Meadowland Homeowners Association
Public Water System

PWSID # MT0001670

SOURCE WATER DELINEATION AND ASSESSMENT REPORT

05/09/02

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INTRODUCTION

This Delineation and Assessment Report was completed by HDR Engineering, Missoula, MT. for:

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PURPOSE

This report is intended to meet the technical requirements for the completion of the delineation and assessment report for the Meadowland Homeowners Association as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to protect public drinking water supplies from contamination. A major component of the Montana Source Water Protection Program is "delineation and assessment". Delineation is a process of mapping source water protection areas, which contribute water used for drinking. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported, and then assessing the relative potential for contamination of drinking water by these sources. The primary purpose of this source water delineation and assessment report is to provide information that helps the Meadowland Homeowners Association protect its drinking water source.

Limitations

This report was prepared to assess threats to the Meadowland Homeowners Association public water supply (PWS), and is based on published information and information obtained from local residents familiar with the community. The terms "drinking water supply" or "drinking water source" refer specifically to the source of the Meadowland Homeowners Association public water supply and not any other public or private water supply. Also, not all potential or existing sources of groundwater or surface water contamination in the area of the Meadowland Homeowners Association PWS are identified. Only potential sources of contamination in areas estimated to contribute water to its drinking water source are considered.

The term "contaminant" is used in this report to refer to constituents for which maximum concentration levels (MCLs) have been specified under the national primary drinking water standards, and to certain constituents that do not have MCLs but are considered to be significant health threats.

CHAPTER 1
BACKGROUND

The Community

The Meadowland Homeowners Association PWS serves the Meadowland subdivision, which is located just outside the Kalispell city limits to the northwest of the City of Kalispell. The subdivision lies within the planning area that is designated in ***Water, Sewer and Storm Drainage Systems Facility Plan 2000,*** a document that was recently adopted the City of Kalispell. This study area will be used to evaluate the water supply system characteristics and is shown on the map in Appendix A. The study area is bounded by the Flathead River on the east, the north border of Sections 26, 27, 28, 29, and 30 of Township 29 North, Range 21 West and Sections 25, 26, and 27 of Township 29 North, Range 22 West on the north, West Valley Drive on the west, Lower Valley Road and Foys Lake on the south.

Kalispell serves as the population and commercial center of Flathead County and portions of four surrounding counties. Kalispell is the Flathead County seat. Major industrial, health care and government facilities are also located in the Kalispell area. The economic base of the Kalispell area and Flathead County is diverse. The county's leading industries are wood products manufacturing, microelectronics manufacturing, metals refining, railroad, agriculture, tourism, and the federal government. The area is also attractive to retired individuals and the local retirement income represents a substantial and growing portion of the local economy. The area's proximity to Glacier National Park and Big Mountain, a destination ski resort, makes it a year-round center for the tourist trade.

The Kalispell area is a growth area and in recent decades, growth rates in the City–County planning jurisdiction have fluctuated in a cyclical pattern between moderate and boom levels. The average annual growth rate of the planning jurisdiction population was 1.7 percent in the 1960's, 3.7 percent in the 1970's, and 1.8 percent in the 1980's[1]. The 1990 census data was adjusted using recent tax information to estimate the current year (2000) population. The overall population growth in the study area between 1990 and 2000 was approximately 17 percent. Population and employment data for the study area is summarized in Table 1-1.

Table 1-1. Existing Population and Employment

Category	1990		2000	
	Population	Employment	Population	Employment
Study Area [1]	26,672	15,246	32,007	22,753

1 Population data for all analysis zones combined

The study area is currently served by City of Kalispell water and sewer utilities, which serve the area inside the Kalispell city limits, the Evergreen Water and Sewer District, which is located northeast of the City of Kalispell, and the Village Sewer District, located north of Kalispell. The

[1] Growth rates as stated in the Resources and Analysis Section, Kalispell City County Master Plan, Flathead Regional Development Office, November 1997.

City of Kalispell provides water and sewer service to the majority of the population in the study area. The Evergreen Water and Sewer District discharges sewage to the City of Kalispell and provides water to a portion of the City. The Village Sewer District receives sewer service from the City of Kalispell and water service from the Evergreen Water and Sewer District. Table 1-2 is a summary of population and employment currently served by these utilities.

Table 1-2. Existing Population and Employment Served By Utilities

Category	2000	
	Population	Employment
Kalispell Sewer	14,639	15,573
Kalispell Water	14,639	15,573
Evergreen Sewer District	5,072	2,740
Evergreen Water District	7,372	3,289
Village Sewer District	813	119

Water services outside the City of Kalispell and the Evergreen and Village service areas consist of a variety of small public and private water systems utilizing groundwater as their source. Wastewater treatment for the areas outside the sewer service areas, described above, is accomplished with on-site septic systems.

The major transportation corridors include Montana State Highway 93, which is the primary north-south corridor, connecting Kalispell with Whitefish to the north and Polson and Missoula to the south. Montana State Highway 2 is the major east-west corridor, connecting Kalispell to Libby on the west and Columbia Falls to the northeast. The Burlington Northern/Santa Fe Railroad also passes through the City of Kalispell.

Geographic Setting

The Meadowland Homeowners Association PWS is located one mile northwest of the City of Kalispell in the heart of the Flathead Valley. The Flathead Valley is a south to northwest trending intermountain valley in western Montana. The valley is surrounded by the Flathead and Mission mountains on the east and the Cabinet and Salish mountains to the west and north. Glacier National Park is north and east of the valley. The eastern half of the study area encompasses the confluence of the Flathead, Whitefish, and Stillwater Rivers. This area is characterized as a large complex of swales, streams, wetlands, and alluvial terraces comprised of a significant amount of floodplain and hydric soils. The Evergreen alluvial aquifer, located generally along the Flathead River floodplain, is a highly permeable sand and gravel aquifer controlled by the flows of the river. These hydrogeologic features were a factor driving the construction of a public sewer system for Evergreen.

The western half of the study area, where the Meadowland Homeowners Association PWS is located, is characterized by agricultural land with foothills in the southwest. Ashley Creek is the

main drainage. Foys Lake is located in the southwestern foothills area. The maps in the Appendices to this report graphically depict the characteristics of the study area.

The climate of the Flathead Valley is consistent with that of other lower elevation basins in the northern Rocky Mountains, west of the Continental Divide. The elevation at Kalispell is 2,970 feet. The average high and low temperatures at the weather station in Kalispell are 81 and 48 degrees F in July and 28 and 13 degrees F in January. Average annual precipitation falls mostly as winter snow and totals an average of 16.6 inches.

General Description of the Source Water

The majority of drinking water in the Kalispell area comes from a deep artesian aquifer that spans the region. This groundwater aquifer generally flows from northwest to southeast across the area, toward Flathead Lake. Because of the depth and semi-confined or confined nature of the aquifer, contamination from septic systems or other sources is unlikely. Flathead Lake, one of the cleanest lakes of its size in the world, is fed by waters from the Flathead, Stillwater, and Whitefish Rivers, as well as Ashley Creek, all of which flow through the study area.

Flathead Lake, the Whitefish River, and Ashley Creek are all on the State of Montana Section 303(d) list of water quality impaired water bodies for nutrients. Concerns over declining water quality in Flathead Lake have led to development of a TMDL (Total Maximum Daily Load) and voluntary nutrient reduction strategy for Flathead Lake. Although nutrients significantly impact surface water quality, the impact to the drinking water taken from the groundwater sources in the area is negligible.

The City of Kalispell is served by a potable water system, consisting of groundwater wells with a distribution pipe network, an elevated storage tank and ground level storage tanks; a sanitary sewer collection system consisting of a network of gravity sewers and lift stations leading to a wastewater treatment plant; and a storm sewer collection system consisting of a network of gravity piping as well as several above grade detention basins. Demands on these facilities are increasing as Kalispell grows and more stringent water quality standards are implemented.

A public sewer system was installed in Evergreen in 1993 due to concerns about pollution of Flathead Lake from septic systems within the alluvial aquifer, located generally along the Flathead River floodplain.

The wastewater that is generated in the Meadowland subdivision is treated in individual septic systems located at each property. The wastewater from the City of Kalispell and Evergreen areas is treated at the Kalispell Advanced Wastewater Treatment Facility, which is located on the south edge of the City of Kalispell, and discharges to Ashley Creek.

The Public Water Supply

The Meadowland Community PWS supplies water to 150 full time, year-round residents in the Meadowland subdivision. There are a total of 44 service connections in the Meadowland subdivision, which are not metered. The system has two wells that pump the drinking water from a depth of approximately 170 feet. The wells are located in the southeast portion of the subdivision near an 18,000 gallon capacity underground storage reservoir.

Well #1 terminates three feet south of the reservoir. This well is drilled to a depth of 170 feet. It was completed in April of 1973. It has an 8-inch steel casing that extends to a depth of 170 feet. A five horsepower submersible pump in the well pumps the water to the reservoir. The well has a capacity of 40 gallons per minute. There is no record of the size of the drilled hole or grouting of the well.

Well #2 terminates at the ground surface about 200 feet east/southeast of the reservoir. It was completed in May of 1986. It has a 15 horsepower submersible pump within the well that pumps the water to the reservoir and has a capacity of 100 gallons per minute. This well was drilled to a depth of 217 feet using a rotary drill. The well casing is 8-5/8 inches in diameter and extends to a depth of 217 feet. The bottom of the well casing is open and all water enters the well from this open end. The well was grouted from 0 to 20 feet with eight sacks of cement.

The reservoir is constructed of concrete with a hypalon liner. The wells pump to the reservoir using submersible pumps. From the reservoir the water goes through a 7.5 horsepower booster pump to a pressure control assembly located within a small pump house. There are ten captive air pressure tanks and a pressure switch that controls the operation of the booster pump. A sanitary survey inspection in February of 1999 noted several deficiencies in the sanitary seals at the wellheads. The distribution system consists of PVC water mains that distribute the water to the subdivision. The well log is included in Appendix H.

Water Quality

The deep aquifer that is utilized for the supply of drinking water is not susceptible to surface contamination and no major sources of contamination are apparent in the area. Selected water quality data for two wells in the nearby area are presented in Appendix J. The tables show the sample results and compare the results against the drinking water standards. The levels of contaminants in the water are substantially lower than the standards in all cases. Other possible sources of contamination and their potential to impact the water quality will be evaluated in the subsequent chapters of this report.

CHAPTER 2
DELINEATION

The source water protection area, the land area that contributes water to the Meadowland Home Owner's Association (HOA) PWS, is identified in this chapter. Three management areas are identified within the source water protection area: the control zone, the inventory region, and the recharge region. The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the well. The inventory region represents the zone of contribution of the well, which approximates a three-year groundwater time-of-travel. Analytical equations describing groundwater flow using estimates of pumping and aquifer characteristics and simple hydrogeologic mapping are used to calculate groundwater time-of-travel distance. The recharge region represents the entire portion of the aquifer, which contributes water to the Meadowland HOA PWS.

Hydrogeologic Conditions

Kalispell is located within the center of the Flathead Valley in northwestern Montana. The Flathead Valley is a northwest trending intermontane basin forming the southern extension of the Rocky Mountain Trench. The valley is bounded on the east by the Swan-Whitefish fault located along the base of the Swan Range and on the west by the Kalispell fault at the base of the Salish Mountains. The mountains rise abruptly 4,500 feet above the valley floor. Gravity data indicate the Cenozoic basin-fill in the central part of the valley may be as much as 4,000 feet thick (Noble and others, 1982). Although Tertiary rocks are not exposed, it is believed that Miocene and Oligocene sediments rest unconformably on Precambrian bedrock. Pleistocene continental and mountain glaciation advanced southward through the Trench in the vicinity of Kalispell depositing a layer of glacial till. As the glaciers receded, meltwater lakes pooled in areas where drainage was impeded, leaving lakebed deposits. In contrast, fluvial outwash deposits accumulated where discharge flowed unrestricted. It is estimated that 600 to 1,000 feet of Wisconsin-age Pleistocene glacial deposits overlie the Tertiary sediments. Surficial geology of the area is shown on the geologic map in Appendix C.

The two primary aquifers recognized in the Kalispell area are the shallow alluvial aquifer and the deep artesian aquifer (Konizeski and others, 1968; MBMG, 20000). The shallow alluvial aquifer is composed of unconsolidated fluvial sediments (i.e., sand and gravel) deposited along the floodplain of the Flathead, Whitefish, and Stillwater Rivers. The aquifer thickness ranges from 20 to 100 feet. Low permeability glacial till and lakebed deposits of various thicknesses separate the shallow aquifer from the deep artesian aquifer. The low permeability deposits are nearly laterally continuous in the area and generally separates surface water and shallow groundwater from the deep artesian aquifer.

The deep artesian aquifer consists of a series of intercalated sand and gravel layers with fine-grained interbeds. These deposits probably represent the paleo-channel of the Flathead River. Recent work in the central and eastern portions of the valley indicate this package of sediments is hydraulically interconnected and responds as a single aquifer demonstrating anisotropic characteristics (Shapley, 1992; and Noble, 1998). The thickness of the deep artesian aquifer is unknown but a well located in Section 18 of Township 29 North, Range 21 West was drilled to a

depth of more than 800 feet and had not penetrated the base of the aquifer. In the western portion of the Flathead Valley, the confining unit overlying the deep artesian aquifer consists of glacial till composed of clayey and silty gravel. Northwest of Kalispell, the till is overlain by glacial outwash deposits.

The Meadowland HOA PWS derives groundwater from the deep artesian aquifer. In this area, the upper surface of the aquifer is approximately 200 feet bgs and is overlain by glacial till (clayey silt, sand, and gravel from approximately 20 to 200 feet bgs), capped by glacial ice contact deposits at the surface. Groundwater flow directions in the deep artesian aquifer are generally from north to south in the center of the valley (see groundwater flow map in Appendix D). Near the edges of the valley, groundwater flows toward the center of the valley. In the vicinity of the Meadowland HOA PWS, groundwater flow directions are northwest to southeast. Because the aquifer is an extensive confined artesian system, seasonal fluctuations in groundwater levels and flow directions likely are small.

Based on hydrogeologic conditions, the Meadowland HOA PWS is classified as having a Low Source Water Sensitivity, according to the following table. The deep artesian aquifer is a deep confined groundwater system.

Source Water Sensitivity
High Source Water Sensitivity
Surface water and GWUDISW
Unconsolidated Alluvium (unconfined)
Fluvial-Glacial Gravel
Terrace and Pediment Gravel
Shallow Fractured or Carbonate Bedrock
Moderate Source Water Sensitivity
Semi-consolidated Valley Fill sediments
Unconsolidated Alluvium (semi-confined)
Low Source Water Sensitivity
Consolidated Sandstone Bedrock
Deep Fractured or Carbonate Bedrock
Semi-consolidated Valley Fill Sediments (confined)

A summary of the published and unpublished sources of information were used in this assessment and are presented in Tables 2-1 and 2-2.

Table 2-1. List of geologic or hydrogeologic investigations near the Meadowland PWS area

Title of Project	Period of Project	Area Covered	Project Purpose
Montana Groundwater Assessment Atlas for the Flathead Lake Area. MBMG, (2000)	Compilation of data and interpretations from approximately 1968 to 2000	Flathead Valley north of Flathead Lake	Groundwater Characterization
Occurrence and Characteristics of Ground Water in Montana: Montana Bureau of Mines and Geology Open-File Report 99, vol. 2, 132 p. Noble and Others (1982)	Compilation of data and interpretations prior to 1982	Montana	Groundwater Characterization
Geology and Ground Water Resources of the Kalispell Valley, Northwestern Montana: Montana Bureau of Mines and Geology Bulletin 68, 42 p. Konizeski and Others (1968)	Compilation of data and interpretations prior to 1968	Flathead Valley north of Flathead Lake	Groundwater Characterization
Analysis of Evans Farm's Aquifer Test, East Flathead Valley, unpublished report on MDNRC Provisional Permit Application No. 066522 Shapley (1990)	1990	Eastern Flathead valley	Characterization of Aquifer
Groundwater Resources of the Upper Flathead Basin, Interpreting the Landscape Through Science Symposium, Flathead Valley Community College, pp 11-14. Noble (1998)	Compilation of data and interpretations prior to 1998	Upper Flathead Valley	Characterization of Aquifer

Table 2-2. List of geologic or hydrogeologic maps available for the Meadowland PWS area

Title or Description	Date	Area Covered	Reference
Montana Groundwater Assessment Atlas for the Flathead Lake Area	2000	Flathead Valley north of Flathead Lake	(MBMG, 2000)

Conceptual Model and Assumptions

A conceptual hydrogeologic model is a simplified representation of the hydrogeologic system. The conceptual hydrogeologic model for the Meadowland HOA PWS area is shown in Appendix D. Groundwater occurs in a permeable, moderately sorted, confined artesian, sand and gravel aquifer that is overlain and confined by poorly sorted, low permeability, glacial till. The low permeability glacial till likely impedes or limits direct surface infiltration of rain or snowmelt to the aquifer. The lateral extent of the aquifer is limited by Flathead Lake to the south, and mountains of the Whitefish Range, Swan Range, and Salish Range to the north, east and west, respectively. Groundwater flow direction is from northwest to southeast. Recharge to the aquifer likely comes from surface infiltration of rain and snowmelt particularly around the valley margins in the foothills of the mountains and groundwater interflow from bedrock in the surrounding mountains. Water flows from the recharge areas vertically downwards to the aquifer, then horizontally towards the central part of the Flathead Valley and Flathead Lake. Groundwater discharge occurs by discharge to Flathead Lake and by groundwater withdrawal from wells. Given the hydrogeologic setting it is unlikely that water table elevations or groundwater flow directions vary appreciably from season to season.

Well Information

The Meadowland HOA PWS consists of two wells, both completed in the same aquifer. Well #1 was installed using an air rotary drill rig in April 1973. The well casing is 8-5/8-inch diameter steel. The well casing extends to 170 feet deep and is open ended. The static water level in the well is 110 feet. The pumping water level was 140 feet after four hours of pumping at 40 gallons per minute. The well yield is reported to be 40 gallons per minute. The driller reports a borehole diameter of 10 inches but no annular seal information is available. The well log is included in Appendix H.

Well #2 is a driven well that was installed using an air rotary drill rig in May 1986. The well casing is 8-5/8-inch diameter steel. The well casing extends to 217 feet deep and is open ended. The static water level in the well is 119 feet. The pumping water level was 150 feet after 9.5 hours of pumping at 150 gallons per minute. The well yield is reported to be 120 gallons per minute. The driller reports a borehole diameter of 12 inches from surface to 20 feet bgs. The annulus around the steel casing was filled with cement grout from 4 to 20 feet bgs to provide a sanitary seal. The available well logs are included in Appendix H.

Table 2-3. Source well information for Meadowland HOA PWS

Information	Well #1	Well #2
PWS Source Code	WL002	WL003
Well Location (T, R, Sec or lat, long)	---	---
MBMG #	---	---
Water Right #	---	---
Date Well was Completed	April 1973	May 1986
Total Depth	170 feet	217 feet
Perforated Interval	Open end	Open End
Static Water Level	110 feet bgs (in 1973)	119 feet bgs (in 1986)
Pumping Water Level	140 feet bgs	150 feet bgs
Drawdown	30 feet	31 feet
Test Pumping Rate	40 gpm	150 gpm
Specific Capacity	1.33 gpm/ft	4.84 gpm/ft

Methods and Criteria

Source water protection areas are divided into zones or regions according to the amount of time water takes to reach the water supply intake. Intakes for the Meadowland HOA are within the water supply well(s). They typically consist of a screen, torch-cut casing slots, casing perforations, or an open-ended casing. Source water protection areas for groundwater-based systems, in order of increasing size and time of travel to intakes are the control zone, inventory region, and recharge region. The methods and criteria used to delineate the source water protection zones for the Meadowland HOA PWS are specified in the DEQ's SWPP (DEQ, 1999). For the Meadowland HOA PWS, the criteria for confined systems were followed for both wells.

The control zone is based on a fixed distance of 100 feet radius from each well and the inventory region is a fixed radius of 1,000 feet. The recharge region is based on geologic mapping and locations of hydrologic boundaries. The analytical method used to calculate groundwater time-of-travel is the Uniform Groundwater Flow Equation described in Appendix H of the SWPP (DEQ, 1999). Copies of the uniform flow equation time-of-travel calculations are in Appendix E and are summarized in Table 2-4.

Aquifer Properties for Estimation of Groundwater Time-of-Travel

Aquifer properties used to estimate groundwater time-of-travel (TOT) are based on site-specific information derived from well drilling logs, hydrogeologic maps, short-term pumping tests and other physical measurements made on the PWS wells. A summary of the hydrogeologic characteristics for the PWS wells is presented in Table 2-4.

Thickness of the aquifer for each well was estimated based on driller's logs and assumed to be equal to the thickness of aquifer penetrated by the well. For purposes of calculating hydraulic conductivity from the transmissivity value, an aquifer thickness of 10 feet was assumed because the wells are open-ended rather than perforated.

Transmissivity values for each well (Table 2-4) were calculated based on the drawdown observed during short-term pumping tests (9.5 hour test for Well #2, 4 hour test for Well #1) using the following equations:

Modified Jacob Equation (Appendix 16.D in Groundwater and Wells, 2nd. Ed.; Driscoll, 1986)

Transmissivity (ft2/day) = [2000 x Pumping Rate (gpm)/Drawdown (ft)]/7.48 (gallon/ft3)

Empirical Equation of Razack and Huntley (in Applied Hydrogeology, 3rd Ed., Fetter, 1994)

Transmissivity (ft2/day) = 33.6[Pumping Rate (ft3/day)/Drawdown (ft)]$^{0.67}$

Effective porosity values were estimated based on literature values (Freeze and Cherry, 1979) for sand and gravel.

Hydraulic gradient was estimated from the MBMG potentiometric map (MBMG, 2000; see Appendix D) to be 50 feet in three miles, or 0.003 ft/ft. Groundwater flow direction is determined to be northwest to southeast based on the MBMG potentiometric map.

The values used in the time-of-travel calculations are based on the characteristics of the PWS wells but differ slightly from the PWS well values for some parameters. The hydraulic conductivity value used in the TOT calculations is the median value for the two wells.

The assumed pumping rate is the average daily production of the system (60,000 gallons) as reported in the Sanitary Survey for the system (see Appendix I). Although short-term pumping rates are higher than average during peak demand periods, the average production of the system is thought to better represent long-term pumping rates for the wells. Because the TOT calculation is intended to predict groundwater travel distances over relatively long time periods (1 year and 3 years), long-term pumping rates are believed to be most appropriate for TOT calculations.

Table 2-4. Estimates of input parameters used to delineate the source water protection area

Input Parameter	Values Used in TOT Calculation	Available Values	
		Well #1	Well #2
PWS Source Code	---	1670-002	1670-003
Transmissivity (ft2/day)	4020	360 to 1380	1290 to 3280
Thickness (feet)	30	30	39
Hydraulic Conductivity (ft/day)	134	36 to 140	130 to 330
Hydraulic Gradient (ft/ft)	0.003	0.003	0.003
Flow Direction	Northwest to Southeast	Northwest to Southeast	Northwest to Southeast
Effective Porosity	0.25	0.25	0.25
Pumping Rate (gpm)	40	40 (pumping capacity)	100 (pumping capacity)
1-Year TOT*	800	---	---
3-Year TOT*	2100	---	---

*Time of Travel

Delineation Results

The results of the delineation of source water protection areas are shown in Appendix F. The control zone is based on a fixed distance of 100 feet radius from each well and the inventory region is a fixed radius of 1,000 feet from each well. The recharge region is based on geologic mapping, groundwater flow directions and locations of hydrologic boundaries, principally the divide along the Salish Mountains to the west of the Meadowland WUA PWS.

Limiting Factors

The groundwater flow rate calculations use values that are considered representative of actual conditions. This approach reflects the uncertainties in the data used in the modeling process, with estimates reflecting conservative conditions. While the inventory regions are delineated using criteria for confined aquifers, groundwater flow rates were estimated to demonstrate the general

properties of the groundwater flow system for assessments on a more regional scale. The assumed groundwater flow direction and gradients in the area are based on regional data, actual local gradients, and flow directions may vary. Limitations also result from the use of the Uniform Flow Equation for analysis of flow rates, which does not account for pumping from multiple wells, and the density and frequency of pumping from wells installed at various locations across the study area. An additional limitation on this assessment reflects the nature of the fluvially-deposited aquifer, where deposit types reflect variable shapes, and can exhibit rapid changes in hydraulic properties, hydraulic gradients and flow directions over very short distances.

CHAPTER 3
INVENTORY

An inventory of potential sources of contamination was conducted for the Meadowland Homeowner's Association within the control and inventory regions. Potential sources of all primary drinking water contaminants and Cryptosporidium were identified, however, only significant potential contaminant sources were selected for detailed inventory. The significant potential contaminants in the Meadowland inventory region are nitrate, pathogens chemical fertilizers, herbicides and pesticides.

The inventory for Meadowland Homeowner's Association focuses on all activities in the control zone, certain sites or land use activities in the inventory region, and general land uses and large facilities in the recharge region.

Inventory Method

Available databases were initially searched to identify businesses and land uses that are potential sources of regulated contaminants in the inventory region. The following steps were followed:

Step 1: Urban and agricultural land uses were identified from data collected by the Montana Department of Natural Resources (1982) and the City of Kalispell Land Use Report (2003).

Step 2: EPA's Envirofacts System was queried to identify EPA regulated facilities. This system accesses the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory (TRI), Permit Compliance System (PCS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS). The available reports were browsed for facility information including the Handler/Facility Classification to be used in assessing whether a facility is a significant potential contaminant source.

Step 3: DEQ databases were queried to identify Underground Storage Tanks (UST), hazardous waste contaminated sites, landfills, and abandoned mines. Jeffrey Frank Herrick, a Water Quality Specialist in the Pollution Prevention Bureau of the DEQ, provided this data.

Step 4: A business phone directory was consulted to identify businesses that generate, use, or store chemicals in the inventory region. Equipment manufacturing and/or repair facilities, printing or photographic shops, dry cleaners, farm chemical suppliers, and wholesale fuel suppliers were targeted.

Step 5: Major road and rail transportation routes were identified.

Step 6: All significant potential contaminant sources were identified in the inventory region. Potential contaminant sources are designated as significant if they fall into one of the following categories:

1) Large quantity hazardous waste generators
2) Landfills
3) Hazardous waste contaminated sites
4) Underground storage tanks
5) Major roads or rail transportation routes
6) Cultivated cropland
7) Animal feeding operations
8) Wastewater lagoons or spray irrigation
9) Septic systems
10) Sewered residential areas
11) Storm sewer outflows
12) Floor drains, sumps, or dry wells
13) Abandoned or active mines

Step 7: Land uses and facilities that generate, store, or use large quantities of hazardous materials were identified within the recharge region. A land use map is provided in Appendix F, Figure F-2. A listing of facilities that generate store or use large quantities of hazardous materials is provided in Appendix J.

Step 8: All wells located within the inventory region were identified and well logs were obtained when available.

Step 9: A site visit was made and the control zone and inventory region were visually inspected for potential contaminant sources.

Inventory Results/Control Zone

Meadowland is a residential subdivision that utilizes individual septic systems for wastewater management and a community water system for drinking water. The land use in the control zone and the surrounding area is residential. The only contaminant source identified in the control zone is the presence of residential lawn areas near the well heads. The chemical fertilizers, herbicides and pesticides that are commonly used for lawn maintenance represent potential sources of contamination.

Inventory Results/Inventory Region

The land use in the inventory region is residential with some vacant lots. Some light agricultural activity may take place in the open fields to the west of the system wells and within the inventory region. The significant potential contaminant source within the inventory region is the septic systems that are used for wastewater management. Although the exact locations of all septic systems in the control zone and inventory regions were not determined, it is likely that at least one system is located within the control zone and several are located within the inventory region.

Table 3-1. Significant potential contaminant sources for Meadowland

Source	Contaminants	Description
Septic Systems	Pathogens and nitrates	Residential septic tanks that may leak and drainfields that discharge septic effluent into the area groundwater.
Lawn and Garden Maintenance	Chemical fertilizers, herbicides and pesticides	Chemicals leaching into groundwater.

Inventory Results/Recharge Region

The recharge region for the Meadowland HOA PWS includes Kalispell and the entire Flathead Valley floor to the northwest and extends to the divides of the surrounding mountains. This large area encompasses a multitude of activities and potential contaminant sources. The area is shown in Appendix H. Large and/or significant potential contaminant sources and general land uses are shown on the map in Appendix H and the lists in Appendix J.

Inventory Update

To make this SWDAR a useful document in the years to come, the certified operator of the system should update the inventory every year. Changes in land uses or potential contaminant sources should be noted and additions made as needed. The complete updated inventory should be submitted to DEQ every five years to ensure re-certification of the source water delineation and assessment report.

Inventory Limitations

The information in this inventory was derived from a number of public and private sources. It is as complete as possible, but is limited by the accuracy and completeness of the original data sources. This inventory was ground-checked by a site visit to the well head. It was not possible to inventory all properties in the inventory region due to access limitations. First hand knowledge of the water system can be provided by the PWS operator(s) and owners. This report will be submitted to those individuals and the edits and updates they provide will be critical to ensuring the accuracy and usefulness of this SWDAR.

CHAPTER 4
SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by local entities, in this case the Meadowland Homeowner's Association.

The goal of Source Water Management is to protect the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the Inventory Region, and 3) ensuring that land use activities in the Recharge Region pose minimal threat to the source water. Management priorities in the Inventory Region are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by the Meadowland Homeowner's Association to reduce susceptibility are recommended.

Susceptibility is determined by considering the hazard rating for each potential contaminant source and the existence of barriers that decrease the likelihood that contaminated water will flow to Meadowland Homeowner's Association well(s) (Table 6). The deep artesian aquifer that is the source water for the Meadowland PWS is a confined aquifer. In accordance with the MDEQ SWPP (1999), hazard for confined aquifers is considered to be low if all wells in the inventory region are constructed to current state standards. Hazard is high if the PWS well is not sealed into the confining layer and moderate if only other wells are not properly constructed.

As described in Chapter 2, no annular seal information is available for the Meadowland PWS Well #1 and Well #2 is sealed at the top from 4 to 20 feet deep with cement grout. Both wells are likely to be adequately sealed because they were constructed with driven casing and because of the high clay content and thickness of the confining layer in the area. For example, compliance with Montana Water Well regulations for domestic wells only requires the feeding of bentonite along the casing as it is driven in order to form an effective seal. This requirement is likely to have been met for the both of the Meadowland wells. Well #1 was constructed in 1973 and Well #2 was constructed in 1986. It should be noted that Montana construction standards for new PWS wells are more stringent than those for domestic wells. However, for purposes of the susceptibility assessment, the Meadowland PWS well is considered likely to be adequately sealed.

A query of the MBMG-GWIC database indicates eight other wells installed within the inventory zone. Well logs for these wells are in Appendix G. Six of these wells appear to penetrate the confining layer and most of these wells are lacking information regarding annular seals. As for the PWS well, it is possible, perhaps likely, that the confining layer forms an adequate sanitary seal for most of the other wells. However, given the number of wells with uncertain seals within the inventory region it is also possible, perhaps likely that at least one well would have an inadequate seal.

To be conservative given the uncertainty about the adequacy of well seals, **hazard for all sources within the inventory region of the PWS wells is deemed to be moderate**. This rating

reflects the assumption that most wells, including the PWS wells likely have adequate seals while some wells may not. **All potential contaminant sources located in the recharge region, and outside of the inventory region, are assigned a relative hazard of low** due to their distance from the PWS wells.

Susceptibility ratings are presented individually for each significant potential contaminant source and each associated contaminant (Table 4-2). The susceptibility of each well to each potential contaminant source is assessed separately.

For wells that derive groundwater from the confined deep artesian aquifer, such as the Meadowland PWS wells, natural barriers to all sources of contamination include:

- The confining layer, which is an extensive, thick, low permeability till that overlies the aquifer and limits or precludes vertical movement of contaminants to the aquifer.
- Upward groundwater flow direction. Because the aquifer is artesian, vertical hydraulic gradients in the aquifer favor upward flow.
- Natural Attenuation. The thick unsaturated zone above the artesian aquifer provides abundant soil mass for chemical transformation, biological degradation, adsorption or other chemical or physical processes to reduce water quality impacts to nonsignificant levels.

For the Meadowland PWS, an engineered barrier to all sources of contamination is the well intake depth, which is greater than 50 feet below the pumping water level elevation. Engineered barriers to specific sources are listed in Table 4-2.

Table 4-1. Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers

Presence Of Barriers	Hazard		
	High	**Moderate**	**Low**
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
One Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility
Multiple Barriers	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

Table 4-2. Susceptibility assessment for significant potential contaminant sources in the Control Zone and Inventory Region

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
Residential Septic Systems	Nitrate and microbial contaminants	Infiltration of untreated sewage	Moderate	Thick unsaturated zone and deep intake Well #1, cement grout annular seal	Low	Inspect for proper operation
Lawn and Garden Maintenance	Chemical fertilizers, herbicides and pesticides	Chemical leaching into groundwater	Moderate	Thick unsaturated zone and deep intake Well #1, cement grout annular seal	Low	Apply at proper rates and restrict all application in control zones of wells.

REFERENCES

Freeze, R. Allan and Cherry, John A., Groundwater, 1979 Prentice-Hall, Inc.

Internet source of graphical and tabular information provided by Montana State Library - Natural Resource Information Service: http://nris.state.mt.us/mapper/

Internet source of tabular well information at the Montana Bureau of Mines and Geology Information Service: http://mbmgsun.mtech.edu/ & http://mbmggwic.mtech.edu/

Kendy, E., and R.E. Tresch, 1996, Geographic, Geologic, and Hydrologic Summaries of Intermontane Basins of the Northern Rocky Mountains, Montana: U.S. Geological Survey Water Resources Investigations Report 96-4025, 233 p.

Montana Department of Environmental Quality, 1999. Montana Source Water Protection Program, Approved by EPA in November 1999, inclusive of personal communications with Joe Meek & Jeffrey F. Herrick.

Montana Department of Environmental Quality, Permitting & Compliance Division and the Drinking Water Assistance Program - Montana Water Center: Ground Water Manual for Small Water Systems, January 1999

Montana State Library - Natural Resources Information System (NRIS) map base of the USGS Topographical coverage at 1:24,000 scale in MrSID format.

Raines, G.L. and B.R. Johnson, 1996. Digital Representation of the Montana State Geologic Map: A Contribution to the Interior Columbia River Basin Ecosystem Management Project: U.S. Geological Survey Open File Report 95-691, 19 p.

United States Environmental Protection Agency (US EPA), Manual of Small Public Water Supply Systems, US EPA Office of Water (WH-550), EPA 570/9-91-003, May 1991

U.S. Geological Survey, 2000. National Landcover Dataset, Montana. 30-meter electronic digital landcover dataset interpreted from satellite imagery.

GLOSSARY*

Acute Health Effect. An adverse health effect in which symptoms develop rapidly.

Alkalinity. The capacity of water to neutralize acids.

Best Management Practices (BMPs). Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

Coliform Bacteria. Bacteria found in the intestinal tracts of animals. Their presence in water is an indicator of pollution and possible contamination by pathogens.

Confined Aquifer. A fully saturated aquifer overlain by a confining unit such as a clay layer. The static water level in a well in a confined aquifer is at an elevation that is equal to or higher than the base of the overlying confining unit.

Confining Unit. A geologic formation that inhibits the flow of water.

Delineation. A process of mapping source water management areas.

Effective Porosity. The percent of soil, sediment, or rock through which fluids, such as air or water, can pass. Effective porosity is always less than total porosity because fluids can not pass through all openings.

Hardness. Characteristic of water caused by presence of various salts. Hard water may interfere with some industrial processes and prevent soap from lathering.

Hazard. A measure of the potential of a contaminant leaked from a facility to reach a public water supply source. Proximity or density of significant potential contaminant sources determines hazard.

Hydraulic Conductivity. A coefficient of proportionality describing the rate at which water can move through an aquifer.

Inventory Region. A source water management area that encompasses an area expected to contribute water to a public water supply well within a fixed distance or a specified groundwater time-of-travel distance.

Maximum Contaminant Level (MCL). Maximum concentration of a substance in water that is permitted to be delivered to the users of a public water supply. Set by EPA under authority of the Safe Drinking Water Act.

Nitrate. An important plant nutrient and type of inorganic fertilizer. In water the major sources of nitrates are septic tanks, feed lots and fertilizers.

Nonpoint-Source Pollution. Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet.

Pathogens. A bacterial organism or virus typically found in the intestinal tracts of mammals, capable of producing disease.

Point-Source. A stationary location or fixed facility from which pollutants are discharged.

Porosity. The percent of soil, sediment, or rock filled by air, water, or other fluid.

Public Water Supply (PWS). A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

SIC Code. The U.S. Standard Industrial Classification (SIC) Codes classify categories of businesses. SIC Codes cover the entire range of business categories that exist within the economy.

Source Water Protection Area. For surface water sources, the land and surface drainage network that contributes water to a stream or reservoir used by a public water supply.

Susceptibility (of a PWS). The potential for a PWS to draw water contaminated at concentrations that would pose concern. Susceptibility is evaluated at the point immediately preceding treatment or, if no treatment is provided, at the entry point to the distribution system.

Synthetic Organic Compounds (SOC). Man made organic chemical compounds (e.g. pesticides).

Total Dissolved Solids (TDS). The dissolved solids collected after a sample of a known volume of water is passed through a very fine mesh filter.

Total Maximum Daily Load (TMDL). The total pollutant load to a surface water body from point, non-point, and natural sources. The TMDL program was established by section 303(d) of the Clean Water Act to help states implement water quality standards.

Turbidity. The cloudy appearance of water caused by the presence of suspended matter.

Transmissivity. The ability of an aquifer to transmit water.

Unconfined Aquifer. An aquifer containing water that is not under pressure. The water table is the top surface of an unconfined aquifer.

Volatile Organic Compounds (VOC). Any organic compound which evaporates readily to the atmosphere (e.g. fuels and solvents).

Recharge Region / Watershed. The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common delivery point.

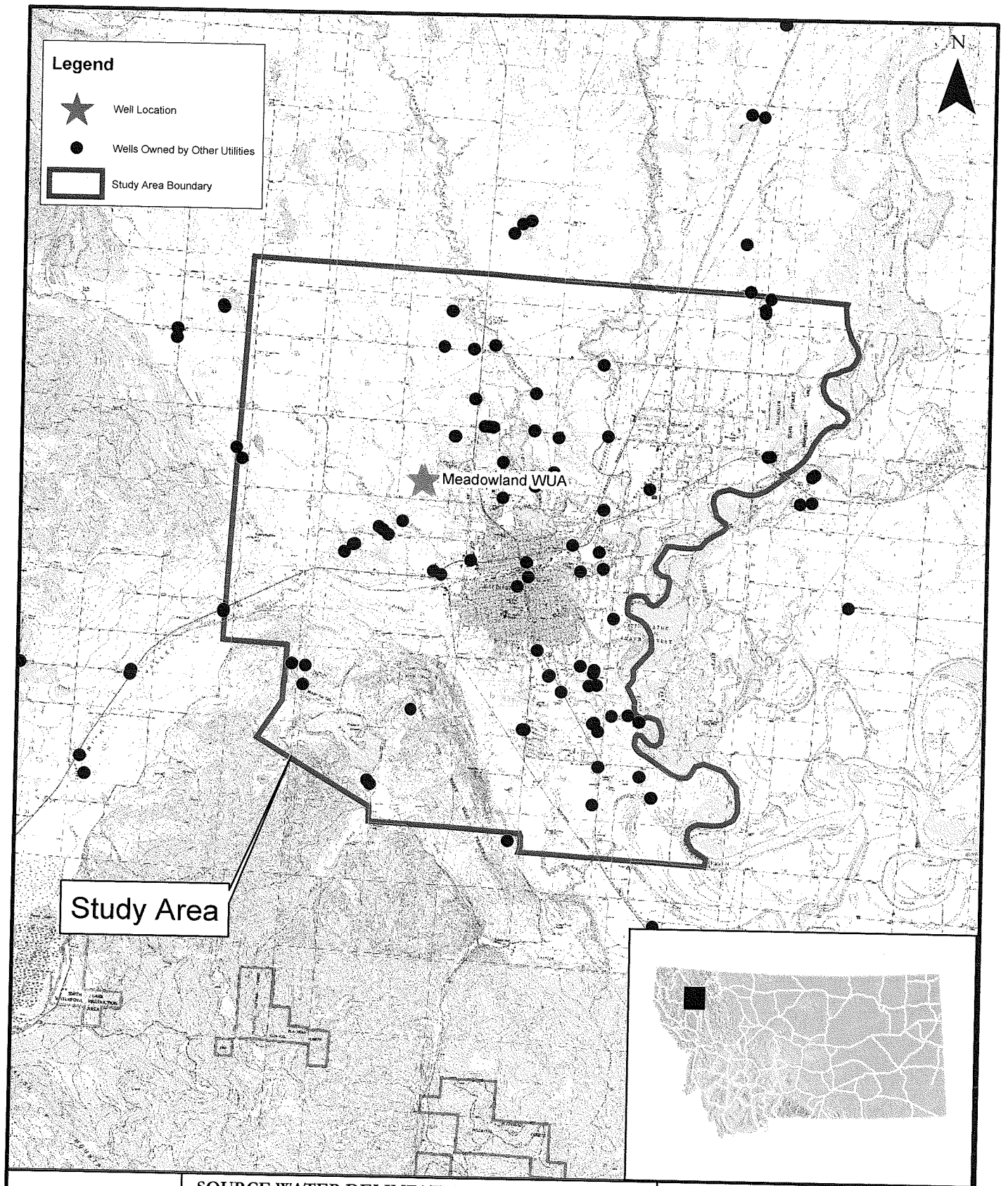
* Definitions taken from EPA's Glossary of Selected Terms and Abbreviations and other sources

APPENDICES

APPENDIX A

VICINITY MAP

Insert File MT0001670-A-1.jpg



Data Source: Flathead County 2003
NRIS 2003
Date: February 12, 2003

Miles
0 0.5 1 2

SOURCE WATER DELINEATION AND ASSESSMENT

Kalispell Montana

LAND & WATER CONSULTING, INC.
P.O. BOX 8027
Kalispell, MT 59904

Montana Department of Environmental Quality

HDR

Appendix A

Figure A-1:
Vicinity Map
Kalispell Area SWDAR
Meadowland WUA

APPENDIX B

PWS SITE PLAN

See Appendix I, Sanitary Survey, for site Plan

APPENDIX C

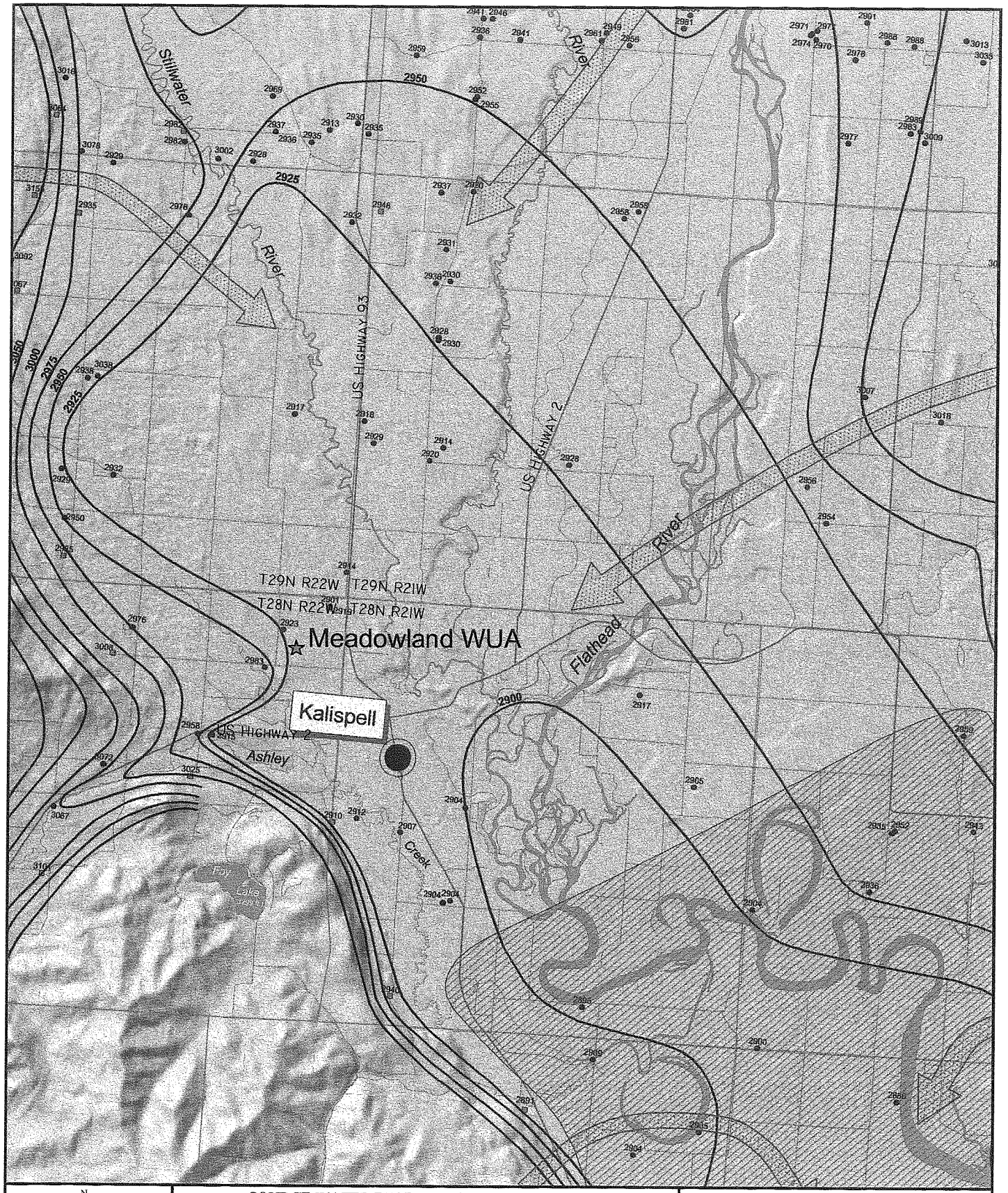
GEOLOGIC MAP(s)

Insert file MT0001670-C-1.jpg

APPENDIX D

GROUND WATER DIRECTION FLOW MAPS

Insert file MT0001670-D-1.jpg
Insert file MT0001670-D-2.jpg



Data Source: LaFave, MBMG, April 2000

SOURCE WATER DELINEATION AND ASSESSMENT

KALISPELL MONTANA

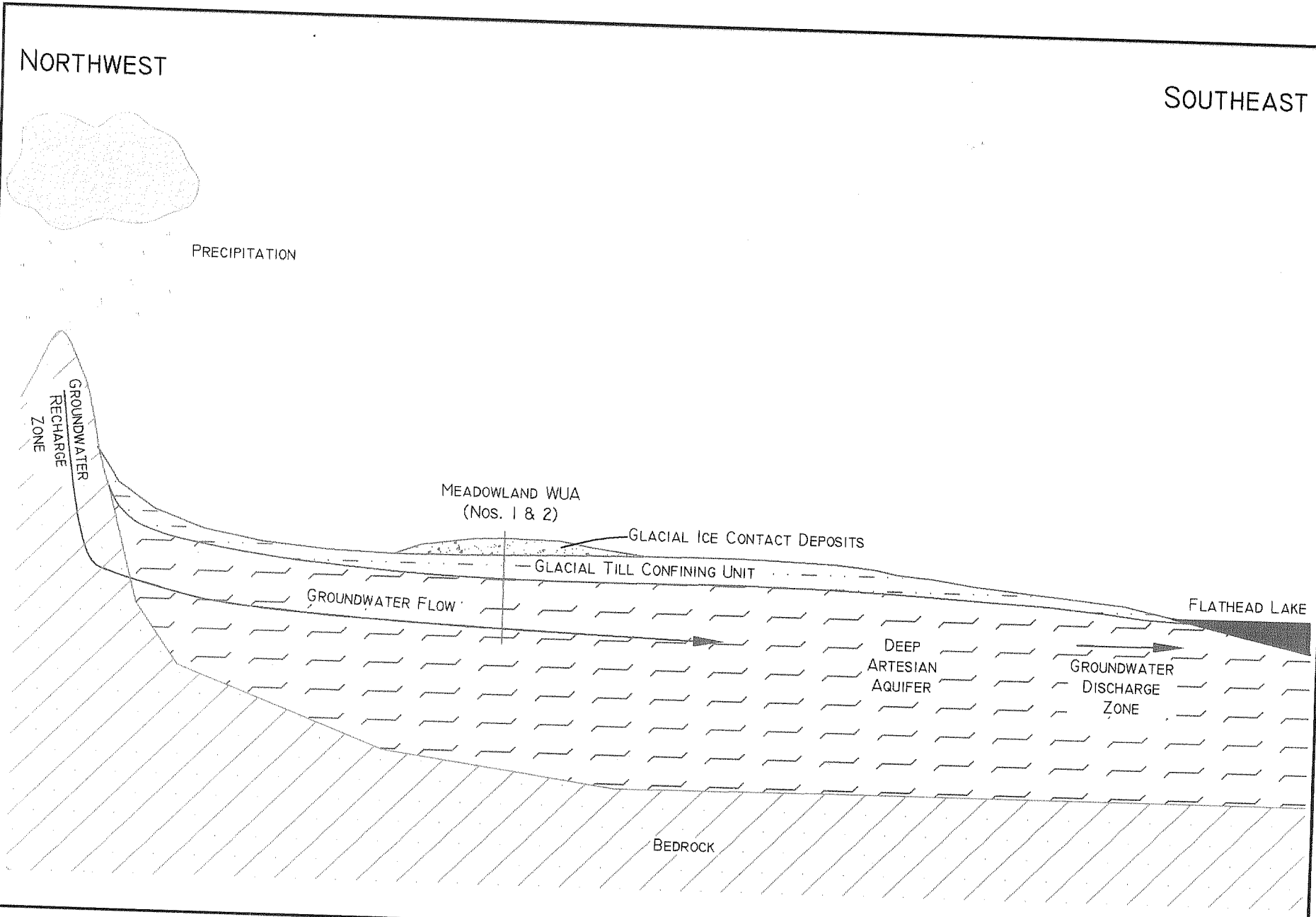
Montana Department of ENVIRONMENTAL QUALITY

LAND & WATER CONSULTING, INC.
P.O. BOX 8027
Kalispell, MT 59904

HDR

Appendix D

Figure 1. Groundwater Flow Direction Map
City of Kalispell SWDAR
Meadowland WUA



SOURCE WATER DELINEATION AND ASSESSMENT

LAND & WATER CONSULTING, INC.
P.O. BOX 9027
Kalispell, MT 59904

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Montana Department of Environmental Quality

Appendix D

Figure 2. Geologic Cross Section & Conceptual Hydrgeologic Model
City of Kalispell SWDAR
Meadowland WUA

APPENDIX E
TIME-OF-TRAVEL EQUATIONS

Meadowland WUA Public Water Supply
Summary of Time of Travel Calculations

Property		Units	
porosity	n	percent	0.25
Hyd Cond	K	ft/day	134
Hyd Grad	I	ft/ft	0.003
Pumping Rate	Q	gpm	42
		ft3/day	8085.42
Aquifer Thickness	b	feet	30
Distance Upgradient to Null Point			
Null Distance	Xl	feet	107
		miles	0.02
Lateral limits of Zone of Contribution			
Boundary Limits	Y	feet	335
		miles	0.06

Note: Add values in this section, to do calculations below. The pumping rate will automatically convert from gpm to cubic feet per day, which is used in the calculations

Change values for the distance traveled at the bottom of the time of travel calculation section to obtain values for a one year and three year time of travel

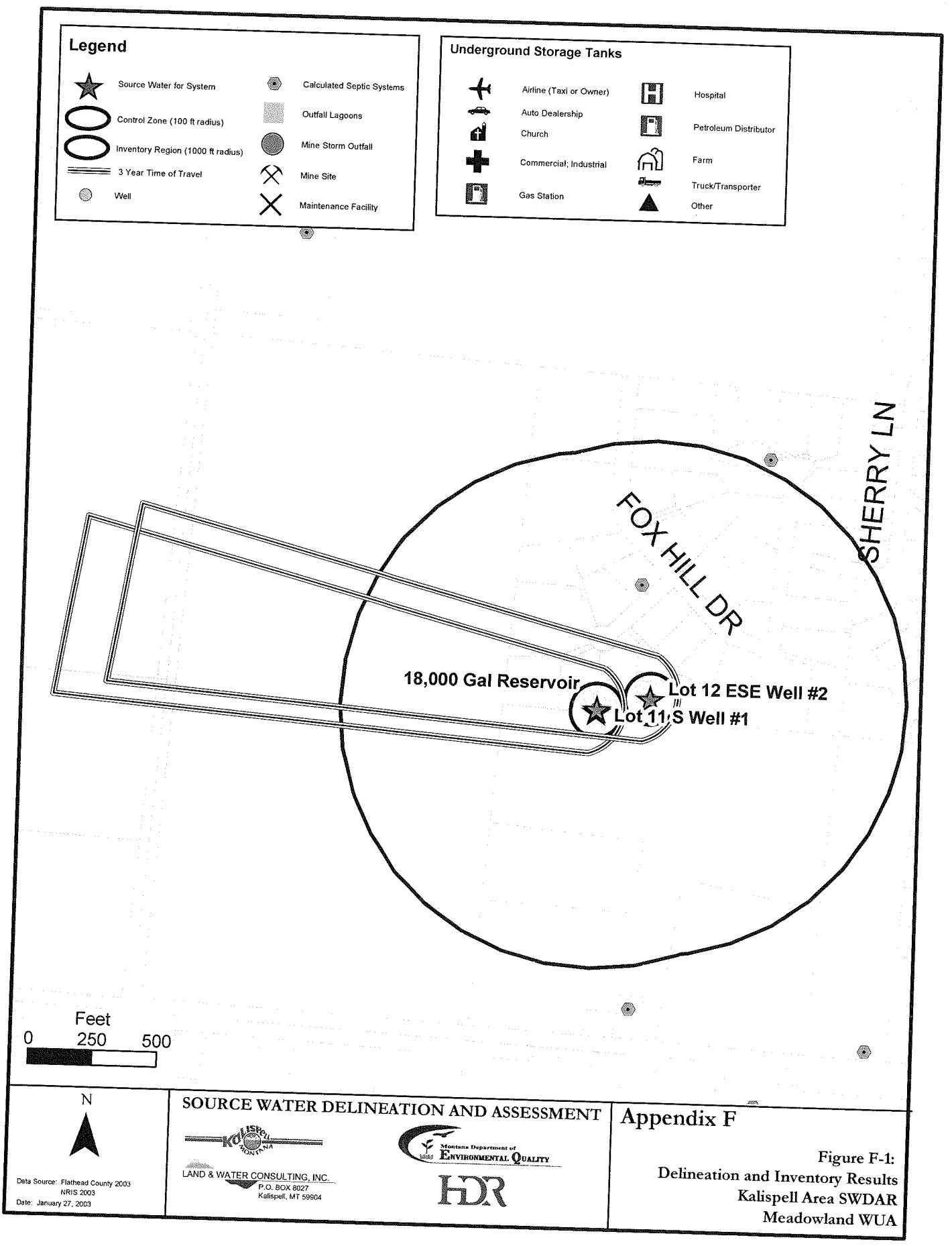
Time of Travel Calculations

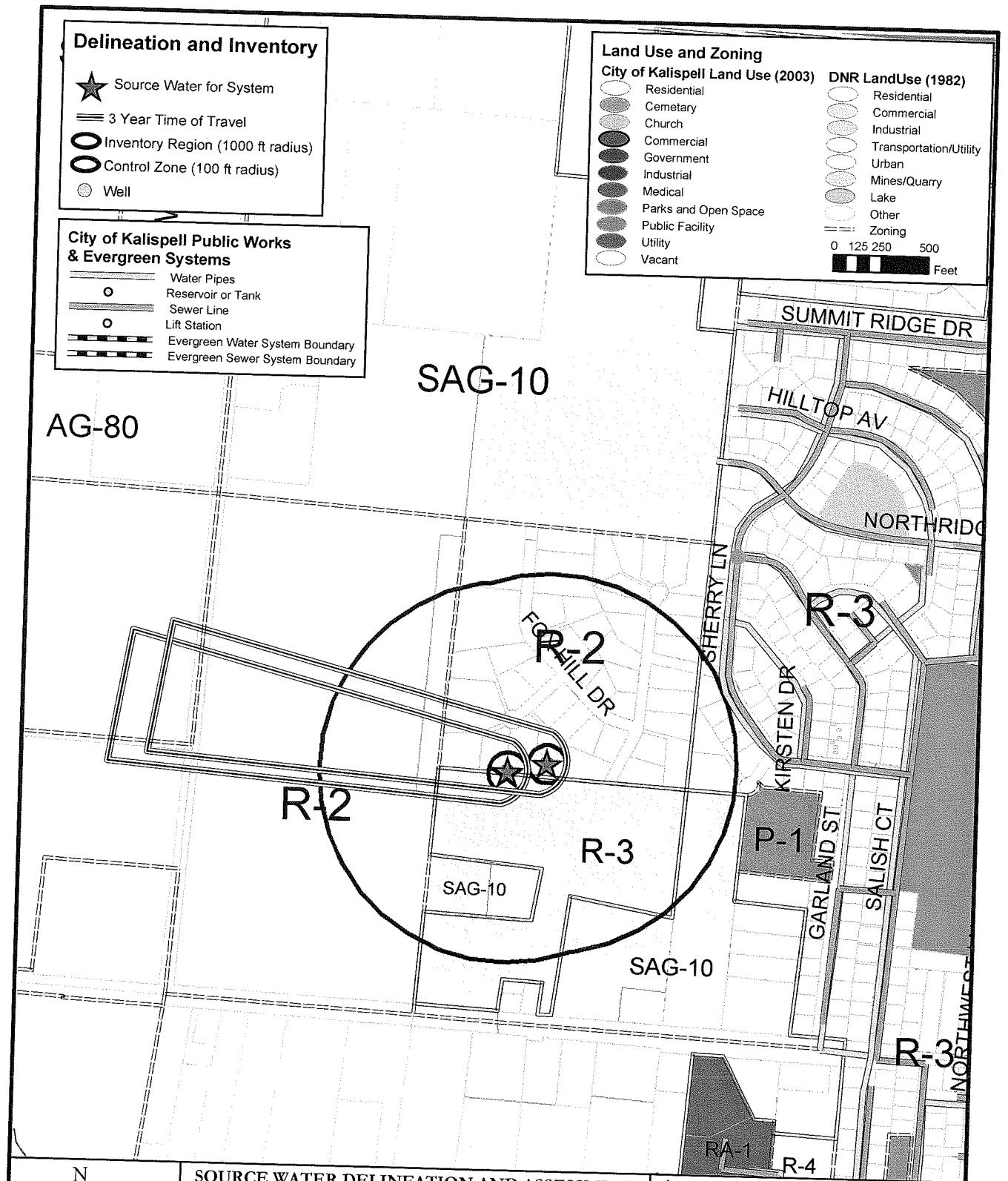
Distance Traveled		Time of Travel	
feet	miles	days	years
820	0.16	366.51	1.00
100	0.02	18.31	0.05
500	0.09	195.62	0.54
1000	0.19	466.67	1.28
2500	0.47	1342.66	3.68
5000	0.95	2852.76	7.81
6070	1.15	3505.56	9.60
7500	1.42	4381.05	11.99
10000	1.89	5916.92	16.20
10560	2.00	6261.60	17.14
15000	2.84	8999.70	24.64
15840	3.00	9518.50	26.06
19100	3.62	11533.52	31.58
21120	4.00	12783.10	35.00
25000	4.73	15184.90	41.57
31680	6.00	19323.47	52.90
40000	7.58	24482.17	67.03
820	0.16	366.51	1.00
2085	0.39	1096.08	3.00
7035	1.33	4096.06	11.21
8980	1.70	5289.65	14.48

APPENDIX F

DELINEATION AND INVENTORY RESULTS

Insert file MT0001670-F-1.jpg
Insert file MT0001670-F-2.jpg


Legend
Source Water for System
Control Zone (100 ft radius)
Inventory Region (1000 ft radius)
3 Year Time of Travel
Well
Calculated Septic Systems
Outfall Lagoons
Mine Storm Outfall
Mine Site
Maintenance Facility
Underground Storage Tanks
Airline (Taxi or Owner)
Auto Dealership
Church
Commercial; Industrial
Gas Station
Hospital
Petroleum Distributor
Farm
Truck/Transporter
Other
FOX HILL DR
SHERRY LN
18,000 Gal Reservoir
Lot 12 ESE Well #2
Lot 11 S Well #1
Feet
0
250
500
N
Data Source: Flathead County 2003
NRIS 2003
Date: January 27, 2003
SOURCE WATER DELINEATION AND ASSESSMENT
LAND & WATER CONSULTING, INC.
P.O. BOX 8027
Kalispell, MT 59904
Montana Department of Environmental Quality
HDR
Appendix F
Figure F-1:
Delineation and Inventory Results
Kalispell Area SWDAR
Meadowland WUA


Delineation and Inventory
Source Water for System
3 Year Time of Travel
Inventory Region (1000 ft radius)
Control Zone (100 ft radius)
Well
City of Kalispell Public Works & Evergreen Systems
Water Pipes
Reservoir or Tank
Sewer Line
Lift Station
Evergreen Water System Boundary
Evergreen Sewer System Boundary
Land Use and Zoning
City of Kalispell Land Use (2003)
Residential
Cemetary
Church
Commercial
Government
Industrial
Medical
Parks and Open Space
Public Facility
Utility
Vacant
DNR LandUse (1982)
Residential
Commercial
Industrial
Transportation/Utility
Urban
Mines/Quarry
Lake
Other
Zoning
0 125 250 500
Feet
SUMMIT RIDGE DR
HILLTOP AV
NORTHRIDG
SAG-10
AG-80
SHERRY LN
FOX HILL DR
R-2
R-3
KIRSTEN DR
R-2
R-3
P-1
GARLAND ST
SALISH CT
SAG-10
SAG-10
R-3
NORTHWEST
RA-1
R-4
N
Data Source: Flathead County 2003
NRIS 2003
Date: January 27, 2003
SOURCE WATER DELINEATION AND ASSESSMENT
LAND & WATER CONSULTING, INC.
P.O. BOX 6027
Kalispell, MT 59904
Montana Department of Environmental Quality
HDR
Appendix F
Figure F-2:
Land Use
Kalispell Area SWDAR
Meadowland WUA

APPENDIX G

WELL LOG(s)

Insert copies of available well logs

Groundwater Information Center Well Data

Click here to close window and return to map.

M number-Site Report	Water Quality Data?	Hydrograph available?	Name	Water Right #	PWS ID	Depth	Date Completed
82670	No	No	GROSSWILER PAUL			445	7/23/1980
82671	No	No	HAMILTON D.			169	5/4/1972
171378	No	No	MEADOWLAND HOMEOWNERS ASSOCIATION #2	C024540	01670003	217.2	5/15/1986
82673	No	No	STEUBS ORIEN E.			202	7/30/1970

Data Description

This report provides basic information about the wells in the area you selected.
Data is provided by the Groundwater Information Center (GWIC), a program of the Montana Bureau of Mines and Geology and was last updated 1/9/2003.

Meadowland WUA 1,000 ft Radius

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
GROSSWILER PAUL

Plot this site on a topographic map

Location Information

GWIC Id: 82670
Location (TRS): 28N 22W 01 C
County (MT): FLATHEAD
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:
Site Notes:

Source of Data: LOG
Latitude (dd): 48.2146
Longitude (dd): -114.3457
Geomethod: TRS-SEC
Datum: 1927
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 445.00
Static Water Level (ft): 120.00
Pumping Water Level (ft):
Yield (gpm):
Test Type:
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: CABLE
Driller's Name: BRIGGS
Driller License: WWC148
Completion Date (m/d/y): 7/23/1980
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 112ALVM
Well/Water Use: UNKNOWN

Hole Diameter Information

No Hole Diameter Records currently in GWIC.

Annular Seal Information

From	To	Description
0.0	20.0	CEMENT

Casing Information[1]

From	To	Dia	Description
-1.0	442.0	12.0	STEEL

Completion Information[1]

From	To	Dia	Description
340.0	360.0	12.0	1/4X3 PERFS
370.0	440.0	12.0	1/4X3 PERFS

Lithology Information

From	To	Description
0.0	3.0	TOPSOIL
3.0	208.0	CLAY & GRAVEL
208.0	300.0	CLAY SAND & GRAVEL
300.0	320.0	SAND
320.0	362.0	CLAY & GRAVEL
362.0	368.0	SAND & GRAVEL
368.0	440.0	CLAY WITH STREAKS OF GRAVEL. WATER
440.0	445.0	CLAY & WATER

[1] - All diameters reported are **inside** diameter of the casing.

These data represent the contents of the GWIC databases at the Montana Bureau of Mines and Geology at the time and date of the retrieval. The

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
HAMILTON D.

Plot this site on a topographic map

Location Information

GWIC Id: 82671
Location (TRS): 28N 22W 01 CA
County (MT): FLATHEAD
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:
Site Notes:

Source of Data: LOG
Latitude (dd): 48.2165
Longitude (dd): -114.3429
Geomethod: TRS-SEC
Datum: 1927
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 169.00
Static Water Level (ft): 72.00
Pumping Water Level (ft): 100.0
Yield (gpm): 50.0
Test Type: AIR
Test Duration:
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: ROTARY
Driller's Name: BILLMAYER
Driller License: WWC005
Completion Date (m/d/y): 5/4/1972
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 112ALVM
Well/Water Use: DOMESTIC

Hole Diameter Information

No Hole Diameter Records currently in GWIC.

Annular Seal Information

No Seal Records currently in GWIC.

Casing Information[1]

From	To	Dia	Description
0.0	169.0	6.0	STEEL

Completion Information[1]

From	To	Dia	Description
160.0	165.0	6.0	PERFS

Lithology Information

From	To	Description
0.0	10.0	TOPSOIL
10.0	80.0	CLAY
80.0	105.0	GRAVEL AND CLAY
105.0	169.0	SAND & GRAVEL

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
MEADOWLAND HOMEOWNERS ASSOCIATION #2

Plot this site on a topographic map

Location Information

GWIC Id: 171378
Location (TRS): 28N 22W 01 CDBA
County (MT): FLATHEAD
DNRC Water Right: C024540
PWS Id: 01670003
Block:
Lot: 12
Addition: MEADOWLAND UNIT NO 2
Site Notes: LAT\LONG FROM DEQ 200 FT E-SE OF RESERVIOR

Source of Data: DEQ\LOG
Latitude (dd): 48.2148
Longitude (dd): -114.3425
Geomethod: MAP
Datum: 1927
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 217.20
Static Water Level (ft): 119.00
Pumping Water Level (ft):
Yield (gpm): 150.0
Test Type: AIR
Test Duration: 9.50
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes: DATA FROM DEQ COPY OF WELL LOG

How Drilled:
Driller's Name: LIBERTY
Driller License:
Completion Date (m/d/y): 5/15/1986
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 112ALVM
Well/Water Use: PUBLIC WATER SUPPLY

Hole Diameter Information

From	To	Diameter
0.0	20.0	12.0
20.0	217.0	8.0

Annular Seal Information

From	To	Description
4.0	20.0	CEMENT

Casing Information[1]

From	To	Dia	Description
0.0	217.0	8.0	0.322 STEEL

Completion Information[1]

From	To	Dia	Description
0.0	0.0	8.0	OPEN BOTTOM

Lithology Information

From	To	Description
0.0	5.0	TAN TO DARK BROWN SANDY SILT
5.0	13.0	TAN SANDY SILT WITH SOME EMBEDDED GRAVEL
13.0	134.0	GRAVEL MIXED IN TAN SILTY CLAY MZTRIX
134.0	139.0	GRAVEL MIXED IN LIGHT BROWN SILT MATRIX
139.0	178.0	GRAVEL MIXED IN CLEANER LIGHT BROWN SILT MATRIX. SEEPS OF WATER
178.0	201.0	FINE TO MEDIUM GRAVEL AND COARSE SAND.
201.0	216.0	CLEAN FINE TO MEDIUM GRAVEL AND COARSE SAND. 80 TO 100 GPM TOTAL WATER. SOME SILT.
216.0	217.2	CLEAN COARSE SAND AND GRAVEL. 150+ GPM TOTAL WATER.

[1] - All diameters reported are **inside** diameter of the casing.

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
STEUBS ORIEN E.

Plot this site on a topographic map

Location Information

GWIC Id: 82673
Location (TRS): 28N 22W 01 CD
County (MT): FLATHEAD
DNRC Water Right:
PWS Id:
Block:
Lot:
Addition:
Site Notes:

Source of Data: LOG
Latitude (dd): 48.2127
Longitude (dd): -114.3429
Geomethod: TRS-SEC
Datum: 1927
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 202.00
Static Water Level (ft): 110.00
Pumping Water Level (ft): 190.0
Yield (gpm): 12.0
Test Type: BAILER
Test Duration: 5.00
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):
Well Notes:

How Drilled: 22W BUCYRUS ERIE
Driller's Name: MCCLARTY
Driller License: WWC018
Completion Date (m/d/y): 7/30/1970
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 112ALVM
Well/Water Use: DOMESTIC

Hole Diameter Information

No Hole Diameter Records currently in GWIC.

Annular Seal Information

No Seal Records currently in GWIC.

Casing Information[1]

From	To	Dia	Description
75.0	202.0	7.0	STEEL

Completion Information[1]

From	To	Dia	Description
202.0	202.0	7.0	OPEN BOTTOM *

Lithology Information

From	To	Description
0.0	75.0	SAND & GRAVEL
75.0	78.0	HARDPAN CREAM COLOR
78.0	132.0	SAND GRAVEL CLAY COLOR BROWN
132.0	185.0	SAND
185.0	202.0	WATER

[1] - All diameters reported are **inside** diameter of the casing.

APPENDIX H

RECHARGE REGION

Insert File MT0001670-H-1.jpg

SOURCE WATER DELINEATION AND ASSESSMENT

KALISPELL MONTANA

Montana Department of ENVIRONMENTAL QUALITY

LAND & WATER CONSULTING, INC.
P.O. BOX 8027
Kalispell, MT 59904

HDR

Appendix H

Figure 1. Recharge Region
City of Kalispell SWDAR
Meadowland WUA

APPENDIX I

SANITARY SURVEY

Insert copy of Sanitary Survey

SANITARY SURVEY FORM - INVENTORY

DATE OF SURVEY	COUNTY	SURVEYOR NAME - REQUIRES SIGNATURE
11/4/98	FLATHEAD	Richard L Montgomery
PWSID	**SYSTEM NAME**	
1670	MEADOWLAND HOMEOWNERS ASSOCIATION	
(SYSTEM REPRESENTATIVE)	**("ALSO KNOWN AS" NAME - IF APPLICABLE)**	
LOREN SALLEE		

SYSTEM ADDRESS

Name: MEADOWLAND HOMEOWNERS ASSOCIATION

Address: P.O. BOX 7322

System Phone : KALISPELL, MT 59904

SYSTEM OWNER

Name:

Address:

Owner Phone

LOCATION OF SYSTEM

Nearest City: KALISPELL

Description or Physical Location: BORDERING NORTHWEST CITY LIMITS OF KALISPELL

OPERATOR OF SYSTEM

Name: RITA GRAHAM

Certification # 3210 Phone: 755-8688 (System Phone)

ALTERNATE OPERATOR OF SYSTEM

Name: LOREN SALLEE

Certification # 2231 Phone: 752-9024

SYSTEM STATUS

A — A = Active; I = Inactive; D = Delete; P = Pending *(Add New System)*

SYSTEM CLASS

C — C = Community; P = Non-Transient Non-Community; N = Transient Non-Community

Total Service Connections: (Total number SVC system was designed for) Residential / Non-Transient: 44 Transient: 0

Total Active Connections: (Number of SVC in use at this date) Residential / Non-Transient: 43 Transient: 0

Service Connections Metered? __ % __ (Metered)

Resident Population: (Number of permanent residents utilizing PWS daily) Summer : 150 Winter : 150

Non-Transient Population (Number of non-transient persons utilizing PWS daily) Summer : 0 Winter : 0

Transient Population (Number of transient persons served by PWS daily) Summer : 0 Winter : 0

OWNER TYPE

2

1 Federal Government
2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.
3 State Government
4 Local Government Authority, Commission, District, Municipality, City, etc.
5 Mixed Public/Private
6 Native American Indian Tribes & Reservations

SERVICE CATEGORY

_ AP Airport
_ BA Bathing/Swimming
_ BR Bar
_ CG Campground
_ CH Church
_ DC Day Care Center
_ HS Hospital
_ IB Interstate Bottler
_ IF Industrial/Agricultural
_ IN Institution
_ LB Local Bottler
_ LO Lodge
_ MA Marina
_ MH Mobile Home Park
_ MO Motel/Hotel
_ PC Picnic Area
_ RA Rest Area
_ RC Recreation
_ RS Residential
_ RT Restaurant
_ RV RV Park
_ SC School
X SD Subdivision
_ SK Ski Area
_ SS Service Station
_ US Water User's Association
_ VC Visitor Center
_ VM Vending Machine
_ WH Water Hauler
_ XX Other : __

Service Category Description: __

Comments: This is a small subdivision just outside the city limits of Kalispell. All but one of the lots in the subdivision presently have residences located on them. There is no anticipation of need for expanding the system. The present supply is from two wells which pump into a hypolon lined concrete reservoir with a storage capacity of 18,000 gallons. From the reservoir water goes through a 7.5 HP booster pump to the distribution system which has ten hydropneumatic tanks with a total volume of 860 gallons. The reservoir and booster system can be bypassed by a direct connection of the wells to the distribution system in case of booster pump problems. There is no treatment of the water prior to distribution. The distribution mains are 4" and 2" PVC. Some service connections are galvanized steel. Some minor low pressure problems at extremity services have been attributed to insufficient carrying capacity of the two inch mains. Fire coverage is not provided. There is one master meter but none of the services are metered.

SANITARY SURVEY FORM - DISTRIBUTION & SOURCES

Source Number Identification: Sources and Entry Points are identified with a three digit code. The codes are used for data entry and federal data reporting. Where appropriate, use the correct source & entry point ID number. (Refer to information from state for correct ID's.) When a source is operational it is considered *A*ctive, this includes systems that are seasonal. *I*nactive sources are those which are shut down but can return to a[illegible] status, such as a system out of business. *D*eleted sources cannot return to active status, such as abandoned wells.

A water source is a well, spring, lake, river, town, city or municipality, etc. from which a system draws or purchases water:

Total Number of Sources 2

SOURCE TYPE

Source ID 001 = Distribution System for all systems

	Source ID Number(s)			
☐ G Groundwater, Non-Purchased	002	003		
☐ W Groundwater, Purchased				
☐ P Surface, Purchased				
☐ S Surface, Non-Purchased				

Example: S 002, G 003, 004 005

Please note, in addition to the above, is source a spring or infiltration gallery?

☐ Spring ☐ Infiltration Gallery

If Purchased _____ supplier of water (Name & PWSID)

If Sold _____ purchaser of water (other than within the system)

AVAILABLE

	Source ID Number(s)			
☑ P *Permanent Utilization*	002	003		
☐ E Emergency Utilization				
☐ I Interim Utilization				
☐ O Other Utilization				
☐ S Seasonal Utilization				

If Seasonal _____ Open date _____ Close date

What is the total design production capacity? 200,000 gallons per day

What is the present average daily production? 60,000 gallons per day

What is the maximum daily production? 105,000 gallons per day

Is there treatment on any of the sources? ☐ Yes ☑ No

If yes, information on treatment MUST be provided on "Treatment" page.

COMPLETE ONE SECTION FOR EACH SOURCE

STATUS OF SOURCE ☑ (A)ctive ☐ (I)nactive ☐ (D)elete

So ID 002 *Entry Point ID* 502 (These are state assigned identification numbers)

Source Name Well #1 (Name of Source - Example: Well #1 or South well, etc.)

Location of Water Source 3 ft south of reservoir

Entry Point Name ~~Reservoir~~ EP for Wells 1+2 (Name of EP - Example: Entry point for North Well #1 & South Well #2)

Location of Entry Point at the reservoir

Log Available? ☑ Yes ☐ No

Average Production 40 gpm (indicate units)

Maximum Production 40 gpm (indicate units)

Date Drilled 4/4/73 (if well. . date drilled)

Casing Size 8" (size of casing installed in well)

Case Depth 170' (depth of casing installed in well)

Well Depth 170' (depth of well expressed in feet)

Grout Depth ? (depth of grout used to seal well walls)

Draw Down 30' @ 40 gpm (expressed in feet)

Pump Capacity 40 gpm (capacity of pump installed expressed in gallons per min)

Intake Type open end (type of intake mechanism)

Well Yield 40 gpm (expressed in gallons per minute)

Latitude 48-12-54 (latitude of source)

Longitude 114-20-32 (longitude of source)

STATUS OF SOURCE ☐ (A)ctive ☐ (I)nactive ☐ (D)elete

Source ID 003 *Entry Point ID* 502 (These are state assigned identification numbers)

Source Name Well #2 (Name of Source - Example: Well #1 or South well, etc.)

Location of Water Source 200 ft ESE of reservoir

Entry Point Name ~~Reservoir~~ EP for Wells 1+2 (Name of EP - Example: Entry point for North Well #1 & South Well #2)

Location of Entry Point @ the reservoir

Log Available? ☑ Yes ☐ No

Average Production 100 gpm (indicate units)

Maximum Production 120 gpm (indicate units)

Date Drilled 5/15/86 (if well. . date drilled)

Casing Size 8" (size of casing installed in well)

Case Depth 217 (depth of casing installed in well)

Well Depth 217 (depth of well expressed in feet)

Grout Depth 20 ft (depth of grout used to seal well walls)

Draw Down 31 ft @ 150 gpm (expressed in feet)

Pump Capacity 100 gpm (capacity of pump installed expressed in gallons per min)

Intake Type open end (type of intake mechanism)

Well Yield 120 gpm (expressed in gallons per minute)

Latitude 48-12-54 (latitude of source)

Longitude 114-20-30 (longitude of source)

Comments: Well #1 needs vented cap. Cap on well #2 is loose.

SANITARY SURVEY FORM - WELLS & PUMPS

Page ____ of ____

(Please copy this sheet for additional wells & pumps)

WELLS - COMPLETE ONE SECTION FOR EACH SOURCE

Source ID Number 002
Example: 001, 002, 003

Is aquifer ☐ Confined ☐ Unconfined or ☑ Unknown ?

Has the recharge area been identified? ☐ Yes ☑ No

What is the nature of recharge zones?

☐ Agricultural
☐ Industrial
☑ Residential
☐ Other _____

Is recharge area protected? ☐ Yes ☑ No

If yes . . How

☐ Ownership
☐ Fencing
☐ Ordinances
☐ Owner

Is well site subject to flooding? ☐ Yes ☑ No

Is well located in proximity of a potential source of pollution (includes surface water, known chemical spills, agricultural use, etc.)? ☐ Yes ☑ No

If . . explain _____

Does casing extend at least ☑ 18 inches above the ground; ☐ 12 inches above the floor; or ☐ 3 feet above maximum flood level? (Check for appropriate distance) ☑ Yes ☐ No

Is top of the well casing properly sealed? (sanitary seal) ☐ Yes ☑ No

Does well vent terminate with return bend facing downward and screened? ☐ Yes ☑ No

Does well have suitable sampling tap? ☑ Yes ☐ No

Are check valves, blow-off valves and water meters maintained and operating properly? ☑ Yes ☐ No

Is upper termination of well protected (housed or fenced)? ☐ Yes ☑ No

Is intake located below the maximum drawdown? ☑ Yes ☐ No

Comments: (Such as, detailed information on any items with identified deficiencies)

Needs vented cap

PUMPS - COMPLETE ONE SECTION FOR EACH SOURCE

Source ID Number 002
Example: 001, 002, 003

Type Submersible

Location in well

Rated Capacity 5 HP

Are pumps operable? ☑ Yes ☐ No

What is state of repair of pumps? not inspected

How frequently has pumps(s) been replaced? 10 yrs

Are backup pumps/motors provided? ☐ Yes ☑ No

Are controls functioning properly and adequately protected? ☑ Yes ☐ No

Are underground compartments and suction well water proof? N/A ☐ Yes ☐ No

Is facility properly protected against trespassing and vandalism? ☑ Yes ☐ No

Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)? ☑ Yes ☐ No

Is the plumbing adequately painted to prevent excessive corrosion? ☑ Yes ☐ No

Is adequate heating, lighting, and ventilation provided? ☑ Yes ☐ No

Is a preventive maintenance program in operation? ☑ Yes ☐ No

Are recommended spare parts on hand? ☑ Yes ☐ No

EMERGENCY POWER

What type None

Frequency of testing —

Record of primary power failures: None in last year

Switchover: ☐ Automatic ☐ Manual

Comments: (Such as, detailed information on any items with identified deficiencies)

SANITARY SURVEY FORM - WELLS & PUMPS

Page ____ of ____

(Please copy this sheet for additional wells & pumps)

WELLS - COMPLETE ONE SECTION FOR EACH SOURCE

Source ID Number 003
Example: 001, 002, 003

Is aquifer ☐ Confined ☐ Unconfined or ☑ Unknown ?

Has the recharge area been identified? ☐ Yes ☑ No

What is the nature of recharge zones?

☐ Agricultural
☐ Industrial
☑ Residential
☐ Other ____

Is recharge area protected? ☐ Yes ☑ No

If yes . . How

☐ Ownership
☐ Fencing
☐ Ordinances
☐ Owner

Is well site subject to flooding? ☐ Yes ☑ No

Is well located in proximity of a potential source of pollution (includes surface water, known chemical spills, agricultural use, etc.)? ☐ Yes ☑ No

If yes . . explain ____

Does casing extend at least ☒ 18 inches above the ground; ☐ 12 inches above the floor; or ☐ 3 feet above maximum flood level? (Check for appropriate distance) ☐ Yes ☑ No

Is top of the well casing properly sealed? (sanitary seal) ☐ Yes ☑ No

Does well vent terminate with return bend facing downward and screened? ☑ Yes ☐ No

Does well have suitable sampling tap? ☑ Yes ☐ No

Are check valves, blow-off valves and water meters maintained and operating properly? ☑ Yes ☐ No

Is upper termination of well protected (housed or fenced)? ☐ Yes ☑ No

Is intake located below the maximum drawdown? ☑ Yes ☐ No

Comments: (Such as, detailed information on any items with identified deficiencies)

Well cap was loose at time of inspection. Casing does not extend 18" above ground surface - only about 12"

PUMPS - COMPLETE ONE SECTION FOR EACH SOURCE

Source ID Number 003

Type submersible
Example: 001, 002, 003

Location in the well

Rated Capacity 15 HP

Are pumps operable? ☐ Yes ☑ No

What is state of repair of pumps? not inspected

How frequently has pumps(s) been replaced? not yet

Are backup pumps/motors provided? ☐ Yes ☑ No

Are controls functioning properly and adequately protected? ☑ Yes ☐ No

Are underground compartments and suction well water proof? N/A ☐ Yes ☐ No

Is facility properly protected against trespassing and vandalism? ☐ Yes ☑ No

Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)? ☑ Yes ☐ No

Is the plumbing adequately painted to prevent excessive corrosion? ☑ Yes ☐ No

Is adequate heating, lighting, and ventilation provided? ☑ Yes ☐ No

Is a preventive maintenance program in operation? ☑ Yes ☐ No

Are recommended spare parts on hand? ☑ Yes ☐ No

EMERGENCY POWER

What type None

Frequency of testing —

Record of primary power failures: None in last year

Switchover: ☐ Automatic ☐ Manual

Comments: (Such as, detailed information on any items with identified deficiencies)

SANITARY SURVEY FORM HYDROPNEUMATIC TANKS

Page _____ of _____

COMPLETE ONE SECTION FOR EACH HYDROPNEUMATIC TANK

CAPTIVE AIR TANK(S)

Source ID 001 Location, Description in control building

Is there an operable pressure gauge? ☑ Yes ☐ No

Does low pressure level provide adequate pressure? ☑ Yes ☐ No

Pressure: Cut-In 40 psi
Cut-Out 62 psi

Does the tank water log? ☐ Yes ☑ No

Is the exterior surface of the tank in good physical condition? ☑ Yes ☐ No

Can tank(s) be by-passed for repair? ☑ Yes ☐ No

Is pump cycle rate known? ☑ Yes ☐ No

If Yes, what is it? on 60 seconds

Comments: Exterior of one older tank is rust covered.

PRESSURE TANK(S)

Source ID _____ Location, Description _____

Is there an operable pressure gauge? ☐ Yes ☐ No

Does low pressure level provide adequate pressure? ☐ Yes ☐ No

Pressure: Cut-In _____ psi
Cut-Out _____ psi

Does the tank water log? ☐ Yes ☐ No

Is air charge system adequate? ☐ Yes ☐ No

Is the exterior surface of the pressure tank in good physical condition? ☐ Yes ☐ No

Is there a water level sight glass? ☐ Yes ☐ No

Is there a bottom drain valve? ☐ Yes ☐ No

Is there a pressure relief valve? ☐ Yes ☐ No

Can tank(s) be by-passed for repair? ☐ Yes ☐ No

Comments: _____

CAPTIVE AIR TANK(S)

Source ID _____ Location, Description _____

Is there an operable pressure gauge? ☐ Yes ☐ No

Does low pressure level provide adequate pressure? ☐ Yes ☐ No

Pressure: Cut-In _____ psi
Cut-Out _____ psi

Does the tank water log? ☐ Yes ☐ No

Is the exterior surface of the tank in good physical condition? ☐ Yes ☐ No

Can tank(s) be by-passed for repair? ☐ Yes ☐ No

Is pump cycle rate known? ☐ Yes ☐ No

If Yes, what is it? _____

Comments: _____

PRESSURE TANK(S)

Source ID _____ Location, Description _____

Is there an operable pressure gauge? ☐ Yes ☐ No

Does low pressure level provide adequate pressure? ☐ Yes ☐ No

Pressure: Cut-In _____ psi
Cut-Out _____ psi

Does the tank water log? ☐ Yes ☐ No

Is air charge system adequate? ☐ Yes ☐ No

Is the exterior surface of the pressure tank in good physical condition? ☐ Yes ☐ No

Is there a water level sight glass? ☐ Yes ☐ No

Is there a bottom drain valve? ☐ Yes ☐ No

Is there a pressure relief valve? ☐ Yes ☐ No

Can tank(s) be by-passed for repair? ☐ Yes ☐ No

Comments: _____

SANITARY SURVEY FORM - STORAGE

Page _____ of _____

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

W' ` type of water is stored? ☑ Raw ☐ Treated

How much storage is provided? 18,000 gallons

Total number of days of supply? 1/4 days

~~GRAVITY~~ STORAGE

Source ID 001 Location, Description near well #1 and control building

Storage Volume? 18,000 gallons

Does surface runoff and underground drainage drain away? ☑ Yes ☐ No

Is the site protected against flooding? ☑ Yes ☐ No

Is tank inspected every 5 years by a structural engineer for structural integrity? ☑ Yes ☐ No

1993 _____

Date of last inspection By whom

Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and te ited a minimum of 3 diameters above the ground or storage tank surface? ☑ Yes ☐ No

Is site adequately protected against vandalism? ☑ Yes ☐ No

Are surface coatings in contact with water ANSI / NSF approved? ☑ Yes ☐ No

Is tank protected against icing and corrosion? ☑ Yes ☐ No

Can tank be isolated from system? ☑ Yes ☐ No

Is all treated water storage covered? ☑ Yes ☐ No

What is cleaning frequency for tanks? 3 yrs ago

Are tanks disinfected after repairs are made? ☑ Yes ☐ No

Is access hatch sealed properly and locked? ☐ Yes ☑ No

Comments: The concrete roof has many hair line cracks and precip. may leak in. Roof hatch needs rubber seal. Electrical box for level controls & booster pump located on top of the tank is open access for insects to interior of tank, I'ere is a lot of sand & concrete chips on bottom of the tank.

GRAVITY STORAGE

Source ID _____ Location, Description _____

Storage Volume? _____ gallons

Does surface runoff and underground drainage drain away? ☐ Yes ☐ No

Is the site protected against flooding? ☐ Yes ☐ No

Is tank inspected every 5 years by a structural engineer for structural integrity? ☐ Yes ☐ No

_____ _____

Date of last inspection By whom

Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface? ☐ Yes ☐ No

Is site adequately protected against vandalism? ☐ Yes ☐ No

Are surface coatings in contact with water approved? ☐ Yes ☐ No

Is tank protected against icing and corrosion? ☐ Yes ☐ No

Can tank be isolated from system? ☐ Yes ☐ No

Is all treated water storage covered? ☐ Yes ☐ No

What is cleaning frequency for tanks? _____

Are tanks disinfected after repairs are made? ☐ Yes ☐ No

Is access hatch sealed properly and locked? ☐ Yes ☐ No

GRAVITY STORAGE

Source ID _____ Location, Description _____

Storage Volume? _____ gallons

Does surface runoff and underground drainage drain away? ☐ Yes ☐ No

Is the site protected against flooding? ☐ Yes ☐ No

Is tank inspected every 5 years by a structural engineer for structural integrity? ☐ Yes ☐ No

_____ _____

Date of last inspection By whom

Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface? ☐ Yes ☐ No

Is site adequately protected against vandalism? ☐ Yes ☐ No

Are surface coatings in contact with water approved? ☐ Yes ☐ No

Is tank protected against icing and corrosion? ☐ Yes ☐ No

Can tank be isolated from system? ☐ Yes ☐ No

Is all treated water storage covered? ☐ Yes ☐ No

What is cleaning frequency for tanks? _____

Are tanks disinfected after repairs are made? ☐ Yes ☐ No

Is access hatch sealed properly and locked? ☐ Yes ☐ No

SANITARY SURVEY FORM - MISCELLANEOUS

DISTRIBUTION SYSTEM EVALUATION

System description Mains are all PVC, at 2300 ft of 4" & 2500 ft of 2".

System drawings available? ☑ Yes ☐ No

Lines adequately sized? ☑ Yes ☐ No

Adequate pressure maintained? ☑ Yes ☐ No

Mains subject to freezing? ☐ Yes ☑ No

Distribution system leaks? ☐ Yes ☑ No

Cross-connections noted? ☐ Yes ☑ No

Comments: There are occasional periods when the pressure on extremity services is below 40 psi but no reports of < 20 psi.

SAFETY

Note any safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.) _____

MONITORING EVALUATION

Bacti monitoring satisfactory? * ☑ Yes ☐ No

Familiar with repeat sampling? ☑ Yes ☐ No

Chemical monitoring satisfactory? ☑ Yes ☐ No

Monitoring records maintained? ☑ Yes ☐ No

Bacti Sample Site Plan submitted to state? (Community Systems Only) ☐ Yes ☐ No

Did Surveyor take a bacteriological sample? ☐ Yes ☑ No

If Yes,

Date of Sample: _____ Time of Sample: _____

Sample Result: _____

Comments: While monitoring frequency is ok, recent samples have shown bacterial contamination. The system will be disinfected.

MANAGEMENT

Are personnel adequately trained? ☑ Yes ☐ No

Are operators properly certified? * ☑ Yes ☐ No

Are there sufficient personnel? ☑ Yes ☐ No

Is an emergency plan available and workable? ☑ Yes ☐ No

Are abandoned wells present? ☐ Yes ☑ No

Do abandoned wells appear to be properly abandoned? N/A ☐ Yes ☐ No

Is operator aware of rules regarding well abandonment? N/A ☐ Yes ☐ No

Comments: The "backup" operator who resides in the subdivision has a Class 5 certification and the system requires a Class 4.

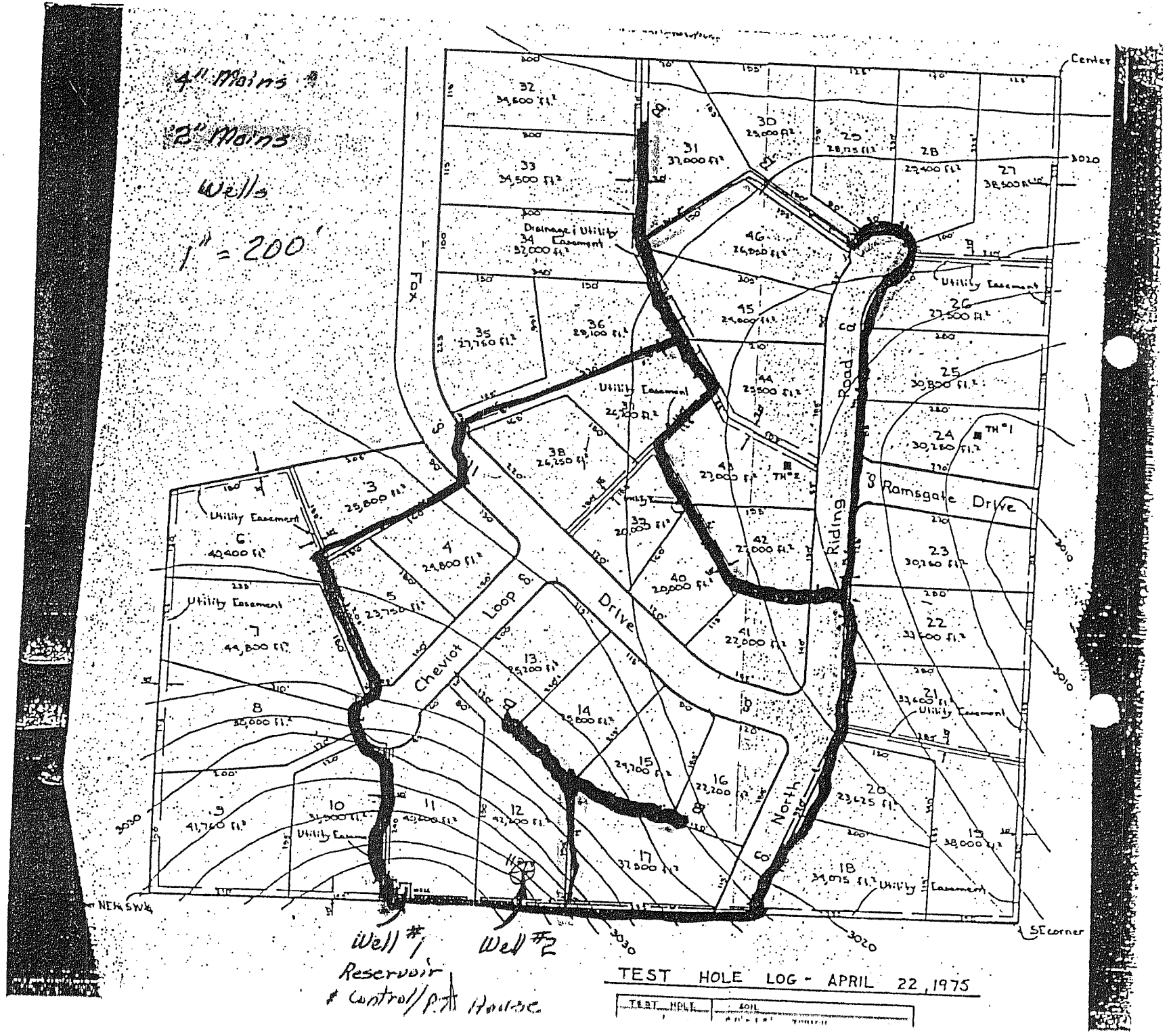
SANITARY SURVEY FORM - DIAGRAMS

Draw brief site plan showing location of well(s), springs(s), water storage, distribution system, pumphouse(s), entry point(s), treatment, etc.

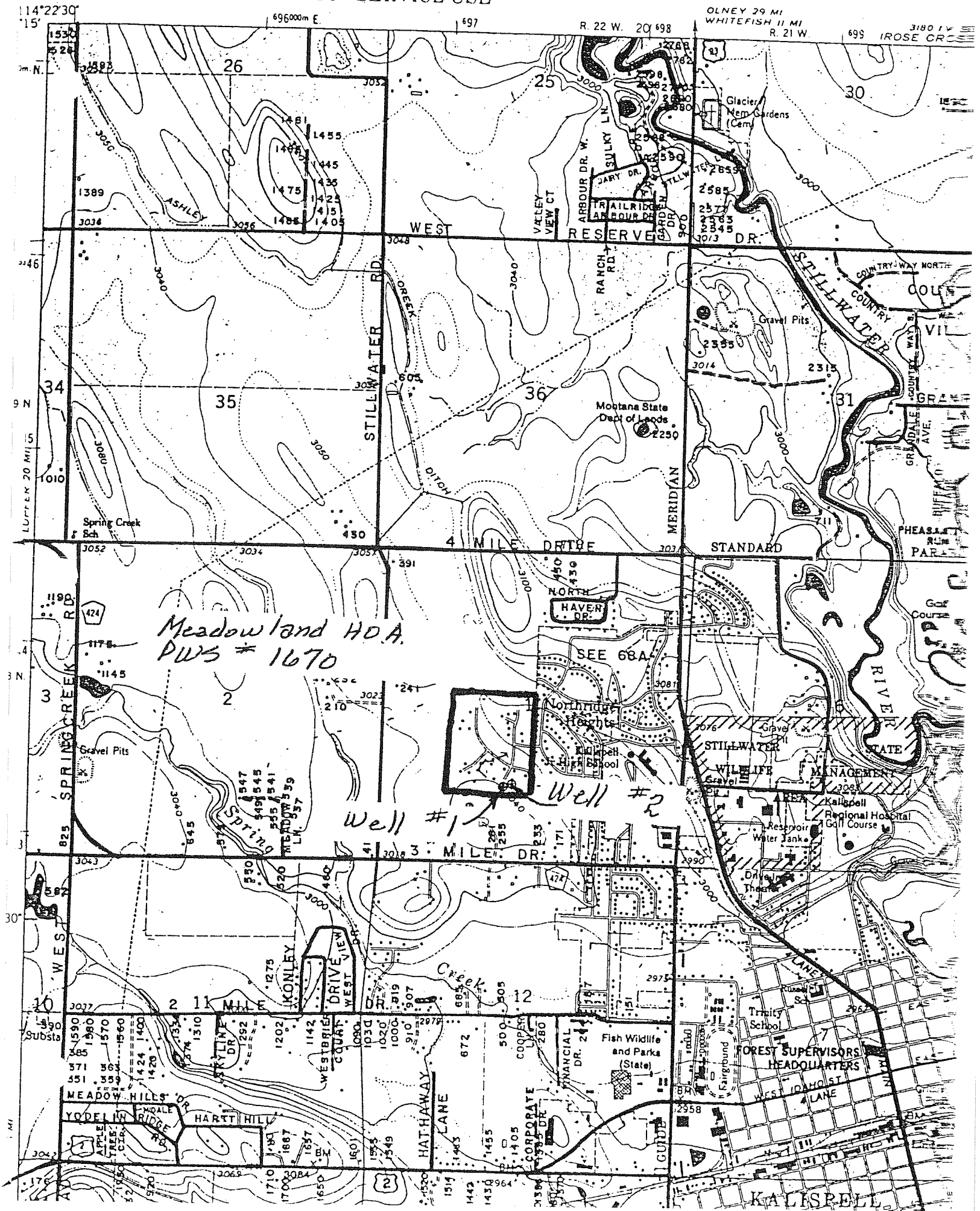
See attached Dwg.

Draw Brief schematic of placement of filters and disinfection equipment in relation to the source, entry point and distribution system below

No treatment


4" Mains
2" Mains
Wells
1" = 200'
Center
Fox
Road
Riding
Ramsgate Drive
Chevriot
Loop Co.
Drive
North
Drainage Utility Easement
Utility Easement
TH #1
TH #2
Well #1
Well #2
Reservoir
& Control/Pump House
SE corner
NE¼ SW¼
TEST HOLE LOG - APRIL 22, 1975
TEST HOLE
SOIL

GEOLOGICAL SURVEY
MODIFIED FOR USDA FORES SERVICE USE



CALCULATION OF COORDINATES

LONGITUDE:

Base Longitude: 114 Degrees 22 Minutes 30 Seconds

2 1/2 minutes of longitude equals 5.17 inches on map

One minute of longitude equals 2.068 inches on map

Distance on map (E) or W of base longitude #1 4.08 #2 4.15 inches

Angle east of base longitude #1 1.97 #2 2.007 minutes

or #1 1 Minutes 58 Seconds
#2 2 0

Base longitude plus W or minus E

Longitude: #1 114 Degrees 20 Minutes 32 Seconds
#2 114 20 30

LATITUDE:

Base Latitude: 48 Degrees 15 Minutes 00 Seconds

2 1/2 minutes of latitude equals 7.57 inches on map

One minute of latitude equals 3.028 inches on map

Distance on map N or (S) of base latitude #1 6.37 #2 6.35 inches

Angle up from base latitude #1 2.10 #2 Minutes

or #1 2 Minutes 6 Seconds
#2 2 6

Base latitude plus N or minus S

Latitude: #1 48 Degrees 12 Minutes 54 Seconds
#2 12 54

STATE PUBLISHING COMPANY

Meadowland WUA Well #1

STATE OF MONTANA
ADMINISTRATOR GROUNDWATER CODE
MONTANA WATER RESOURCES BOARD

128891

County Flathead

NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION BY MEANS OF WELL

Developed after January 1, 1962

(Under Chapter 237 Montana Session Laws, 1961, as amended)

This form to be prepared by driller, and three copies to be filed by the owner with the County Clerk and Recorder in the county in which the well is located, last copy to be retained by driller.

Please answer all questions. If not applicable, so state, otherwise the form may be returned.

Owner Darwin Hamilton

Address Kalispell

Montana

Date well started Mar. 30, 1973

completed Apr. 4, 1973

For Administrator's Use
File
GW 1

Type of well Drilled
(Dug, driven, bored or drilled)

Equipment used Air Rotary
(Churn drill, rotary or other)

Water Use: Domestic ☒ Municipal ☐ Stock ☐ Irrigation ☐

Industrial ☐ Drainage ☐ Other ☐* Garden/Lawn ☐

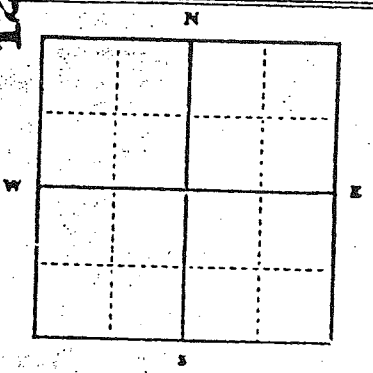
*Describe

USE: If used for irrigation, industrial, drainage or other. Explain, state number of acres and location or other data (i.e. Lot, Block and Addition).

ESTIMATED ANNUAL WITHDRAWAL

Size of Drilled Hole	Size and Weight of Casing	From (Feet)	To (Feet)	PERFORATIONS Kind Size	From (Feet)	To (Feet)
10"	8-5/8" 25#	0	170			

128891



NE¼ SW¼ Sec. 1
T. 28 N R. 22 E
S W

Lot 11 Meadowland Unit #2

INDICATE LOCATION OF WELL AND PLACE OF USE, IF POSSIBLE.
EACH SMALL SQUARE REPRESENTS 40 ACRES

Static water level 110 ft.*
Pumping water level 140 ft.*
at 40 gallons per minute,
measured 4 ~~minutes~~ hours after pumping began.
*Measured from ground level.
Well developed by air
for 4 hours.
Power Elec. Pump 5 HP
Remarks: (Gravel packing, cementing, packers, type of shutoff)

DRILLER'S LOG

Indicate the character, color, thickness of strata such as soil, clay, sand, gravel, shale, sandstone, etc. Show depth at which water is found and height to which water rises in well.

Top of Ground (Elev. above sea level)

From (Feet)	To (Feet)	
0	20	Top Soil
20	80	Boulders & Clay
80	140	Clay & Gravel
140	170	Gravel & Sand

WM. F. OSBORNE, Owner

LIBERTY DRILLING COMPANY

Well #2

MUNICIPAL
INDUSTRIAL
DOMESTIC
IRRIGATION
WELLS

LICENSED, BONDED AND INSURED

3850 HIGHWAY 93 SOUTH
PH. 752-2800
KALISPELL, MONTANA 59901

May 15, 1986

Meadowland Unit No. 2 Homeowners Assoc., Inc.
Jean A. Johnson, President
200 North Riding Road
Kalispell, Montana 59901

WELL LOG

Location: Lot 12, Meadowland Unit No. 2 T28 R22 Sec. 1

Formation Log:

0 - 5	Tan to dark brown sandy silt.
5 - 13	Tan sandy silt with some embedded gravel.
13 - 134	Gravel mixed in tan silty clay matrix.
134 - 139	Gravel mixed in light brown silt matrix.
139 - 178	Gravel mixed in cleaner light brown silt matrix.
178 - 201	Fine to medium gravel and coarse sand. Seeps of water.
201 - 216	Clean find to medium gravel and coarse sand. 80 to 100 gallons per minute total water. Some silt.
6 - 217'2"	Clean coarse sand and gravel. 150+ gallons per minute total water.

Water Log:

Well produced in excess of 150 gallons per minute of clear sand-free water on a 9½ hour test with an air lift pump. Static water level at completion of well was 119 feet from surface.

Casing Log:

Well is cased from two feet above surface to 217'02" with 8 5/8" OD x .322 wall new black steel water well casing. An eight inch forged steel drive shoe is welded to the bottom of the eight inch casing. From 215' to 217'2" the well is filled with clean coarse gravel in order to make a filter and conduit to conduct water into the well. All water is entering the well thru the open bottom of the eight inch casing.

Grouting Log:

A twelve inch diameter hole was drilled to a depth of 20' in order to provide an annulus around the 8 5/8" OD x .322 wall new steel surface casing. This annulus was filled with 8 sacks of cement grout from 20' below surface to 4' below surface in order to provide a sanitary surface seal and prevent seepage of surface waters and other contaminants into and around the well.

Note:

Wells of this type in this area can be depended upon year after year to produce clear sand-free water as long as they are not overpumped, i.e., they should be pumped at tes not in excess of 65 to 70 percent of the tested capacity of the aquifer.

Vanadium (V)	**<1. ug/L**	---	---	---
Zinc (Zn)	**<3. ug/L**	5,000 ug/L [smcl]	24,000 ug/L	2,000 ug/L
Zirconium (Zr)	**<4. ug/L**	---	---	---

Key:

NR	No Reading in GWIC
mg/L	milligrams per liter or parts per million
ug/L	micrograms per liter or parts per billion
---	There is currently no standard for this constituent.
[b]	High concentrations of sulfate may restrict calcium uptake by crops.
[c]	Varies with crop; generally dissolved solids should be less than 2,000 mg/L (equivalent to specific conductance of about 2,000 to 3,000 micromhos/cm).
[d]	Dependent upon other variables such as type of clay in soil and salt content of water. (See SAR)
[mcl]	U.S. Environmental Protection Agency maximum contaminant level or action level: revised October 13, 1999.
[smcl]	U.S. Environmental Protection Agency secondary contaminant level: revised October 13, 1999. This standard is based on aesthetic quality of water (i.e. odor, color, etc.) and is not a health standard.

Sample Id: 1997Q0048

Sample Date: 07/15/1996

Site Name: MCADAMS RICHARD

Location (TRS): 29N 22W 32 DADB

Site Type: WELL

The code **---** means there is currently no standard for this constituent.

Constituent	This Sample	Drinking Water	Stock Water	Irrigation Water
Calcium (Ca)	**22.00 mg/L**	---	---	---
Magnesium (Mg)	**18.00 mg/L**	---	2,000 mg/L	---
Sodium (Na)	**19.00 mg/L**	250 mg/L [smcl]	2,000 mg/L	See SAR
Potassium (K)	**0.53 mg/L**	---	---	---
Iron (Fe)	**<.003 mg/L**	0.3 mg/L [smcl]	---	---
Manganese (Mn)	**<.002 mg/L**	0.05 mg/L [smcl]	---	2.0 mg/L
Silica (SiO2)	**32.80 mg/L**	---	---	---
Bicarbonate (HCO3)	**183.20 mg/L**	---	---	---
Carbonate (CO3)	**0.00 mg/L**	---	---	---
Chloride (Cl)	**2.70 mg/L**	250 mg/L [smcl]	1,500 mg/L	---
Sulfate (SO4)	**16.00 mg/L**	250 mg/L [smcl]	1,500 mg/L	[b]
Nitrate (NO3 as N)	**.18 P mg/L**	10 mg/L [mcl]	100 mg/L	---
Fluoride (F)	**<1. mg/L**	4 mg/L [mcl]	2 mg/L	---
Phosphate (as P)	**NR mg/L**	500 mg/L [smcl]	5,000 mg/L	2,000 mg/L [c]
Aluminum (Al)	**<30. ug/L**	50-200 ug/L [smcl]	---	1,000 ug/L
Antimony (Sb)	**<2. ug/L**	6 ug/L [mcl]	---	---
Arsenic (As)	**<1. ug/L**	50 ug/L [mcl]	50 ug/L	100 ug/L
Barium (Ba)	**<2. ug/L**	2,000 ug/L [mcl]	---	---
Boron (B)	**<30. ug/L**	---	---	---
Cadmium (Cd)	**<2. ug/L**	5 ug/L [mcl]	10 ug/L	5 ug/L
Chromium (Cr)	**4.40 ug/L**	100 ug/L [mcl]	1,000 ug/L	100 ug/L
Cobalt (Co)	**<2. ug/L**	---	1,000 ug/L	50 ug/L
Copper (Cu)	**<2. ug/L**	1,300 ug/L [mcl]	500 ug/L	200 ug/L
Lead (Pb)	**<2. ug/L**	15 ug/L [mcl]	50 ug/L	5,000 ug/L
Lithium (Li)	**<6. ug/L**	---	---	2,500 ug/L
Molybdenum (Mo)	**<10. ug/L**	---	---	5 ug/L
Nickel (Ni)	**<2. ug/L**	---	---	200 ug/L
Phosphate (P)	**NR ug/L**	---	---	---
Selenium (Se)	**<1. ug/L**	50 ug/L [mcl]	50 ug/L	20 ug/L
Silver (Ag)	**<1. ug/L**	100 ug/L [smcl]	---	---
Strontium (Sr)	**130.00 ug/L**	---	---	---
Titanium (Ti)	**<10. ug/L**	---	---	---
Vanadium (V)	**<5. ug/L**	---	---	---
Zinc (Zn)	**104.20 ug/L**	5,000 ug/L [smcl]	24,000 ug/L	2,000 ug/L
Zirconium (Zr)	**<20. ug/L**	---	---	---

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
BATCO OF KALISPELL INC 1023 E IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BAUSKA FIREARMS 1ST ST W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BEARINGS INCORPORATED 2547 US HIGHWAY 2 EAST KALISPELL, MT 599012399	NO	NO	**YES**	NO	NO	NO
BIG MOUNTAIN TOYOTA 1331 US HIGHWAY 2 EAST KALISPELL, MT 599013296	NO	NO	**YES**	NO	NO	NO
BIOFORCE OF MONTANA 2211 HWY 2 E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
BMC WEST TRUSS PLANT KALISPELL FACILITY KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
BN KALISPELL POLE AND TIMBER 330 FLATHEAD DRIVE KALISPELL, MT 59901	NO	NO	**YES**	**YES**	NO	**YES**
BUSY BEE DRY CLEANERS 305 2ND AVE W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
CABLE TECHNOLOGY INC 3985 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
CENEX FARMERS UNION EXCHANGE 55 4TH AVENUE EAST NORTH KALISPELL, MT 599014197	NO	NO	**YES**	NO	NO	NO
CITY SERVICE TRUCK STOP 990 DEMERSVILLE ROAD KALISPELL, MT 599017936	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
CLASSIC CLEANERS 710 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
COLUMBIA PAINT & COATINGS CO KALISPELL 645 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
COSTCO WHOLESALE NUMBER 109 3850 US HIGHWAY 2 EAST KALISPELL, MT 599016511	NO	NO	**YES**	NO	NO	NO
CRESTON POST CO INC 1220 HATCHERY RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
DELTA AIR LINES - KALISPELL GLACIER PARK INTL AIRPORT KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
DIAMOND AIRE 1893 AIRPORT ROAD KALISPELL, MT 599017501	NO	NO	**YES**	NO	NO	NO
DISASTER AND EMERGENCY SERVICES 1249 WILLOW GLEN DRIVE KALISPELL, MT 599017541	NO	NO	**YES**	NO	NO	NO
DOUG MILLER SHOPS SE CRN OF HWY 93 S & FOREST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
DRUG ENFORCEMENT ADMINISTRATION 17 SHADY LANE NUMBER 8 KALISPELL, MT 599012956	NO	NO	**YES**	NO	NO	NO
EISINGER MOTORS 1000 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
EQUITY SUPPLY COMPANY 150 1ST AVE NW KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FEDERAL EXPRESS CORPORATION 2033 US HIGHWAY 2 EAST KALISPELL, MT 599012944	NO	NO	**YES**	NO	NO	NO
FERRON & SONS HOME 231 W RESERVE KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FERRON & SONS BODY SHOP INC 2540 HWY 2 E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FLATHEAD CO SHERIFF STORAGE FFA RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FLATHEAD COUNTY ROAD DEPARTMENT 800 SOUTH MAIN KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
FLATHEAD COUNTY ROAD DEPT. - ASPHALT 5 MILES EAST OF KALISPELL KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
FLATHEAD COUNTY SOLID WASTE DISTRICT NE1/4 NE1/4 SEC 1, T29N, R22W KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
FLATHEAD ELECTRIC COOPERATIVE INCORPORATED 2510 US HIGHWAY 2 EAST KALISPELL, MT 599012397	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
FLATHEAD PROPERTIES MINING PROJECT T 25 N R 23 W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
FRONTIER TRANSPORTATION 2422 US HIGHWAY 2 WEST KALISPELL, MT 599017303	NO	NO	**YES**	NO	NO	NO
GLACIER FUR DRESSING 2185 3RD AVE E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
GOOSE BAY EQUIPMENT, INC. 1995 THIRD AVENUE EAST KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
GRIZZLY LOGGINE AND LUMBER LLC 100 SHERMAN ROAD KALISPELL, MT 599018123	NO	NO	NO	NO	**YES**	NO
HEDSTROM DAIRY E 1/2 NW 1/4 OF SEC 9 T29N KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
ICEAN CORPORATION 3975 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
IMPERIAL DRY CLEANERS INCORAPORATED 151 3RD AVENUE EAST NORTH KALISPELL, MT 599014109	NO	NO	**YES**	NO	NO	NO
INDUSTRIAL PACIFIC MACHINE WORKS 640 W MONTANA KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
KALISPELL CITY OF 1400 1ST AVE W KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
KALISPELL REGIONAL HOSPITAL 310 SUNNYVIEW LN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
KALISPELL WRECKING COMPANY 57 5TH AVENUE EAST N KALISPELL, MT 599014115	**YES**	NO	NO	NO	NO	NO
KLINGLER LUMBER 350 FLATHEAD DRIVE KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
LASALLE SAND AND GRAVEL LLP 1107 ROSE CROSSING KALISPELL, MT 599016634	NO	NO	NO	NO	**YES**	NO
LHC INC 615 W MONTANA KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
LONG MACHINERY 3500 US HIGHWAY 93 SOUTH KALISPELL, MT 599018637	NO	NO	**YES**	NO	NO	NO
MAJOR AEROCRAFTSMAN INCORPORATED 1845 AIRPORT ROAD KALISPELL, MT 599017501	NO	NO	**YES**	NO	NO	NO
MAJOR AEROCRAFTSMAN INCORPORATED 4475 US HIGHWAY 2 EAST KALISPELL, MT 599016517	NO	NO	**YES**	NO	NO	NO
MAKING TRACKS 3981 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
MC ELROY & WILKEN, INC. 86 KHD HMBLT WEDAG B #4620128 KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
MC ELROY AND WILKEN 801 WHITEFISH STAGE KALISPELL, MT 599013771	NO	NO	**YES**	NO	**YES**	NO
MEADOW GOLD DAIRY INCORPORATED 1300 TWO MILE DRIVE KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
MENNONITE ROAD MENMILE RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MONTANA DEPARTMENT OF TRANSPORTATION 85 5TH AVENUE EAST NORTH KALISPELL, MT 599014115	NO	NO	**YES**	NO	NO	NO
MONTANA GOLD BULLET 350 18TH ST E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MOUNTAIN VIEW PET CREMATORY 3249 US HIGHWAY 93 SOUTH KALISPELL, MT 599017904	NO	NO	NO	NO	**YES**	NO
MSE ENVIRONMENTAL INC KALISPELL 1840 HWY 93 S KALISPELL, MT 599015721	NO	NO	**YES**	NO	NO	NO
MT ARNG OMS 1 1800 HWY 93 S 1800 HWY 93 S KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
MT ARNG OMS 1 2987 HWY 93 N 2987 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
MT DOT KALISPELL HUTTON PIT 2359 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	**YES**
NORTHWEST PIPE 1780 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
NORTHWESTERN TELEPHONE SYSTEMS 290 N MAIN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
NUPAC 2355 HWY 93 N KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
OMNI PLASTICS 4005 MONTANA HIGHWAY 35 KALISPELL, MT 599018806	NO	NO	**YES**	NO	NO	NO
PACIFIC POWER AND LIGHT 448 MAIN STREET KALISPELL, MT 599014849	NO	NO	**YES**	NO	NO	NO
PACK & COMPANY 2355 HWY 93N KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
PALMER BROTHERS AUTO SUPPLY 111 W IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PENSKE AUTO CENTER KALISPELL 245 LASALLE RD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PLUM CREEK MANUFACTURING L P EVERGREEN PLYWOOD DIVISION 75 SUNSET DRIVE KALISPELL, MT 599012347	NO	**YES**	**YES**	NO	**YES**	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
PONDEROSA MOTORS 1177 HIGHWAY 2 EAST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
PREFERRED PAVING INC 1978 BARBER-GRN DRUM MX-AS PLT PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO
PREFERRED PAVING, INC. 1960'S BARBER-GREENE BATCH MIX PORTABLE ASPHALT PLANT, MT 59901	NO	NO	NO	NO	**YES**	NO
R LAZY M ENT., DBA CRESTON SAND & GRAVEL 5915 MONTANA HIGHWAY 35 KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
RELIANCE REFINING COMPANY 100 1ST AVE E KALISPELL, MT 59901	NO	NO	**YES**	**YES**	NO	NO
RENT-A-WRECK 2425 US HIGHWAY 2 EAST KALISPELL, MT 599012309	NO	NO	**YES**	NO	NO	NO
ROBINSON FOREST PRODUCTS 3182 MONTANA HIGHWAY 35 KALISPELL, MT 599017722	NO	NO	**YES**	NO	NO	NO
ROBINSON POST & POLE 519 EZY DR KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
RUSSELL OLSEN CONSTRUCTION/TRUCKING 2820 HELENA FLATS ROAD KALISPELL, MT 599016535	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
RYGG FORD 820 E IDAHO KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SCARFF AUTO CENTER INC. 1212 S MAIN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SEMI THERM 4051 HWY 53 S KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SEMITOOL INCORPORATED RESERVE DR 655 W RESERVE DR KALISPELL, MT 599010000	NO	NO	**YES**	NO	NO	**YES**
SEMITOOL, INCORPORATED 4051 US HIGHWAY 93 SOUTH KALISPELL, MT 599018602	NO	NO	**YES**	NO	NO	NO
SMALLS FARMS INC 305 SMALLS LN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SMITHS PHOTO 172 195 3RD AVE KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SONJUS AUTO BODY SHOP 2902 US HIGHWAY 93 NORTH KALISPELL, MT 599016859	NO	NO	**YES**	NO	NO	NO
STAMPEDE PACKING COMPANY KALISPELL, MT 59901	**YES**	NO	NO	NO	NO	NO
STAMPEDE PACKING COMPANY 2095 AIRPORT ROAD KALISPELL, MT 599017503	**YES**	NO	NO	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
STEVENS AERO WORKS 2436 US HIGHWAY 93 SOUTH KALISPELL, MT 599017532	NO	NO	**YES**	NO	NO	NO
STILLWATER FOREST PRODUCTS 955 WHITEFISH STAGE KALISPELL, MT 599013773	NO	NO	**YES**	NO	**YES**	NO
STREICH SEED POTOTOES 1328 TRUMBLE CREEK ROAD KALISPELL, MT 599016741	NO	NO	**YES**	NO	NO	NO
SURE SEAL DUST CONTROL WEST VALLEY DR KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
SUTHERLAND CLOTHES CLINIC 130 2ND ST E KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
THORNTON OIL 2ND AVE EAST N & RAILROAD KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
TOW MASTER 2211 US HIGHWAY 2 EAST KALISPELL, MT 599012815	NO	NO	**YES**	NO	NO	NO
TREASURE STATE FOUNDRY 4063 US HIGHWAY 93 SOUTH KALISPELL, MT 599018602	NO	NO	**YES**	NO	NO	NO
TREE IMAGE 3979 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
TRI CITY WRECKING 3900 US HIGHWAY 2 EAST KALISPELL, MT 599016512	NO	NO	**YES**	NO	NO	NO

FACILITY NAME/ADDRESS	Permitted Discharges to Water?	Toxic Releases Reported?	Hazardous Waste Handler?	Active or Archived Superfund Report?	Air Releases Reported?	BRS Reporter?
UPS KALISPELL CENTER 1151 N MERIDIAN KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
USDOE BPA KALISPELL SUBSTATION 2540 MONTANA HWY 35 KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
USDOE BONNEVILLE POWER ADMINISTRATION(BPA)/KALISPELL MAINTANCE HEADQUATERS 2520 US HIGHWAY 2 EAST KALISPELL, MT 599012312	NO	NO	**YES**	NO	NO	NO
VALLEY EXCAVATING & WEST SHORE GRAVEL 4644 HIGHWAY 93 SOUTH KALISPELL, MT 59901	NO	NO	NO	NO	**YES**	NO
VALLEY MOTOR SUPPLY COMPANY 140 W CENTER ST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
WAL MART STORE # 2259 KALISPELL 1150 IDAHO ST KALISPELL, MT 59901	NO	NO	**YES**	NO	NO	NO
WASTEWATER TREATMENT PLANT 2001 AIRPORT ROAD KALISPELL, MT 599017503	**YES**	NO	NO	NO	NO	NO
WISHER'S AUTO RECYCLING 2190 AIRPORT ROAD KALISPELL, MT 599017540	**YES**	NO	NO	NO	NO	NO
WOODRING'S CONSTRUCTION 43 CEDAR RAPIDS JAW & ROLL CRS PORTABLE, MT 59901	NO	NO	NO	NO	**YES**	NO