, AMENDED 8/16 BASED ON COMMENTS FROM 8/9 MEETING

STATUS OF PROJECT/DESCRIPTION OF WORK COMPLETED:

Proposed Improvements:

On August 2, 2011 the Santa & Fernwood Boards met with IDEQ and Welch Comer to discuss modifications to the Scope of Improvements presented to the public at the June 14th Public Information Meeting. The following summarizes the Boards modifications:

- For Fernwood Sewer, the selected improvements include:
  - Facility Planning (Remaining Fernwood Share): $4,900
  - Fernwood Lift Station: The Board has elected to reduce the budget for this improvement from $557,700 to $300,000. The Board is intending not to relocate the lift station from the existing location. (*This budget was selected by the Board; this budget may not be adequate to correct all of the lift station deficiencies identified.*)
  - Sewer Main Replacement: $103,000 (*Please note that this was not part of the budget for the "selected improvements" presented at the public meeting. The Engineer recommended that this number be added for contingency during the 8/2 meeting due to the budget reduction for the lift station.*)
  - Manhole Repair/Grouting: $30,900
  - Force Main/Air Vac Valve Replacement: ELIMINATED BY BOARD 8/09
  - Spring Street Gravity Extension: $50,900
    - Total: $489,700
- For Fernwood Water, the selected improvements include:
  - Facility Planning (Remaining Fernwood Share): $7,400
  - Bridge Crossing: Eliminated, the Board understands from the County that the bridge reconstruction is not moving forward and that the County will fund this. (*It is the Engineers' understanding that this project is slated for construction in 2013 and the Engineer has been told by the Agency funding the Bridge reconstruction that the waterline replacement is not eligible for funding.*)
  - Backup Source: Eliminated based on IDEQ's interpretation of IDAPA allowing for improvements to be made to the system as long as they do not result in expansion of the system's capacity. The District cannot add new connections. The District may be able to add connections that are considered "infill" by IDEQ, for which the District has distribution capacity to serve. (*Engineer recommends that Fernwood consult with IDEQ before adding any new connections to the water system.)*

- Air Release Valves: ELIMINATED BY BOARD 08/09
- Meter Replacement (may not coverall system meters): $309,000
- Depot Lane Replacement / Upsize: Eliminated by Board
- Oak Street Replacement / Upsize: Added by Board--$82,600
- 9th Street Replacement / Upsize: ELIMINATED BY BOARD 08/09
- Sandfilter Repairs: Completed in House and Eliminated
- Tank Repairs: $77,300
  - Total: $476,300

- For Santa sewer, the selected improvements include:
  - Manhole Replacement: $103,800
  - Sewer Main Replacement: $361,200
  - Lift Station 2 Wet Well Repair and Pump Repair: $47,500 MODIFIED TO REPAIR VS. REPLACEMENT BY BOARD 08/09
  - Lift Station 1 Pump Repair: $9,800 MODIFIED TO REPAIR VS. REPLACEMENT BY BOARD 08/09
  - Force Main / Air Vac Valve Replacement: $20,400
  - Annexations: Eliminated by Board
    - Total: $542,700
- For the Santa-Fernwood wastewater treatment, the selected improvements include:
  - Facility Plan (Remaining Fernwood Share): $6,500
  - Lagoon Leak Testing (District Share): $5,200 (*IDEQ has indicated that the leak testing must be completed by April 15, 2012. The Districts' acknowledge that unless the outstanding Engineering invoices are paid in full by Fernwood, Welch Comer cannot complete the leak testing until the Districts' acquire the necessary funds. At a minimum this will not occur until after a Revenue Bond has passed. Thus, the Districts' acknowledge that they will not be in compliance with the IDEQ leak test requirements and may be subject to a compliance order.*)
  - Overflow Piping Modifications: $69,800
  - Influent Flowmeters: $32,300
  - Chlorine Contact Basin: $78,600
  - Lagoon Lining (Pending Leak Test Results): Eliminated by Board since the leak test cannot be completed at this time due to funding and it is not known if this improvement will be necessary until completion of the leak test.
    - Total: $192,400

<u>Estimated Impact of Modifications:</u>

The following table summarizes the estimated total project cost presented to the public 6/14:

Santa Sewer:	$ 561,700
Santa and Fernwood Treatment:	$ 735,800
Fernwood Sewer:	$ 651,800
Fernwood Water:	$ 988,500
Total	**$ 2,937,800**

The following table summarizes the estimated total project costs based on the modifications made 8/2 and 8/9:

Santa Sewer:	$ 542,700
Santa and Fernwood Treatment:	$ 192,400
Fernwood Sewer:	$ 489,700
Fernwood Water:	$ 476,300
Total	**$ 1,701,100**

Thus, the estimated rate increases for the reduced scope of work from 8/2 and 8/9 is as follows:

- Estimated Monthly Rate Increases per EDU based on the above project costs using IDEQ 2% loan over 30 years with principal forgiveness.

REVENUE BOND OPTION:

Santa Sewer	$ 31.29
Santa and Fernwood Treatment	$ 2.68
Total Santa Increase	**$ 33.97**
Fernwood Sewer	$ 9.32
Santa and Fernwood Treatment	$ 2.78
Fernwood Water	$ 6.94
Total Fernwood Increase	**$ 19.05**

If the District(s) secure Block Grants and USDA funding, the above increases could *potentially* be reduced by an additional estimated $5.00 for Fernwood and $10.00 for Santa.

INFORMATION / OTHER REQUIRED FROM CLIENT OR OTHERS:

At this time Welch Comer is on hold and is not in the position to complete *any* additional engineering work for Fernwood until Fernwood submits payment for outstanding Engineering Invoices, as follows:

Fernwood Water: $4,637.50

Fernwood Sewer (Including WWTP): $9004.72

Total Engineering Invoices Due for Fernwood: $13,624.22

UPDATE AS OF 8/16: WITH RESPECT TO THE LAGOON LEAK TEST

Welch Comer would proceed forward with lagoon leak testing if a retainer for this work is received by the Districts. The total cost of work to be done in the first phase is $7,000 which includes the leak testing plan and the leak tests for the first three lagoons. This does not take into account any grant funding that IDEQ may have available.

Please contact our firm if you have any questions or comments about this project.

Fernwood Water and Sewer District
P. O. Box 215
Fernwood, ID 83830

June 21, 2012

Re: Fernwood Sewer Improvement Project

Ester Ceja, Senior Water Quality Analyst
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

Dear Ester,

On August 23rd, 2011 the Fernwood Water and Sewer District board met for a special meeting. They identified and selected the alternatives for the project from the Welch-Comer Project Status Report dated August 16, 2011, based on public comment and board member input.

The items chosen were as follows:

Fernwood Sewer
- Fernwood Lift Station restoration or relocation
- Sewer Main Replacement
- Manhole Repair/Grouting
- Spring Street Gravity Extension

Wastewater Treatment Plant
- Lagoon Leak Testing/ later modified by DEQ to Ground Water Monitoring Plan
- Overflow Piping Modifications
- Influent Flowmeters
- Chlorine Contact Basin

Thank you for helping us work through the EID approval process. If you have any questions or concerns, please call the Fernwood Water and Sewer District office at 245-3554.

Sincerely,

Henry Lewis

Henry Lewis, Chairman

Fernwood Water and Sewer District
P. O. Box 215
Fernwood, ID 83830

June 21, 2012

Re: Fernwood Drinking Water Improvement Project

Ester Ceja, Senior Water Quality Analyst
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

Dear Ester,

On August 23rd, 2011 the Fernwood Water and Sewer District board met for a special meeting. They identified and selected the alternatives for the project from the Welch-Comer Project Status Report dated August 16, 2011, based on public comment and board member input.

The items chosen were as follows:

Fernwood Drinking Water

- Water Service Replacement
- Depot Lane Replacement
- Oak Street Water Line Replacement
- Finn Creek Reservoir Repairs

Thank you for helping us work through the EID approval process. If you have any questions or concerns, please call the Fernwood Water and Sewer District office at 245-3554.

Sincerely,

Henry Lewis

Henry Lewis, Chairman

Santa Water and Sewer District
P.O. Box 215
Fernwood, ID 83830

June 21, 2012

Re: Santa Sewer Improvement Project

Ester Ceja, Senior Water Quality Analyst
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706

Dear Ester,

On August 23rd, 2011, the Santa Water and Sewer District board met for a special meeting. They identified and selected the alternatives for the project from the Welch-Comer Project Status Report dated August 16, 2011, based on public comment and board member input.

The items chosen were as follows:

Santa Sewer
- Manhole Replacement
- Sewer Main Replacement
- Lift Station 2 Wet Well Repair and Pump Repair
- Lift Station 1 Pump Repair
- Force Main / Air Vac Valve Replacement

Wastewater Treatment Plant
- Lagoon Leak Testing/ later modified by DEQ to Ground Water Monitoring Plan
- Overflow Piping Modifications
- Influent Flowmeters
- Chlorine Contact Basin

Thank you for helping us work through the EID approval process. If you have any questions or concerns, please call the Santa Water and Sewer District office at 245-3554.

Sincerely,

Lillian Gustin, Legal Signature Authority

Newsletter Date
Volume 2, Issue 1

FERNWOOD WATER & SEWER

P.O. Box 215 Fernwood, Idaho 83830 1-208-245-3554

Planning Study Nears Completion

The Fernwood Water and Sewer Planning Study was partially paid for by a grant from the Idaho Department of Environmental Quality. The Planning Study was completed by Welch-Comer Engineers. Welch-Comer has identified the following problems with-in our systems and recommends the following improvements to put us in compliance with IDEQ and EPA.

FERNWOOD'S SEWER SYSTEM

- When the water tables are high the sewer pumps, pump ten times more liquid than normal. The reason for the increase is storm water entering the system.
- The increased volume causes our pumps undue wear and tear. It also means higher electrical bills, and increased costs at the wastewater treatment plant.
- The United States Department of Environmental Quality allows for **only** 4 times the normal volume during a high ground water event.
- Fernwood Sewer Pump Station #1 is located in the flood zone of the St. Maries River. The St. Maries River inundates our pump station during flood events.
- Department of Environmental Quality is suggesting major changes to this pump station. Changes include raising the pump station above the 100 year flood. Building a dike to keep the river away from the pump station. Repairing and up-dating the existing pumps and pump station to make it meet compliance requirements
- The District will also continue to work on addressing the influence of storm water to the waste water system by raising, repairing and sealing manholes. The district may also need to replace some old defective sewer mains
- The planning study also identified a sewer main that needs to be extended to fix a reoccurring sewer blockage problem.

Community Meeting
September 13, 2011
The CAF Building
7:00 P.M.

FERNWOOD'S WATER SYSTEM

- Most of the water meters were installed in 1967 and need to be replaced.
- Oak street's water line is undersized and needs to be replaced with a larger line that will allow the District to meet DEQ's minimum system pressure requirements.
- The Districts Finn Creek Reservoir is in need of repairs. The walls and floor of the reservoir are cracked and leaking. The reservoir needs to be sealed on the interior to prevent further weathering. The failed interior coating needs to be removed and replaced. The exterior of the reservoir should also be sealed. The reservoir vent needs to be extended above the top of the reservoir to prevent snow and ice from building up around it and sealing it off. Access to the reservoir should be provided to meet OSHA safety requirements.

Welch-Comer has also defined needed repairs and up dates at the Santa-Fernwood Treatment Plant.

They are

- Restructure the flow of Waste Water at the plant
- Put in Influent Meters.
- Build a Chlorine Contact Basin
- Conduct required Lagoon Leak Testing

Bond Election to be held November 8, 2011

HOW WILL THE PROJECT BE PAID FOR?

- District will apply for low interest loans and a block grant. The Sewer Improvements qualify for a loan with an interest rate of .25%. While the water improvements qualify for a loan of 0% interest.
- Benewah County has already agreed to sponsor Fernwood for a block grant.
- There also may be some assistance from a rebate program through Bonneville Power Company.

The District Board is well aware that this is an expensive project and that no one is wealthy. The Board also realizes that we are living in uncertain economic times and our monthly rates are already quite high. However, there is no choice but to move ahead with the improvements. Choosing to do nothing will continue to put the District in none compliance status with the regulating agencies which could result in daily fines.

- Please attend the September 13th. Community Meeting to find out more about this important project.
- This will be a joint Santa/Fernwood Meeting
- No one from DEQ or Welch-Comer Engineers will be at this meeting

Please come to the Community meeting on September 13, 2011 @ 7:00 P.M. @ The CAF Building and be part of the solution

The Fernwood Well Head Photo from an Airplane

The District Board has been working very hard to negotiate with the regulating agencies regarding the scope and extent of the different proposed projects. With the hard persistent work of the board the total cost of the proposed projects has dropped from $3,195,700 to $1,250,400.

The district needs several more board members who are willing to hang in there for the long run and who have a sense for business and a compassion for people.

If the district is unable to fill the board member positions the courts could appoint board members.

Repaired and Resealed Manhole

SANTA-FERNWOOD SEWER PROJECT

Fernwood Water and Sewer District

Santa Water and Sewer District

Tuesday, September 13, 2011

Agenda

7:00 P.M.

AT THE CAF BUILDING

THE FERNWOOD DISTRICT WILL MEET IN THE MAIN SECTION.
THE SANTA DISTRICT WILL MEET IN THE SECTION TO THE RIGHT

THE DISTRICT CHAIRMEN WILL CALL THE MEETINGS TO ORDER @ 7:00 P.M.

- THE DISTRICT BOARDS WILL MAKE PRESENTATIONS REGARDING THE FACILITY PLANNING STUDY.
- THE DISTRICT BOARDS WILL OPEN THE FLOOR FOR QUESTIONS FROM THE COMMUNITY.

AT 8:15P.M. THE MEETINGS WILL BREAK UNTIL 8:30P.M.

- AT 8:30 THE TWO BOARDS WILL PRESENT THE RESULTS FROM THE FACILITY STUDY REGARDING THE SEWER TREATMENT PLANT.
- THE DISTRICT BOARDS WILL OPEN THE FLOOR FOR QUESTIONS FROM THE COMMUNITY.

The CAF BUILDING is handicapped accessible.
If you should need assistance, please call the clerk at 245-3554.
"This institution is an Equal Opportunity Provider."
Meetings are recorded.

Fernwood Water and Sewer District

Tuesday, September 13, 2011

Special Meeting Minutes

AT THE CAF BUILDING

Board members present were: Hank Lewis, Dale Hawkins,

Staff Present were: John Sherman and Marzetta Reimann

Community Members present were:, Linda Allman, Don St. George, Mark Turkington, Ernest Hall, Thomas Foster, Paul Jeffers, Ron Cook, Bill Strain, Rosemary Niemier, Jody Bergeset, Anna Hatton, Velda Ausman, Jim Braden and Shirley Harvey.

Hank Lewis called the meeting to order at 7:00 p.m.

Dale Hawkins and Hank Lewis made a presentation regarding the facility planning study.

Then Hank and Dale took and answered questions from the members of the community.

The meeting adjourned at 8:15 P.M.

Respectfully Submitted by Marzetta Reimann

Signed by: Henry Lewis Chairman of the Board

Date: _____:

SANTA-FERNWOOD SEWER PROJECT

Fernwood Water and Sewer District

Santa Water and Sewer District

Tuesday, September 13, 2011

Special Meeting Minutes

AT THE CAF BUILDING

Board members present were: Hank Lewis, Dale Hawkins, Lillian Gustin, Rebecca Brusseau, Mike Spray and Lola Braden.

Community Members present were: Nathan Crews, Freda Ferguson, Alvin Albert, John Ahonen, Linda Allman, Don St. George, Mark Turkington, Ernest Hall, Thomas Foster, Paul Jeffers, Ron Cook, Bill Strain, Rosemary Niemier, Jody Bergeset, Anna Hatton, Velda Ausman, Jim Braden and Shirley Harvey.

Hank Lewis called the meeting to order at 8:30 p.m.

Dale Hawkins and Hank Lewis made a presentation regarding the facility planning study.

Then Hank and Dale took and answered questions from the members of the community.

The meeting adjourned at 9:03 P.M.

Respectfully Submitted by Marzetta Reimann

Chairman of the board Signature: Henry Lewis

Date:_____

SANTA-FERNWOOD SEWER PROJECT

SANTA WATER AND SEWER DISTRICT

1. Ernest Hall
2. Thomas Foster
3. Peggy Foster
4. Paul Jeffries
5. Ron Cook
6. Bill Strain
7. Darryl Phillips
8. Rosemary Kuenicke
9. Judy Burgset
10. Ann Hatton
11. Delda R. Newman
12. Shirley Hovey
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SANTA-FERNWOOD SEWER PROJECT

SANTA WATER AND SEWER DISTRICT

1. Don D. Kruze Fernwood
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Fernwood Water and Sewer District
Santa Water and Sewer District
Santa-Fernwood Sewer Project
September 13, 2011 Meeting Sign-In (Community Members)

Linda Allman
P.O. Box 124
Santa, Idaho 83866
Don St. George
P.O. Box 55
Fernwood, Idaho 83830
Mark Turkington
P.O. Box 446
Fernwood, Idaho 83830
Ernest Hall
P.O. Box 214
Fernwood, Idaho 83830
Thomas Foster
602 Main Street
Lewiston, Idaho 83501
Paul Jeffers
P.O. Box 352
Fernwood, Idaho 83830
Ron Cook
P.O. Box 291
Fernwood, Idaho 83830
Bill Strain
P.O. Box 99
Fernwood, Idaho 83830
Rosemary Niemier
P.O. Box 404
Fernwood, Idaho 83830
Jody Bergeset
P.O. Box 454
Fernwood, Idaho 83830
Anna Hatton
P.O. Box 38
Fernwood, Idaho 83830
Velda Ausman
P.O. Box 171
Fernwood, Idaho 83830
Jim Braden
P.O. Box 93
Fernwood, Idaho

Shirley Harvey
P.O. Box 101
Fernwood, Idaho 83830
Nathan Crews
P.O. Box 16
Santa, Idaho 83866
Freda Ferguson
P.O. Box 278
Santa, Idaho 83866
Alvin Albert
P.O. Box 278
Santa, Idaho 83866
John Ahonen
P.O. Box 43
Santa, Idaho 83866

How is this related to Santa's bond election?

We are jointly financing the repairs and upgrades to the treatment plant. Those costs are projected to be $192,400 we will pay 75% of the costs and Santa 25%. We have 75% of the connections to the treatment plant and Santa has the other 25%.

Can we go forward with the project if Santa's bond fails?

Yes. We can still obtain the block grant funds and work on our project.

When would these repair and improvements occur?

We would begin design after the grant and loan applications have been determined. Construction work would be in late 2012 and 2013.

Where can I get more information?

You can contact any of the board members or Marzetta Reimann, the District's Clerk at (208)245-3554.

The District Board Members for Fernwood:
Henry (Hank) Lewis – Chairman
Dale Hawkins
Mark Turkington
Judi Schaum

PROPOSITION 1: SEWER SYSTEM BOND

Santa-Fernwood Water and Sewer Districts
P.O. Box 215
Fernwood, Idaho 83830

Address

FERNWOOD
WATER AND SEWER DISTRICT

Voting is November 8th

Located at the CAF building, from 8am-8pm

Please bring your identification with you.

Proposition 1

Shall the Fernwood Water and Sewer District issue and sell its sewer revenue bonds to pay the costs of the acquisition and construction of improvements to the District's sewer system in the principal amount of not to exceed $634,000?

COMMONLY ASKED QUESTIONS

What is the vote and election for?

The vote is to allow the District to increase its borrowing capacity to make improvements and needed repairs to the sewer system. By being called a revenue bond, it means we will pledge revenue from the sewer system to repay the bonds. A yes vote will not increase or decrease your taxes.

What are the improvements?

The district needs to make improvements and repairs to the treatment plant, and the sewer collection system. The repairs to the collection system will include refurbishing manholes, sewer mains and a pump station. Approximately $400,000 will be for the main sewage pumping station, and replacement of sewer main. An additional $145,000 is budgeted for overflow piping and improvements to the disinfection system (clorination) at the treatment plant.

Why are we doing these things?

We have had ongoing problems with compliance with our discharge and operating permit and these upgrades will address both compliance and operational problems. We risk fines by the State DEQ and loss of control of our system. We believe these projects will cost us substantially and we have obtained a financing package that we believe could not be better.

If I vote yes, does this mean the district will borrow this money?

No, the district is only authorized to borrow this amount. The goal of the district is to obtain additional grants, which would lower the loan amount needed to complete our projects.

How does the district propose to finance and pay for this?

We have applied for loans and grants. We have been offered a 30 year loan from the Idaho DEQ with an annual interest rate of ¼%, which is extremely low. We have also been offered a reduction in the loan repayment referred to as "principal forgiveness" in the amount of $55,472. In addition, we are applying for a grant referred to as a Community Development Block Grant in conjunction with Santa. The county is supporting us in this. This grant can be used to cover up to 30% of our project costs. This would further reduce our costs by $190,200. We are required to pass this increase in bonding authority to be successful in obtaining this grant.

What is the cost per customer?

If no additional grant funds are obtained, this would translate to a monthly cost to each customer of about $8.95. With the anticipated grant this could be in the range of $6.00 per customer.

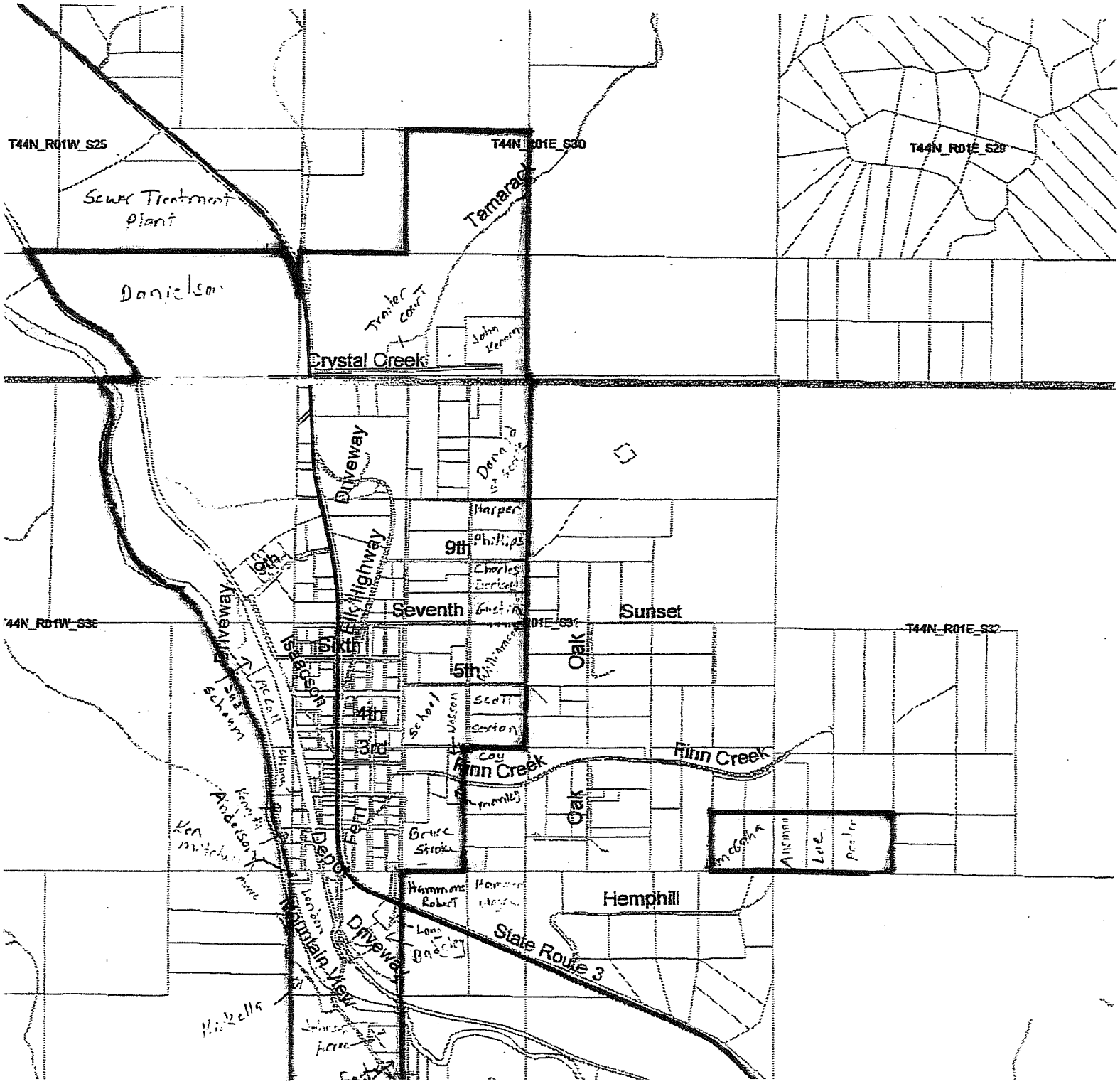
Is everyone who receives sewer service from the district eligible to vote in this election?

No. There are a small number of customers who live outside the district's legal boundaries and receive disposal service and are not allowed to vote on this ballot issue. (see attached map of district boundaries).

PROPOSITION 1: SEWER SYSTEM BOND

FERNWOOD WATER AND SEWER DISTRICT'S BOUNDARY LINES

If you live inside the pink lines you are in the district.



SAMPLE BALLOT

FERNWOOD SEWER REVENUE BOND ELECTION
NOVEMBER 8, 2011

PROPOSITION NO. 1

SAMPLE BALLOT

FERNWOOD SEWER REVENUE BOND ELECTION
NOVEMBER 8, 2011

PROPOSITION NO. 1

Shall the Fernwood Water and Sewer District issue and sell its sewer revenue bonds to pay the costs of the acquisition and construction of improvements to the District's sewer system in the principal amount of not to exceed $634,000? The bonds shall mature over a period of not to exceed forty (40) years, and shall be payable solely from the revenues of the sewer system, all as more fully provided in Resolution No. 110906A, adopted on September 6, 2011.

INSTRUCTIONS TO VOTERS: To vote on the foregoing proposition, the voter must make a cross [X] in the space to the right of the words "IN FAVOR OF issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A" or "AGAINST issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A" according to the way you desire to vote on the question. If you, by mistake or accident, mark, tear, deface, or otherwise mutilate this ballot, return it to the election judges and obtain another ballot. Unless an elector casts a vote on this Proposition, they shall be deemed to have not voted thereon and their ballot shall not be counted in determining the number of qualified electors voting at or participating in the bond election.

IN FAVOR OF issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A ..... ☐

AGAINST issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A ..... ☐

The following information is required by Idaho Code §34-439:

The District currently has outstanding bonded indebtedness in the amount of $436,632.55. The interest rate anticipated on the proposed sewer revenue bonds is .25% per annum. The total amount to be repaid over the life of the proposed bonds, principal and interest, based on the anticipated interest rate, is estimated to be $667,019.

Verification

Marzetta Reimann, being first duly sworn upon oath deposes and says that she is the Secretary of the Fernwood Water and Sewer District, that she has read the within information required by §34-439, Idaho Code, and believes the statements therein contained are true.

/s/ Marzetta Reimann
Marzetta Reimann, Secretary
Fernwood Water & Sewer District, Fernwood, Idaho

FERNWOOD WATER AND SEWER DISTRICT
Benewah County, Idaho

SEWER REVENUE BONDS

RESOLUTION NO. 110906A

A RESOLUTION of the Board of Directors of the Fernwood Water and Sewer District, Benewah County, Idaho, describing certain improvements to be made to the sewer system of the District; ordering a special election to be held in the District for the issuance of sewer revenue bonds in the principal amount of not to exceed $634,000; setting the date, time, and place of the election; adopting a notice of election; and providing for other matters relating thereto.

Adopted on September 6, 2011

Prepared by:

K&L GATES LLP
Coeur d'Alene, Idaho and Spokane, Washington

FERNWOOD WATER AND SEWER DISTRICT
RESOLUTION NO. 110906A

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* This Table of Contents and the cover page are not a part of the following resolution and are included only for the convenience of the reader.

RESOLUTION NO. 110906A

A RESOLUTION of the Board of Directors of the Fernwood Water and Sewer District, Benewah County, Idaho, describing certain improvements to be made to the sewer system of the District; ordering a special election to be held in the District for the issuance of sewer revenue bonds in the principal amount of not to exceed $634,000; setting the date, time, and place of the election; adopting a notice of election; and providing for other matters relating thereto.

FERNWOOD WATER AND SEWER DISTRICT
Benewah County, Idaho

BE IT RESOLVED BY THE CHAIR AND BOARD OF DIRECTORS OF THE FERNWOOD WATER AND SEWER DISTRICT, BENEWAH COUNTY, IDAHO, as follows:

WHEREAS, Fernwood Water and Sewer District, Benewah County, Idaho (the "District"), is a duly existing water and sewer district organized and operating under the laws of the State of Idaho; and

WHEREAS, it is hereby determined by the Board of Directors of the District (the "Board") to be necessary and essential to the health, safety, comfort, and welfare of the inhabitants of the District to acquire, install, and construct certain improvements to its sewer system (the "Sewer System"); and

WHEREAS, the Board has determined to finance part of the costs of the acquisition and construction of said improvements by the issuance of sewer revenue bonds of the District, pursuant to the provisions of the Revenue Bond Act of the State of Idaho, Sections 42-4101 to 42-4115, inclusive, Idaho Code, and the Municipal Bond Law of the State of Idaho, Chapter 2 of Title 57, Idaho Code; and

WHEREAS, the sewer revenue bonds cannot be issued without the assent of a majority of the qualified electors of the District voting in an election called for that purpose; and

WHEREAS, to authorize these sewer revenue bonds, the Board has determined to call and conduct a special municipal bond election for the aforesaid purposes as required by the Revenue Bond Act; and

WHEREAS, pursuant to the provisions of the Idaho Code, the District has elected to have the District Secretary conduct the election under the provisions of Title 34, Chapter 14 and Title 42, Chapter 41;

NOW, THEREFORE, BE IT FURTHER RESOLVED BY THE CHAIR AND BOARD OF DIRECTORS OF THE FERNWOOD WATER AND SEWER DISTRICT as follows:

Section 1. Call of the Election

An election is hereby called to be held within the District on Tuesday, November 8, 2011, for the purpose of submitting to the qualified electors of the District the question set forth in the form of ballot appearing in Section 4 hereof.

Section 2. Authorization of the Project

(a) *Project Description.* The project consists of making various capital improvements to the Sewer System of the District (hereinafter the "Project"), consisting generally of the acquisition, construction and installation of improvements to the Sewer System as follows:

(1) The upgrade of a gravity sewer main and pump station No. 1;

(2) Replacement sewer main line;

(3) Manhole repair/grouting;

(4) Spring Street gravity extension;

(5) Improvements to the Wastewater Treatment Plant jointly owned and operated with Santa Water and Sewer District, including, lagoon leak testing, overflow piping modifications, influent flowmeters, and chlorine contact basin; and

(6) The costs of engineering, legal, and grant and project administration; and together with the purchase of sites and easements therefor and all appurtenances and machinery necessary or useful for the Sewer System, all pursuant to the preliminary maps, plans, and specifications therefore, which are being prepared by Welch Comer & Associates, Coeur d'Alene, Idaho, heretofore selected by the Board for such purpose and on file in the office of the District.

(b) *Cost of Project*. The estimated cost and expense of the acquisition, installation, and construction of the Project is approximately $634,000, up to one hundred percent (100%) of which will be paid with proceeds of the bonds authorized in Section 6 of this resolution, if approved by the qualified electors of the District. The Project includes (1) payment of all preliminary expenses incurred and incident to the Project and properly incident to the issuance of the bonds as such expenses are set forth in the Revenue Bond Act and Municipal Bond Law; (2) payment of interest on such bonds or bond anticipation notes or other interim financing during the period to be covered by the acquisition and construction of the improvements as described in subparagraph (a) above; and (3) the funding of any reserve account to secure repayment of the bonds. Any portion of the cost of the Project not paid for by the proceeds of the bonds authorized herein will be paid by other funds of the District and by grant funds received from agencies of the United States or the State of Idaho, if any.

Section 3. Conduct of Election

The election shall be conducted as specified in Title 34, Chapter 14 and Title 42, Chapter 41, of the Idaho Code, and in the Notice of Special Bond Election attached hereto, marked Exhibit "A", and by this reference made a part hereof.

Section 4. Ballot Proposition

The ballot title for the special election shall be in substantially the following form:

PROPOSITION No. 1

Shall the Fernwood Water and Sewer District issue and sell its sewer revenue bonds to pay the costs of the acquisition and construction of improvements to the District's sewer system in the principal amount of not to exceed $634,000? The bonds shall mature over a period of not to exceed forty (40) years, and shall be payable solely from the revenues of the sewer system, all as more fully provided in Resolution No. 110906A, adopted on September 6, 2011

INSTRUCTIONS TO VOTERS: To vote on the foregoing proposition, the voter must make a cross [X] in the space to the right of the words "IN FAVOR OF issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A YES" or "AGAINST issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A NO" according to the way you desire to vote on the question. If you, by mistake or accident, mark, tear, deface, or otherwise mutilate this ballot, return it to the election judges and obtain another ballot. Unless an elector casts a vote on this Proposition, they shall be deemed to have not voted thereon and their ballot shall not be counted in determining the number of qualified electors voting at or participating in the bond election.

IN FAVOR OF issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A	YES	☐
AGAINST issuing sewer revenue bonds to the amount of $634,000 for the purpose stated in Resolution No. 110906A	NO	☐

The following information is required by Idaho Code §34-439.

The District currently has outstanding bonded indebtedness in the amount of $436,632.55. The interest rate anticipated on the proposed sewer revenue bonds is .25% per annum. The total amount to be repaid over the life of the proposed bonds, principal and interest, based on the anticipated interest rate, is estimated to be $667,019.

Section 5. Notice of Special Bond Election

Pursuant to Idaho Code §34-1406, the Secretary of the District is hereby authorized and directed to forward to the County Clerk the Notice of Special Bond Election in substantially the form attached hereto as Exhibit "A," prior to the election, for publication as follows:

(a) *Publication.* The Notice of Special Election shall be published in the official newspaper of Benewah County.

(b) *Affidavits.* Proof of publication shall be upon the affidavit of the publisher of the newspaper. Such affidavits shall be filed with the District prior to the date of the election.

Section 6. Approval; Issuance of Bonds

If, at the election, a majority of the qualified electors of the District voting thereon vote in favor of the issuance of the sewer revenue bonds for the purposes set forth herein and designated on the aforesaid ballot, fully registered sewer revenue bonds of the District shall be authorized, issued, sold, and delivered. The bonds will be sewer revenue bonds of the District, and as such, the revenues of the Sewer System will be pledged for their payment as provided by Idaho Code §42-4107. The bonds will be payable solely out of and derived from rates and charges for the use of and the services rendered by, and all other income, earnings and revenue of, the Sewer System of the District; will mature annually over a period which may be less than but which will not exceed forty (40) years from their date; and will bear interest at such rate or rates as may be determined by the Board in the resolution authorizing the issuance of such sewer revenue bonds.

All sewer revenue bonds shall be issued in the form and manner, be registered, disposed of, and redeemed, in accordance with the provisions of Idaho Code §42-4110.

Section 7. Debt Disclosure Statement

Pursuant to Idaho Code §34-439, as amended, a Debt Disclosure Statement shall be prepared and verified by the District.

Section 8. Ratification

All actions heretofore taken, not inconsistent with the provisions of this resolution, by the Board and the officers of the District, directed toward making said acquisitions and improvements within and for the District, and the issuance of sewer revenue bonds of the District therefor, and for the holding of a Special Bond Election, are hereby ratified, approved and confirmed.

Section 9. Effective Date

This resolution shall be effective from and after its passage.

PASSED AND ADOPTED this 6th day of September, 2011.

FERNWOOD WATER AND SEWER DISTRICT

_____

Chairperson

ATTEST:

_____

Secretary

(SEAL)

CERTIFICATION

I, the undersigned, Secretary of the Board of the Fernwood Water and Sewer District, of Benewah County, Idaho, hereby certify that the foregoing Resolution is a full, true and correct copy of a Resolution duly adopted at a special meeting of said Board duly and regularly held at the regular meeting place thereof on September 6, 2011, of which meeting all members of said Board had due notice and at which a majority thereof were present; and that at said meeting said Resolution was adopted by the following vote:

AYES, and in favor thereof, Board Members:

NOES, Board Members:

ABSENT, Board Members:

ABSTAIN, Board Members:

I further certify that I have carefully compared the same with the original Resolution on file and of record in my office; that said Resolution is a full, true and correct copy of the original Resolution adopted at said meeting; and that said Resolution has not been amended, modified or rescinded since the date of its adoption, and is now in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the official seal of the District on September 6, 2011.

_____

Secretary

(S E A L)

EXHIBIT A

FERNWOOD WATER AND SEWER DISTRICT
Benewah County, Idaho

NOTICE OF SPECIAL BOND ELECTION

NOTICE IS HEREBY GIVEN that, pursuant to Resolution No. 110906A, adopted on September 6, 2011, by the Board of Directors (the "Board") of the Fernwood Water and Sewer District, Benewah County, Idaho (the "District"), a Special Bond Election will be held in the District on

TUESDAY, NOVEMBER 8, 2011

Between the hours of 8:00 a.m. and 8:00 p.m., for the purpose of voting upon the question and proposition of issuing sewer revenue bonds in the principal amount of $634,000 and payable over a period of up to forty (40) years, for the purpose of financing the construction of and improvement to the District's sewer system; and payment of engineering fees, contingencies, administrative costs, legal fees and all other costs incidental thereto, together with the acquisition of sites and easements therefor, and all appurtenances and machinery necessary or useful for said project. The sewer revenue bonds will bear interest at such rate or rates as may be determined by the Board, and will be payable solely out of and derived from rates and charges for the use of and the services rendered by, and all other income, earnings and revenue of, the sewer system of the District.

Resolution No. 110906A, is hereby referred to for further particulars and by reference is made part of this Notice. The total estimated cost of the Project is $634,000, up to one-hundred percent (100%) of which is to be paid from the sale of the proposed bond issue.

The question to be submitted to the electors shall be by ballot reading substantially as follows:

PROPOSITION NO. 1

Shall the Fernwood Water and Sewer District issue and sell its sewer revenue bonds to pay the costs of the acquisition and construction of improvements to the District's sewer system in the principal amount of not to exceed $634,000? The bonds shall mature over a period of not to exceed forty (40) years, and shall be payable solely from the revenues of the sewer system, all as more fully provided in Resolution No. 110906A, adopted on September 6, 2011

The following information is required by Idaho Code §34-440.

The District currently has outstanding bonded indebtedness in the amount of $436,632.55 The interest rate anticipated on the proposed bonds is .25% per annum. The total amount to be repaid over the life of the proposed bonds, principal and interest, based on the anticipated interest rate, is estimated to be $667,019.

Qualified electors shall vote at the following polling place:

Polling Location
CAF Building 64361 Highway Three South Fernwood, ID 83830

Only qualified electors eighteen (18) years of age or older, who are United States citizens and who have resided in the State of Idaho and in the District at least thirty (30) days next preceding the election, and no others, will be permitted to vote at the special election. No person so qualified and offering himself or herself at the polling place at which he or she is entitled to vote will be denied the privilege of voting at the special election.

All electors must register before being able to vote in the special election. The County Clerk of Benewah County is a registrar for the special election and shall conduct voter registration pursuant to Idaho Code §34-1402. Any registered elector of the District may make written application to the County Clerk for a mail in absentee ballot on the sixth day prior to the

election and an in person absentee ballot not later than 5:00 p.m. on the day before the election, Monday, November 7, 2011.

If, at the election, a majority of the qualified electors voting at such election vote in favor of the issuance of the bonds proposed therein for the purposes set forth in Resolution No. 110906A, sewer revenue bonds of the District will be issued for said purposes.

DATED this 6th day of September, 2011.

FERNWOOD WATER AND SEWER DISTRICT

_____

Chairman, Board of Directors

ATTEST:

_____

Secretary

(SEAL)

K&L | GATES

K&L Gates LLP
618 West Riverside Avenue
Suite 300
Spokane, WA 99201-0602

T 509.624.2100 www.klgates.com

COPY

November 10, 2011

Board of Directors
Fernwood Water and Sewer District
P.O. Box 215
Fernwood ID 83830

Re: Preliminary Opinion Regarding Existence of District and Authority to Borrow

Ladies and Gentlemen:

We hereby certify that we have reviewed the legal authority for the Fernwood Water and Sewer District, of Benewah County, Idaho, (herein called the "District"), to accept assistance under programs of USDA - Rural Development and the State of Idaho – Department of Environmental Quality. In connection therewith, we have found:

(1) The District is a municipal corporation duly organized and existing under and by virtue of the laws of the State of Idaho and is duly authorized to own and operate the sewer system and improvements and betterments thereto being permanently financed by the sale of a bond.

(2) In our opinion, the District has the legal authority to issue its sewer revenue bond in an amount of not to exceed Six Hundred Thirty Four Thousand and No/100 Dollars ($634,000.00), for the purpose provided in its application. Said bond was duly authorized by a special election conducted within Benewah County on November 8, 2011, and, when duly authorized and issued, such bond will constitute a binding and legal special obligation of the District issued pursuant to the Water and Sewer District Revenue Bond Act of the State of Idaho, being Sections 42-4101 through 42-4115, inclusive, Idaho Code.

Very truly yours,

K&L GATES LLP

By
Laura D. McAloon

Cc: Nancy Mabile, Panhandle Area Council
John Tindall, State of Idaho – Department of Environmental Quality
Jeff Beeman, USDA – Rural Development
Necia Maiani, Welch Comer

STATE OF IDAHO } ss.

COUNTY OF BENEWAH

I, Michele McDaniel, Benewah County Clerk of said County and State, do hereby certify that the attached is a full, true and complete copy of the abstract of votes for the candidates therein named and/or the questions as they appeared on the election ballot on November 8, 2011 for the Fernwood Water and Sewer District, Sewer Revenue Bond, as shown by the record of the Benewah Board of Canvassers filed in my office this 14th day of November, 2011.

Michele McDaniel
Benewah County Clerk

(County Seal)

BENEWAH COUNTY RESULTS
CONSOLIDATED ELECTION NOVEMBER 8, 2011

Precinct	Total Number of Registered Voters at Cutoff	Number of Election Day Registrants	Total Number of Registered Voters	Number of Ballots Cast	% of Registered Voters That Voted
	VOTING STATISTICS				
2 Center	421	0	421	50	11.9%
3 College	515	0	515	87	16.9%
5 Fernwood	139	0	139	66	47.5%
6 Plummer	507	0	507	159	31.4%
7 Santa	55	0	55	40	72.7%
9 St. Maries	810	0	810	104	12.8%
10 Tensed	53	0	53	11	20.8%
11 Townsite	657	0	657	102	15.5%
CO. TOTAL	3,157	0	3,157	619	19.6%
		Total # Absentee Ballots Cast			39

Number of Election Day Registrants is not yet determined

*****UNOFFICIAL ELECTION RESULTS****

BENEWAH COUNTY RESULTS
CONSOLIDATED ELECTION
NOVEMBER 8, 2011

Precinct	BONDS							
	St. Maries Fire (2/3 Majority)		Fernwood Sewer		Fernwood Water		Santa Sewer	
	YES	NO	YES	NO	YES	NO	YES	NO
2 Center	49	1						
3 College	83	3						
5 Fernwood			36	30	38	28		
6 Plummer	0	0						
7 Santa	0	1	4	1	4	1	29	5
9 St. Maries	91	13						
11 Townsite	95	7						
CO. TOTAL	318	25	40	31	42	29	29	5

*****UNOFFICIAL ELECTION RESULTS****

BENEWAH COUNTY RESULTS
CONSOLIDATED ELECTION NOVEMBER 8, 2011

	City of St. Maries Council Position Available Positions (3)			City of Plummer Mayor			City of Plummer Council Position Available Positions (2)				City of Tensed Council Position Available Positions (2)	
	NON	NON		NON	NON	NON	NON	NON	NON	NON	WRI	
Precinct	Harry J. Grubham	Edward J. Spooner	No Candidate	Terry P. Allen	Michael Meagher	John M. Wheaton	Jack L. Bringman	Tim R. Clark	Jannette I. Taylor	William E. Weems	Gayle Carter Cook	No Candidate
2 Center	6	6										
3 College	49	63										
6 Plummer				85	28	45	73	46	64	77		
9 St. Maries	19	25										
10 Tensed											8	
11 Townsite	62	60										
CO. TOTAL	136	154	0	85	28	45	73	46	64	77	8	0

*****UNOFFICIAL ELECTION RESULTS****

STATE OF IDAHO } ss.

COUNTY OF BENEWAH

We, the Commissioners of Benewah County and State aforesaid, acting as a Board of Canvassers of Election, do hereby state that the attached is a true and complete abstract of all votes cast within this county for the candidates and/or questions as they appeared at the election held on November 8, 2011, as shown by the records now on file in the County Clerk's office.

Benewah County Board of Canvassers

Jack A. Buell, Chairman

N.L. "Bud" McCall

Philip R. Lampert

Attest: Michele McDaniel

(County Seal)

E-31. Approved Secretary of State, January 2011

Fernwood Water and Sewer

Acree, Shirley
P.O. BOX 158
Fernwood, ID 83830

American General Finance
601 N. Second Ave
Attn. Casey Spivey in Creo
Evansville, IN 47708

Anderson, James & Cathy
P.O. Box 64
Fernwood, ID. 83830

Anderson, Jerry & Sandra
P.O. Box 134
Fernwood, Idaho 83830

~~Anderson, Jerry & Sandra (Shop)~~
~~P.O. Box 134~~
~~Fernwood, Idaho 83830~~
Dup

Anderson, Kenneth & Tricia
P.O. Box 122
Fernwood, Idaho 83830

Anderson,John
Andrea McAllister
P.O. Box 466
Fernwood, Idaho 83830

Andrews, Andy
14923 Phillips Rd
Oakrun, California 96069

Ashmead, Charles & Christine
P.O. Box 202
Fernwood, Idaho 83830

Ausman, Dave & Velda
P.O. Box 171
Fernwood, Idaho 83830

Badgley, Bill
P.O. Box 401
Fernwood, Idaho

Baird, Raylen & Brinda
P. O. Box 162
Fernwood, Idaho 83830

Baker, Crystal
P.O. Box 434
Fernwood, Idaho 83830

Baltz, Bernadine & Robert
2023 Main Avenue
St. Maries, Idaho 83861

Barden, Doug
P.O. BOX 93
Fernwood ID 83830

Barden, Doug & Sherry
P.O. Box 93
Fernwood, Idaho 83830

Barden, Greg
P.O. Box 274
Fernwood, Idaho 83830

Barton, Kelley
P.O. Box 429
Fernwood, Idaho 83830

Beauchman Enterprises, LLC
P.O. Box 98
Fernwood, Idaho 83830

Bergset, Geordine
P.O. Box 454
Fernwood, Idaho 83830

Birdsall, Robert
P.O. Box 312
Fernwood, Idaho 83830

Bode,Nick
2219 Grelle Ave
Lewiston, Idaho 83501

~~Bohannon, John & Lacey~~
~~P.O. Box 1364~~
~~Pinehurst, Idaho 83850~~
ND

Boller, John H.
P.O. Box 433
Fernwood, Idaho 83830

Brambiett, Deanna
P.O. Box 1162
Clarkia, Idaho 83812

Brusseau, Cliff
P. O. Box 36
Fernwood, Idaho 83830

Brusseau, Dave & Kris
P.O. Box 3
Fernwood, Idaho 83830

Brusseau, Mark & Theresa
P.O. Box 295
Fernwood, Idaho 83830

Buchanan, Maureen
1573 Kenora Street
Escondido, California 92027

Burch, Norm & Karin
P.O. Box 206
Fernwood, Idaho 83830

Cady Mike & Kelli
933 S. 3rd. Street
St. Maries, Idaho 83830

CAF
701 W. College Avenue
Suite 101
St. Maries, Idaho 83861

Calnon, Mark
1107 West 14th Avenue
Spokane, Washington 99204

Chappell, Rosalie
P.O. Box 343
Fernwood, Idaho 83830

Christian, Ernest & Lonni
P.O. Box 125
Fernwood, Idaho 83830

Clean Country Living
Emma and Jimmy Williams
P.O. Box 234
Fernwood, ID 83830

Cook, Miles & Paul
P.O. Box 42
Fernwood, Idaho 83830

Cook, Rick & Sherry
P.O. Box 152
Fernwood, Idaho 83830

Cook, Ron & Susie
P.O. Box 291
Fernwood, Idaho 83830

Cookies Chuck Wagon
P.O. Box 336
Fernwood, Idaho 83830

Cory, Ron & Betty
152 Little Carpenter Creek
Fernwood, Idaho 83830

~~Cory, Ron & Betty~~
~~152 Little Carpenter Creek~~
~~Fernwood, Idaho 83830~~ Dup

Country Kitchen
56 Poplar
Clarkia, Idaho 83812

Coy, Jack & Rita
P.O. Box 484
Fernwood, Idaho 83830

Crocker, B.C. & Candy
P.O. Box 128
Fernwood, Idaho 83830

Day, Alice
P.O. Box 357
Fernwood, Idaho 83830

Dean, Clyde & Hilda
P.O. Box 53
Fernwood, Idaho 83830

Dennis, Gladys
P.O. Box 416
Fernwood, Idaho 83830

Derry, Andy
195 E. Meadow Hurst Drive
St. Maries, Idaho 83830

Dockery, Charles
P.O. Box 402
Fernwood, Idaho 83830

~~Dockery, Lee~~
~~P.O. Box 402~~
~~Fernwood, Idaho 83830~~ Dup

Dutton, David & Jani
P.O. Box 424
Fernwood, Idaho 83830

Ebert, Patricia
P.O. Box 63
Fernwood, Idaho 83830

Eckard, Leander & Diane (mill)
P.O. Box 188
Fernwood, Idaho 83830

Edstrom, A.R. & Elsa
P.O. Box 219
Fernwood, Idaho 83830

Ellinwood, Ronda
P.O. Box 328
Fernwood, Idaho 83830

Fernwood Church (Parsonage)
P.O. Box 279
Fernwood, Idaho 83830

Fernwood Community Church
P.O. Box 279
Fernwood, Idaho 83830

Fernwood Rural Fire District
P.O. Box 39
Fernwood, Idaho 83830

Fernwood Senior Citizens
P.O. Box 414
Fernwood, Idaho 83830

Florin, Bill & Naomi
318 175th Place SW
Bothell, Washington 98012

Forest Protection Systems
7635 N. Ramsey Road
Coeur d' Alene, Idaho 83815

Foster, Thomas
602 Main Street
Lewiston, Idaho 83501

Gaskill, Patrick
P.O. Box 314
Fernwood, Idaho 83830

Geiger, Gerald
P.O. Box 247
Fernwood, Idaho 83830

Girtz, Charles & Judy
4311 183rd Avenue E.
Lake Tapps, Washington 98391

Godwin, Jennifer
P.O. Box 146
Fernwood, Idaho 83830

Gray, Gertrude
P.O. Box 86
Fernwood, Idaho 83830

Green Clinton
P.O. Box 21
Fernwood, Idaho 83830

Gustin, Serenity
P.O. Box 284
Fernwood, Idaho 83830

Hall, Ernest & Denise
P.O. Box 214
Fernwood, Idaho 83830

Hammons, Bobby & Karen
P.O. Box 31
Fernwood, Idaho 83830

Hammons, Robert & Elizabeth
P.O. Box 129
Fernwood, Idaho 83830

Hammons, Wayne & Shelly
P.O. Box 203
Fernwood, Idaho 83830

Hart, Gary & Tressa
P.O. Box 187
Fernwood, Idaho 83830

Harvey, Richard
P.O. Box 41
Fernwood, Idaho 83830

Harvey, Shirley
P.O. Box 101
Fernwood, Idaho 83830

Hatton,-Rowsey, Anna & Ron
P.O. Box 38
Fernwood, Idaho 83830

Henson, Randall
P.O. Box 85
Fernwood, Idaho 83830

Hill, Gary
P.O. Box 268
Fernwood, Idaho 83830

Hindman, Jack & Kendra
P.O. Box 373
Fernwood, Idaho 83830

Hoover, Lawrence & Beverly
P.O. Box 131
Fernwood, Idaho 83830

Howard, Rev. Tom
P.O. Box 111
Fernwood, Idaho 83830

Howell, Julie
P.O. Box 271
Fernwood, Idaho 83830

Huffman, David & April
P.O. Box 7
Fernwood, Idaho 83830

Hulse, Shane & Vicki
P.O. Box 337
Fernwood, Idaho 83830

Hyk, Sandra
P.O. Box 536
Fernwood, Idaho 83830

Irelan, Donal & Shirley
P.O. Box 155
Fernwood, Idaho 83830

Jeffers, Paul
P.O. Box 352
Fernwood, Idaho 83830

Joiner, Troy & Lori
P.O. Box 384
Fernwood, Idaho 83830

Jolliff, Cassie
P.O. Box 506
Fernwood, Idaho 83830

Jones, Becky (Rental)
P.O. Box 535
Fernwood, Idaho 83830

~~Jordan, Ann~~ closed
~~P.O. Box 419~~
~~Fernwood, Idaho 83830~~

Jorgensen, Vern & Vinnie
P.O. Box 275
Fernwood, Idaho 83830

Kennon, John
P.O. Box 358
Fernwood, Idaho 83830

Kennon, Mary
P.O. Box 134
Santa, Idaho 83866

Kimberly-Clark Corporation
Attention: Kelly King
2600 Federal Avenue
Everett, Washington 98201

Kinzebach, Ron
P.O. Box 154
Fernwood, Idaho 83830

Kirkella, Connie
P,O, Box 472
Fernwood, Idaho 83830

Krueger, Traci and Stacy
P.O. Box 246
Fernwood, Idaho 83830

Kruger, Kaila & Bob
P.O. Box E
159 Cedar Street
Clarkia, idaho 83812

Lape, Mike
P.o. Box 351
Fernwood, Idaho 83830

Leer, David & Shirley
1405 E Lakeside Avenue
Coeur d' Alene, Idaho 83814

Lewis, Eugene & Pat
P.O. Box 342
Fernwood, Idaho 83830

Lewis, Hank
P.O. Box 127
Fernwood, Idaho 83830

Lewis, Hank (house)
~~P.O. Box 127~~
~~Fernwood, Idaho 83830~~ Onp

Lewis, Harold
P.O. Box 71
Fernwood, Idaho 83830

Lewis, Henry ~~(Shop)~~
~~P.O. Box 127~~
~~Fernwood, Idaho 83830~~ Onp

Lewis, Henry ~~(Trailer)~~ Onp
~~P.O. Box 127~~
~~Fernwood, Idaho 83830~~

Lewis, Mark
P.O. Box 6
Fernwood, Idaho 83830

Lingo, Skip
P.O. Box 364
Fernwood, Idaho 83830

Loe, Robert & Calandria
P.O. Box 465
Fernwood, Idaho 83830

Long, Randall
P.O. Box 324
Fernwood, Idaho 83830

Machado, Eric & Kelly
P.O. Box 399
Fernwood, Idaho 83830

Maland, Morgan, Matt, Nitcy
P.O. Box 175
Fernwood, Idaho 83830

Manley, Jerry
P.O. Box 173
Fernwood, Idaho 83830

Martin, Mike
P.O. Box 293
Fernwood, Idaho 83830

McCall, Bud
P.O. Box 160
Fernwood ID. 83830

McEwen, Bill
P.O. Box 371
Fernwood ID 83830

McGaha, Earl & Jackie
P.O. Box 263
Fernwood, ID 83830

McHenry, Dan & Jacque
P.O. Box 252
Fernwood, ID 83830

McQueen, David & Gloria
P.O. Box 24
Fernwood, ID 83830

McQueen, David Jr.
P.O. Box 382
Fernwood, ID 83830

McQueen, John
P.O. Box 415
Fernwood, Idaho 83830

McQueen, Sarah
P.O. BOX 273
Fernwood, ID 83830

Michael, Viola
P.O. BOX 310
Fernwood, ID 83830

Mills, Don & Francine
P.O. BOX 67
Fernwood, ID 83830

Mills, Wade
P.O. BOX 81
Fernwood, ID 83830

Minier, Francis & Crystal
P.O. BOX 82
Fernwood, ID 83830

~~Minier, Francis & Crystal~~
~~P.O. BOX 82~~
~~Rental~~ DNP
~~Fernwood, ID 83830~~

Minier, Raymond & Patsy
P.O BOX 94
Fernwood, ID 83830

Mitchell, Ken & Pam
P.O. BOX 387
Fernwood, ID 83830

Mitchell, Lynda
P.O. BOX 238
Fernwood, ID 83830

Moore, Amber
P.O. BOX 272
Fernwood, ID 83830

Moore, Jason & Aurora
P.O. BOX 412
Fernwood, ID 83830

Moors, Tim & Gwen
P.O. BOX 459
Fernwood, ID 83830

~~Moors, Tim & Gwen~~
~~P.O. BOX 459~~
~~Fernwood, ID 83830~~ DNP

Morris, Cory
P.O BOX 35
Fernwood, ID 83830

Morris, Keven
155 Sterling Grove Drive
Galt, California 95632

Mullins, Debra
P.O. Box 304
Frnwood, Idaho 83830

Mullins, Henry
Keith & Eula Needham
P.O. Box 395
Fernwood, Idaho 83830

Needham, Keith & Eula
P.O. Box 395
Fernwood, Idaho 83830

Nelson, Marv & Peggy
P.O. Box 56
Fernwood, Idaho 83830

Niemier, Rosemary
P.O. Box 404
Fernwood, Idaho 83830

North Idaho Crushing
P.O. Box 160
Fernwood, Idaho 83830

O'Dwyer, Roger & Joanne
P.O. Box 183
Fernwood, Idaho 83830

Olson, Don & Anna
P.O. Box 151
Fernwood, Idaho 83830

Overstreet, David
501 West Carlton
Tracy, California 95376

Page, Sharon
P.O. Box 425
Fernwood, Idaho 83830

Pannell, Eva
P.O. Box 92
Fernwood, Idaho 83830

Pannell, Michael & Evelyn
P.O. Box 46
Fernwood, Idaho 83830

Peters, Brian
P.O. Box 322
Fernwood, Idaho 83830

Peters, Jon
P.O. Box 353
Fernwood, Idaho 83830

Phillips, Darryl & Elaine
P.O. Box 156
Fernwood, Idaho 83830

Primer, Stan & Cathy
P.O. BOX 325
Fernwood, Idaho 83830

Quigley, Gisella
P.O. Box 221
Santa, Idaho 83866

R.V. Dump Station
P.O. Box 215
Fernwood, Idaho 83830

Reynolds, Matthew
922 Park Drive
St. Maries, Idaho 83861

Robins, Dic & Jennifer
P.O. Box 487
Fernwood, Idaho 83830

Rodrigue, Oliver
c/o Rosella Lochridge
P.O. Box 336
Fernwood, Idaho 83830

Rossetto, Cheryl
P.O. Box 102
Fernwood, Idaho 83830

Sams Della & Jasper
P.O. Box 361
Fernwood, Idaho 83830

~~Santa-Fernwood Plant~~
~~P.O. Box 215~~
~~Fernwood, Idaho 83830~~

Sawyer, Stacy
P.O. Box 473
Fernwood, Idaho 83830

~~Schaum, Judi~~
~~P.O. Box 65~~
~~Fernwood, Idaho 83830~~
closed

Scott Sexton
P.O. Box 284
St. Maries, Idaho 83861

Scott, Robert & Sandra
P.O. Box 372
Fernwood, Idaho 83830

Shick, Dean (Upriver Realty)
P.O. Box 64
Santa, Idaho 83866

Shuman, Marshall
P.O. Box 485
Fernwoo, Idaho 83830

Sonnentag, Peter & Verna
P.O. Box 194
Fernwood, Idaho 83830

Spray, P.J.
P.O. Box 151
Santa, Idaho 83866

~~Spray, Peggy (Henry Lewis)~~
~~P.O. Box 127~~
~~Fernwood, Idaho 83830~~
Dup

Spray, Russell & DeAnna
P.O. Box 22
Fernwood, Idaho 83830

St. George, Don
P.O. Box 55
Fernwood, Idaho 83830

St. Maries River Railroad
318 N. Tenth Street
Attn: Accounts Payable
St. Maries, Idaho 83861

St. Maries School District
P.O. Box 384
St. Maries, ID 83861

Stamper, Wanda
P.O. BOX 266
Fernwood, ID 83830

Sterkel Joyce
P.O. BOX 36
Fernwood, ID 83830

~~Sterkel, Joyce~~
~~P.O. Box 36~~
~~Fernwood, ID 83830~~
Dup

Strain, Bill
P.O. Box 99
Fernwood, ID 83830

Strong, Doug & Barbara
P.O. Box 115
Fernwood, ID 83830

Sullivan, Cleve & Sheryl
P.O. Box 43
Fernwood, ID 83830

Sullivan, Darin & Karin
P.O. Box 104
Fernwood, ID 83830

Sullivan, Michael
P.O. Box 311
Fernwood, Idaho 83830

Sweatfield, Rhea
51 Little Carpentar Creek Rd.
Fernwood, ID 83830

Teal, Gloria
P.O. Box 181
Fernwood, ID 83830

Teal, Harry
P.O. Box 423
Fernwood, ID 83830

Thompson, Denzie & Kathy
2940 Cabrillo Drive
Tracy, CA 95376

~~Thompson, Denzie & Kathy~~
~~2940 Cabrillo Drive~~
~~Tracy, CA 95376~~ DNP

Thormahlen, Don & Sue
P.O. Box 218
Fernwood, ID 83830

Tressler, Kevin & Vickie
P.O. Box 334
Fernwood, ID 83830

Tri-Community Library
Margaret Benson
4345 Fox Rd.
Tensed, ID 83870

Tritle, Claudia
P.O. Box 446
Fernwood, Idaho 83830

Trueman, Jay & Vicci
P.O. Box 208
Fernwood, ID 83830

Turkington, Mark
P.O. Box 446
Fernwood, ID 83830

United States Post Office
P.O. Box
Fernwood, ID 83830

Wasson, Shirley
P.O. Box 477
Fernwood, ID 83830

Webb, Debra
363 Trudy Ct.
Ripon, California 95366

~~Webb, Debra~~
~~363 Trudy CT.~~
~~Ripon, California 95366~~ DNP.

Wernecke, Ralph & Patsy
P.O. Box 236
Fernwood, Idaho 83830

Wilks, Jamie
P.O. Box 244
Fernwood, Idaho 83830

Williamson, David & Louella
P.O. Box 223
Fernwood, Idaho 83830

Wise, Kathy
P.O. Box 368
Fernwood, Idaho 83830

Woodbury, Ray
10313 Theresa Place, NE
Albuquerque, New Mexico 87111-3658

Worthington, Mark
58 Worthington Road
Kingston, Georgia 30145

Yost, Richard
P.O. Box 278
Fernwood, Idaho 83830

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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

C.L. "Butch" Otter, Governor
Curt Fransen, Director

May 3, 2012

Marzetta Reimann, Clerk-Treasurer
Fernwood and Santa Water & Sewer Districts
P.O. Box 215
Fernwood, Idaho 83830

RE: Allowance of Design Work Prior to Loan

Dear Ms. Reimann:

In order to facilitate continuous progress on resolving Fernwood and Santa sewer and water districts' (Districts) infrastructure issues, the Department of Environmental Quality (DEQ) supports and accepts the Districts' efforts at engaging the public in its planning process.

Both districts on are DEQ's Fundable Lists for state fiscal year 2012, for both wastewater and drinking water facility loans. Both Districts, working closely with their consulting engineer Welch-Comer, engaged in a public notice effort prior to holding their required planning meeting (in which the preferred alternative to address their issues was decided upon). The method chosen to alert the public to the meeting and to solicit their comments followed an acceptable alternative to the guidance outlined in Chapter 5 of the Loan Handbooks (as required by IDAPA 58.01.22.040 and IDAPA 58.01.04.042), given the District's broad public awareness campaign of the projects and the strong public participation at District meetings.

The loan application is still in process and DEQ expects to award a loan upon completion of the environmental review process.

If you have any questions please call Tim Wendland, Loan Manager, at 208-373-0439.

Sincerely,

Barry N. Burnell

Barry N. Burnell
Water Quality Division Administrator

BNB:TAW:dls

c: Katy Baker-Casile, DEQ Coeur d'Alene Regional Office
Ester Ceja and Mike May, DEQ State Office
Henry Lewis, Fernwood Board Chairman, P.O. Box 215 Fernwood, ID 83830
Lilian Gustin, Santa Board Member, P.O. Box 215 Fernwood, ID 83830
Necia Maiani, Welch-Comer Engineering, nmaiani@welchcomer.com

Public Questions and Board Responses 6/14/2011

Welch-Comer Engineers presented a PowerPoint presentation, which described each district's potential projects and the estimated costs associated with them. Then, Necia opened up the meeting to the public.

Tammy Damiano, from Santa, stated that the easement granted by the previous owners of their property to the district for the water line entitles them to one additional water and two sewer hook ups. She wanted to know when can they could get hooked up. No sewer service runs to their property currently. The cost to install the sewer lines is prohibitive for Santa. Necia stated that no water improvements will be done in Santa.

Several customers expressed deep concern over the potential rate increases. One customer asked if the rates would go down after the project was finished. The customer was told it was too early to tell at this point. Another customer asked if the rates would not be raised as much if the Block Grant funds were received. The customer was told that the goal was to obtain the block grant which could lessen the cost to the customers.

Rodger O'Dwyer asked if the county would pay to replace the water line when the bridge is replaced. It was unclear at this time. Rodger also asked what would happen if we didn't do these improvements. Katy Baker-Casile, from IDEQ, replied that the district could be fined heavily by DEQ and the EPA, also we would be breaking the law and the public health would be at risk.

Tammy asked if the interest rates on the loans would be fixed and Necia replied that Fernwood's loan is fixed at 2% interest. Rodger asked if we know how much will have to be spent. Katy Baker-Casile said that until the contractor bids are in, we do not know the exact cost and can only estimate. Katy said that the amount spent on the project cannot exceed the amount passed on the revenue bond. Hopefully the actual cost of the project will come in significantly lower than the amount the revenue bond was passed for.

Tammy asked if when the project is completed we will have more capacity to process sewer. Necia replied we will not have or need more capacity as our treatment facility is already more than adequate.

Several customers had questions about the formation of the LID. Necia described the process of forming a LID and the public's ability to protest. A customer asked what the cost would be if the loans and grants do not come through. Necia replied that the loans must be given in order to complete the project. If we get USDA funding and Block Grant funds then the cost will be reduced. Phil Boyd commented that the cost of the project will depend greatly on materials costs, such as PVC pipe, and the amount of the contractor bids.

Board member, Francine Mills, mentioned that local contractors can be used whenever possible and this may keep costs down as well. Many repairs have already been completed by district employees and

assistance agencies such as IRWA. Francine mentioned all the volunteer hours she has been putting in to help keep costs down.

A customer asked when the vote will be. Francine said the vote will be in November, but we would like input from people by the first of July to begin the grant application. Necia asked for people to express their opinion on the LID. An informal pole was taken which showed that the people would prefer a bond over an LID.

Rebecca asked if any hook ups could be added. Necia replied that no connections could be added until after the projects are completed.

* customers in attendance have been included in the meeting sign-in sheet included in this appendix.

Public Questions and Board Responses Round Table Meeting 8/2/2011

Nancy Corbin, a Fernwood customer, asked if the customers would be required to pass the bond for the wastewater treatment plant for the total amount of $550,000 including the cost of lining all the lagoons even though it may not be necessary? Bill Burke, Idaho Rural Water Association, replied that we don't have to accept all the money the bond allows unless we need it. Once the projects are bid on, then we get to decide what to do. He also stated that grant funds may be available to help offset the overall cost.

A customer asked if we would be responsible for the cost of replacing the water line when the county replaces the bridge in Fernwood? Hank Lewis, Fernwood and Santa/Fernwood Sewer Project Chairman, said we don't know at this time.

A customer asked if we needed another water source for Fernwood if no expansion of the system was going to be allowed. Bill Burke and Dale Hawkins, Fernwood Board Member, answered that the second water source is required for a backup for the existing service.

Nancy Corbin said that in 1996 a well was drilled as backup for the slow sand filter water supply and wants to know why now we need a backup for our backup. She said no one is getting sick. John Tindall said that if you have a groundwater source a backup groundwater source is required by the safe drinking water act.

A customer stated that 50 lots in Fernwood could be developed and he thinks they all could have access to the water line now. After John Tindall checked the IDAPA rules, it was decided that some infill of water hook-ups could be completed if the service lines met DEQ requirements.

Customers Present at meeting:

Ray Woodbury
10313 Theresa Place, NE
Albequerque, NM 87111-3658
Service Address:
140 Rays Look Rd.
Fernwood, ID 83830

Nancy Corbin and Scott Whealy
P.O. Box 457
Fernwood, ID 83830

COMMENT / QUESTION FORM

Aren't some of our current loans close to being completed?

I do not like I.D.

Name:	Freda
Address:	Santa
Email:	freda53844@yahoo.com

Please return your comments to:

Santa/Fernwood Water & Sewer District
P.O. Box 215
Fernwood, Idaho 83830

COMMENT / QUESTION FORM

Go for the revenue bond

Name:	Brigitte O'Dwyer
Address:	P.O. Box 201 Santa ID
Email:	911 E. Davis

Please return your comments to:

Santa/Fernwood Water & Sewer District
P.O. Box 215
Fernwood, Idaho 83830

COMMENT / QUESTION FORM

I would support the revenue bond!

Name:	Joanne Dahlman
Address:	
Email:	

Please return your comments to:

Santa/Fernwood Water & Sewer District
P.O. Box 215
Fernwood, Idaho 83830

Williams, Ashley

From: Maiani, Necia M
Sent: Monday, July 23, 2012 10:54 AM
To: Williams, Ashley
Subject: FW: Public Comment

From: Marzetta Reimann [mailto:santawood@cpcinternet.com]
Sent: Wednesday, March 28, 2012 5:11 PM
To: Maiani, Necia M
Subject: RE: Public Comment

Necia: I explained to Freda that Santa has three loans. I told her that they would mature in 2018,2022 and 2029. I called her around June 29th, 2011.
Hope this helps.
I am going to be off until Monday.
Thanks Again
Marzetta

From: Maiani, Necia M [mailto:nmaiani@welchcomer.com]
Sent: Wednesday, March 28, 2012 2:47 PM
To: Marzetta Reimann
Subject: RE: Public Comment

I suspect that DEQ is going to require documentation of the verbal response you provided to that comment. Can you tell me what your response to her was so that we can reflect this in the Environmental Information Document? (If you happen to have a date when you responded to her, that would be beneficial also.)

Thanks again,
NM

From: Marzetta Reimann [mailto:santawood@cpcinternet.com]
Sent: Wednesday, March 28, 2012 2:42 PM
To: Maiani, Necia M
Subject: RE: Public Comment

Necia:

I just responded verbally to Freda, and heard nothing else.
Thank you

From: Maiani, Necia M [mailto:nmaiani@welchcomer.com]
Sent: Wednesday, March 28, 2012 2:16 PM
To: Marzetta Reimann
Subject: RE: Public Comment

Thank you. I recall you responded to the one from Freda. Do you have your response to her question and did you receive anything back from her after that? If so, can you forward that to me.

Thanks again.

Written comments received by:

Jonne O'Dwyer
P.O. Box 183
Fernwood, Idaho 83830

Bridgette O'Dwyer
P.O. Box 201
Santa, Idaho 83866

Alfreda Ferguson
P.O. Box 278
Santa, Idaho 83866

Appendix N

Agency Consultation Correspondence

- Example Letter to Agencies
- Agency Responses

WELCH-COMER
ENGINEERS | SURVEYORS

www.welchcomer.com
208-664-9382
877-815-5672 (toll free)
208-664-5946 (fax)
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815

November 18, 2011

Katy Baker-Casile
Department of Environmental Quality, Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene, ID 83814

Re: Fernwood Sewer Collection System – Request for Comments for Preparation of an Environmental Informational Document

Dear Katy Baker-Casile:

The Fernwood Water and Sewer District is preparing a facility planning document to identify and make necessary improvements to their sewer collection system that are cost effective and environmentally sound. The facility plan for this project is being funded 50 percent by a Department of Environmental Quality (DEQ) planning grant which requires compliance with the Rules for Administration of Wastewater Treatment Facility Grants, IDAPA 58.01.04. The grant rule carries DEQ State Environmental Review Process requirements which mirror those of the National Environmental Policy Act (NEPA).

The proposed project consists of several additions and upgrades to the existing system. The project will relocate one lift station out of the 100-year floodplain, which will require a new gravity or pressure sewer main to the lift station. This may also require pressure systems for the five residences located below the proposed gravity line; if a pressure line is installed, this will not be required. Existing manhole repair and main replacement (as budget allows) are incorporated to reduce the occurrence of infiltration and inflow (I&I). Lastly, a new gravity sewer main on Spring Street will be extended to serve two additional residences. Enclosed are maps of the proposed project area that depict the proposed improvements.

We request that you advise us of any comments that you may have regarding this project within 30 days, so that the Fernwood Water and Sewer District can proceed with the completion of the Environmental Information Document. If you have any questions concerning this proposed project or if you need any further information, please feel free to contact me at Welch, Comer & Associates, Inc. at (208) 664-9382 at your convenience.

Sincerely,

Ashley M. Williams, E.I.T.

Ashley M. Williams, E.I.T.
Staff Engineer

AMW
Enclosure: Project Area Maps

awilliams@welchcomer.com

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WELCH-COMER
ENGINEERS | SURVEYORS
www.welchcomer.com
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

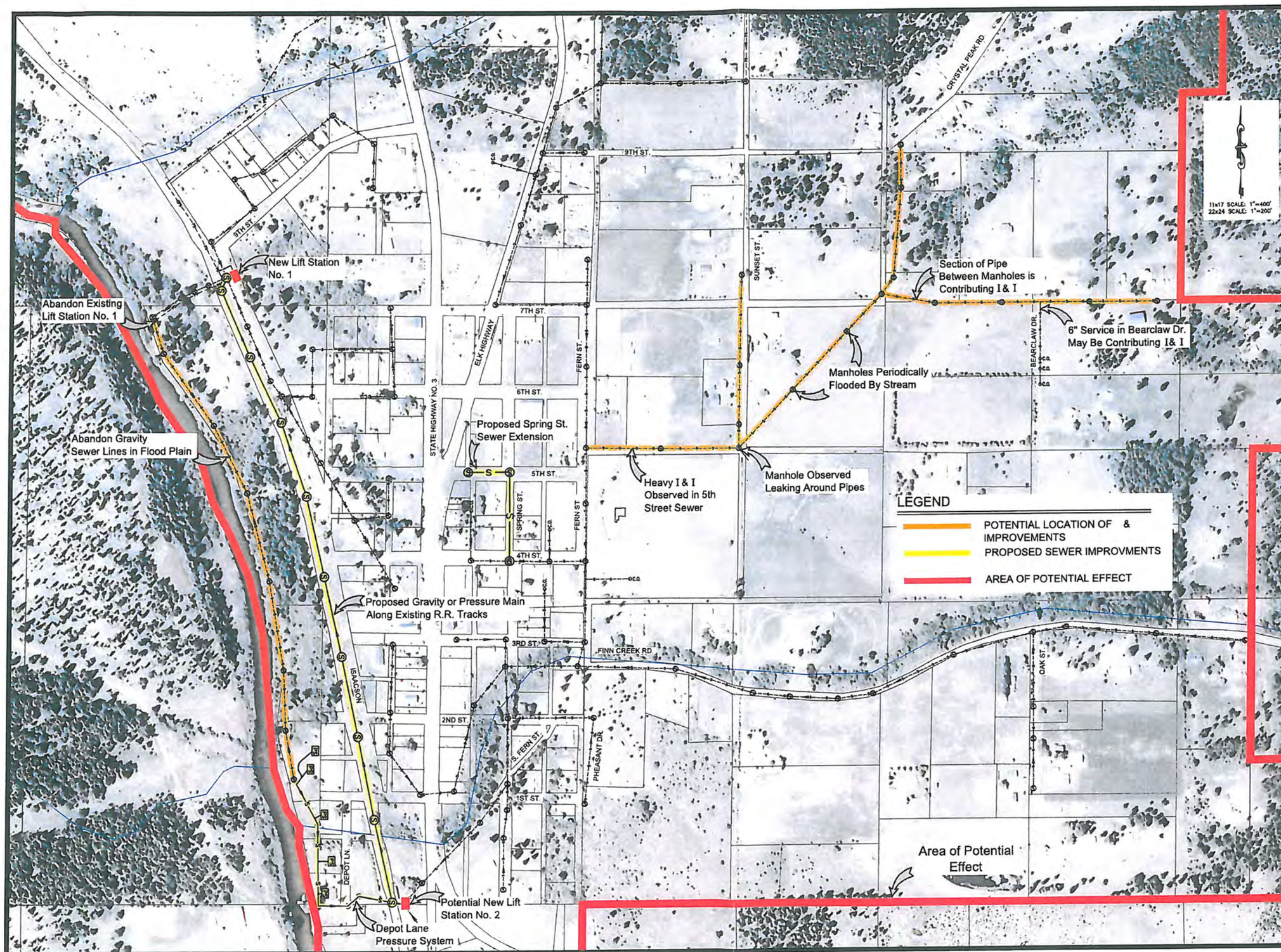
FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

SELECTED SYSTEM IMPROVEMENTS OVERVIEW

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008DS05-3D.DWG
DATE:	11-14-11
SHEET NO:	

\\Nas-01\cad\CAD Projects\43008\dwg\43008DS05-3D.dwg, 12/12/2011 11:07:36 AM, julie, 1:2



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350 E. Kathleen Ave.
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208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

FERNWOOD WATER AND SEWER DISTRICT

SEWER COLLECTION SYSTEM FACILITY PLAN

SELECTED SYSTEM IMPROVEMENTS

PROJECT NO.:	43008
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43008DS05-3D.DWG
DATE:	12-12-11
SHEET NO:	

\\Nas-01\cad\CAD Projects\43008\dwg\43008DS05-3D.dwg, 12/12/2011 10:47:27 AM, julie, 1:2

DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT, CORPS OF ENGINEERS
COEUR D'ALENE REGULATORY OFFICE
2065 W Riverstone Drive, Suite 201
Coeur d'Alene, ID 83814

June 22, 2012

Regulatory Division

SUBJECT: NWW-2011-606-C09

Ashley Williams, E.I.T.
Welch-Comer Engineers
350 E Kathleen Ave.
Coeur d'Alene, ID 83815

Dear Ms. Williams:

This in regard to your June 15, 2012, email detailing the Fernwood and Santa Water and Sewer Districts' improvement project for Department of the Army (DA) review. The project would be located in Benewah County, in and around the cities of Fernwood and Santa, Idaho.

Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), a DA permit must be obtained prior to discharging dredged or fill material into Waters of the U.S., which includes most perennial and intermittent rivers and streams, natural and man-made lakes and ponds, irrigation and drainage canals and ditches that are tributaries to other waters, and wetlands.

Activities regulated under Section 404 would include excavation and land clearing operations involving vegetation removal with mechanized equipment such as front-end loaders, backhoes, or bulldozers with sheer blades, rakes, or discs; windrowing of vegetation; land leveling; or other soil disturbance in areas subject to Corps jurisdiction that result in a discharge of dredged or fill material into wetlands or Waters of the U.S.

Based on our review of the information you provided on June 15, 2012, we have determined that although the subject project area contains Waters of the U.S. including wetlands, the proposed work would not involve a discharge of dredged or fill material into wetlands and/or Waters of the U.S. Therefore, a DA permit is not required for your project as proposed. **If the method of construction/demolition, scope of work, or project locations change, it is recommended you contact this office for a verification of this determination.**

This approved JD is valid for a period of 5-years from the date of this letter, unless new information supporting a revision (as further specified by paragraph 1.a. of Regulatory Guidance Letter No.05-02 dated June 14, 2005), is provided to this office before the expiration date. Also enclosed, you will find the Approved Jurisdictional Determination Form(s) addressing wetlands and Waters of the U.S. located within the JD review area, and a Notification of Administrative Appeals Options and Process and Request for Appeal Form (RFA) regarding this DA Approved

Jurisdictional Determination. Should you disagree with certain terms and/or conditions of this DA Approved JD, the Notification of Administrative Appeal Options form outlines the steps to take to file your objection.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the RFA. Should you decide to submit an RFA form, it must be received at the following Northwest Division Office address by August 21, 2012.

U.S. ARMY CORPS OF ENGINEERS
NORTHWEST DIVISION
ATTN: MARY HOFFMAN, APPEAL REVIEW OFFICER
POST OFFICE BOX 2870
PORTLAND, OR 97208-2870

It is not necessary to submit an RFA form to the District or Division Offices if you do not object to the determination in this letter.

Please be advised this approved jurisdictional determination only applies to the upland areas (roads) where the sewer lines in the Town of Santa are being replaced, and the proposed well site for the Town of Fernwood. The St. Maries River, Finn Creek, and Renfro Creek and their adjacent wetlands are considered to be waters of the United States. As such, if the proposed plans are revised, and fill is placed in these water bodies, and permit might be required from our office.

The statements contained herein do not convey any property rights or exclusive privileges, and do not authorize any injury to property or excuse you from compliance with other Federal, State, or local statutes, ordinances, or regulations that may affect the proposed work. Your project may require permits from other Federal, state, and local agencies including the Idaho Department of Water Resources or your local city or county zoning office if they have adopted a local floodplain management ordinance under the National Flood Insurance Program. You should contact these agencies to obtain any necessary permits prior to starting construction.

We are interested in your thoughts and opinions concerning the quality of service you received from the Walla Walla District, Corps of Engineers Regulatory Division. Please visit our web site at www.nww.usace.army.mil/html/offices/op/rf/survey.asp and complete our on-line Customer Service Survey, which will be automatically submitted to us. You may also complete and return to us by mail or by fax at 208-765-8368. For additional information about the Walla Walla District Regulatory program, please visit www.nww.usace.army.mil/html/offices/op/rf/rfhome.asp.

Please contact me by telephone at 208-765-8139, by mail at the address in the above letterhead, or via e-mail at Michael.a.burgan@usace.army.mil if you have any questions regarding the information contained in this letter.

Sincerely,

Michael Burgan
Environmental Resource Specialist
Coeur d'Alene Regulatory Office

Enclosures

Electronic copies furnished:

June Bergquist, DEQ

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): June 22, 2012

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Walla Walla District, Fernwood/Santa Water & Sewer Districts Drinking water & Sewer System Improvements, Uplands in Santa, NWW-2011-606-C09

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Uplands.
State: Idaho County/parish/borough: Benewah City: Santa
Center coordinates of site (lat/long in degree decimal format): 47.1509 ° Lat. -116.4497 ° Long.

Name of nearest waterbody: St. Maries River
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: N/A. With the exception of sewer line crossing of Renfro Creek (to be handled under separate PJD form) all sewer improvements within the Town of Santa are located in upland areas.
Name of watershed or Hydrologic Unit Code (HUC): 17010304
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: June 22, 2012
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

No Section 10 waters occur in the project area.

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

1. Non-regulated waters/wetlands (check if applicable):[1]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **With the exception of sewer line crossing of Renfro Creek (to be handled under separate PJD form) all sewer line improvements within the Town of Santa are located under existing roads constructed in upland areas.**

SECTION III: CWA ANALYSIS

A. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☒ Other: (explain, if not covered above): **Project located in uplands. With the exception of a proposed crossing of Renfro Creek (which will be handled under separate preliminary jurisdictional determination), all sewer lines being replaced within the Town of Santa are all currently located under existing roads constructed in upland areas.**

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Submitted by Ms. Ashley Williams (WelchComer Engineers) via email on June 15, 2012 .
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☐ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .

[1] Supporting documentation is presented in Section III.F.

☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 7.5 minute topographic map for the Santa quadrangle.
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☒ National wetlands inventory map(s). Cite name: Santa quadrangle.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth image of the area dated June 24, 2009.
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD:

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Fernwood and Santa Water and Sewer Districts	File Number: NWW-2011-606-C09	Date: June 22, 2012
Attached is:		See Section Below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations (JD) associated with the permit.

OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: District Engineer ATTN: David B. Barrows Regulatory Division Walla Walla District 201 North 3rd Avenue Walla Walla, Washington 99362-1876 Telephone (509) 527-7150	If you only have questions regarding the appeal process you may also contact: U.S. Army Corps of Engineers Northwestern Division Attn: Mary Hoffman, Appeal Review Officer P.O. Box 2870 Portland, Oregon 97208-2870 Telephone (503) 808-3825

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent	Date:	Telephone number

Williams, Ashley

From: Burgan, Michael A NWW [Michael.A.Burgan@usace.army.mil]
Sent: Monday, June 18, 2012 11:18 AM
To: Williams, Ashley
Cc: Maiani, Necia M; Ownbey, Dennis
Subject: RE: Santa and Fernwood Projects

Ashley,

Thanks for the additional information. Based on your descriptions below, no permits will be required from the Corps, because no fill will be added to waters of the United States to complete the projects. I'll get a formal no permit required letter out later this week.

I would like to add one thing though. The NWI maps are not official wetland delineations, and cannot be substituted for a wetland delineation if a permit is required. They were developed based on satellite photographs and should be used for informational and scoping level purposes. Just because the NWI indicates an area is not wetland does not necessarily mean it is not a wetland. Conversely, just because the NWI map indicates an area is a wetland, does not mean the area is actually a wetland. The only way to know for sure if an area is wetland would be to complete a wetland delineation. That could be as simple as a walk through the area to determine if hydrophytic vegetation is present, if not, and the area is not an atypical situation as defined in the Corps 1987 Wetland Delineation Manual, or natural hydrology has been modified, the area is not a wetland.

I mention this because in your description of the Fernwood water improvement project, you discuss boring a new water line at the Old County Road (aka Carpenter Creek RD). Depending on their locations, work pads for directional drilling can require the temporary placement of fill into waters of the United States. However, in this instance, I'm familiar with the Carpenter Creek Road bridge over the St. Maries River, and as long as the work pads are constructed next to the road, and not down by the river, no wetlands will be filled. If they get down by the river, wetlands could be impacted, and a permit could be required.

If you have any questions, give me a call.

Thanks,

Mike Burgan
Environmental Resources Specialist
Coeur d'Alene Regulatory Office
(208) 765-8139

-----Original Message-----
From: Williams, Ashley [mailto:awilliams@welchcomer.com]
Sent: Friday, June 15, 2012 5:31 PM
To: Burgan, Michael A NWW
Cc: Maiani, Necia M; Ownbey, Dennis
Subject: Santa and Fernwood Projects

Mike,

We received your letter regarding the Santa and Fernwood Projects on January 12, 2012. Since your analysis included in the letter was slightly different than indicated below in your email from December 22, 2011, I wanted to follow up with you regarding the need for wetland delineation in addition to nationwide or joint permits. I have overlaid the improvements for each of the separate projects onto the wetlands maps (National Wetland Inventory downloaded from US Fish and Wildlife). This gave me a better idea of what improvements may be in the wetland areas, and I think it might help us look at the

potential impact of these projects. I will send the maps separately since they are quite large.

Fernwood Water:

There are two improvements shown in the designated wetland areas. The first is the Old County Road Bridge Crossing. This crossing may be either bored or may be attached to the new Old County Road Bridge. The District has not selected which option they would like to proceed with, so they are including both in the EID. In either case, there will not be work within designated wetland areas. The bore pits would be located outside the high water mark and designated wetland areas; if the waterline is attached to the new bridge, the waterline installation will occur outside this high water mark (and designated wetland area). The second improvement is having a backup well on hand at the Fernwood well. This will not involve any ground-disturbing work within the designated wetland area.

Fernwood Sewer:

The only improvements/work that could occur in the designated wetland is the abandonment of the sewer line and lift station presently in the wetland. The sewer line will be abandoned (not removed or replaced). The lift station will be "cut off" at the ground level; the top portion will be hauled away and the bottom portion will stay in place. Thus no ground-disturbing work will occur here. The other work in the project is in close proximity to the wetland but is not located in the designated wetland area.

Additionally, there will be a sewer line crossing at Finn Creek. This crossing will likely be attached to the existing railroad crossing of this Creek.

Santa Sewer:

The improvements within this project are close to the designated wetland area but are not located within the area. The work will be occurring within pre-existing roadways and will not involve disturbance in the designated wetland area. Additionally, there will be a sewer crossing at Renfro Creek (which is not in a wetland area). It will be trenchless, utilizing non-stream disturbing methods to cross the Creek.

Based on this additional information and the maps provided, do you have any additional or updated consultation information? Is the Corps requiring a wetland delineations and/or permits (nationwide or joint) be completed and submitted for these projects?

Let me know if you have any questions or need any further information. We are hoping to move forward quickly, so let me know if you need anything from me.

Thanks!

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they are addressed. If you are not the intended recipient, you must not keep, use, disclose, take action, copy or distribute this email. Please notify the sender immediately by e-mail if you have received this e-mail by mistake and delete this e-mail from your system. This email and any attachments are the property of Welch Comer Engineers and may contain information that is copyrighted, or confidential and privileged and must not be distributed without Welch Comer Engineers permission. If this email contains contracts, survey or engineering data, design information, recommendations, plans, specifications or GIS information, these documents should be considered draft documents unless explicitly stated otherwise in the email text.

-----Original Message-----
From: Burgan, Michael A NWW [mailto:Michael.A.Burgan@usace.army.mil]
Sent: Thursday, December 22, 2011 10:20 AM
To: Williams, Ashley
Subject: RE: Santa and Fernwood Projects

Hi Amy,

I have reviewed your submittal, and have been trying to get a written response back to you, but have been unable to do so yet. I will try to get you an official response the first week of 2012. However, until then, please accept this as a preliminary response. Based on your letters concerning this project, it looks like the project could be authorized under NWP12 (Utility Line Activities) and/or NWP39 (Commercial and Institutional Development) depending on the various impacts. It also appears at least one of the potential sewer lines in Fernwood could be located in a wetland adjacent to the St. Maries River (see attached Google Earth image with the NWI overlay). If so, it could fall either NWP, but NWP39 might be the easiest because DEQ has denied 401 certification on NWP12. As such, under NWP12, if less than 500' of the line is placed in wetland, you would have to request a 401 certification from DEQ. If more than 500' of the line is in wetland, you would have to submit a preconstruction notification (application) to us, and we would request the 401 certification. Probably six of one half dozen or another.

I'll try to get something more formal out week after next. If you have any questions, don't hesitate to give me a call.

Mike Burgan

Environmental Resources Specialist

Coeur d'Alene Regulatory Office

(208) 765-8139

-----Original Message-----

From: Williams, Ashley [mailto:awilliams@welchcomer.com]

Sent: Wednesday, December 21, 2011 4:26 PM

To: Reinhart, Mary E NWW; Burgan, Michael A NWW

Subject: Santa and Fernwood Projects

Beth and Mike,

I recently sent information to you regarding the Santa and Fernwood projects. I typically hear from you within the 30 day comment period, but I have not received anything yet. Do you have any questions or concerns about these projects?

I will be finishing the Environmental Information Document this week and was hoping to get any comments from you before I finish the document. If you don't have any comment, that is fine, just let me know.

Thanks! Have a very Merry Christmas.

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be distributed without Welch Comer Engineers permission. If this email contains contracts, survey or engineering data, design information, recommendations, plans, specifications or GIS information, these documents should be considered draft documents unless explicitly stated otherwise in the email text.

ORIGINAL

DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT, CORPS OF ENGINEERS
COEUR D'ALENE REGULATORY OFFICE
2065 W. RIVERSTONE DR., STE 201
COEUR D'ALENE, ID 83814

REPLY TO
ATTENTION OF:

RECEIVED JAN 1 2012 By

January 12, 2012

Regulatory Division

SUBJECT: NWW-2011-00606-C09

Ashley Williams, E.I.T.
Welch, Comer & Associates, Inc
350 E Kathleen Ave.
Coeur d'Alene, ID 83815

Dear Ms. Williams:

This is in response to your November 18, 2011, letter requesting our comments on the wastewater system improvements being proposed by the Santa and Fernwood Water and Sewer Districts. Section 404 of the Clean Water Act (33 U.S.C. 1344) requires a Department of the Army permit be obtained for the discharge of dredged or fill material into waters of the United States. This includes most perennial and intermittent rivers and streams, natural and man-made lakes and ponds, and wetlands, as well as irrigation and drainage canals and ditches that are tributaries to other waters. Activities regulated under Section 404 include excavation and mechanized land clearing activities which result in the discharge of dredged material and destroy or degrade waters of the United States.

Based on the information provided, and the national wetlands inventory (NWI) map for the Santa quadrangle, it appears that the proposed wastewater system improvement projects could involve work in wetland areas subject to our jurisdiction. We would suggest you have a qualified wetland consultant complete a wetland delineation throughout the entire project area to determine if the proposed project will involve work in such areas. If the proposed project will involve the discharge fill material in waters of the United States, including wetlands a Department of the Army permit may be required prior to the start of construction. As shown on the attached maps entitled *Fernwood and Santa Water and Sewer Districts, File No. NWW-2011-606-C09, Sheets 1 and 2, dated January 12, 2012*, the NWI map indicates there are potentially wetlands along the route of the sewer line being abandoned within the St. Maries floodplain in Fernwood. If the line is removed, replaced, or modified, or other lines or structures to be removed, replaced, or installed are determined to be located in wetlands not shown on the NWI map, those activities could be authorized under Nationwide Permits 12 (*Utility Line Activities*) and 39 (*Commercial and Institutional Developments*). However, if the proposed sewer lines being removed or installed in Waters of the U.S. exceed 500 feet, or if any of the related facilities require fill to be placed in waters of the U.S. you will need to complete and submit a permit application, including a wetland delineation to this office. A copy of the permit application and instructions for filling out the application, including the types of drawings that must accompany the application, are available on our website http://www.nww.usace.army.mil/html/offices/op/rf/joint_app.asp.

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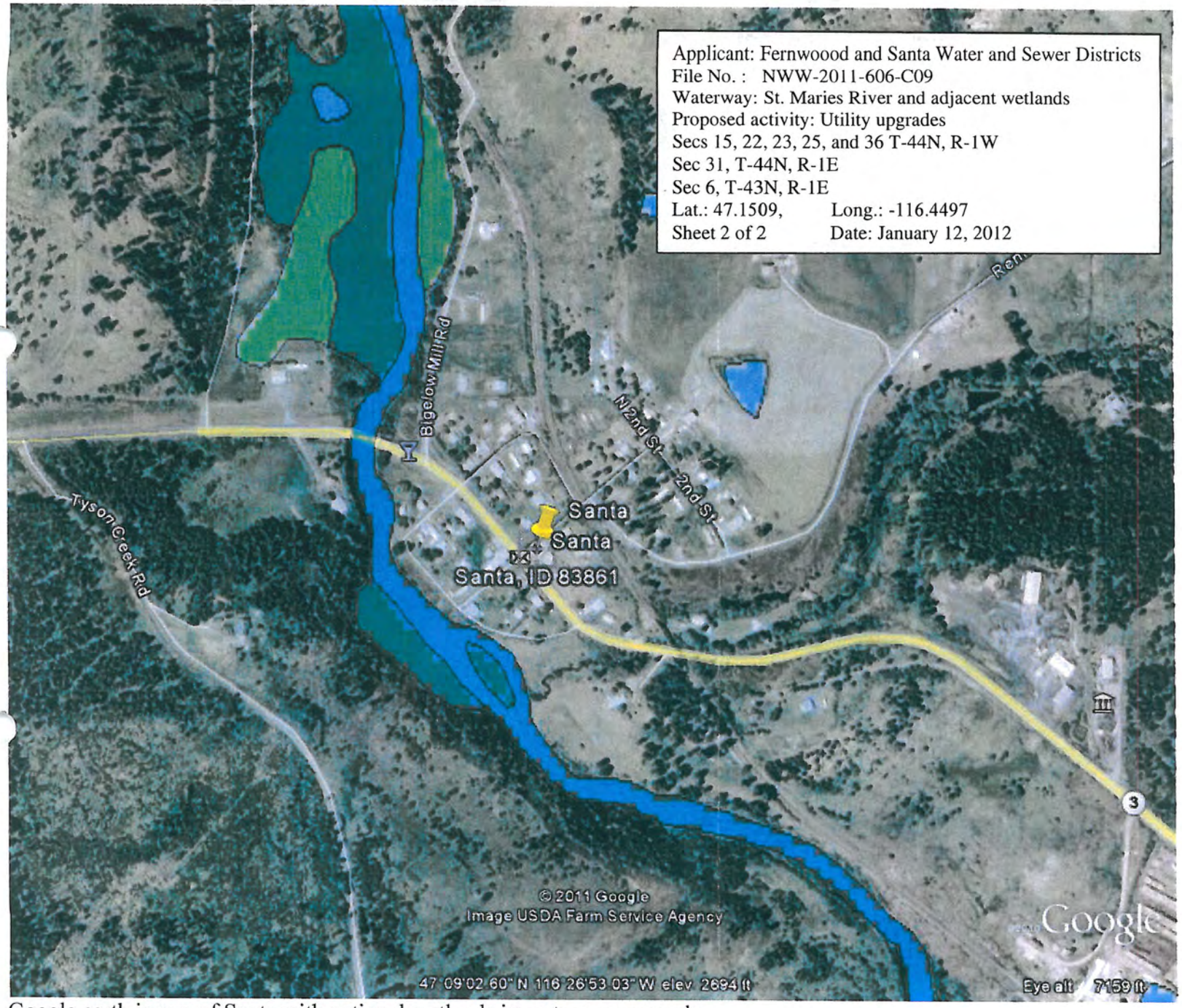
Please be advised that starting work before we verify that the project is authorized under Nationwide Permit 12, and/or 39, could constitute a violation of Section 404 and result in legal action.

If you have any questions concerning these regulatory matters, please contact me at 208-765-8139.

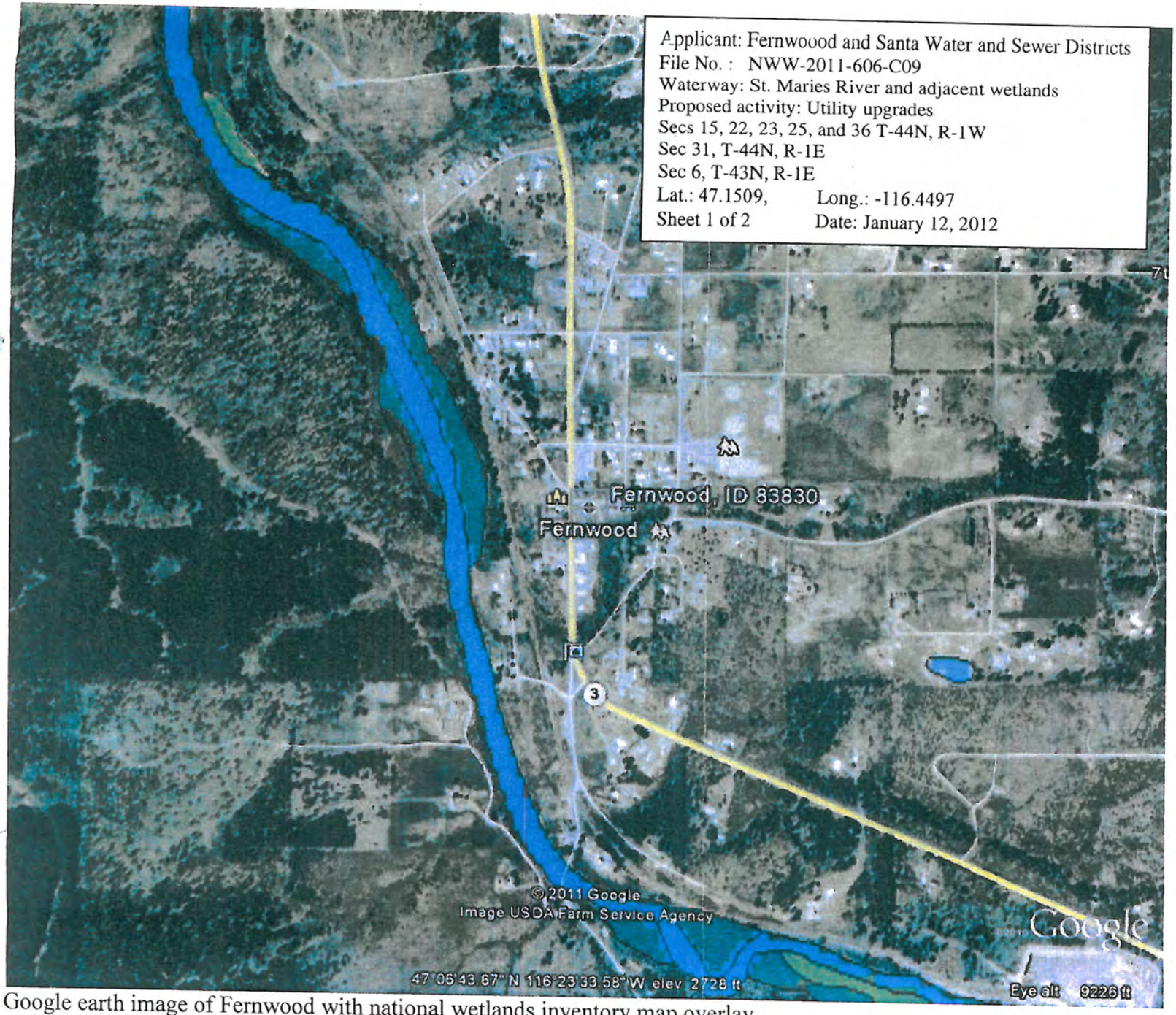
Sincerely,

Michael A. Burgan
Environmental Resource Specialist

Enclosures



Google earth image of Santa with national wetlands inventory map overlay.



Google earth image of Fernwood with national wetlands inventory map overlay.

Williams, Ashley

From: Burgan, Michael A NWW [Michael.A.Burgan@usace.army.mil]
Sent: Thursday, December 22, 2011 10:20 AM
To: Williams, Ashley
Subject: RE: Santa and Fernwood Projects

Attachments: 2011-606 Google earth image of Fernwood & Santa with NWI map overlay.pdf

2011-606 Google earth image of...

Hi Amy,

I have reviewed your submittal, and have been trying to get a written response back to you, but have been unable to do so yet. I will try to get you an official response the first week of 2012. However, until then, please accept this as a preliminary response. Based on your letters concerning this project, it looks like the project could be authorized under NWP12 (Utility Line Activities) and/or NWP39 (Commercial and Institutional Development) depending on the various impacts. It also appears at least one of the potential sewer lines in Fernwood could be located in a wetland adjacent to the St. Maries River (see attached Google Earth image with the NWI overlay).
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Mike Burgan
Environmental Resources Specialist
Coeur d'Alene Regulatory Office
(208) 765-8139

-----Original Message-----
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Sent: Wednesday, December 21, 2011 4:26 PM
To: Reinhart, Mary E NWW; Burgan, Michael A NWW
Subject: Santa and Fernwood Projects

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Thanks! Have a very Merry Christmas.

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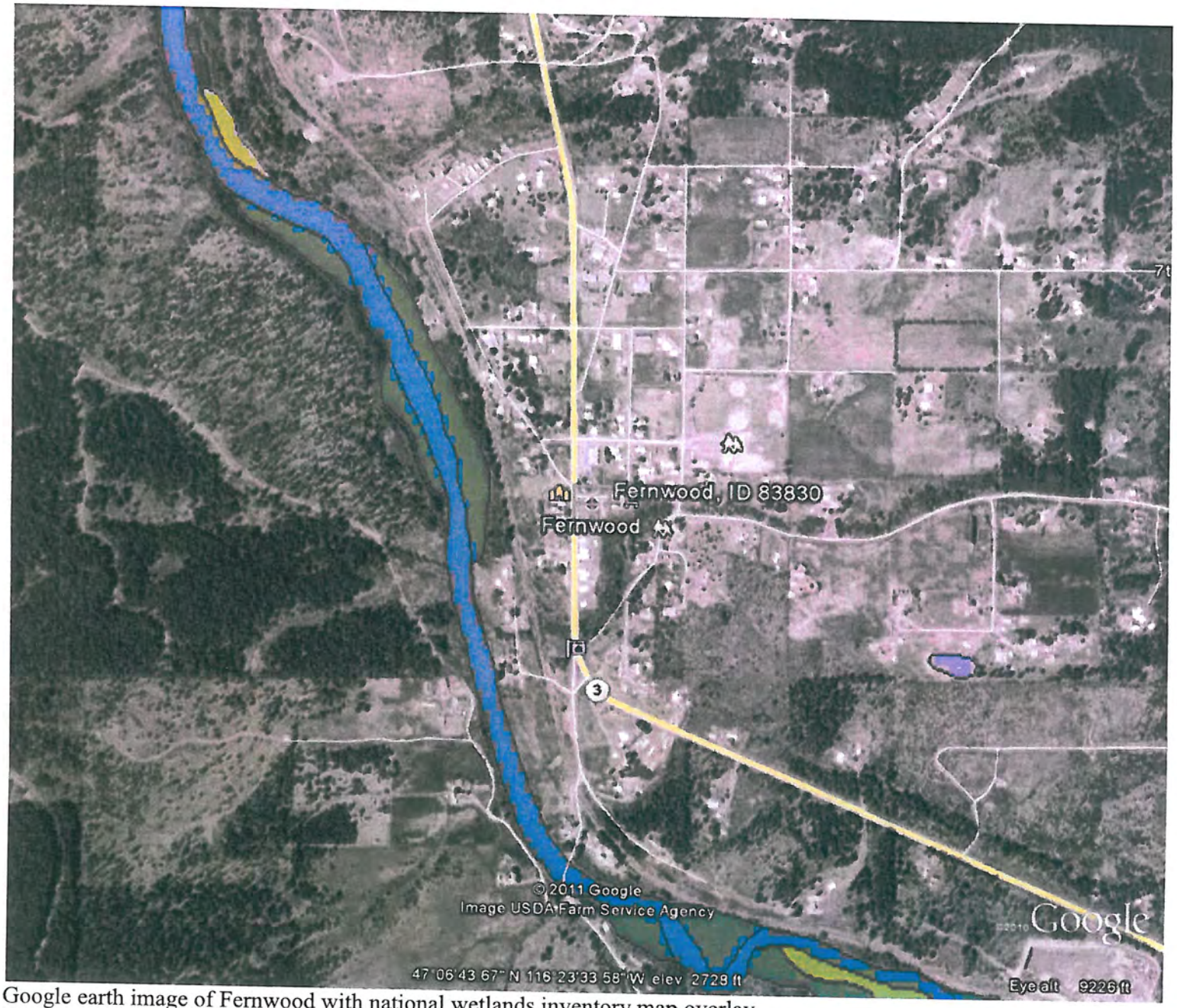
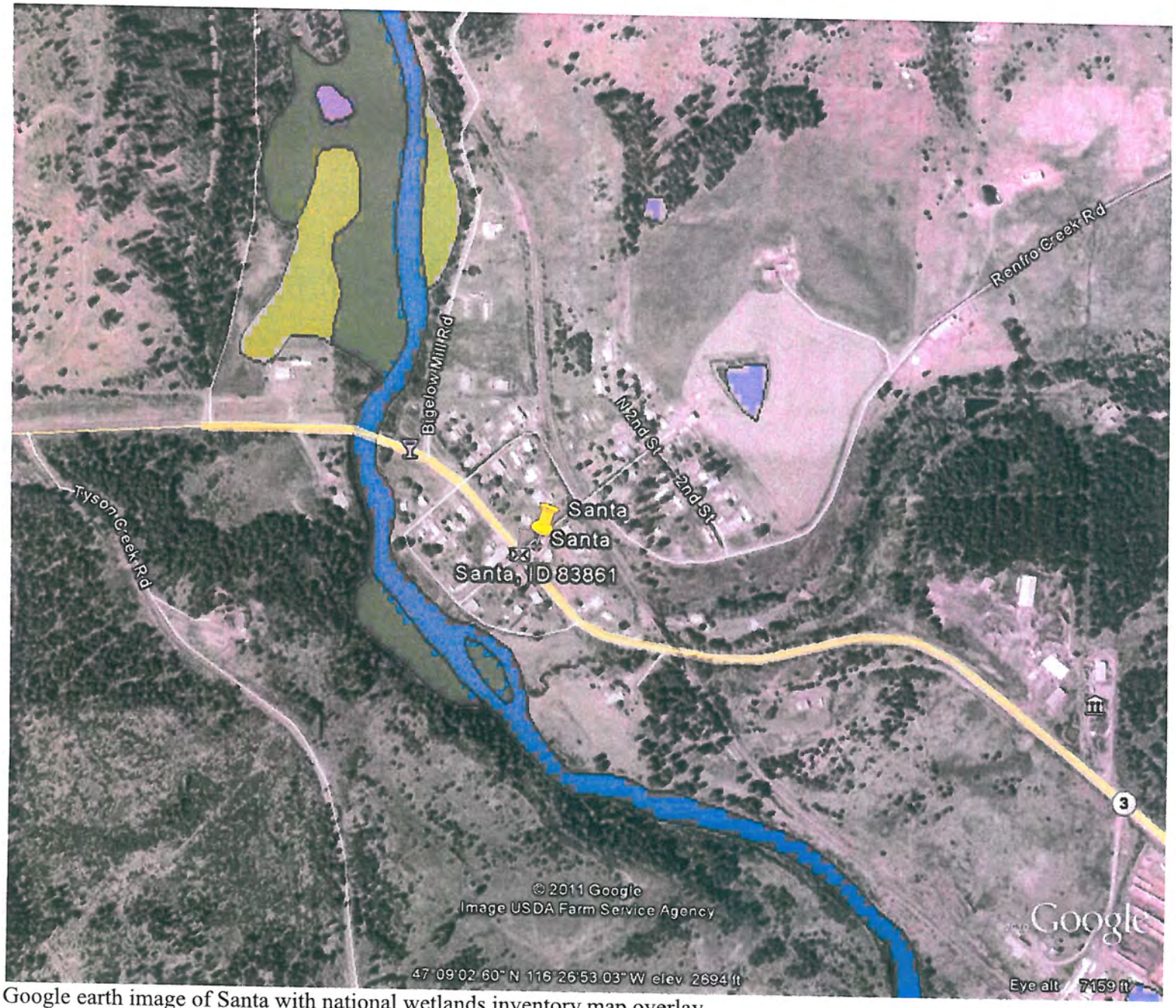


Google earth image of Fernwood with national wetlands inventory map overlay.



Google earth image of Santa with national wetlands inventory map overlay.

Williams, Ashley

From: Bryon_Holt@fws.gov
Sent: Tuesday, December 20, 2011 7:49 AM
To: Williams, Ashley
Subject: Re: Santa and Fernwood Projects

Ashley,

Sorry about the mix-up. I took a quick look at these - I don't see any red flags. We would have sent you a letter for each of these directing you to our web site to obtain a species list. In my opinion the only species that could potentially be affected is bull trout, primarily because it occurs in the St. Joe River downstream of these project locations.

****
Bryon Holt
U.S. Fish and Wildlife Service
Northern Idaho Field Office, Spokane, WA
Telephone: (509) 893-8014
Fax: (509) 891-6748
Blackberry: (509) 209-0711
email: bryon_holt@fws.gov
****

"Williams, Ashley" <awilliams@welchcomer.com>

"Williams, Ashley" <awilliams@welchcomer.com>	To<Bryon_Holt@fws.gov> cc"Fullerton, Jacki" <jfullerton@welchcomer.com>
12/19/2011 02:11 PM	SubjectSanta and Fernwood Projects

Bryon,

Here are the letters that went out last month. They are addressed to the DEQ, but the information about the project is the same that was included in your letter. The attached maps have been revised. I will send those to you in another email, so that this one shouldn't be too large.

Let me know if you have any questions or comments.

Thanks!

Ashley Williams, E.I.T.
Staff Engineer
WELCH-COMER
208-664-9382
208-664-5946 (fax)
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
www.welchcomer.com

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[attachment "Santa-Fernwood WWTP.pdf" deleted by Bryon Holt/UCRB/R1/FWS/DOI]
[attachment "Fernwood Sewer.pdf" deleted by Bryon Holt/UCRB/R1/FWS/DOI]
[attachment "Fernwood Water.pdf" deleted by Bryon Holt/UCRB/R1/FWS/DOI]
[attachment "Santa Sewer.pdf" deleted by Bryon Holt/UCRB/R1/FWS/DOI]

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway, Coeur d'Alene, ID 83814 (208) 769-1422

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

December 13, 2011

Ashley Williams, EIT
Welch Comer Engineers
350 E Kathleen Ave
Coeur d'Alene, ID 83815
awilliams@welchcomer.com

Subject: **Fernwood Water and Sewer District, Wastewater Collection System Improvement Projects**, Idaho DEQ Comments on Environmental Impacts

Dear Ashley:

In your letter dated November 18, 2011, you requested comments from the Idaho Department of Environmental Quality (DEQ) on the environmental impacts from the proposed wastewater collection system improvement projects for the Fernwood Water and Sewer District.

The proposed projects are the following:

1. The construction of a new Lift Station #1 located out of the flood plain.
2. The construction of either a gravity main or new Lift Station #3 with a pressure main to reroute sewage to the new Lift Station #1. This will allow the District to abandon a portion of the gravity collection system that is periodically subject to flooding.
3. The construction of about 600 feet of 8-inch gravity sewer collection line and three (3) manholes on Spring St. between 4th and 5th Streets.
4. Manhole sealing and main line replacement will be done if the budget is sufficient to reduce the amount of infiltration/inflow that is entering the collection system.

These upgrades are needed to reduce the infiltration/inflow (I/I) entering the collection system, improve the reliability of the community's main lift station and replace deteriorated portions of the collection system.

DEQ is supportive of these projects. The following are comments regarding the wastewater collection system, drinking water system, surface water quality, storm water control and air quality issues related to this project:

Wastewater System Improvements

The facility plan and plans and specifications will need to be reviewed and approved by DEQ before starting construction. During planning and design, the Idaho Wastewater Rules (IDAPA 58.01.16) requirements will need to be considered. Fernwood has a public drinking water distribution system and the appropriate horizontal and vertical separation distances between the sewer and drinking water lines will need to be met.

Surface Water Quality

It is not clear from the project description and maps if there could be a crossing of Finn Creek or other stream required as part of the relocation of the sewer line upstream from the new Lift Station

No. 1. If there is a crossing, the appropriate permits will need to be obtained and any permit requirements incorporated into the construction plans and specifications.

Storm Water Control

Storm water controls will need to be developed that adequately protect surface waters and ground water from being impacted during and after construction. The local stormwater control authority should be contacted for details on the appropriate collection/treatment/disposal requirements. Control of sedimentation and erosion during construction activities must be achieved by the use of acceptable best management practices (BMPs) and is considered the responsibility of the owner/developer/contractor for the project. The project may require compliance with the Construction General Permit, a program administered by the U.S. Environmental Protection Agency. This requirement is designed to prevent pollution of waters of the U.S. during construction projects. More information on this requirement can be found at:
http://yosemite.epa.gov/R10/WATER.NSF/NPDES+Permits/Region+10+CGP+resources/

Air Quality

Potential air quality impacts may arise with land clearing, demolition, construction and the subsequent operational phases of the project.

The project plans must incorporate reasonable controls on fugitive dust sources during all phases of the project. All reasonable precautions shall be taken to prevent particulate matter (dust) from becoming airborne, as required in IDAPA 58.01.01.651. A project specific dust control plan that incorporates adequate levels of control measures is encouraged.

Project plans should consider alternatives to open burning of vegetative (land clearing) debris. Mechanical processing of land clearing debris avoids generating smoke and offers the greatest flexibility for timely project progress. If open burning of land clearing debris is incorporated into the project plan, smoke management practices to protect air quality as described in IDAPA 20.02.01.071.03 and IDAPA 58.01.01.614.03 must be considered.

The project plan should describe the proper disposal of demolition and construction debris. Open burning of demolition or construction debris is not an allowable form of open burning as defined by IDAPA 58.01.01.600. Demolition and construction debris must be treated in accordance with solid waste regulations.

Depending on the facility's maximum capacity to emit an air pollutant under its physical and operational design, an air quality permit may be required as described in IDAPA 58.01.01.200-228. If a permit is required, it must be obtained prior to the construction phase of this project. Typical water, wastewater, and sewer project sources that will require an applicability determination include flares and generator sets powered by internal combustion (IC) engines.

Limiting odorous emissions, to the extent possible, during construction and operational phases of the project should be considered. An odor control plan addressing those activities that can be reasonably expected to create odorous emissions is encouraged.

There are no additional or specific air pollution concerns apparent at this time based on the request described in the letter from Ashley Williams, Staff Engineer, Welch Comer Engineers, dated November 18, 2011. The project area is located in Benewah County which is classified as "Attainment" or "Unclassified" for all Criteria Pollutants.

If you have any questions about air quality issues, please call Mark Boyle at 769-1422 or email him at mark.boyle@deq.idaho.gov. Thank you for the opportunity to provide input on these projects.

Sincerely,

John Tindall

John C. Tindall, P.E.
John.tindall@deq.idaho.gov

c: Necia Maiani, P.E., Welch Comer, Coeur d'Alene nmaiani@welchcomer.com
Marzetta Reimann, Santa and Fernwood W&S Districts santawood@cpcinternet.com
Ester Ceja, DEQ State Office, Boise ester.ceja@deq.idaho.gov
Mark Boyle, DEQ Coeur d'Alene mark.boyle@deq.idaho.gov
June Bergquist, DEQ Coeur d'Alene june.bergquist@deq.idaho.gov
File: Fernwood WW Grant TRIM

WELCH, COMER & ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

PHONE LOG

DATE: 12/21/11 TIME: 10:30 (approx.)

PROJECT NAME: Coeur Bay Wastewater ED, Santa and Fernwood EDs

PROJECT NUMBER: 41024; 43007; 43008; 43009

WELCH-COMER REPRESENTATIVE: Ashley Williams

WHO INITIATED COMMUNICATION: Ashley Williams

NAME: Don Martin PHONE NUMBER: 208-665-0458

ADDRESS: 1910 NW Blvd. Suite 208 Coeur d'Alene, ID 83814

SUBJECT: ED comments

Don did not have any comment for any of these projects.

He would like to be removed from the list, if possible. He does not want to be included in the review process.

WELCH-COMER FOLLOW-UP REQUIRED? ☐ YES ☒ NO

FOLLOW-UP COMMUNICATION REQUIRED? ☐ YES ☒ NO

NOTES:

No comment

Williams, Ashley

From: Cyndi Grafe [Grafe.Cyndi@epamail.epa.gov]
Sent: Friday, December 23, 2011 1:27 PM
To: Williams, Ashley
Subject: Fernwood Water System - Preparation of EID

Hi Ashley,

Thank you for the opportunity to review the Fernwood project. After checking with my colleagues, the R10 Idaho Operations Office does not have any comments regarding the proposed project.

Best regards,
Cyndi
==========
Cyndi Grafe
EPA Region 10 - Idaho Operations Office
Boise, Idaho
208/378-5771
grafe.cyndi@epa.gov

WELCH, COMER & ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

PHONE LOG

DATE: 12/7/11 TIME: 1:10 pm

PROJECT NAME: Santa and Fernwood EIDs; Carlin Bay EID

PROJECT NUMBER: 43007, 43008, 43009; 41024

WELCH-COMER REPRESENTATIVE: Ashley Williams

WHO INITIATED COMMUNICATION: Ashley Williams (letter)

NAME: Maria Lopez PHONE NUMBER: 208-378-5616

ADDRESS: 1435 North Orchard Street Boise, ID 83706

SUBJECT: EID comments

No substantial comment on Santa and Fernwood projects or Carlin Bay project.

She wanted to make us aware of the construction General Permit which requires a SWPPP for anything (disturbance) greater than 1 acre.

I told her we would incorporate this, if it was greater than 1 acre.

WELCH-COMER FOLLOW-UP REQUIRED? ☐ YES ☒ NO

FOLLOW-UP COMMUNICATION REQUIRED? ☐ YES ☒ NO

NOTES:

No comment, incorporate SWPPP if needed.

350 E. Kathleen Avenue, Coeur d'Alene, ID 83815 · (208) 664-9382 · Fax (208) 664-5946

Williams, Ashley

From: Susan Eastman [Eastman.Susan@epamail.epa.gov]
Sent: Thursday, December 22, 2011 4:54 PM
To: Williams, Ashley
Subject: RE: Santa and Fernwood Projects

Attachments: pic02513.jpg; pic09261.jpg

pic02513.jpg (65 KB) pic09261.jpg (65 KB)

Thank you for submitting your four projects for review. We have reviewed the information provided and find that the projects will not have a significant adverse impact on the Spokane Valley Rathdrum Prairie Sole Source Aquifer and therefore the funding may proceed.

EPA reviews federally financially assisted projects that are proposed in federally designated Sole Source Aquifer review areas to determine if the projects have a potential to contaminate the aquifer through a recharge zone so as to create a significant hazard to public health.
Such projects are submitted to EPA by federal, state, and local governments, and by the public.

This correspondence only addresses the Sole Source Aquifer Program, any other federal environmental requirements are your responsibility to ensure compliance. Please retain this email for your records.

Thank You,

Susan Eastman, Environmental Scientist
EPA Region 10
1200 Sixth Ave. Suite 900, OWW-136
Seattle, WA. 98101
SDWA Tribal & CWA Indian Set Aside Program, Sole Source Aquifer Program, Source Water Protection and ID 106

206-553-6249
EASTMAN.SUSAN@EPA.GOV

From: "Williams, Ashley" <awilliams@welchcomer.com>
To: Susan Eastman/R10/USEPA/US@EPA
Date: 12/21/2011 04:28 PM
Subject: RE: Santa and Fernwood Projects

Susan,

I called you last week regarding the Santa and Fernwood projects and I had sent you the checklist for each project. I have not heard anything from you, and I was wondering if you had any comments or concerns?

I was hoping to finish the Environmental Information Document by the end of this week. If you don't have any comments, that's fine, just let me know.

Thanks! Have a very Merry Christmas.

(Embedded image moved to file: pic02513.jpg) This email and any attachments are intended solely for the use of the

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or engineering data, design information, recommendations, plans, specifications or GIS information, these documents should be considered draft documents unless explicitly stated otherwise in the email text.

From: Williams, Ashley
Sent: Tuesday, December 06, 2011 3:05 PM
To: 'Eastman.susan@epamail.epa.gov'
Subject: Santa and Fernwood Projects

Susan,

I received your voicemail today regarding the Santa and Fernwood projects. All four projects are located within the source area for the Spokane Valley-Rathdrum Prairie Aquifer and will be potentially funded with Idaho DEQ, Idaho Dept. of Commerce, and USDA funds. I believe this puts these projects within your review. I will be sending the checklists soon for your review.

Let me know if you have any questions or concerns.

Thanks!

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service
7830 Meadow lark Way, Suite C-1
Coeur d'Alene, Id 83815
Phone: 208-762-4939
Fax: 208-762-9859

COPY

RECEIVED NOV 23 2011 By

November 21, 2011

Ashley M Williams, E.I.T.
Welch-Comer
350 E Kathleen Ave.
Coeur d' Alene, ID 83815

Dear Ashley,

I have recently reviewed the documents for the Fernwood Sewer Collection System. The proposed project seems environmentally sound in relocating a lift station out of a 100-year floodplain. Was this lift station in jeopardy from the previous year's record precipitation, for the logic of moving it out of the floodplain? It seems only logical to be able to repair and replacement current lines that are contributing to infiltration and inflow, hopefully budget will allow for this to happen.

Overall, the project seems viable to improve environmental conditions. We have no further comment at this time, but would like to be informed on the progress of the project.

Sincerely,

Aubrey Woodcock

Aubrey Woodcock
DISTRICT CONSERVATIONIST

Williams, Ashley

From: Williams, Ashley

Sent: Tuesday, December 06, 2011 4:44 PM

To: 'Aubrey.Woodcock@id.usda.gov'

Subject: Fernwood Sewer System Improvements

Aubrey,

I received your letter dated November 21, 2011; thank you for responding to our request for comments on on this project.

In response to your questions in this letter:

1. The lift station that will be relocated out of the floodplain is often subject to flooding due to its location location within the floodplain. In addition, it does not have the pumping capacity to handle the peak flow. flow. Therefore, relocating and upgrading this lift station will improve its function and maintenance issues.

2. We hope the budget will allow for the infiltration and inflow improvements, as it would improve the overall system.

Let me know if you have any other questions or concerns.

Thanks!

Ashley Williams, E.I.T.
Staff Engineer
WELCH-COMER
208-664-9382
208-664-5946 (fax)
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
www.welchcomer.com

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Williams, Ashley

From: McGown, Mary [Mary.McGown@idwr.idaho.gov]
Sent: Wednesday, November 23, 2011 1:11 PM
To: Williams, Ashley
Cc: Norm Suenkel
Subject: Fernwood Sewer Collection System

Ms. Williams:

Thank you for sending such readable maps with easily visible project components.

Fernwood is not an incorporated city and thus is not in the National Flood Insurance Program (NFIP). Benewah County's flood damage prevention ordinance regulates floodplain management in the project area. There are mapped flood hazard zones in the project area, specifically the Finn Creek and St. Maries River drainages. Some of the proposed sewer collection system components are in flood hazard zone A. In particular the potential location of I & I improvements is in the mapped flood hazard area of the St. Maries River. The potential new life station No. 3 is close to the confluence of Finn Creek and the St. Maries River, but may be out of the mapped flood hazard area.

The federal minimum regulations are general for water system and waste water system improvements.

> *[The community must] Require within flood-prone areas new and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems: 44 CFR 60.3(a)(5)*
>
> *[The community must] Require within flood-prone areas (i) new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters ... 44 CFR 60.3(a)(6)*

In most instances, these criteria can be met through careful system design. Manholes should be raised above the Base Flood Elevation (BFE) or equipped with seals to prevent leakage. Pumping stations should have electrical panels elevated above the BFE.

A floodplain development permit is required for construction activities and other development in the mapped flood hazard area. Mr. Norm Suenkel is the floodplain administrator for Benewah County and will be the person to work with for a floodplain development permit.

Mary G. McGown, Ph.D., CFM

State Floodplain Coordinator

Idaho Department of Water Resources

322 E. Front Street

State of Idaho
DEPARTMENT OF WATER RESOURCES
Northern Region, 7600 N. Mineral Drive, Suite 100 • Coeur d'Alene, Idaho 83815
Phone: (208) 762-2800 • Fax: (208) 762-2819 • Web Site: www.idwr.idaho.gov

ORIGINAL COPY

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

December 8, 2011

Ashley M Williams
Welch-Comer
350 E Kathleen Ave
Coeur d' Alene ID 83815

Re: Fernwood Water System; Santa-Fernwood Sewer Treatment Facility and Santa and Fernwood's Sewer Collection System.

Well Construction Rules & Regulations:

If a new well is going to be constructed, a well drilling permit must be obtained from IDWR. In addition, if your project involves construction of a new well, or modification of an existing well, the well driller must hold a valid Idaho Driller's License. (Idaho Code Sections 42-230, *et seq.*)

Stream Protection Act

If any alteration of a stream channel is required in a continuously flowing stream, a stream alteration permit is required from the Idaho Department of Water Resources. Alterations can include digging, trenching, bank stabilization, culverts/bridges, etc. (Idaho Code Sections 42-3801, *et seq.*)

Water Rights

A valid water right is required for any use of water, whether it is surface or subsurface. The only exception is ground water domestic as defined in Section 42-111, Idaho Code.

Please do not hesitate to contact us, at the number above, if you have questions.

Sincerely,

Gregory J. Taylor
Stream Channel Protection Specialist
greg.taylor@idwr.idaho.gov

COPY

IDAHO DEPARTMENT OF FISH AND GAME
PANHANDLE REGION
2885 West Kathleen Avenue
Coeur d' Alene, Idaho 83815

C.L. "Butch" Otter/Governor
Virgil Moore/Director

November 29, 2011

Ms. Nancy Mabile,
Economic Development Planner
Panhandle Area Council
11100 Airport Drive
Hayden, ID 83835

Ms. Ashley M. Williams, E.I.T.
Welch, Comer and Associates, Inc.
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815

Dear Nancy/Ms. Williams:

REFERENCE: 1) SANTA-FERNWOOD SEWER TREATMENT FACILITY PROJECT
2) FERNWOOD SEWER COLLECTION SYSTEM
3) SANTA SEWER COLLECTION SYSTEM

The purpose of these comments is to assist the decision-making authority by providing technical information addressing potential effects on wildlife and wildlife habitat and how any adverse effects might be mitigated. It is not the purpose of Idaho Department of Fish and Game to support or oppose this proposal.

1) Santa-Fernwood Sewer Treatment Facility. According to the information provided, the project involves reconfiguring existing lagoon overflow piping, installing a chlorine contact basin, and influent flow meters will be upgraded and check valves will all be located in a new concrete vault (currently in individual manholes). Additionally, because the lagoons were constructed out of clay and are not lined with a synthetic liner, groundwater monitoring wells will be installed to monitor groundwater movement and water quality.

   All of the work will take place within the existing treatment area; therefore, IDFG does not anticipate that the proposed project will have significant impacts to fish or wildlife.

2) Fernwood Sewer Collection System. This project involves several additions and upgrades to the existing system. One lift station, which is located in the 100-year floodplain, will be relocated out of the floodplain. Relocating the lift station will require a new gravity or pressure sewer main to the lift station, and may also require pressure systems for the five residences located below the proposed gravity line (not necessary if a pressure line is installed). The new gravity main on Spring Street will be extended to serve two additional residences. As budget allows, existing manhole repair and main replacement will be incorporated to reduce the occurrence of infiltration and inflow.

All of the improvement work will take place along existing right-of-ways. Abandoning Lift Station 1 and the attached gravity sewer line in the 100-year floodplain will safeguard water quality in the stream adjacent to the lift station and line. IDFG does not anticipate that the proposed project will have significant impacts to fish or wildlife.

3) Santa Sewer Collection System. This system experiences excessive infiltration and inflow and the existing manholes and mains require replacement. One concrete lift station wet well is corroding and will be recoated with polyurethane or industrial elastomeric coating. Pumps will also be repaired at each of the existing lift stations. Air release valves will also be replaced.

   All of the improvements fall along road right-of-ways or existing line pathways in the project planning area; therefore, IDFG does not anticipate that the proposed project will have significant impacts to fish or wildlife.

Thank you for the opportunity to comment.

Sincerely,

Charles E. Corsi
Regional Supervisor

CEC:MTB

C: Sharon Kiefer, IDFG Boise

File: Welch Comer –PAC Santa&Fernwood Water-Wastewater improvement

COPY

STATE OF IDAHO

C. L. "BUTCH" OTTER
GOVERNOR
CELIA R. GOULD
DIRECTOR

November 28, 2011

Ashley Williams
350 E Kathleen Ave
Coeur d Alene, ID 83815

Dear Ms. Williams:

Thank you for inquiring with the Idaho State Department of Agriculture (ISDA) with regards to your work with the Fernwood Sewer Collection System Improvement Project. The public works project being proposed will be an important project for the citizens of that area.

We have reviewed the planning documents provided to us. Your documents appear to be professional and informative. At this time we do not have comments or questions related to this project.

Thank you for contacting our agency. Feel free to contact us in the future (main number - 208-332-8500, my number - 208-332-8597).

Sincerely,

Gary Bahr

Gary Bahr

Water Quality Programs

PC: Water Program File

WELCH, COMER & ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

PHONE LOG

DATE: 12/16/11 TIME: 3:30pm

PROJECT NAME: Santa and Fernwood Projects

PROJECT NUMBER: 43007, 43008, 43009

WELCH-COMER REPRESENTATIVE: Ashley Williams

WHO INITIATED COMMUNICATION: Ashley Williams

NAME: Dick Martindale PHONE NUMBER: 208-415-5200

ADDRESS: 8500 N Atlas Rd. Hayden, ID 83835

SUBJECT: ED comments.

If you don't get any letter or correspondence, we have no comment.

WELCH-COMER FOLLOW-UP REQUIRED? ☐ YES ☒ NO

FOLLOW-UP COMMUNICATION REQUIRED? ☐ YES ☒ NO

NOTES:

No comment for these projects.

350 E. Kathleen Avenue, Coeur d'Alene, ID 83815 · (208) 664-9382 · Fax (208) 664-5946

Williams, Ashley

From: Ken Ockfen [KOckfen@idl.idaho.gov]
Sent: Friday, December 16, 2011 3:14 PM
To: Williams, Ashley
Cc: Tony Brede; Ron Valek
Subject: Fernwood Water System

Ashley,

You requested comments on three sewer projects and one water system project for the City of Fernwood. Idaho Department of Lands does not have any comments relevant to the sewer projects.

With respect to the Water System Project, it is my understanding that the proposed project will be repairing/updating the sand filter and reservoir in Finn Creek on endowment land managed by Idaho Department of Lands. It is the wish of the department to be notified prior to any work that will require excavation or the removal of vegetation outside of the currently fenced enclosure.

Thank you for the opportunity to comment.

Kenneth E. Ockfen

St. Joe Area Manager

1806 Main Street

St. Maries, Idaho 83861-1239

(208) 245-4551

WELCH, COMER & ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

PHONE LOG

DATE: 11/21/11 TIME: 1:40pm

PROJECT NAME: Santa/Fernwood Projects;

PROJECT NUMBER: 43007, 43008, 43009;

WELCH-COMER REPRESENTATIVE: Ashley Williams

WHO INITIATED COMMUNICATION: Ashley Williams

NAME: Howard Lundurstadt PHONE NUMBER: 208-762-7939

ADDRESS: 7830 Meadowlark Way Suite C3, Coeur d'Alene, ID

SUBJECT: Santa/Fernwood Projects EID comments

Letters sent to Jeff Beeman, but in the future should be sent to Howard now.

Since they are a funding agency (Rural Development), typically do not have comments on EIDs.

So, no comment.

WELCH-COMER FOLLOW-UP REQUIRED? ☐ YES ☒ NO

FOLLOW-UP COMMUNICATION REQUIRED? ☐ YES ☒ NO

NOTES:

WELCH, COMER & ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

PHONE LOG

DATE: 11/21/11 TIME: 12:49pm

PROJECT NAME: Santa and Fernwood EIDs

PROJECT NUMBER: 43007, 43008, 43009

WELCH-COMER REPRESENTATIVE: Ashley Williams

WHO INITIATED COMMUNICATION: Ashley Williams

NAME: Tony Tchne PHONE NUMBER: 208-334-2470

ADDRESS: 700 West State St. Boise, ID 83720

SUBJECT: EID comments for all 4 projects

Tony received letters for all four projects. He has no comment on them.

Idaho CDBG is involved with Santa projects.

WELCH-COMER FOLLOW-UP REQUIRED? ☐ YES ☒ NO

FOLLOW-UP COMMUNICATION REQUIRED? ☐ YES ☒ NO

NOTES:

No comment for 4 projects

350 E. Kathleen Avenue, Coeur d'Alene, ID 83815 · (208) 664-9382 · Fax (208) 664-5946

www.history.idaho.gov

Idaho State Historical Society

C.L. "Butch" Otter
Governor of Idaho

Janet Gallimore
Executive Director

Administration
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2682
Fax: (208) 334-2774

Membership and Fund Development
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 514-2310
Fax: (208) 334-2774

Historical Museum and Education Programs
610 North Julia Davis Drive
Boise, Idaho 83702-7695
Office: (208) 334-2120
Fax: (208) 334-4059

State Historic Preservation Office and Historic Sites Archeological Survey of Idaho
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3861
Fax: (208) 334-2775

Statewide Sites:
- Franklin Historic Site
- Pierce Courthouse
- Rock Creek Station and
- Stricker Homesite

Old Penitentiary
2445 Old Penitentiary Road
Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225

Idaho State Archives
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2620
Fax: (208) 334-2626

North Idaho Office
112 West 4th Street, Suite #7
Moscow, Idaho 83843
Office: (208) 882-1540
Fax: (208) 882-1763

December 7, 2011

Nancy Mabile
Panhandle Area Council
11100 N. Airport Drive
Hayden, Idaho 83835-9798

RE: Santa and Fernwood Water and Sewer Districts Sewer System Upgrades; Fernwood Water System Upgrade

Dear Nancy:

Thank you for requesting our views on the proposed upgrades to the Santa and Fernwood, Idaho, Water and Sewer Districts' sewer system upgrades. We received these same projects from Welch Comer Engineers along with Fernwood's water system upgrade. With this letter, we are commenting on all three projects.

Information from Welch Comer indicates that most of the proposed work will involve replacing and installing new equipment or in place replacement of lines. It appears that very little new ground disturbance will occur. If this is the case, we do not think an archaeological survey will be necessary, and the project can proceed with *no effect* on historic properties. Your archaeological consultant should be notified immediately, however, if archaeological remains are discovered during construction.

If we are misinterpreting the nature of the projects, please let us know.

We appreciate your cooperation. If you have any questions, feel free to contact me at 208-334-3847, ext. 107.

Sincerely,

Susan Pengilly

Susan Pengilly
Deputy SHPO

Cc: Ashley Williams, Welch Comer Engineers

Historical Society is an Equal Opportunity Employer.

Williams, Ashley

From: Suzi Pengilly [Suzi.Pengilly@ishs.idaho.gov]
Sent: Monday, December 19, 2011 9:45 AM
To: Williams, Ashley
Subject: RE: Santa/Fernwood Projects
Attachments: santa.pdf

Ashley,
I had intended this letter to encompass all that you had sent, and those that Nancy sent. There was much overlap. Let me know if you need something else, but I hope this will suffice.
Thanks
Suzi.

From: Williams, Ashley [mailto:awilliams@welchcomer.com]
Sent: Friday, December 16, 2011 5:42 PM
To: Suzi Pengilly
Subject: RE: Santa/Fernwood Projects

Suzi,

If you could scan and email those to me, that would be great. We'll be trying to wrap up the EID this next next week before Christmas.

Have a good weekend.

Thanks!

Ashley Williams, E.I.T.
Staff Engineer
WELCH-COMER
208-664-9382
208-664-5946 (fax)
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
www.welchcomer.com

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From: Suzi Pengilly [mailto:Suzi.Pengilly@ishs.idaho.gov]
Sent: Friday, December 16, 2011 4:40 PM
To: Williams, Ashley
Subject: RE: Santa/Fernwood Projects

Yes, I think I just wrote one letter for all four projects--i think I lumped them into three. i will look on Monday.

Appendix O

Completed DEQ EID Checklist

Form 5-B
Outline and Checklist for Environmental Information Documents (EIDs)

Applicant/Borrower and DEQ Grant or Loan # Fernwood Water and Sewer District

Environmental Reviewer

Date

Y=yes N=no N/A=not applicable

A. COVER SHEET

1. Is the project properly identified with the applicant's name and address? ◉ Y ○ N
2. Is the project contact person named on the cover sheet, along with address, phone number, and email address? Please provide the name and contact information for the environmental review contact if different from project contact person. ◉ Y ○ N
3. Is it clear what the project will cost and how it will be funded? ◉ Y ○ N
4. Is the environmental information document (EID) or environmental assessment a stand-alone document, a separate chapter in the engineering report or facility plan, or an appendix in the engineering report or facility plan? Select one stand-alone document

A recommended format for showing the costs and funding follows:

ESTIMATED CONSTRUCTION COSTS

Secondary treatment	* See Document	New interceptors	
Advanced treatment		Recycled water distribution	
Inflow and infiltration correction		Combined sewer overflows	
Sewer system rehabilitation		Storm water sewers	
New collector sewers		**Total estimated cost**	

FUNDING

DEQ share	* See Document	Other share	(list sources in box below)
Total funding			

5. Does the cover sheet provide information about the estimated user costs of the project? ◉ Y ○ N

The recommended format for item A.5 follows:

A.	Current Average Monthly User Charge per EDU	$ 41.00
B.	Change in Operation & Maintenance Monthly Charge per EDU	$ 0.00
C.	Change in Debt Service Monthly Charge per EDU	$ 8.00
D.	Future Average Monthly User Charge per EDU (A+B+C)	$ 49.00

6. Does the cover sheet provide a one-paragraph abstract of the EID? ◉ Y ○ N

B. PURPOSE AND NEED FOR THE PROPOSED PROJECT

1. Does the document provide a clear discussion of the need for the proposed project relative to public health, water quality problems, and other concerns, with particular emphasis on the severity and extent of the problem(s)? Describe sources of information used to assess the need. ◉ Y ○ N
2. Does the document describe conformity, or lack thereof, with any existing NPDES or reuse permits? ◉ Y ○ N

C. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

1. Does the document briefly describe all alternatives studied in the planning document, including the no-action alternative? ◉ Y ○ N
2. Does the document discuss the low-cost alternative? ◉ Y ○ N
3. Does the document comparatively analyze the alternatives with respect to relevant environmental impacts, costs to mitigate environmental impacts, and capital and operating costs? ◉ Y ○ N
4. Does the document discuss the apparent best alternative in detail, including the following: ◉ Y ○ N
   a) Treatment, collection, and discharge/disposal methods ◉ Y ○ N
   b) Location of proposed new facility, or footprint of project components (if other than a new facility) ◉ Y ○ N
   c) Methods of sludge disposal ◉ Y ○ N
   d) Permit requirements ◉ Y ○ N
   e) Environmental impacts (See Section D, Affected Environment) ◉ Y ○ N
   f) Notes and Discussion:
5. If the selected alternative is not the most cost-effective one, does the document provide a justification for the option chosen? ○ Y ○ N ◉ N/A

D. AFFECTED ENVIRONMENT

The purpose of this section is to verify that the selected alternative is environmentally sound and verify that any adverse environmental impacts are avoided, minimized, or mitigated. To validate the selection of the preferred alternative, it is important at this point to identify the major human-made and natural features of the environment that will be affected by the proposed project. Direct, indirect, short-term, long-term, and cumulative impacts must be considered. This information is one part of the information that will be used to determine whether a full environmental impact statement (EIS) will be required.

1. Is a description and map of the proposed project planning area included in the facility planning document or EID (if stand alone document)? ◉ Y ○ N

   Do the description and map take into account the following criteria?

   a) A description of the proposed project planning area boundaries ◉ Y ○ N

   b) Key topographic and geographic features of the area ◉ Y ○ N

   c) The population distribution ◉ Y ○ N

   d) Industrial and commercial features of the planning area ◉ Y ○ N

2. Has a map of the proposed project planning area been provided that includes all pertinent details? ◉ Y ○ N

3. Has the area of potential effects (APE), if different from the proposed project planning area, been identified? ◉ Y ○ N

   a) Once the APE has been identified, have the direct, indirect, short-term, long-term, and cumulative effects related to the proposed project been characterized? ◉ Y ○ N

   b) Has a map of the APE been included? ◉ Y ○ N

4. Describe the following major features of the proposed project.

   a) The length and diameter of collector and interceptor sewer lines and force mains

   * See Document

   b) The number, size, and location of pumping stations

   c) The location and description of treatment facilities

   d) The location and description of each type of on-site septic system, community system, or large soil absorption system that will be used

e) Any other facets of the planned construction (such as location of outfall for a surface water discharge or location of reuse site).

f) If relevant, explain how the wastewater project fits into a regional plan

g) The schedule of construction

5. Are flow projections and their sources described for existing and projected (20-year minimum) for treatment and wastewater flows (40 year minimum for collection)? ◉ Y ○ N

   a) Is an evaluation of operation and maintenance changes resulting from system improvements included? ◉ Y ○ N

   b) Is the contribution of flow from residential, commercial, and industrial sources characterized, along with any related problems? ◉ Y ○ N

   c) Have any related problems been identified? If yes, describe below. ◉ Y ○ N

6. Have all environmental features affected by the proposed project been characterized and mitigation of any resulting environmental impacts discussed in the planning document? ◉ Y ○ N

NOTE: Section D.6 of the EID constitutes the heart of the environmental review for the selected alternative of any wastewater construction project. This information will be most important in determining whether a full environmental impact statement (EIS) will be required. It is important at this point to identify all environmental features that will be affected by the proposed project.

Has each of the following major human-made and natural features and related relevant questions for each feature been included? The list of major human-made and natural features should be considered for each proposed project.

NOTE: These questions should be answered as appropriate, and additional information provided when necessary. Much of the information provided in Section D of the EID can be referenced when completing Section F. Alternatively, the applicant may wish to combine Sections D and F of the EID outline into one section in the final document.

a) Physical aspects (topography, geology, and soils)

   i) Are there physical conditions (e.g., steep slopes, shrink-swell soils, etc.) that might be adversely affected by or might adversely affect construction of the facilities? ○ Y ◉ N

ii) Are there similar physical conditions in the planning area that might make development unsuitable? ○ Y ● N

iii) Are there any unusual or unique geological features that might be affected? ○ Y ● N

iv) Are there any hazardous areas (e.g., slides, faults) that might affect construction or development? ○ Y ● N

(v) Discussion

b) Climate

i) Are there any unusual or special meteorological constraints in the planning area that might result in an air quality problem (e.g., may be an issue for certain types of treatment systems with emission considerations)? ○ Y ● N

ii) Are there any unusual or special meteorological constraints in the planning area that affect the feasibility of the proposed alternative? ○ Y ● N

iii) Discussion

c) Population

i) Are the growth rates excessive because of:

(1) exceeding by 25% the 20-year population growth rate expectations for the state (Idaho Division of Financial Management), and ○ Y ● N

(2) having a change of greater than 500 estimated residential units over the life of the project? ○ Y ● N

ii) Do the plans call for sufficient extra capacity? ● Y ○ N ○ N/A

iii) Discussion

d) Economics and social profile

i) Does documentation exist that suggests that the local populace can afford to build the project? ● Y ○ N

ii) Will certain landowners benefit substantially from the development of land due to collection or interceptor routing or wastewater treatment plant (WWTP) location and size? ○ Y ● N ○ Unknown

iii) Will the facilities adversely affect land values? ○ Y ● N

iv) Environmental justice (Executive Order No. 12898):

(1) Will any low-income or minority groups be adversely affected by the proposed project? ○ Y ● N

(2) Are any benefits from this project going to accrue in a non-discriminatory manner? ● Y ○ N

v) Discussion

e) Land use

i) Is the location of the WWTP or other facilities incompatible with local land use plans? ○ Y ● N

ii) Will inhabited areas be adversely impacted by the project site? ○ Y ● N

iii) Will new development that is stimulated by a new wastewater facility have adverse effects on older, existing land uses (e.g., agriculture, forest land, etc.)? ○ Y ● N

iv) Will this project contribute to changes in land use in association with recreation, mining, or other large industrial or energy development? ○ Y ● N

v) Discussion

*f) Floodplain development (no floodway construction is allowed)

i) Has the community determined if any part of the planned wastewater project will be located within a 100-year floodplain? (Attach maps used to arrive at decision.) ● Y ○ N

ii) If some part of the planned wastewater facility will be located within a 100-year floodplain, and no practicable alternative to this exists, has the community indicated that measures will be included in the design of the facilities to minimize or avoid adverse effects to the floodplain? ● Y ○ N

iii) Will the facility be able to fully function and operate during a 100-year flood event? ● Y ○ N

iv) If a 100-year floodplain will be impacted by the proposed project, has the applicant indicated how the public will be notified of this and how public input will be considered? ● Y ○ N ○ N/A

v) If the project or some part of it will be in a 100-year floodplain, is the borrower currently participating in the National Flood Insurance Program? ● Y ○ N

vi) Discussion

*g) Wetlands

i) Is any portion of the project planning area located within wetlands as defined and mapped by the U.S. Fish and Wildlife Service or as determined through site visits by the U.S. Army Corps of Engineers (COE), the Soil Conservation Service, or a qualified private consultant? ○ Y ◉ N

ii) If part of the proposed project will be located in or will affect wetlands, as determined by maps and/or site investigations, will a 404 dredge and fill permit be required from the COE? (Attach maps, site investigations, or correspondence used to reach decision.) ◉ Y ○ N

iii) Have alternatives to keeping the project outside the identified wetlands been proposed in the EID or engineering report/facility plan? ◉ Y ○ N

iv) If part of the proposed project will be located in an identified wetland, and no practicable alternative exists, has a wetlands assessment of measures to minimize or mitigate adverse affects been made? ○ Y ◉ N

v) If a Wetland Delineation Report has been prepared for the proposed project site, did the COE concur with DEQ findings on the Wetland Delineation Report? ○ Y ○ N N/A

vi) Discussion

h) Wild and scenic rivers

i) Does the planning area contain a designated or proposed wild and scenic river? ○ Y ◉ N

ii) Discussion

*i) Cultural resources

i) Has the State of Idaho historic preservation officer (SHPO) and/or the tribal historic preservation officer (THPO) been consulted to determine if there are any properties (historic, architectural, or archaeological) in the planning area that are listed, or eligible for listing, on the National Register of Historic Places? ◉ Y ○ N

NOTE: Contact the appropriate THPO, as the lead authority for the Coeur d'Alene Tribe of Idaho and the Nez Perce tribal lands in Idaho. Contact the SHPO as the lead authority for all other tribal lands in Idaho.

ii) Has the SHPO or THPO requested a site survey to determine the presence or absence of cultural resources in the proposed project area? ○ Y ● N

iii) If cultural resources have been identified in the project area, will the project have direct or indirect adverse impacts on any listed or eligible property? ○ Y ○ N N /A

iv) Has the community developed mitigation measures to avoid or reduce adverse impacts to cultural resources identified in the proposed project area? ○ Y ○ N ● N/A

v) Discussion

*j) Flora and fauna

i) Has a current U.S. Fish and Wildlife Service threatened and endangered species list specific to the proposed project site been provided? ● Y ○ N

ii) Are there any designated threatened or endangered species or critical habitats in the proposed project planning area? ○ Y ● N

iii) If listed species or habitats are present, has a biological assessment been prepared by a qualified expert for designated threatened or endangered species? ○ Y ○ N N/A

iv) Will the project have direct or indirect adverse impacts on any such designated species or habitats? ○ Y ● N

v) Will the project have direct or indirect adverse impacts on other fish and wildlife, or their habitats, including migratory routes, wintering, or calving areas? ○ Y ● N

vi) Does the planning area include a sensitive habitat area designated by a local, state, or federal wildlife agency? ○ Y ● N

vii) If a Biological Assessment (BA) has been prepared for threatened or endangered species, did the applicable agency/agencies (U.S. Fish and Wildlife Service or National Marine Fisheries Service) concur with DEQ findings on the BA, if necessary? ○ Y ○ N N/A

viii) Discussion

k) Recreation and open space

i) Will the project eliminate or modify recreational open space, parks, or areas of recognized scenic or recreational value? ○ Y ◉ N

ii) Is it feasible to combine the project with parks, bicycle paths, hiking trails, waterway access, and other recreational uses? ○ Y ◉ N

iii) Discussion

*l) Agricultural lands

i) Does the planning area contain any important farmlands (prime, unique, statewide importance, local importance, etc.) as defined by the U.S. Department of Agriculture? ○ Y ◉ N

ii) If yes, will the project directly or indirectly encourage the irreversible conversion of environmentally significant agricultural lands to uses that result in the loss of these lands as an environmental or essential food production resource? ○ Y ○ N ◉ N/A

iii) Discussion

*m) Air quality

i) Will there be any direct air emissions from the project (as from construction equipment) that will not meet federal and state emission standards contained in the air quality state implementation plan (SIP)? ○ Y ◉ N

ii) Is the project service area located in an area without an approved or conditionally approved SIP? ○ Y ◉ N

iii) Does the project violate national ambient air quality standards in an attainment or unclassified area? ○ Y ◉ N

iv) Will the facilities cause odor or noise nuisance problems? ○ Y ◉ N

v) Discussion

n) Water quality, quantity, and sole source aquifers

i) Are present stream classifications in the receiving stream being challenged as too low to protect present or recent stream uses? ○ Y ● N

ii) Is there a substantial risk that the proposed discharge will not meet existing stream standards or will not be of sufficient quality to protect present or recent stream uses? ○ Y ● N

iii) Will project construction and development served by the project result in nonpoint water quality problems (sedimentation, urban storm water, etc.)? ○ Y ● N

iv) Will the project adversely affect water rights? ○ Y ● N

v) Will stream habitat be affected as a result of the change in flow or stream-bank modification? ○ Y ● N

vi) Will the project adversely affect the quality or quantity of a ground water source? ○ Y ● N

vii) Does the project adversely affect a sole-source aquifer or streamflow source area or recharge area? ○ Y ● N

viii) Does the project adversely affect a source water area for a public drinking water system? ○ Y ● N

xi) Could other water conservation measures be implemented to reduce wastewater generation? ○ Y ● N

x) Discussion

o) Public health

i) Will there be adverse direct or indirect noise impacts from the project? ○ Y ● N

ii) Will there be a vector problem (e.g., mosquito) generated by the project? ○ Y ● N

iii) Will there be unique public health problems as a result of the project (e.g., increased disease risk)? ○ Y ● N

iv) Discussion

p) Solid waste/sludge management

i) Will sludge disposal occur in an area with inadequate sanitary landfills or on land not suited to land application? ○ Y ◉ N

ii) Are there special sludge problems that make disposal difficult (hazardous, difficult to treat)? ○ Y ◉ N

iii) Is the selected sludge technology controversial? ○ Y ◉ N

iv) Does the sludge management plan conform to the EPA 503 regulation for municipal sludge? ◉ Y ○ N

v) Discussion

q) Energy

i) Are there additional cost-effective measures to reduce energy consumption or increase energy recovery that could be included in the project? ○ Y ◉ N

ii) Have air quality issues of energy recovery been addressed? ○ Y ○ N ◉ N/A

iii) Discussion

r) Reuse/land application or subsurface disposal system N/A

i) Has a new or unproved technique been selected? ○ Y ○ N

ii) Will rapid infiltration basins be in use? ○ Y ○ N

iii) Will slow-rate land application be used? ○ Y ○ N

iv) Will subsurface sewage disposal be used? ○ Y ○ N

v) Has application for a permit been made in accordance with Idaho Code, State Wastewater Reuse Rules, and the Individual/ Subsurface Sewage Disposal Rules? ○ Y ○ N

vi) Is there public controversy about the project? ○ Y ○ N

vii) Will the project require additional water rights or impact existing water rights? ○ Y ○ N

viii) Is the project multi-purpose? ○ Y ○ N

ix) Discussion

s) Regionalization

i) Are there jurisdictional disputes or controversy over the project? ○ Y ● N

ii) Have intermunicipal agreements been signed? ● Y ○ N ○ N/A

iii) Have intermunicipal agreements been discussed with surrounding communities? ● Y ○ N ○ N/A

iv) Discussion

E. MAPS, CHARTS, AND TABLES

1. Do the maps, charts, and other graphic materials used in the EID help the reader clearly discern project features? ● Y ○ N
2. Are all graphs, charts, tables, and other graphics clearly labeled and referenced properly in the text of the EID? ● Y ○ N

F. ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT

1. Are the direct, indirect, short-term, long-term, and cumulative impacts of the project upon human-made and natural features clearly identified, and is mitigation provided? (Refer to Section D of this form.) ● Y ○ N
2. Are additional potential or existing impacts that are worthy of discussion in the EID noted? ● Y ○ N ○ N/A
3. Are there obvious areas of impact that have not been considered in this evaluation? List them below. ○ Y ● N ○ N/A
4. Have unavoidable adverse impacts that cannot be fully mitigated been listed and discussed? ○ Y ○ N ● N/A

G. MEANS TO MITIGATE ADVERSE ENVIRONMENTAL IMPACTS

1. Have mitigation measures been clearly listed for direct, indirect, short-term, long-term, and cumulative impacts? ● Y ○ N ○ N/A
2. Have means of achieving mitigation measures been given? ● Y ○ N ○ N/A

a) The means to achieve the mitigation measures must identify and establish all the following:

i) The mitigation measures identified for implementation are enforceable, and

ii) Verification that parties committing to mitigation measures has the authority and ability to fulfill the commitments, and

iii) Appropriate monitoring is conducted during implementation of the mitigation measures

H. PUBLIC PARTICIPATION

1. During the planning process if the environmental review process has determined that something other than a categorical exclusion (with no supporting documentation) is appropriate, has the public been given at least 14 days to review and comment on the alternatives under consideration for the proposed project and commensurate environmental impacts of each alternative? This is to ensure that environmental information is available before decisions are made and actions are taken. The comment period begins with the date the public notice is published. The notice need not be published more than once, unless the project is highly controversial. If the project is deemed controversial, then the public notice will be tailored to suit the circumstance. Include a copy of the public notice in the EID. ◉ Y ○ N

2. Have dates and meeting locations for all public hearings and meetings concerning the engineering report or facility plan and EID been described in the EID? Include copies of the meeting minutes of when an alternative was selected. ◉ Y ○ N

3. Have all substantive issues raised by the public in meetings, hearings, and by correspondence been described in the EID? Include copies of public comments received. ◉ Y ○ N ○ N/A

4. Have substantive public concerns been addressed in the engineering report or facility plan and final environmental document? ○ Y ○ N ◉ N/A

5. Have significant substantive comments received from state and federal agencies been described and considered in the engineering report or facility plan and final environmental document? Include copies of state and federal agency comments received. ◉ Y ○ N ○ N/A

I. REFERENCES CONSULTED

Is there a list of all reference documents consulted in preparation of the EID? ◉ Y ○ N

J. AGENCIES CONSULTED

1. Is there a list of all agencies and agency experts or individuals consulted during the preparation of the EID? ◉ Y ○ N

2. Does the list of consulted agencies include dates the agency response was received or dates consultation was attempted? (Include correspondence such as emails on attempted consultations.) ◉ Y ○ N

K. MAILING LIST

1. Has a mailing list been included in the EID? ◉ Y ○ N

2. Does the mailing list include the names and addresses of all attendees of public meetings, affected local residents, relevant environmental groups, DEQ and local officials, and agencies that were consulted or who were provided information regarding proposed project? ◉ Y ○ N

NOTE: Asterisk items are not required for projects identified as Tier II. Please see Form 5C for discussion of Tier II.

Appendix P

Railroad Easement Correspondence

Fernwood Water and Sewer District
P.O. Box 215
Fernwood, ID 83830

COPY

March 7, 2012

St. Maries River Railroad Co.
318 N. 10th Street
St. Maries, ID 83861
Attn: Jody Jackson and Paul

Dear Jody and Paul,

As our operator, John Sherman discussed with you by telephone, Fernwood must relocate over 2600 Ft. of sewer pipeline that runs along the St. Maries River and within the floodplain. The best and most affordable option that was presented to the board by the engineer is to install the new sewer main along the R.R. tracks between Depot Rd. and 9th St. in Fernwood. We understand that Mike would have to approve a pipeline easement within the R.R. easement.

Please discuss our situation with Mike and let us know if this is a possibility. We are in the early planning stages and need to know which doors may be open to us. Thank you very much for your consideration.

Respectfully Submitted,

Hank Lewis

Hank Lewis, Chairman

Cc: John Tindall, DEQ

Ownbey, Dennis

From: Marzetta Reimann [santawood@cpcinternet.com]
Sent: Thursday, May 17, 2012 10:07 AM
To: Ownbey, Dennis
Cc: katy.baker-casile@deq.idaho.gov
Subject: Rate Study and Letter to St. Maries River Railroad
Attachments: Scan0098.pdf

Attached is the Rate Study that IRWA completed for the block grant also a letter from the district to St. Maries River Railroad, When have had no response from them.

Hope this helps!

Marzetta