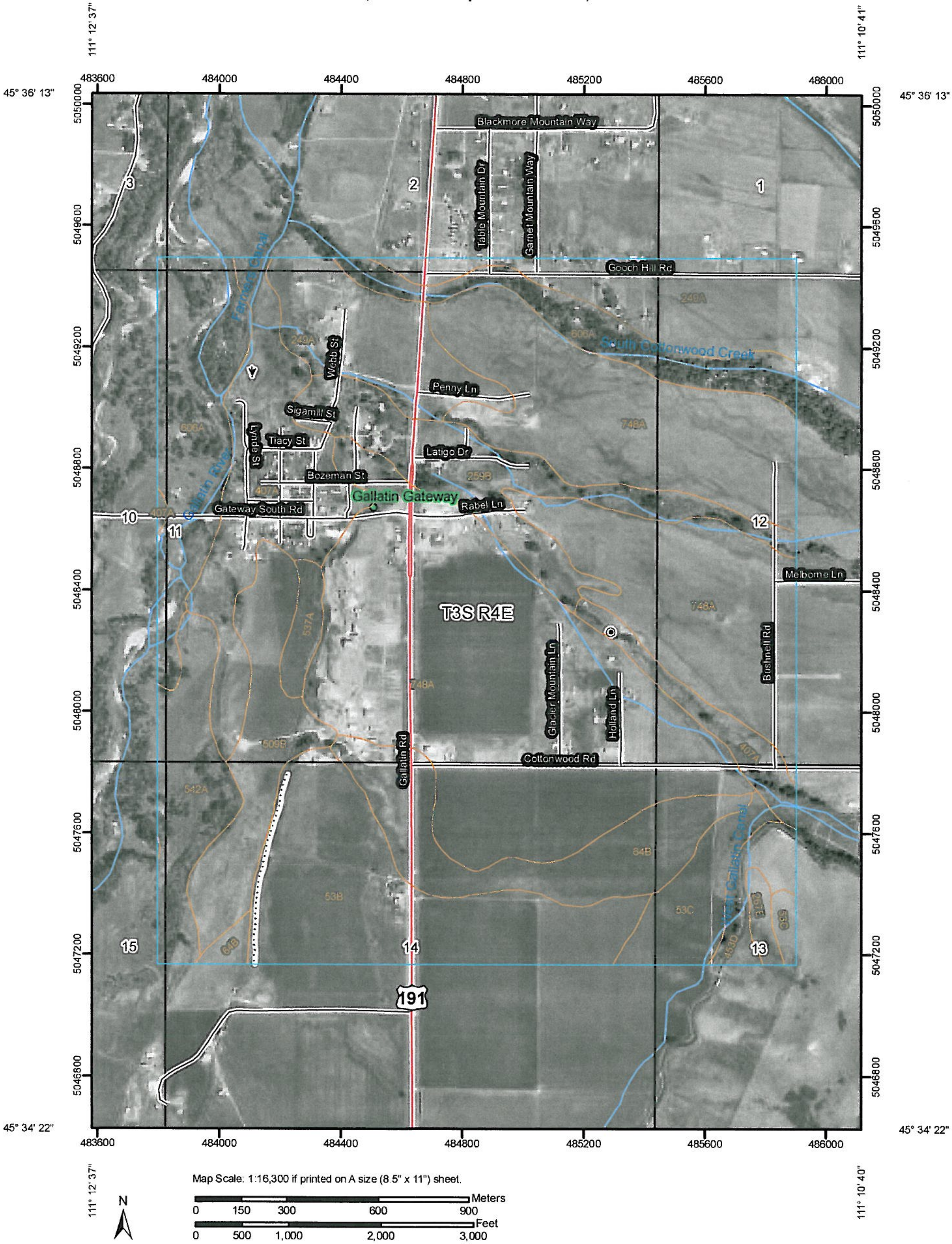
Appendix A

NRCS Soils Data

Soil Map—Gallatin County Area, Montana
(Gallatin Gateway Wastewater PER)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

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

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities
- PLSS Township and Range
- PLSS Section

Water Features

- Oceans
- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:16,300 if printed on A size (8.5" × 11") sheet.

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

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

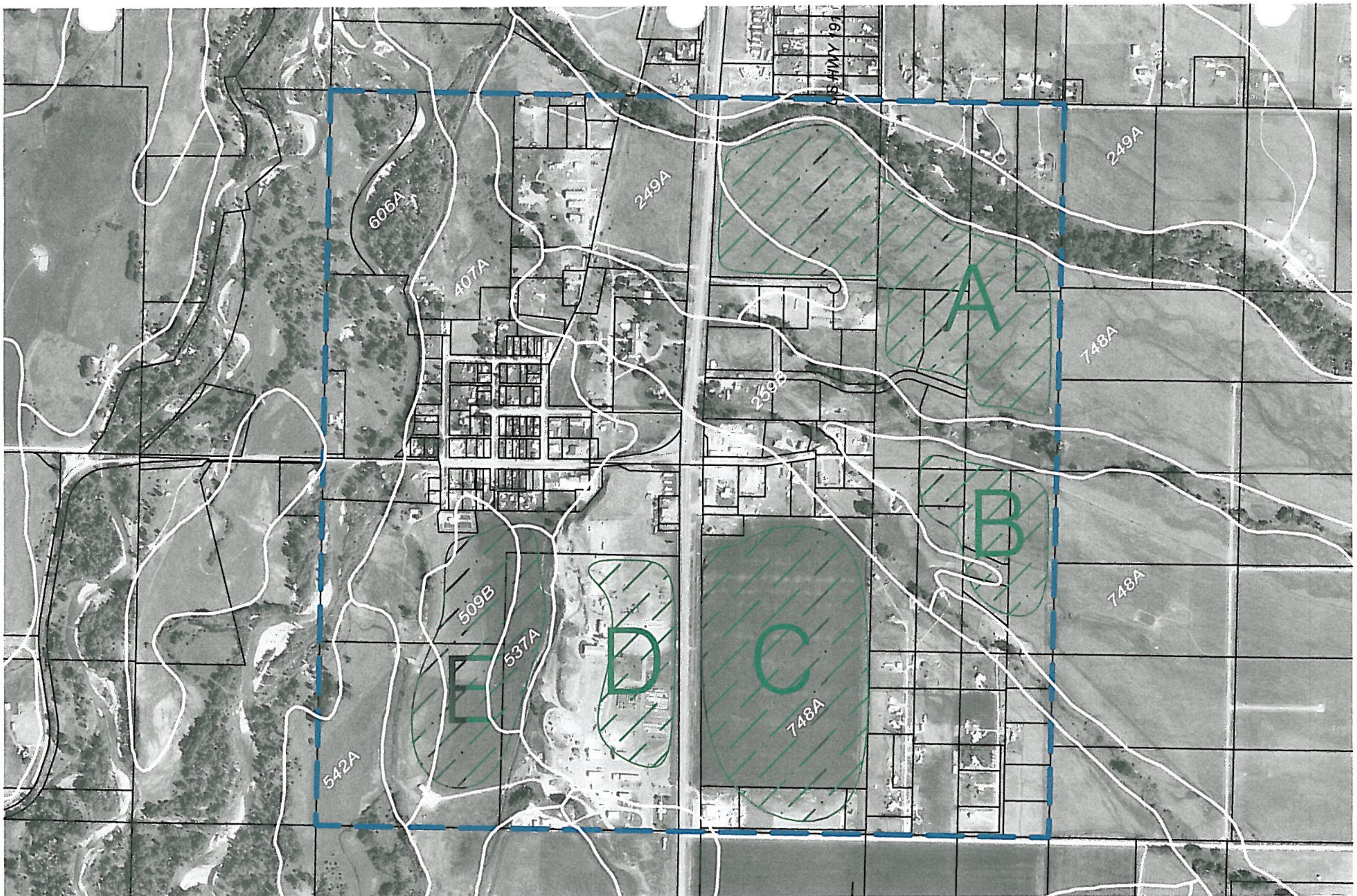
Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

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

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Date(s) aerial images were photographed: 8/15/1995

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



SCALE:

0 500 1000
SCALE IN FEET

LEGEND:

PLANNING AREA BOUNDARY
748A NRCS SOIL CLASSIFICATION
SITE ALTERNATIVE

NORTH

GreatWest engineering

FIGURE A
NRCS SOILS
& SITE ALTERNATIVES

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERING REPORT (PER)

Map Unit Legend

Gallatin County Area, Montana (MT622)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
53B	Amsterdam silt loam, 0 to 4 percent slopes	112.0	9.2%
53C	Amsterdam silt loam, 4 to 8 percent slopes	33.0	2.7%
64B	Straw loam, 0 to 4 percent slopes	68.5	5.7%
249A	Beaverton cobbly clay loam, 0 to 2 percent slopes	112.1	9.3%
259B	Corbly very gravelly sandy loam, 0 to 4 percent slopes	69.8	5.8%
267E	Roy cobbly clay loam, 15 to 60 percent slopes	5.6	0.5%
407A	Sudworth-Nesda loams, 0 to 2 percent slopes	104.0	8.6%
453D	Amsterdam-Brodyk silt loams, 8 to 15 percent slopes	15.6	1.3%
509B	Enbar loam, 0 to 4 percent slopes	54.2	4.5%
537A	Lamoose silt loam, 0 to 2 percent slopes	9.9	0.8%
542A	Blossberg loam, 0 to 2 percent slopes	46.9	3.9%
606A	Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes	108.7	9.0%
748A	Hyalite-Beaverton complex, 0 to 4 percent slopes	471.3	38.9%
Totals for Area of Interest		**1,211.6**	**100.0%**

soils in potential treatment areas

Map Unit Description

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

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

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Gallatin County Area, Montana

53B—Amsterdam silt loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,400 to 5,550 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Amsterdam and similar soils: 85 percent
Minor components: 15 percent

Description of Amsterdam

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 3e
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Typical profile

0 to 8 inches: Silt loam
8 to 15 inches: Silt loam
15 to 42 inches: Silt loam
42 to 60 inches: Very fine sandy loam

Minor Components

Quagle

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy (Ly) 15-19" p.z. (R044XS357MT)

Blackdog

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Bowery

Percent of map unit: 3 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Meagher

Percent of map unit: 2 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

53C—Amsterdam silt loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,450 to 5,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Amsterdam and similar soils: 85 percent
Minor components: 15 percent

Description of Amsterdam

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 3e
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Typical profile

0 to 8 inches: Silt loam
8 to 15 inches: Silt loam
15 to 42 inches: Silt loam
42 to 60 inches: Very fine sandy loam

Minor Components

Quagle

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy (Ly) 15-19" p.z. (R044XS357MT)

Blackdog

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Bowery

Percent of map unit: 3 percent
Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Meagher

Percent of map unit: 2 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

64B—Straw loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,350 to 6,150 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Straw and similar soils: 90 percent
Minor components: 10 percent

Description of Straw

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.8 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability (nonirrigated): 3e
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Typical profile
0 to 18 inches: Loam
18 to 60 inches: Loam

Minor Components

Enbar
Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Subirrigated (Sb) 15-19" p.z. (R044XS359MT)

Sudworth
Percent of map unit: 3 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Straw
Percent of map unit: 2 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (Cy) 15-19" p.z. (R044XS350MT)

249A—Beaverton cobbly clay loam, 0 to 2 percent slopes

Map Unit Setting
Elevation: 4,450 to 5,900 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition
Beaverton and similar soils: 90 percent
Minor components: 10 percent

Description of Beaverton

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability (nonirrigated): 6s
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Typical profile

0 to 5 inches: Cobbly loam
5 to 21 inches: Very gravelly clay loam
21 to 25 inches: Very cobbly coarse sandy loam
25 to 60 inches: Extremely cobbly loamy coarse sand

Minor Components

Beaverton

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Turner

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,350 to 5,350 feet

Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Corbly and similar soils: 85 percent
Minor components: 15 percent

Description of Corbly

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly alluvium

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability (nonirrigated): 6e
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Typical profile

0 to 5 inches: Very gravelly sandy loam
5 to 12 inches: Very gravelly sandy loam
12 to 60 inches: Extremely gravelly loamy sand

Minor Components

Corbly

Percent of map unit: 10 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Corbly

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

267E—Roy cobbly clay loam, 15 to 60 percent slopes

Map Unit Setting

Elevation: 4,750 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Roy and similar soils: 90 percent
Minor components: 10 percent

Description of Roy

Setting

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Properties and qualities

Slope: 15 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Clayey-Droughty (CyDr) 15-19" p.z. (R044XS724MT)

Typical profile

0 to 6 inches: Cobbly clay loam
6 to 24 inches: Very cobbly clay
24 to 60 inches: Extremely cobbly clay loam

Minor Components

Roy

Percent of map unit: 5 percent
Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey-Droughty (CyDr) 15-19" p.z. (R044XS724MT)

Meagher

Percent of map unit: 3 percent

Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Bowery

Percent of map unit: 2 percent
Landform: Escarpments
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Overflow (Ov) 15-19" p.z. (R044XS351MT)

407A—Sudworth-Nesda loams, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,300 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Sudworth and similar soils: 60 percent
Nesda and similar soils: 25 percent
Minor components: 15 percent

Description of Sudworth

Setting

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 48 to 96 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 3e
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Typical profile

0 to 24 inches: Loam
24 to 29 inches: Loam

29 to 60 inches: Extremely gravelly sand

Description of Nesda

Setting

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 48 to 96 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability (nonirrigated): 6s
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Typical profile

0 to 11 inches: Loam
11 to 60 inches: Very gravelly loamy sand

Minor Components

Meadowcreek

Percent of map unit: 8 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Subirrigated (Sb) 15-19" p.z. (R044XS359MT)

Enbar

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Subirrigated (Sb) 15-19" p.z. (R044XS359MT)

Bonebasin

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,450 to 5,650 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Amsterdam and similar soils: 50 percent
Brodyk and similar soils: 35 percent
Minor components: 15 percent

Description of Amsterdam

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Typical profile

0 to 8 inches: Silt loam
8 to 15 inches: Silt loam
15 to 42 inches: Silt loam
42 to 60 inches: Very fine sandy loam

Description of Brodyk

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty calcareous loess

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e
Ecological site: Limy (Ly) 15-19" p.z. (R044XS357MT)

Typical profile

0 to 6 inches: Silt loam
6 to 30 inches: Silt loam
30 to 60 inches: Silt loam

Minor Components

Meagher

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Bowery

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Overflow (Ov) 15-19" p.z. (R044XS351MT)

Brodyk

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Thin Silty (TSi) 15-19" p.z. (R044XS363MT)

509B—Enbar loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,400 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Enbar and similar soils: 85 percent
Minor components: 15 percent

Description of Enbar

Setting

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

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability (nonirrigated): 3w
Ecological site: Subirrigated (Sb) 15-19" p.z. (R044XS359MT)

Typical profile

0 to 22 inches: Loam
22 to 49 inches: Sandy loam
49 to 60 inches: Very gravelly loamy sand

Minor Components

Nythar

Percent of map unit: 10 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Straw

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

537A—Lamoose silt loam, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Lamoose and similar soils: 85 percent
Minor components: 15 percent

Description of Lamoose

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.0 mmhos/cm)
Available water capacity: Low (about 5.8 inches)

Interpretive groups

Land capability (nonirrigated): 5w
Ecological site: Wet Meadow (WM) 9-14" p.z. (R044XS349MT)

Typical profile

0 to 9 inches: Silt loam
9 to 27 inches: Silt loam
27 to 60 inches: Very gravelly loamy sand

Minor Components

Bonebasin

Percent of map unit: 10 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Meadowcreek

Percent of map unit: 5 percent
Landform: Stream terraces

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Subirrigated (Sb) 9-14" p.z. (R044XS343MT)

542A—Blossberg loam, 0 to 2 percent slopes

Map Unit Setting
Elevation: 4,200 to 5,550 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition
Blossberg and similar soils: 85 percent
Minor components: 15 percent

Description of Blossberg

Setting
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 5.5 inches)

Interpretive groups
Land capability (nonirrigated): 5w
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Typical profile
0 to 15 inches: Loam
15 to 24 inches: Sandy clay loam
24 to 60 inches: Extremely gravelly loamy coarse sand

Minor Components

Bonebasin
Percent of map unit: 10 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Meadowcreek

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Subirrigated (Sb) 15-19" p.z. (R044XS359MT)

606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,200 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Bandy and similar soils: 50 percent
Riverwash: 25 percent
Bonebasin and similar soils: 10 percent
Minor components: 15 percent

Description of Bandy

Setting

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability (nonirrigated): 4w

Typical profile

0 to 8 inches: Loam
8 to 17 inches: Sandy loam
17 to 60 inches: Very cobbly loamy sand

Description of Riverwash

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Description of Bonebasin

Setting

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

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability (nonirrigated): 5w
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Typical profile

0 to 4 inches: Muck
4 to 15 inches: Loam
15 to 25 inches: Stratified sandy loam to silty clay loam
25 to 60 inches: Very gravelly coarse sand

Minor Components

Water

Percent of map unit: 5 percent

Blossberg

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Meadow (WM) 15-19" p.z. (R044XS365MT)

Nesda

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear

Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

748A—Hyalite-Beaverton complex, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,350 to 6,150 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Hyalite and similar soils: 70 percent
Beaverton and similar soils: 20 percent
Minor components: 10 percent

Description of Hyalite

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 4e
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Typical profile

0 to 5 inches: Loam
5 to 9 inches: Clay loam
9 to 17 inches: Silty clay loam
17 to 26 inches: Very cobbly sandy clay loam
26 to 60 inches: Very cobbly loamy sand

Description of Beaverton

Setting

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities
Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability (nonirrigated): 6s
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Typical profile
0 to 5 inches: Cobbly loam
5 to 21 inches: Very gravelly clay loam
21 to 25 inches: Very cobbly coarse sandy loam
25 to 60 inches: Extremely cobbly loamy coarse sand

Minor Components

Turner
Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XS355MT)

Hyalite
Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Shallow to Gravel (SwGr) 15-19" p.z. (R044XS354MT)

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Report—Component Legend

Component Legend– Gallatin County Area, Montana						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
53B—Amsterdam silt loam, 0 to 4 percent slopes						
	85	Amsterdam	Series	0	2	4
	5	Quagle	Series	0	2	4
	5	Blackdog	Series	0	2	4
	3	Bowery	Series	0	2	4
	2	Meagher	Series	0	2	4
53C—Amsterdam silt loam, 4 to 8 percent slopes						
	85	Amsterdam	Series	4	6	8
	5	Quagle	Series	4	6	8
	5	Blackdog	Series	4	6	8
	3	Bowery	Series	2	5	8
	2	Meagher	Series	4	6	8
64B—Straw loam, 0 to 4 percent slopes						
	90	Straw	Series	0	2	4
	5	Enbar	Series	0	2	4
	3	Sudworth	Series	0	1	2
	2	Straw	Series	0	2	4
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes						
	90	Beaverton	Series	0	1	2
	5	Beaverton	Series	0	2	4
	5	Turner	Series	0	2	4
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes						
	85	Corbly	Series	0	2	4
	10	Corbly	Series	0	2	4
	5	Corbly	Series	0	2	4

Component Legend– Gallatin County Area, Montana						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
267E—Roy cobbly clay loam, 15 to 60 percent slopes						
	90	Roy	Series	15	38	60
	5	Roy	Series	15	38	60
	3	Meagher	Series	15	38	60
	2	Bowery	Series	15	30	45
407A—Sudworth-Nesda loams, 0 to 2 percent slopes						
	60	Sudworth	Series	0	1	2
	25	Nesda	Series	0	1	2
	8	Meadowcreek	Series	0	2	4
	5	Enbar	Series	0	2	4
	2	Bonebasin	Series	0	1	2
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes						
	50	Amsterdam	Series	8	12	15
	35	Brodyk	Series	8	12	15
	5	Meagher	Series	8	12	15
	5	Bowery	Series	4	10	15
	5	Brodyk	Series	15	30	45
509B—Enbar loam, 0 to 4 percent slopes						
	85	Enbar	Series	0	2	4
	10	Nythar	Series	0	2	4
	5	Straw	Series	0	2	4
537A—Lamoose silt loam, 0 to 2 percent slopes						
	85	Lamoose	Series	0	1	2
	10	Bonebasin	Series	0	1	2
	5	Meadowcreek	Series	0	1	2
542A—Blossberg loam, 0 to 2 percent slopes						
	85	Blossberg	Series	0	1	2
	10	Bonebasin	Series	0	1	2
	5	Meadowcreek	Series	0	2	4

Component Legend– Gallatin County Area, Montana						
Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes						
	50	Bandy	Series	0	1	2
	25	Riverwash	Miscellaneous area			
	10	Bonebasin	Series	0	1	2
	5	Water	Miscellaneous area			
	5	Blossberg	Series	0	1	2
	5	Nesda	Series	0	1	2
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes						
	70	Hyalite	Series	0	2	4
	20	Beaverton	Series	0	2	4
	5	Turner	Series	0	2	4
	5	Hyalite	Series	4	6	8

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:
American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
53B—Amsterdam silt loam, 0 to 4 percent slopes												
Amsterdam	0-8	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-95	25-30	5-10
	8-15	*Silt loam, Very fine sandy loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	80-95	25-35	5-15
	15-42	*Silt loam, Very fine sandy loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
	42-60	*Very fine sandy loam, Silt loam	CL-ML, ML	A-4	0	0	100	100	95-100	70-90	20-30	NP-10
Blackdog	0-10	*Silty clay loam	CL	A-6	0	0	100	100	95-100	80-90	30-35	10-15
	10-19	*Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	19-60	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
Quagle	0-6	*Silt loam	CL-ML	A-4	0	0	100	100	85-100	75-85	25-30	5-10
	6-9	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
	9-60	*Silt loam	CL-ML, ML	A-4	0	0	100	95-100	90-95	80-90	20-30	NP-10
Bowery	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	65-85	50-75	25-30	5-10
	22-60	*Clay loam, Loam	CL-ML, CL	A-6, A-4	0	0	80-100	75-100	65-95	50-75	25-35	5-15
Meagher	0-6	*Cobbly loam	CL-ML, SC-SM	A-4	0-5	15-25	75-95	70-90	50-70	45-65	25-30	5-10
	6-19	*Clay loam, Gravelly clay loam, sandy clay loam	CL, SC	A-6	0	0-5	75-85	55-75	45-70	30-60	25-40	10-20
	19-31	*Loam, Gravelly loam	CL-ML, SC-SM	A-4	0	0-5	75-95	55-90	45-70	35-60	25-30	5-10

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	31-60	*Very gravelly loam, Extremely gravelly sandy loam	GP-GM, GC-GM, GM	A-1, A-2	0	5-15	25-65	20-50	15-45	5-35	20-30	NP-10

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
53C—Amsterdam silt loam, 4 to 8 percent slopes												
Amsterdam	0-8	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-95	25-30	5-10
	8-15	*Silt loam, Very fine sandy loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	95-100	80-95	25-35	5-15
	15-42	*Silt loam, Very fine sandy loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
	42-60	*Very fine sandy loam, Silt loam	ML, CL-ML	A-4	0	0	100	100	95-100	70-90	20-30	NP-10
Blackdog	0-10	*Silty clay loam	CL	A-6	0	0	100	100	95-100	80-90	30-35	10-15
	10-19	*Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	19-60	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
Quagle	0-6	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-85	25-30	5-10
	6-9	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
	9-60	*Silt loam	ML, CL-ML	A-4	0	0	100	95-100	90-95	80-90	20-30	NP-10
Bowery	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	65-95	50-75	25-30	5-10
	22-60	*Clay loam, Loam	CL, CL-ML	A-6, A-4	0	0	80-100	75-100	65-95	50-75	25-35	5-15
Meagher	0-6	*Cobbly loam	SC-SM, CL-ML	A-4	0-5	15-25	75-95	70-90	50-70	45-65	25-30	5-10
	6-19	*Clay loam, Gravelly clay loam, sandy clay loam	CL, SC	A-6	0	0-5	75-85	55-75	45-70	30-60	25-40	10-20
	19-31	*Loam, Gravelly loam	SC-SM, CL-ML	A-4	0	0-5	75-95	55-90	45-70	35-60	25-30	5-10

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	31-60	*Very gravelly loam, Extremely gravelly sandy loam	GP-GM, GC-GM, GM	A-1, A-2	0	5-15	25-65	20-50	15-45	5-35	20-30	NP-10
64B—Straw loam, 0 to 4 percent slopes												
Straw	0-18	*Loam	CL-ML	A-4	0	0	100	100	80-100	60-85	25-30	5-10
	18-60	*Loam, Silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-100	60-85	25-35	5-15
Enbar	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	5-10
	22-49	*Sandy loam, Loam	CL-ML, ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	NP-10
	49-60	*Very gravelly loamy sand, Very gravelly sandy loam, extremely gravelly sandy loam	GM, GP-GM	A-1, A-2	0	0-10	25-60	15-50	10-40	5-30	15-25	NP-5
Sudworth	0-24	*Loam	CL-ML	A-4	0	0-10	90-100	85-100	65-95	60-85	25-30	5-10
	24-29	*Loam, Silt loam, clay loam	CL-ML	A-4	0	0	90-100	90-100	65-95	60-85	25-35	5-10
	29-60	*Extremely gravelly sand, Very gravelly loamy sand, extremely cobbly loamy sand	GP-GM, SP-SM	A-1	0	5-35	30-60	30-50	15-35	5-10	0-14	NP
Straw	0-18	*Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-35	10-15
	18-60	*Loam, Silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-100	60-85	25-35	5-15

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes												
Beaverton	0-5	*Cobbly loam	CL-ML, SC-SM	A-4	0	15-30	75-95	70-90	60-80	45-65	25-30	5-10
	5-21	*Very gravelly clay loam, Very cobbly clay loam, very cobbly sandy clay loam	GC, GC-GM, SC, SC-SM	A-2, A-4, A-6	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
	21-25	*Very cobbly coarse sandy loam	SP-SM, GM, GP-GM, SM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP
	25-60	*Extremely cobbly loamy coarse sand, Extremely gravelly sand, very cobbly loamy sand	GM, GP-GM, SM, SP-SM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP
Beaverton	0-5	*Very cobbly loam	GC-GM	A-4, A-2-4	0	20-30	50-70	40-60	35-55	25-45	25-30	5-10
	5-21	*Very gravelly clay loam, Very cobbly clay loam, very cobbly sandy clay loam	GC, GC-GM, SC, SC-SM	A-6, A-2, A-4	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
	21-25	*Very cobbly coarse sandy loam	SP-SM, GM, GP-GM, SM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP
	25-60	*Extremely cobbly loamy coarse sand, Extremely gravelly sand, very cobbly loamy sand	GM, GP-GM, SM, SP-SM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP
Turner	0-6	*Loam	CL-ML	A-4	0	0-10	80-100	75-100	65-95	50-75	25-30	5-10

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	6-12	*Clay loam, Silty clay loam, gravelly loam	CL, GC, SC	A-6	0	0-10	65-100	60-100	55-90	35-70	30-40	10-20
	12-26	*Clay loam, Loam, gravelly loam	GC, SC, CL	A-6	0	0-10	65-100	60-100	55-95	40-75	30-40	10-15
	26-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	GP-GM, GM, GP	A-1	0	10-30	25-60	15-50	10-35	0-15	0-14	NP

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes												
Corbly	0-5	*Very gravelly sandy loam	GC-GM	A-2-4	0	5-15	40-60	35-50	20-35	10-20	29-39	9-13
	5-12	*Very gravelly sandy loam, Gravelly loam, very cobbly coarse sandy loam	GP-GC, GC	A-1, A-2-4, A-4	0	10-30	40-70	35-65	25-55	10-40	22-35	6-13
	12-60	*Extremely gravelly loamy sand, Very gravelly sand, extremely cobbly loamy coarse sand	GP-GM, SP, SP-SM, GP	A-1	0	20-40	30-60	20-55	10-40	0-10	0-24	NP-6
Corbly	0-5	*Very cobbly loam	GC, GM	A-2-6, A-7-6	0	20-30	50-70	40-60	35-55	25-45	33-45	13-18
	5-12	*Very gravelly sandy loam, Gravelly loam, very cobbly coarse sandy loam	GP-GC, GC	A-1, A-2-4, A-4	0	10-30	40-70	35-65	25-55	10-40	22-35	6-13
	12-60	*Extremely gravelly loamy sand, Very gravelly sand, extremely cobbly loamy coarse sand	SP, SP-SM, GP, GP-GM	A-1	0	20-40	30-60	20-55	10-40	0-10	0-24	NP-6
Corbly	0-5	*Very cobbly loam	GC, GM	A-2-6, A-7-6	0	20-30	50-70	40-60	35-55	25-45	33-45	13-18
	5-12	*Very gravelly sandy loam, Gravelly loam, very cobbly coarse sandy loam	GP-GC, GC	A-2-4, A-4, A-1	0	10-30	40-70	35-65	25-55	10-40	22-35	6-13
	12-60	*Extremely gravelly loamy sand, Very gravelly sand, extremely cobbly loamy coarse sand	SP, SP-SM, GP, GP-GM	A-1	0	20-40	30-60	20-55	10-40	0-10	0-24	NP-6

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
267E—Roy cobbly clay loam, 15 to 60 percent slopes												
Roy	0-6	*Cobbly clay loam	CL	A-6	0	15-40	75-95	70-90	65-85	50-70	25-35	10-15
	6-24	*Very cobbly clay, Extremely cobbly clay loam	CL, GC	A-2, A-6, A-7	0	30-60	25-75	20-70	20-65	15-55	35-50	15-30
	24-60	*Extremely cobbly clay loam, Very cobbly clay loam	GC, CL	A-2, A-6	0	30-60	25-75	20-70	20-65	15-55	30-40	10-20
Roy	0-6	*Cobbly clay loam	CL	A-6	0	15-40	75-95	70-90	65-85	50-70	25-35	10-15
	6-24	*Very cobbly clay, Extremely cobbly clay loam	CL, GC	A-6, A-7, A-2	0	30-60	25-75	20-70	20-65	15-55	35-50	15-30
	24-60	*Extremely cobbly clay loam, Very cobbly clay loam	CL, GC	A-2, A-6	0	30-60	25-75	20-70	20-65	15-55	30-40	10-20
Meagher	0-6	*Cobbly loam	SC-SM, CL-ML	A-4	0-5	15-25	75-95	70-90	50-70	45-65	25-30	5-10
	6-19	*Clay loam, Gravelly clay loam, sandy clay loam	SC, CL	A-6	0	0-5	75-85	55-75	45-70	30-60	25-40	10-20
	19-31	*Loam, Gravelly loam	CL-ML, SC-SM	A-4	0	0-5	75-95	55-90	45-70	35-60	25-30	5-10
	31-60	*Very gravelly loam, Extremely gravelly sandy loam	GP-GM, GC-GM, GM	A-1, A-2	0	5-15	25-65	20-50	15-45	5-35	20-30	NP-10
Bowery	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	65-95	50-75	25-30	5-10
	22-60	*Clay loam, Loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-95	50-75	25-35	5-15

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
407A—Sudworth-Nesda loams, 0 to 2 percent slopes												
Sudworth	0-24	*Loam	CL-ML	A-4	0	0-10	90-100	85-100	65-95	60-85	25-30	5-10
	24-29	*Loam, Silt loam, clay loam	CL-ML	A-4	0	0	90-100	90-100	65-95	60-85	25-35	5-10
	29-60	*Extremely gravelly sand, Very gravelly loamy sand, extremely cobbly loamy sand	GP-GM, SP-SM	A-1	0	5-35	30-60	30-50	15-35	5-10	0-14	NP
Nesda	0-11	*Loam	SM, ML	A-4	0	0-5	80-100	65-100	65-95	35-75	15-25	NP-5
	11-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	SP-SM, GM, GP, GP-GM	A-1	0	0-25	25-60	15-50	5-40	0-20	—	NP
Meadowcreek	0-11	*Loam	CL-ML	A-4	0	0	95-100	90-100	70-95	50-75	20-30	5-10
	11-25	*Silt loam, Loam, sandy loam	SC-SM, CL-ML	A-4	0	0	95-100	80-100	70-90	40-75	20-30	5-10
	25-60	*Very gravelly sand, Extremely gravelly sand, very gravelly loamy sand	GP, GP-GM	A-1	0	0-10	25-45	15-35	10-25	0-10	0-19	NP
Enbar	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	5-10
	22-49	*Sandy loam, Loam	CL-ML, ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	NP-10
	49-60	*Very gravelly loamy sand, Very gravelly sandy loam, extremely gravelly sandy loam	GM, GP-GM	A-1, A-2	0	0-10	25-60	15-50	10-40	5-30	15-25	NP-5
Bonebasin	0-4	*Muck	PT	A-8	0	0	100	100	75-95	55-75	—	—
	4-15	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	15-25	*Stratified sandy loam to silty clay loam	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	0	85-100	90-100	60-90	30-70	25-35	5-15
	25-60	*Very gravelly coarse sand, Very cobbly loamy coarse sand, extremely cobbly loamy sand	SP-SM, GM, GP-GM, GM, SM	A-1	0	10-45	25-60	20-55	10-40	5-15	20-25	NP-5

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				Pct	Pct					Pct	
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes												
Amsterdam	0-8	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-95	25-30	5-10
	8-15	*Silt loam, Very fine sandy loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	80-95	25-35	5-15
	15-42	*Silt loam, Very fine sandy loam	CL-ML	A-4	0	0	100	100	95-100	80-90	25-30	5-10
	42-60	*Very fine sandy loam, Silt loam	ML, CL-ML	A-4	0	0	100	100	95-100	70-90	20-30	NP-10
Brodyk	0-6	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-85	25-30	5-10
	6-30	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	20-25	5-10
	30-60	*Silt loam, Very fine sandy loam	CL-ML	A-4	0	0	100	95-100	90-95	80-90	20-25	5-10
Bowery	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	65-95	50-75	25-30	5-10
	22-60	*Clay loam, Loam	CL-ML, CL	A-4, A-6	0	0	80-100	75-100	65-95	50-75	25-35	5-15
Brodyk	0-6	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-85	25-30	5-10
	6-30	*Silt loam	CL-ML	A-4	0	0	100	100	95-100	80-90	20-25	5-10
	30-60	*Silt loam, Very fine sandy loam	CL-ML	A-4	0	0	100	95-100	80-95	80-90	20-25	5-10
Meagher	0-6	*Cobbly loam	SC-SM, CL-ML	A-4	0-5	15-25	75-95	70-90	50-70	45-65	25-30	5-10
	6-19	*Clay loam, Gravelly clay loam, sandy clay loam	SC, CL	A-6	0	0-5	75-85	55-75	45-70	30-60	25-40	10-20
	19-31	*Loam, Gravelly loam	SC-SM, CL-ML	A-4	0	0-5	75-95	55-90	45-70	35-60	25-30	5-10

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
	31-60	*Very gravelly loam, Extremely gravelly sandy loam	GP-GM, GC-GM, GM	A-1, A-2	0	5-15	25-65	20-50	15-45	5-35	20-30	NP-10
509B—Enbar loam, 0 to 4 percent slopes												
Enbar	0-22	*Loam	CL-ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	5-10
	22-49	*Sandy loam, Loam	CL-ML, ML	A-4	0	0	80-100	75-100	60-85	50-75	20-30	NP-10
	49-60	*Very gravelly loamy sand, Very gravelly sandy loam, extremely gravelly sandy loam	GM, GP-GM	A-1, A-2	0	0-10	25-60	15-50	10-40	5-30	15-25	NP-5
Nythar	0-8	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-70	25-30	5-10
	8-33	*Silt loam, Silty clay loam, gravelly loam	SC, CL, CL-ML, GC-GM	A-4, A-6	0	0-10	60-100	55-100	50-100	35-90	25-35	5-15
	33-60	*Sandy loam, Cobbly silty clay loam, loam	CL-ML, GC, SC-SM, CL	A-6, A-4	0	0-20	70-100	65-100	60-100	40-90	25-35	5-15
Straw	0-18	*Loam	CL-ML	A-4	0	0	100	100	80-100	60-85	25-30	5-10
	18-60	*Loam, Silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-100	60-85	25-35	5-15

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
537A—Lamoose silt loam, 0 to 2 percent slopes												
Lamoose	0-9	*Silt loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	70-95	55-90	25-35	5-15
	9-27	*Silt loam, Loam, gravelly loam	GC-GM, CL, CL-ML, GC	A-4, A-6, A-2	0	0	55-100	50-100	45-95	30-85	25-35	5-15
	27-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	GP, GP-GM, GM	A-1	0	0-20	25-55	20-50	10-40	0-15	0-14	NP
Bonebasin	0-4	*Muck	PT	A-8	0	0	100	100	75-95	55-75	—	—
	4-15	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	15-25	*Stratified sandy loam to silty clay loam	SC-SM, CL, CL-ML, SC	A-6, A-2, A-4	0	0	95-100	90-100	60-90	30-70	25-35	5-15
	25-60	*Very gravelly coarse sand, Very cobbly loamy coarse sand, extremely cobbly loamy sand	GP-GM, SM, SP-SM, GM	A-1	0	10-45	25-60	20-55	10-40	5-15	20-25	NP-5
Meadowcreek	0-11	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	11-25	*Silt loam, Loam, sandy clay loam	CL-ML	A-4	0	0	95-100	90-100	70-90	50-75	25-30	5-10
	25-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	GP, GP-GM	A-1	0	0-15	20-40	15-35	10-20	0-10	—	NP

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
542A—Blossberg loam, 0 to 2 percent slopes												
Blossberg	0-15	*Loam	CL-ML	A-4	0	0-10	90-100	85-100	70-95	50-75	25-30	5-10
	15-24	*Sandy clay loam, Gravelly loam, clay loam	SC-SM, CL, CL-ML, SC	A-4, A-6, A-2	0	0-15	70-100	65-100	50-95	30-60	25-35	5-15
	24-60	*Extremely gravelly loamy coarse sand, Very cobbly sand, very gravelly loamy coarse sand	SM, SP-SM, GM, GP-GM	A-1	0	30-45	25-75	20-70	10-50	5-20	20-25	NP-5
Bonebasin	0-4	*Muck	PT	A-8	0	0	100	100	75-95	55-75	—	—
	4-15	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	15-25	*Stratified sandy loam to silty clay loam	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	0	85-100	90-100	60-90	30-70	25-35	5-15
	25-60	*Very gravelly coarse sand, Very cobbly loamy coarse sand, extremely cobbly loamy sand	SM, SP-SM, GM, GP-GM	A-1	0	10-45	25-60	20-55	10-40	5-15	20-25	NP-5
Meadowcreek	0-11	*Loam	CL-ML	A-4	0	0	95-100	90-100	70-95	50-75	20-30	5-10
	11-25	*Silt loam, Loam, sandy loam	CL-ML, SC-SM	A-4	0	0	95-100	90-100	70-90	40-75	20-30	5-10
	25-60	*Very gravelly sand, Extremely gravelly sand, very gravelly loamy sand	GP, GP-GM	A-1	0	0-10	25-45	15-35	10-25	0-10	0-19	NP

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				Pct	Pct					Pct	
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes												
Bandy	0-8	*Loam	CL-ML	A-4	0	0-10	95-100	95-100	80-95	55-75	25-30	5-10
	8-17	*Sandy loam, Cobbly sandy loam, gravelly loam	CL-ML, SC-SM	A-2-4, A-4	0	0-25	70-95	65-90	45-75	25-60	20-25	5-10
	17-60	*Very cobbly loamy sand, Very gravelly sand, extremely gravelly loamy coarse sand	GP-GM, SP-SM, GM	A-1	0	10-30	35-65	25-55	15-40	5-15	20-25	NP-5
Riverwash	—	—	—	—	—	—	—	—	—	—	—	—
Bonebasin	0-4	*Muck	PT	A-8	0	0	100	100	75-95	55-75	—	—
	4-15	*Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	15-25	*Stratified sandy loam to silty clay loam	SC, SC-SM, CL, CL-ML	A-6, A-2, A-4	0	0	95-100	90-100	60-90	30-70	25-35	5-15

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	25-60	*Very gravelly coarse sand, Very cobbly loamy coarse sand, extremely cobbly loamy sand	GM, GP-GM, SM, SP-SM	A-1	0	10-45	25-60	20-55	10-40	5-15	20-25	NP-5
Blossberg	0-15	*Loam	CL-ML	A-4	0	0-10	90-100	85-100	70-95	50-75	25-30	5-10
	15-24	*Sandy clay loam, Gravelly loam, clay loam	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	0-15	70-100	65-100	50-95	30-60	25-35	5-15
	24-60	*Extremely gravelly loamy coarse sand, Very cobbly sand, very gravelly loamy coarse sand	GM, GP-GM, SM, SP-SM	A-1	0	30-45	25-75	20-70	10-50	5-20	20-25	NP-5
Nesda	0-11	*Cobbly loam	ML, CL-ML, SC-SM, SM	A-4	0	15-30	75-95	70-90	60-85	40-60	20-30	NP-10
	11-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	GP-GM, SP-SM, GM, GP	A-1	0	0-25	25-60	15-50	5-40	0-20	—	NP
Water	—	—	—	—	—	—	—	—	—	—	—	—

Engineering Properties– Gallatin County Area, Montana

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes												
Hyalite	0-5	*Loam	CL-ML	A-4	0	0-10	85-100	90-100	75-95	55-75	25-30	5-10
	5-9	*Clay loam, Loam, silty clay loam	CL	A-6	0	0-10	90-100	85-100	75-90	60-80	30-35	10-15
	9-17	*Silty clay loam, Clay loam, gravelly loam	CL, GC, SC	A-6	0	0-15	65-95	60-90	55-80	40-75	30-35	10-15
	17-26	*Very cobbly sandy clay loam, Very cobbly sandy loam, extremely cobbly sandy loam	GM, SM	A-2, A-1	0	30-55	35-65	30-60	20-50	10-25	20-35	NP-10
	26-60	*Very cobbly loamy sand, Very cobbly sand, extremely cobbly coarse sand	GP-GM, SM, SP-SM, GM	A-1	0	30-55	35-65	30-60	15-40	5-15	—	NP
Beaverton	0-5	*Cobbly loam	CL-ML, SC-SM	A-4	0	15-30	75-95	70-90	60-80	45-65	25-30	5-10
	5-21	*Very gravelly clay loam, Very cobbly clay loam, very cobbly sandy clay loam	GC, GC-GM, SC, SC-SM	A-4, A-6, A-2	0	20-40	45-70	40-60	35-55	20-40	25-35	5-15
	21-25	*Very cobbly coarse sandy loam	GP-GM, SM, SP-SM, GM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP
	25-60	*Extremely cobbly loamy coarse sand, Extremely gravelly sand, very cobbly loamy sand	SP-SM, GM, GP-GM, SM	A-1	0	25-50	30-75	20-65	10-50	5-15	—	NP

Engineering Properties– Gallatin County Area, Montana												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Hyalite	0-5	*Loam	CL-ML	A-4	0	0-10	95-100	90-100	75-95	55-75	25-30	5-10
	5-9	*Clay loam, Loam, silty clay loam	CL	A-6	0	0-10	90-100	85-100	75-90	60-80	30-35	10-15
	9-17	*Silty clay loam, Clay loam, gravelly loam	CL, GC, SC	A-6	0	0-15	65-95	60-90	55-80	40-75	30-35	10-15
	17-26	*Very cobbly sandy clay loam, Very cobbly sandy loam, extremely cobbly sandy loam	GM, SM	A-2, A-1	0	30-55	35-65	30-60	20-50	10-25	20-35	NP-10
	26-60	*Very cobbly loamy sand, Very cobbly sand, extremely cobbly coarse sand	GM, GP-GM, SM, SP-SM	A-1	0	30-55	35-65	30-60	15-40	5-15	—	NP
Turner	0-6	*Loam	CL-ML	A-4	0	0-10	80-100	75-100	65-95	50-75	25-30	5-10
	6-12	*Clay loam, Silty clay loam, gravelly loam	SC, CL, GC	A-6	0	0-10	65-100	60-100	55-90	35-70	30-40	10-20
	12-26	*Clay loam, Loam, gravelly loam	GC, SC, CL	A-6	0	0-10	65-100	60-100	55-95	40-75	30-40	10-15
	26-60	*Very gravelly loamy sand, Very gravelly sand, extremely gravelly sand	GM, GP, GP-GM	A-1	0	10-30	25-60	15-50	10-35	0-15	0-14	NP

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Sewage Disposal

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

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

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Sewage Disposal

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
53B—Amsterdam silt loam, 0 to 4 percent slopes					
Amsterdam	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Blackdog	5	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Quagle	5	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Bowery	3	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Meagher	2	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
53C—Amsterdam silt loam, 4 to 8 percent slopes					
Amsterdam	85	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.92
				Seepage	0.50
Blackdog	5	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.92
				Seepage	0.50
Quagle	5	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.92
				Seepage	0.50
Bowery	3	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Slope	0.68
				Seepage	0.50
Meagher	2	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Slope	0.92
64B—Straw loam, 0 to 4 percent slopes					
Straw	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Enbar	5	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
Sudworth	3	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
Straw	2	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes					
Beaverton	90	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.59
		Large stones	0.20		
Beaverton	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.65
		Large stones	0.21		
Turner	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes					
Corbly	85	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.02
		Large stones	0.01		
Corbly	10	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.25
		Large stones	0.02		
Corbly	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.25
		Large stones	0.02		

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	**Pct. of map unit**	**Septic tank absorption fields**		**Sewage lagoons**	
		Rating class and limiting features	**Value**	**Rating class and limiting features**	**Value**
267E—Roy cobbly clay loam, 15 to 60 percent slopes					
Roy	90	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Large stones	1.00
		Large stones	0.82		
Roy	5	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Large stones	1.00
		Large stones	0.82		
Meagher	3	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		
Bowery	2	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
407A—Sudworth-Nesda loams, 0 to 2 percent slopes					
Sudworth	60	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
Nesda	25	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Flooding	0.40
		Flooding	0.40		
Meadowcreek	8	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50		
Enbar	5	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
Bonebasin	2	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Organic matter content	1.00
		Flooding	0.40	Flooding	0.40

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes					
Amsterdam	50	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Brodyk	35	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Bowery	5	Somewhat limited		Very limited	
		Slow water movement	0.50	Slope	1.00
		Slope	0.16	Seepage	0.50
Brodyk	5	Very limited		Very limited	
		Too steep	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50
Meagher	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Slow water movement	0.50		
509B—Enbar loam, 0 to 4 percent slopes					
Enbar	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
Nythar	10	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40
Straw	5	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
537A—Lamoose silt loam, 0 to 2 percent slopes					
Lamoose	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50		
Bonebasin	10	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Organic matter content	1.00
		Flooding	0.40	Flooding	0.40
Meadowcreek	5	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Flooding	0.40
		Flooding	0.40		
542A—Blossberg loam, 0 to 2 percent slopes					
Blossberg	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.72		
Bonebasin	10	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Organic matter content	1.00
		Flooding	0.40	Flooding	0.40
Meadowcreek	5	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50		

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	**Pct. of map unit**	**Septic tank absorption fields**		**Sewage lagoons**	
		Rating class and limiting features	**Value**	**Rating class and limiting features**	**Value**
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes					
Bandy	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Filtering capacity	1.00		
Riverwash	25	Not rated		Not rated	
Bonebasin	10	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.50	Organic matter content	1.00
Blossberg	5	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.72		
Nesda	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Flooding	0.40
		Flooding	0.40		
Water	5	Not rated		Not rated	

Sewage Disposal– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes					
Hyalite	70	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	1.00		
		Large stones	0.02		
Beaverton	20	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Filtering capacity	1.00	Large stones	0.59
		Large stones	0.20		
Hyalite	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	1.00	Slope	0.92
		Large stones	0.02		
Turner	5	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.50		

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Water Features

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. The water features table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Report—Water Features

Water Features– Gallatin County Area, Montana										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
53B—Amsterdam silt loam, 0 to 4 percent slopes										
Amsterdam	B	—	Jan-Dec	—	—	—	—	None	—	—
53C—Amsterdam silt loam, 4 to 8 percent slopes										
Amsterdam	B	—	Jan-Dec	—	—	—	—	None	—	—
64B—Straw loam, 0 to 4 percent slopes										
Straw	B	—	Jan-Dec	—	—	—	—	None	—	—
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes										
Beaverton	B	—	Jan-Dec	—	—	—	—	None	—	—
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes										
Corbly	A	—	Jan-Dec	—	—	—	—	None	—	—
267E—Roy cobbly clay loam, 15 to 60 percent slopes										
Roy	B	—	Jan-Dec	—	—	—	—	None	—	—

Water Features– Gallatin County Area, Montana										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
407A—Sudworth-Nesda loams, 0 to 2 percent slopes										
Sudworth	B	—	January	—	—	—	—	None	Brief	Rare
	B	—	February	—	—	—	—	None	Brief	Rare
	B	—	March	—	—	—	—	None	Brief	Rare
	B	—	April	4.0-8.0	>6.0	—	—	None	Brief	Rare
	B	—	May	4.0-8.0	>6.0	—	—	None	Brief	Rare
	B	—	June	4.0-8.0	>6.0	—	—	None	Brief	Rare
Nesda	B	—	January	—	—	—	—	None	Brief	Rare
	B	—	February	—	—	—	—	None	Brief	Rare
	B	—	March	—	—	—	—	None	Brief	Rare
	B	—	April	4.0-8.0	>6.0	—	—	None	Brief	Rare
	B	—	May	4.0-8.0	>6.0	—	—	None	Brief	Rare
	B	—	June	4.0-8.0	>6.0	—	—	None	Brief	Rare
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes										
Amsterdam	B	—	Jan-Dec	—	—	—	—	None	—	—
Brodyk	B	—	Jan-Dec	—	—	—	—	None	—	—

Water Features– Gallatin County Area, Montana										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
509B—Enbar loam, 0 to 4 percent slopes										
Enbar	B	—	January	—	—	—	—	None	Brief	Rare
	B	—	February	—	—	—	—	None	Brief	Rare
	B	—	March	—	—	—	—	None	Brief	Rare
	B	—	April	2.0-3.5	>6.0	—	—	None	Brief	Rare
	B	—	May	2.0-3.5	>6.0	—	—	None	Brief	Rare
	B	—	June	2.0-3.5	>6.0	—	—	None	Brief	Rare
	B	—	July	2.0-3.5	>6.0	—	—	None	Brief	Rare
537A—Lamoose silt loam, 0 to 2 percent slopes										
Lamoose	D	—	April	1.0-2.0	>6.0	—	—	None	—	None
	D	—	May	1.0-2.0	>6.0	—	—	None	—	None
	D	—	June	1.0-2.0	>6.0	—	—	None	—	None
	D	—	July	1.0-2.0	>6.0	—	—	None	—	None
542A—Blossberg loam, 0 to 2 percent slopes										
Blossberg	C	—	April	1.0-2.0	>6.0	—	—	None	—	None
	C	—	May	1.0-2.0	>6.0	—	—	None	—	None
	C	—	June	1.0-2.0	>6.0	—	—	None	—	None
	C	—	July	1.0-2.0	>6.0	—	—	None	—	None

Water Features– Gallatin County Area, Montana										
Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes										
Bandy	C	—	January	—	—	—	—	None	Brief	Occasional
	C	—	February	—	—	—	—	None	Brief	Occasional
	C	—	March	—	—	—	—	None	Brief	Occasional
	C	—	April	—	—	—	—	None	Brief	Occasional
	C	—	May	1.0-2.0	>6.0	—	—	None	Brief	Occasional
	C	—	June	1.0-2.0	>6.0	—	—	None	Brief	Occasional
Riverwash	—	—	Jan-Dec	—	—	—	—	None	—	—
Bonebasin	D	—	January	0.0-1.0	>6.0	—	—	None	—	—
	D	—	February	0.0-1.0	>6.0	—	—	None	—	—
	D	—	March	0.0-1.0	>6.0	—	—	None	—	—
	D	—	April	0.0-1.0	>6.0	—	—	None	Brief	Occasional
	D	—	May	0.0-1.0	>6.0	—	—	None	Brief	Occasional
	D	—	June	0.0-1.0	>6.0	—	—	None	Brief	Occasional
	D	—	July	0.0-1.0	>6.0	—	—	None	—	—
	D	—	August	0.0-1.0	>6.0	—	—	None	—	—
	D	—	September	0.0-1.0	>6.0	—	—	None	—	—
	D	—	October	0.0-1.0	>6.0	—	—	None	—	—
	D	—	November	0.0-1.0	>6.0	—	—	None	—	—
	D	—	December	0.0-1.0	>6.0	—	—	None	—	—

Water Features– Gallatin County Area, Montana

Map unit symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
746A—Hyalite-Beaverton complex, 0 to 4 percent slopes										
Hyalite	B	—	Jan-Dec	—	—	—	—	None	—	—
Beaverton	B	—	Jan-Dec	—	—	—	—	None	—	—

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

This table shows the degree and kind of soil limitations affecting the treatment of wastewater, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat wastewater but also are beneficial to crops. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Ksat and reaction affect performance. Permanently frozen soils are unsuitable for waste treatment.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, Ksat, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Report—Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes					
Beaverton	90	Very limited		Somewhat limited	
		Slow water movement	1.00	Filtering capacity	0.99
		Cobble content	0.99	Cobble content	0.32
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes					
Corbly	85	Somewhat limited		Somewhat limited	
		Cobble content	0.69	Filtering capacity	0.99
		Slow water movement	0.32		
267E—Roy cobbly clay loam, 15 to 60 percent slopes					
Roy	90	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Slow water movement	1.00	Too steep for sprinkler irrigation	1.00
		Cobble content	1.00	Cobble content	0.75
				Slow water movement	0.26
407A—Sudworth-Nesda loams, 0 to 2 percent slopes					
Sudworth	60	Very limited		Somewhat limited	
		Slow water movement	1.00	Filtering capacity	0.99
Nesda	25	Very limited		Somewhat limited	
		Slow water movement	1.00	Filtering capacity	0.99
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes					
Amsterdam	50	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Slow water movement	1.00	Too steep for sprinkler irrigation	1.00
				Slow water movement	0.26
Brodyk	35	Very limited		Very limited	
		Slope	1.00	Too steep for surface application	1.00
		Slow water movement	1.00	Too steep for sprinkler irrigation	1.00

Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment– Gallatin County Area, Montana					
Map symbol and soil name	**Pct. of map unit**	**Rapid infiltration of wastewater**		**Slow rate treatment of wastewater**	
		Rating class and limiting features	**Value**	**Rating class and limiting features**	**Value**
509B—Enbar loam, 0 to 4 percent slopes					
Enbar	85	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	0.68
		Slow water movement	1.00		
537A—Lamoose silt loam, 0 to 2 percent slopes					
Lamoose	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Filtering capacity	0.99
53B—Amsterdam silt loam, 0 to 4 percent slopes					
Amsterdam	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.26
53C—Amsterdam silt loam, 4 to 8 percent slopes					
Amsterdam	85	Very limited		Somewhat limited	
		Slow water movement	1.00	Too steep for surface application	0.68
		Slope	0.50	Slow water movement	0.26
542A—Blossberg loam, 0 to 2 percent slopes					
Blossberg	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Filtering capacity	0.99
		Cobble content	0.52		
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes					
Bandy	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Filtering capacity	0.99
		Flooding	0.60	Flooding	0.60
		Cobble content	0.02		
Riverwash	25	Not rated		Not rated	
Bonebasin	10	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Filtering capacity	0.99
		Flooding	0.60	Too acid	0.77
		Cobble content	0.01	Flooding	0.60

Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
64B—Straw loam, 0 to 4 percent slopes					
Straw	90	Very limited		Not limited	
		Slow water movement	1.00		
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes					
Hyalite	70	Very limited		Somewhat limited	
		Slow water movement	1.00	Filtering capacity	0.99
		Cobble content	0.97	Slow water movement	0.26
Beaverton	20	Very limited		Somewhat limited	
		Slow water movement	1.00	Filtering capacity	0.99
		Cobble content	0.99	Cobble content	0.32

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Agricultural Disposal of Wastewater by Irrigation and Overland Flow

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

This table shows the degree and kind of soil limitations affecting the treatment of wastewater, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the table are for waste management systems that not only dispose of and treat wastewater but also are beneficial to crops. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

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

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, Ksat, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Permanently frozen soils are unsuitable for waste treatment.

Report—Agricultural Disposal of Wastewater by Irrigation and Overland Flow

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Agricultural Disposal of Wastewater by Irrigation and Overland Flow– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes					
Beaverton	90	Somewhat limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.86	Cobble content	0.98
		Cobble content	0.32		

Agricultural Disposal of Wastewater by Irrigation and Overland Flow– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes					
Corbly	85	Very limited		Very limited	
		Droughty	1.00	Seepage	1.00
		Filtering capacity	0.99	Cobble content	0.57
267E—Roy cobbly clay loam, 15 to 60 percent slopes					
Roy	90	Very limited		Very limited	
		Too steep for surface application	1.00	Too steep for surface application	1.00
		Too steep for sprinkler application	1.00	Seepage	1.00
		Cobble content	0.75	Cobble content	1.00
		Slow water movement	0.37		
		Droughty	0.35		
407A—Sudworth-Nesda loams, 0 to 2 percent slopes					
Sudworth	60	Somewhat limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
				Flooding	0.40
Nesda	25	Somewhat limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.87	Flooding	0.40
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes					
Amsterdam	50	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.78	Too steep for surface application	1.00
		Slow water movement	0.37		
Brodyk	35	Very limited		Very limited	
		Too steep for surface application	1.00	Seepage	1.00
		Too steep for sprinkler application	0.78	Too steep for surface application	1.00

Agricultural Disposal of Wastewater by Irrigation and Overland Flow– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
509B—Enbar loam, 0 to 4 percent slopes					
Enbar	85	Somewhat limited		Very limited	
		Depth to saturated zone	0.68	Seepage	1.00
				Depth to saturated zone	0.68
				Flooding	0.40
537A—Lamoose silt loam, 0 to 2 percent slopes					
Lamoose	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.01		
53B—Amsterdam silt loam, 0 to 4 percent slopes					
Amsterdam	85	Somewhat limited		Very limited	
		Slow water movement	0.37	Seepage	1.00
53C—Amsterdam silt loam, 4 to 8 percent slopes					
Amsterdam	85	Somewhat limited		Very limited	
		Too steep for surface application	0.68	Seepage	1.00
		Slow water movement	0.37		
542A—Blossberg loam, 0 to 2 percent slopes					
Blossberg	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.05	Cobble content	0.06

Agricultural Disposal of Wastewater by Irrigation and Overland Flow– Gallatin County Area, Montana					
Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes					
Bandy	50	Very limited		Very limited	
		Depth to saturated zone	1.00	Flooding	1.00
		Filtering capacity	0.99	Depth to saturated zone	1.00
		Droughty	0.99	Seepage	1.00
		Flooding	0.60	Cobble content	0.01
Riverwash	25	Not rated		Not rated	
Bonebasin	10	Very limited		Very limited	
		Depth to saturated zone	1.00	Flooding	1.00
		Filtering capacity	0.99	Depth to saturated zone	1.00
		Too acid	0.77	Seepage	1.00
		Flooding	0.60	Too acid	0.77
64B—Straw loam, 0 to 4 percent slopes					
Straw	90	Not limited		Very limited	
				Seepage	1.00
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes					
Hyalite	70	Somewhat limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.51	Cobble content	0.70
		Slow water movement	0.37		
Beaverton	20	Somewhat limited		Very limited	
		Filtering capacity	0.99	Seepage	1.00
		Droughty	0.86	Cobble content	0.98
		Cobble content	0.32		

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Selected Soil Interpretations

This report allows the customer to produce a report showing the results of the soil interpretation(s) of his or her choice. It is useful when a standard report that displays the results of the selected interpretation(s) is not available.

When customers select this report, they are presented with a list of interpretations with results for the selected map units. The customer may select up to three interpretations to be presented in table format.

For a description of the particular interpretations and their criteria, use the "Selected Survey Area Interpretation Descriptions" report.

Report—Selected Soil Interpretations

Selected Soil Interpretations– Gallatin County Area, Montana

Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
53B—Amsterdam silt loam, 0 to 4 percent slopes							
Amsterdam	85	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Blackdog	5	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Quagle	5	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Bowery	3	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Meagher	2	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50		

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
53C—Amsterdam silt loam, 4 to 8 percent slopes							
Amsterdam	85	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Slope	0.92
		Slope	0.50			Seepage	0.50
Blackdog	5	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Slope	0.92
		Slope	0.50			Seepage	0.50
Quagle	5	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Slope	0.92
		Slope	0.50			Seepage	0.50
Bowery	3	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Slope	0.68
		Slope	0.13			Seepage	0.50
Meagher	2	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Slope	0.50	Slow water movement	0.50	Slope	0.92
64B—Straw loam, 0 to 4 percent slopes							
Straw	90	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Enbar	5	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		
Sudworth	3	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		
Straw	2	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
249A—Beaverton cobbly clay loam, 0 to 2 percent slopes							
Beaverton	90	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.99	Filtering capacity	1.00	Large stones	0.59
				Large stones	0.20		
Beaverton	5	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.99	Filtering capacity	1.00	Large stones	0.65
				Large stones	0.21		
Turner	5	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50		
259B—Corbly very gravelly sandy loam, 0 to 4 percent slopes							
Corbly	85	Somewhat limited		Very limited		Very limited	
		Cobble content	0.69	Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.32	Filtering capacity	1.00	Large stones	0.02
				Large stones	0.01		
Corbly	10	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.79	Filtering capacity	1.00	Large stones	0.25
				Large stones	0.02		
Corbly	5	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.79	Filtering capacity	1.00	Large stones	0.25
				Large stones	0.02		

Selected Soil Interpretations– Gallatin County Area, Montana								
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
267E—Roy cobbly clay loam, 15 to 60 percent slopes							
Roy	90	Very limited		Very limited		Very limited	
		Slope	1.00	Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	1.00	Large stones	1.00
		Cobble content	1.00	Large stones	0.82		
Roy	5	Very limited		Very limited		Very limited	
		Slope	1.00	Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	1.00	Large stones	1.00
		Cobble content	1.00	Large stones	0.82		
Meagher	3	Very limited		Very limited		Very limited	
		Slope	1.00	Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50		
Bowery	2	Very limited		Very limited		Very limited	
		Slope	1.00	Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
407A—Sudworth-Nesda loams, 0 to 2 percent slopes							
Sudworth	60	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		
Nesda	25	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Filtering capacity	1.00	Flooding	0.40
				Flooding	0.40		
Meadowcreek	8	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
				Slow water movement	0.50		
Enbar	5	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		
Bonebasin	2	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Cobble content	0.01	Slow water movement	0.50	Organic matter content	1.00
				Flooding	0.40	Flooding	0.40

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
453D—Amsterdam-Brodyk silt loams, 8 to 15 percent slopes							
Amsterdam	50	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.63	Slope	1.00
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Brodyk	35	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.63	Slope	1.00
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Bowery	5	Very limited		Somewhat limited		Very limited	
		Slow water movement	1.00	Slow water movement	0.50	Slope	1.00
		Slope	1.00	Slope	0.16	Seepage	0.50
Brodyk	5	Very limited		Very limited		Very limited	
		Slope	1.00	Too steep	1.00	Slope	1.00
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
Meagher	5	Very limited		Very limited		Very limited	
		Slope	1.00	Seepage, bottom layer	1.00	Slope	1.00
		Slow water movement	1.00	Slope	0.63	Seepage	1.00
				Slow water movement	0.50		
509B—Enbar loam, 0 to 4 percent slopes							
Enbar	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		
Nythar	10	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50
				Flooding	0.40	Flooding	0.40
Straw	5	Very limited		Somewhat limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	0.50	Seepage	0.50

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
537A—Lamoose silt loam, 0 to 2 percent slopes							
Lamoose	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
				Slow water movement	0.50		
Bonebasin	10	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Cobble content	0.01	Slow water movement	0.50	Organic matter content	1.00
				Flooding	0.40	Flooding	0.40
Meadowcreek	5	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00
				Slow water movement	0.50	Flooding	0.40
				Flooding	0.40		

Selected Soil Interpretations– Gallatin County Area, Montana								
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
542A—Blossberg loam, 0 to 2 percent slopes								
Blossberg	85	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
		Cobble content	0.52	Slow water movement	0.72			
Bonebasin	10	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
		Cobble content	0.01	Slow water movement	0.50	Organic matter content	1.00	
				Flooding	0.40	Flooding	0.40	
Meadowcreek	5	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
				Slow water movement	0.50			

Selected Soil Interpretations– Gallatin County Area, Montana								
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
606A—Bandy-Riverwash-Bonebasin complex, 0 to 2 percent slopes								
Bandy	50	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Flooding	1.00	Flooding	1.00	
		Slow water movement	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Flooding	0.60	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
		Cobble content	0.02	Filtering capacity	1.00			
Riverwash	25	Not rated		Not rated		Not rated		
Bonebasin	10	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Flooding	1.00	Flooding	1.00	
		Slow water movement	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Flooding	0.60	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
		Cobble content	0.01	Slow water movement	0.50	Organic matter content	1.00	
Blossberg	5	Very limited		Very limited		Very limited		
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	1.00	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Depth to saturated zone	1.00	
		Cobble content	0.52	Slow water movement	0.72			
Nesda	5	Very limited		Very limited		Very limited		
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00	
				Filtering capacity	1.00	Flooding	0.40	
				Flooding	0.40			
Water	5	Not rated		Not rated		Not rated		

Selected Soil Interpretations– Gallatin County Area, Montana							
Map symbol and soil name	Pct. of map unit	Awm - rapid infiltration disposal of wastewater		Eng - septic tank absorption fields		Eng - sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
748A—Hyalite-Beaverton complex, 0 to 4 percent slopes							
Hyalite	70	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.97	Slow water movement	1.00		
				Large stones	0.02		
Beaverton	20	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.99	Filtering capacity	1.00	Large stones	0.59
				Large stones	0.20		
Hyalite	5	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
		Cobble content	0.97	Slow water movement	1.00	Slope	0.92
		Slope	0.50	Large stones	0.02		
Turner	5	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Seepage, bottom layer	1.00	Seepage	1.00
				Slow water movement	0.50		

Data Source Information

Soil Survey Area: Gallatin County Area, Montana
Survey Area Data: Version 13, Jan 15, 2010

Appendix B

Hydraulic Gradient & Soils Data
(Nicklin Earth & Water, Inc., Report)

Draft Report

Ground-water Supply Evaluation Gateway Village Subdivision

prepared by

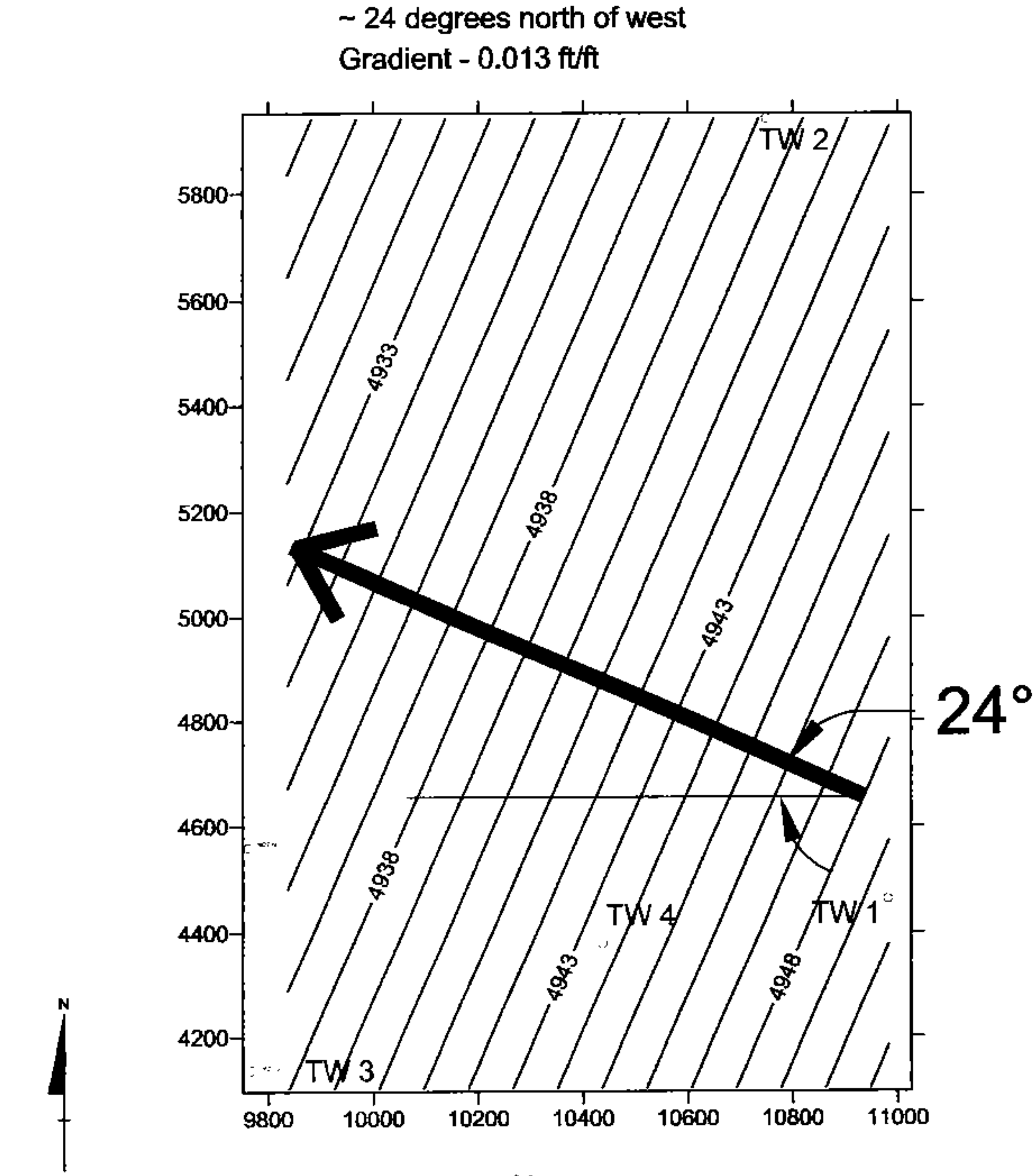
NICKLIN

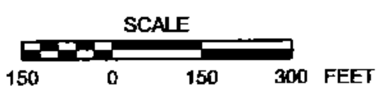
EARTH & WATER, INC.

for

Gateway Village, L.L.C.

October, 2006





Notes:
Ground-water elevation data collected on October 12, 2006.
Gradient and flow direction based on data from TW 1, TW 2 and TW 3.

Date Project File	NICKLIN EARTH & WATER, INC.	Ground-Water Flow Gateway Village	Figure 5

Appendix C

TMDL Water Quality Information

Montana Department of Environmental Quality

Clean Water Act Information Center

Close Window | Print Window | Export Data

2008 Water Quality Information

Water Information

Waterbody Id	MT41H001_010	**Water Type**	RIVER
Name	Gallatin River	**Hydro Unit**	10020008 - Gallatin
Size (Miles/Acres)	50.5	**Basin**	Upper Missouri
Ecoregion	Middle Rockies	**Watershed**	Upper Missouri Tribs.
County	GALLATIN	**Use Class**	B-1
TMDL Planning Area	Lower Gallatin	**Trophic Status and Trend**	NA
Location	GALLATIN RIVER, Spanish Creek to the mouth (Missouri River)		
Water Quality Category	4C - TMDLs are not required; no pollutant-related use impairment identified.		

Beneficial Use Support Information

Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural	✓					
Aquatic Life		✓				
Cold Water Fishery			✓			
Drinking Water	✓					
Industrial		✓				
Primary Contact Recreation			✓			

Impairment Information

Probable Causes	Probable Sources	Associated Uses	TMDL Completed
Low flow alterations	Irrigated Crop Production	Aquatic Life Cold Water Fishery Industrial Primary Contact Recreation	NO

pollutant vs. pollution.

Assessment Information

Assessment Type	Associated Uses	Confidence
BIOLOGICAL	Aquatic Life Cold Water Fishery	GOOD
HABITAT	Aquatic Life	GOOD
PHYSICAL/CHEMICAL	Agricultural Aquatic Life Cold Water Fishery Drinking Water Industrial Primary Contact Recreation	GOOD

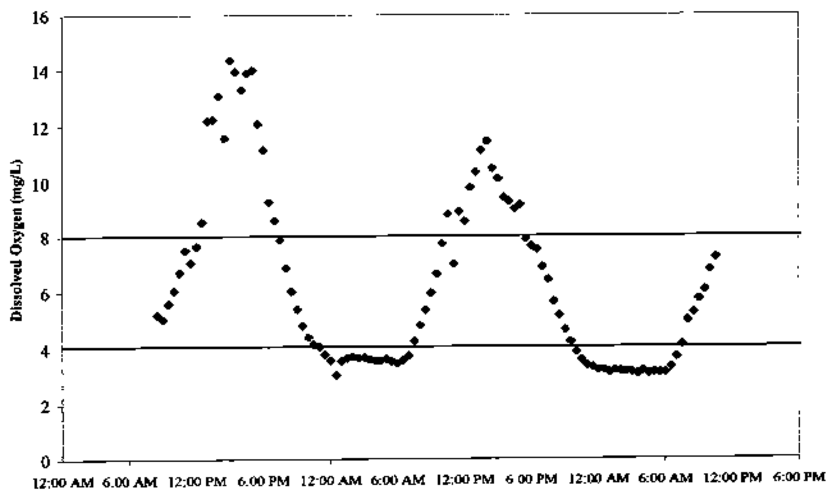
Assessment Method	Associated Uses
NA	NA

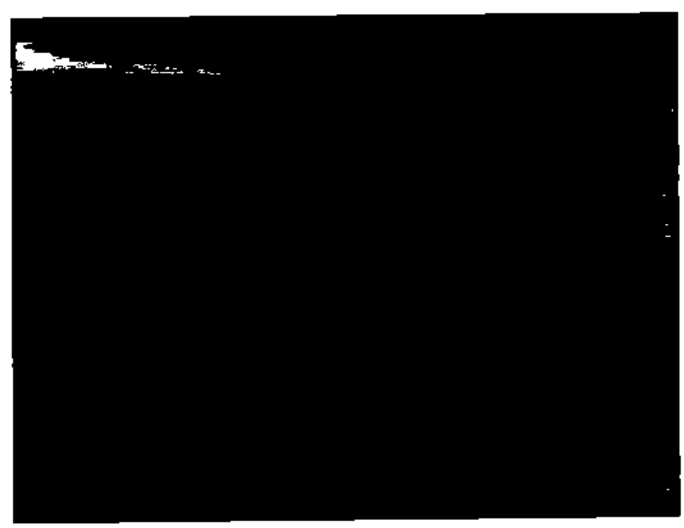
Comments

Overall Assessment
NA

Use	Comment
NA	NA
Cause	**Comment**
NA	NA
Source	**Comment**
NA	NA

Scientific and Technical Basis of the Numeric Nutrient Criteria for Montana's Wadeable Streams and Rivers





Prepared By

Michael Suplee, Ph.D. — Montana Department of Environmental Quality
Vicki Watson, Ph.D. — University of Montana
Arun Varghese and Josh Cleland — ICF International

November 2008

Scientific and Technical Basis of the Numeric Nutrient Criteria for Montana's Wadeable Streams and Rivers

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Montana Department of Environmental Quality

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EXECUTIVE SUMMARY

Beneficial uses are valuable characteristics of a stream or river resource that, directly or indirectly, contribute to human welfare. Examples of beneficial uses include drinking water, fish and aquatic life, and recreation. Beneficial uses are established in law and reflect the societal values embodied in those laws. The intent of water quality criteria, in turn, is to assure a level of water quality that will protect the beneficial uses. Some beneficial uses are more sensitive to impacts (harm) than others; water quality criteria are required by law to protect the most sensitive use from harm. This document presents the science and technical analyses used to develop numeric nutrient criteria for wadeable streams in Montana.

It is well documented that the addition of nitrogen (N) and phosphorus (P) compounds to surface waters leads to a phenomenon referred to as eutrophication. Eutrophication is increased plant and algae growth and decay in a waterbody, and all of the consequential changes to the waterbody and the water quality that occur as a result. N and P criteria are set so that they protect streams from the *undesirable* aspects of eutrophication. Undesirable aspects of eutrophication include nuisance algae growth and reduced dissolved oxygen levels which impact fish and aquatic life.

Although N and P enrichment causes stream eutrophication, the manner in which eutrophication manifests itself in streams is influenced by other factors. These factors include stream temperatures, flow patterns, light levels, and grazing on algae and plants by fish and aquatic insects. Of these, the most important in Montana appear to be temperature and flow patterns. As such, both temperature and flow patterns were incorporated into the criteria development process; this will be discussed further when the criteria are presented at the end of this summary.

Montana already has several water quality standards that address undesirable aspects of eutrophication. (Water quality standards are, essentially, criteria that have been adopted into law.) However, the existing standards are either narrative (they describe a water quality condition that should be maintained, but provide no specifics, therefore they are open to varied interpretations), or they are numeric but address only *effect* variables (e.g., low dissolved oxygen levels). Thus, one is still required to determine the root cause of the effects and that root cause is commonly nutrient enrichment. Numeric nutrient criteria will improve upon the existing standards because they address the causes of eutrophication directly.

N and P concentrations in wadeable streams vary naturally in accordance with regional geology, soils, climate, and vegetation. To address this regional variation, DEQ tested three candidate mapping systems. The intended purpose of the mapping system was to assure that appropriate nutrient criteria are applied to different regions of the state given the natural spatial variation in nutrient concentrations. Omernik ecoregions, Strahler stream order, and underlying geology (lithology) were each evaluated to see which one was the best at maximizing the difference in stream nutrient concentrations between zones and minimizing the difference within zones. Among the three mapping systems, ecoregions were found to be superior to the others and are recommended as the system upon which nutrient criteria zones should be based.

In some parts of the state, mainly in the west, the most sensitive beneficial use is recreation. A public opinion study carried out by DEQ shows that the public majority in Montana does not want to see excessive bottom-attached algae growth in the gravel-bottomed, clear running, trout-fishery streams common in western Montana. For these types of streams, the nutrient criteria have been set to prevent nuisance algal levels (as defined by the public perception study) from developing and will, therefore, protect the recreation use. The criteria will also protect the fishery, which typically comprises fish such as trout, char, and whitefish, from the negative effects of excessive nutrient enrichment (e.g., low dissolved oxygen concentrations). The criteria will also better protect the agricultural use by reducing elevated algae levels that clog irrigation systems.

In the eastern part of the state, low gradient prairie streams are common. Wadeable prairie streams in Montana often become intermittent, commonly have mud bottoms, are turbid, frequently have substantial macrophyte populations, usually have filamentous algae but sometimes have only phytoplankton algae, and support catfish, walleye, chubs, bass, and other warm water fishes. Because prairie streams are fundamentally different in many ways from western Montana trout streams, the results from the algae public perception survey should probably not be directly applied to them. Prairie streams nevertheless have important and sensitive beneficial uses that need protection, like the diverse species of fish mentioned above. For these types of streams, the nutrient criteria have been set so that they will maintain dissolved oxygen concentrations that protect regional fish and aquatic life. The most sensitive use in prairie streams is therefore considered to be fish and aquatic life.

Fundamentally, the nutrient criteria are based on scientific stressor-response studies in which harm to a sensitive beneficial use is shown. All applicable stressor-response studies (N or P as stressor, beneficial use impact as response) that could be located were reviewed. This included regional studies as well as studies from other parts of the country and world. Some of these studies were carried out by DEQ.

We then compared the nutrient concentrations indicated by the stressor-response studies to regionally-applicable reference stream nutrient data. This analysis showed that there is a consistent relationship between nutrient concentrations that harm uses (as determined in the stressor-response studies) and nutrient concentrations observed in reference sites; namely, the most elevated nutrient concentrations observed in reference sites (e.g., those at the 87^{th} percentile of reference) are equivalent to harm-to-use concentrations. It is not surprising that reference sites have some nutrient samples whose concentrations are higher than the harm-to-use threshold identified in stressor-response studies. In any population there are always low and high values that differ considerably from the population's central tendency; the important point is that nutrient concentrations in reference sites that are greater than the harm-to-use threshold occur infrequently, e.g. due to an atypical high-flow event in summer. It is when the harm-to-use concentrations occur commonly in a stream (e.g., 50% of the time) that eutrophication problems occur.

Owing to the collective relationship we observed between stressor-response studies and the their corresponding reference data, we recommend using nutrient concentrations linked to specified upper percentiles of the reference data (e.g., the 90^{th} of reference) as criteria. This approach has the advantage that it helps overcome statistical uncertainties in any given stressor-response study, and makes certain that natural, regional effects on background nutrient concentrations are reflected in the criteria so that the criteria will not be overly stringent or insufficiently protective.

Table E1 below shows the recommended numeric criteria for different ecoregions. Both total P and total N are recommended, as co-limitation by both nutrients is common in rivers and streams. Nitrate + nitrite (NO_{2+3}) is also suggested because total N criteria — in the absence of NO_{2+3} criteria — may not achieve the water quality goals anticipated (nitrate is particularly important in prairie streams). Analysis shows that the total P criteria should generally maintain soluble P at appropriate levels.

The criteria only apply seasonally. This is because low temperatures in winter and high flow events during spring runoff tend to mute the local effects of eutrophication (plant growth slows dramatically in winter, and spring high-flow events prevent nuisance algal mats from developing). Therefore, the criteria have been set for the time period when eutrophication problems are most likely to occur (i.e., summer). Note also that we have included benthic (i.e., bottom-attached) algae criteria for the mountainous ecoregions (Northern, Canadian, and Middle Rockies, and the Idaho Batholith). The algae levels shown are based on DEQ's nuisance algae public-perception survey. In these mountainous ecoregions, the algae criteria should be adopted along with the nutrient criteria to assure protection of the beneficial uses. In the eastern prairie streams (Northwestern Glaciated Plains, Northwestern Great Plains, and Wyoming Basin), nutrient criteria are provided but benthic algae levels are not. As noted earlier, prairie stream nutrient criteria are intended to maintain dissolved oxygen levels already in state law and are not based on the algae public-perception survey. As for all water quality criteria, the numeric nutrient criteria will undergo periodic revision and update as more stressor-response studies are completed and more reference data are collected.

Table E1. Recommended Numeric Nutrient and Benthic Algae Criteria for Different Ecoregions of Montana.

Level III Ecoregion	Period When Criteria Apply	Nutrient Criteria: Total P (mg/L)	Total N (mg/L)	NO_{2+3} (mg/L)	Benthic Algae Criteria
Northern Rockies	July 1 -Sept. 30	0.012	0.233	0.081	150 mg Chl a/m^2 (36 g AFDW/m^2)
Canadian Rockies	July 1 -Sept. 30	0.006	0.209	0.020	150 mg Chl a/m^2 (36 g AFDW/m^2)
Middle Rockies	July 1 -Sept. 30	0.048	0.320	0.100	150 mg Chl a/m^2 (36 g AFDW/m^2)
Idaho Batholith	July 1 -Sept. 30	0.011	0.130	0.049	150 mg Chl a/m^2 (36 g AFDW/m^2)
Northwestern Glaciated Plains	June 16-Sept. 30	0.123	1.311	0.020	n/a
Northwestern Great Plains, Wyoming Basin	July 1 -Sept. 30	0.124	1.358	0.076	n/a

Appendix D

Gallatin River Water Sampling Data

(LOWER) WEST GALLATIN RIVER

Station Description	Date	Nitrate + Nitrite as N (mg/L)	RL	TKN (mg/L)	RL	Total Phosphorus (mg/L)	RL	Collecting Agency	Laboratory
Above Hwy 191 Br @ Canyon Mouth	8/20/2001	0.01	0.01	0.5	0.1	0.134	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	9/10/2001	<0.01	0.01	0.2	0.1	0.016	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	10/16/2001	<0.01	0.01	0.3	0.1	0.014	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	11/5/2001	<0.01	0.01	0.2	0.1	0.011	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	8/19/2002	ND	0.01	ND	0.1	0.019	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	9/9/2002	ND	0.01	0.3	0.1	0.025	0.001	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	10/15/2002	ND	0.01	ND	0.1	0.02	0.01	GLWQD	Energy-Billings
Above Hwy 191 Br @ Canyon Mouth	11/4/2002	ND	0.01	0.2	0.1	0.006	0.001	GLWQD	Energy-Billings
At Williams Bridge	8/20/2001	<0.01	0.01	0.3	0.1	0.022	0.001	GLWQD	Energy-Billings
At Williams Bridge	9/10/2001	<0.01	0.01	0.2	0.1	0.016	0.001	GLWQD	Energy-Billings
At Williams Bridge	10/16/2001	0.01	0.01	0.3	0.1	0.013	0.001	GLWQD	Energy-Billings
At Williams Bridge	11/5/2001	<0.01	0.01	0.1	0.1	0.004	0.001	GLWQD	Energy-Billings
At Williams Bridge	8/19/2002	ND	0.01	0.2	0.1	0.015	0.001	GLWQD	Energy-Billings
At Williams Bridge	9/9/2002	ND	0.01	0.2	0.1	0.021	0.001	GLWQD	Energy-Billings
At Williams Bridge	10/15/2002	ND	0.01	ND	0.1	0.02	0.01	GLWQD	Energy-Billings
At Williams Bridge	11/4/2002	ND	0.01	0.2	0.1	0.009	0.001	GLWQD	Energy-Billings
At Axtell Bridge	8/21/2001	<0.01	0.01	0.3	0.1	0.019	0.001	GLWQD	Energy-Billings
At Axtell Bridge	9/11/2001	<0.01	0.01	0.2	0.1	0.023	0.001	GLWQD	Energy-Billings
At Axtell Bridge	10/17/2009	0.02	0.01	0.3	0.1	0.016	0.001	GLWQD	Energy-Billings
At Axtell Bridge	11/6/2001	0.01	0.01	0.2	0.1	0.015	0.001	GLWQD	Energy-Billings
At Axtell Bridge	8/20/2002	0.01	0.01	0.2	0.1	0.014	0.001	GLWQD	Energy-Billings
At Axtell Bridge	9/10/2002	0.05	0.05	ND	0.5	0.018	0.004	GLWQD	Energy-Billlings *
At Axtell Bridge	10/16/2002	ND	0.01	0.1	0.1	0.016	0.004	GLWQD	Energy-Billings *
At Axtell Bridge	11/5/2002	ND	0.01	0.3	0.1	0.006	0.001	GLWQD	Energy-Billings

*RL increased due to sample matrix interference.

Rich,

Had more data points than I thought we had. Good news.

Let me know if you have any other questions.

Best Regards,

Tammy

Tammera J. Crone
Water Quality Specialist
Gallatin Local Water Quality District
1709 W. College St., Suite 104
Bozeman, MT 59715
406-582-3145
406-539-1912 (cell)
tammy.crone@gallatin.mt.gov
www.gallatin.mt.gov/GLWQD

(LOWER) WEST GALLATIN RIVER

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At Williams Bridge	10/15/2002	ND	0.01	ND	0.1	0.02	0.01	GLWQD	Energy-Billings	
At Williams Bridge	11/4/2002	ND	0.01	0.2	0.1	0.009	0.001	GLWQD	Energy-Billings	
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At Axtell Bridge	8/20/2002	0.01	0.01	0.2	0.1	0.014	0.001	GLWQD	Energy-Billings	
At Axtell Bridge	9/10/2002	0.05	0.05	ND	0.5	0.018	0.004	GLWQD	Energy-Billlings	*
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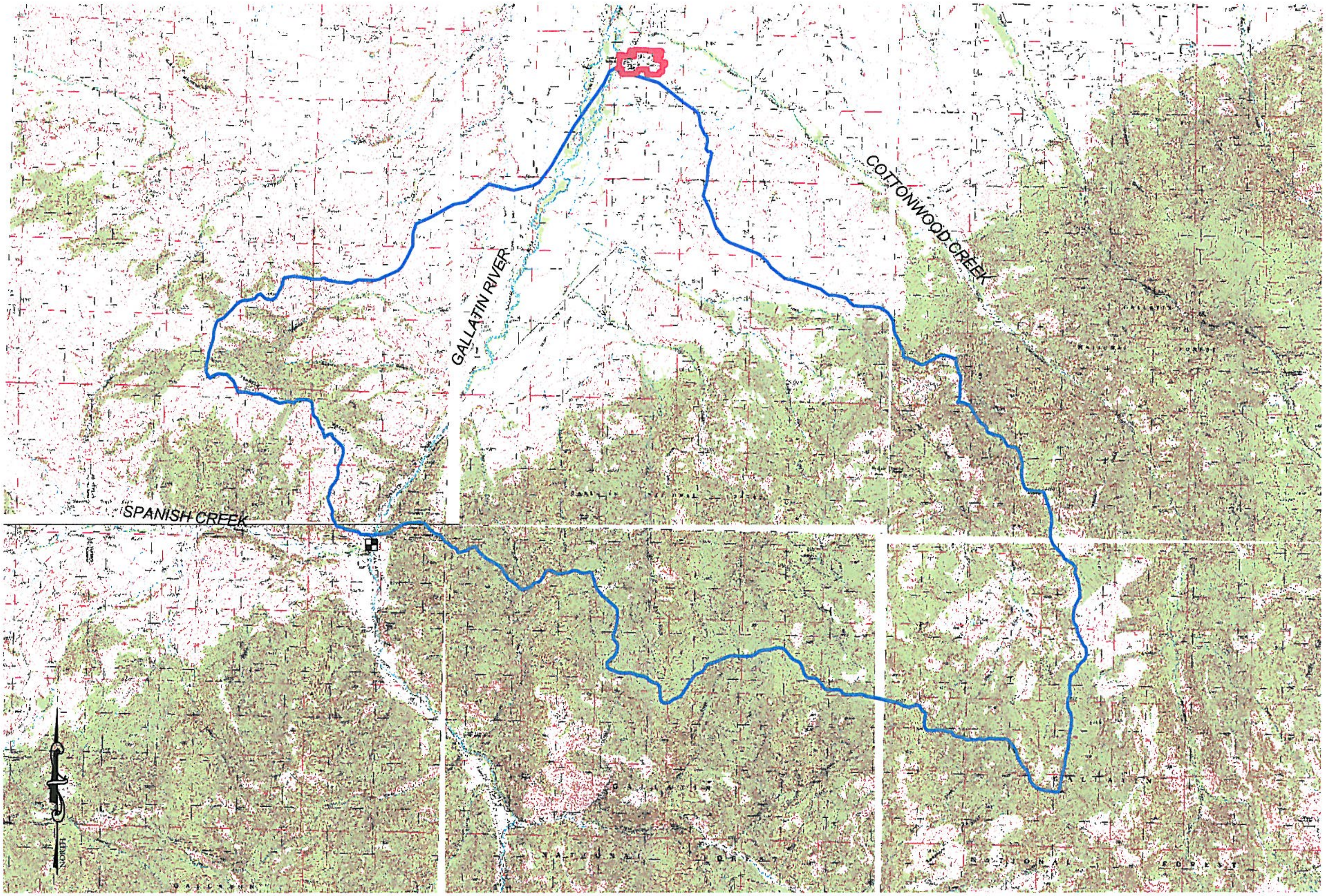
At Axtell Bridge	11/5/2002	ND	0.01	0.3	0.1	0.006	0.001	GLWQD	Energy-Billings	

*RL increased due to sample matrix interference.

From Tami Crone @ Gallatin County Local Water Quality District 12/3/09

Appendix E

Surface Water Calculations (7Q10 Flow; Dilution)



SCALE:

0 5,000 10,000
SCALE IN FEET

LEGEND:

DISTRICT BOUNDARY
DRAINAGE BASIN (56mi²)
USGS GAUGING STATION MT 06043500

FIGURE E
USGS QUAD MAPS WITH DRAINAGE BASIN

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERING REPORT (PER)

GreatWest engineering

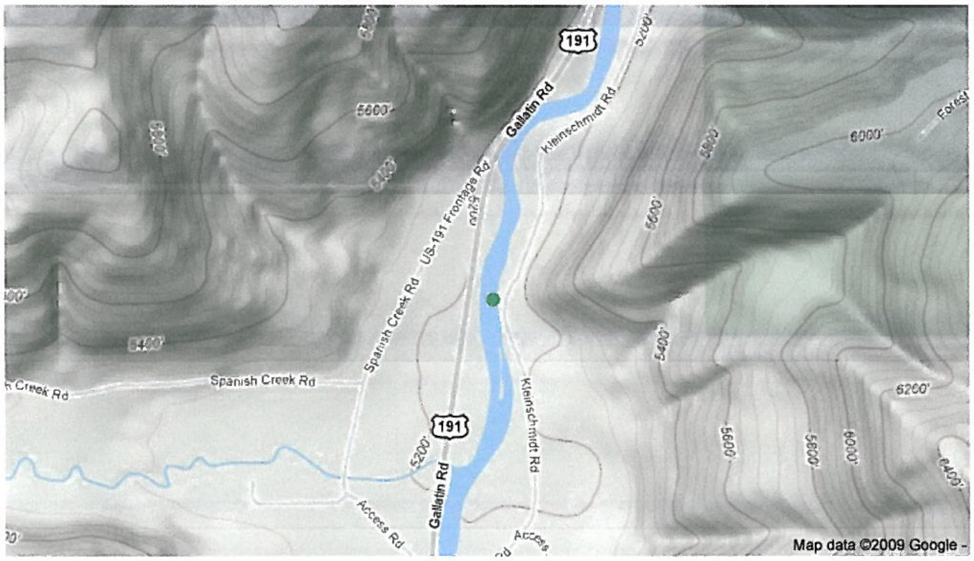
USGS science for a changing world

WaterWatch -- *Current Water Resources Conditions* ***Special Features*** Contents

Current Maps/Graphs:	Flood Watch:	Drought Watch:	Recent/Historical Maps/Graphs:
Current Streamflow			
Google Map	United States	Search	Additional Information

WaterWatch -- *Current water resources conditions*

Map of real-time streamflow compared to historical streamflow for the day of the year (United States)



Explanation - Percentile classes

Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High

Build Regional Streamflow Google Map

Select states or regions from the drop-down button or from the map. Click "GO" to create a Google Map.
(Due to limitation of Google Map, limit to two regions or four states)

Regions: clr | help | GO
United States | Water Resource Region

Map of Streamflow Conditions

06043500 Gallatin River near Gallatin Gateway, Mont.
Site Number 37

LOCATION.--Lat 45°29'51", long 111°16'11" (NAD 27), in SE¼SE¼SE¼ sec.7, T.4 S., R.4 E., Gallatin County, Hydrologic Unit 10020008, on left bank 0.3 mi downstream from Spanish Creek, 7.3 mi south of Gallatin Gateway and at river mile 47.7.

DRAINAGE AREA.--825 mi^2.

PERIOD OF RECORD.--August 1889 to September 1894, June 1930 to September 1969, annual maximum, water years 1970-71, October 1971 to September 1981, October 1984 to current year (2002). Monthly discharge only for some periods, published in WSP 1309. Published as "West Gallatin River near Bozeman," 1889-94.

REVISED RECORDS.--WSP 1389: 1892(M), 1893-94. WSP 1559: Drainage area. WDR MT-85-1 (M), WDR MT-02-1: 1970-71 (M).

GAGE.--Water-stage recorder. Altitude of gage is 5,167.67 ft (NGVD 29). Prior to Oct. 20, 1932, nonrecording gages at several different sites and datums within 0.8 mi of present site.

REMARKS.--Diversions for irrigation of about 1,400 acres upstream from station. U.S. Geological Survey satellite telemeter at station.

Magnitude and probability of annual low flow based on 65 years of record

Period of consecutive days	Discharge, in ft^3/s, for indicated recurrence interval, in years, and non-exceedance probability, in percent					
	2	5	10	20	50	100
	50%	20%	10%	5%	2%	1%
1	222	195	183	174	165	160
3	233	205	192	183	173	167
7	247	218	204	194	183	177
14	257	228	215	205	194	187
30	273	242	228	217	205	197
60	289	256	240	228	215	207
90	296	261	245	233	221	213
120	313	274	257	244	230	222
183	362	310	286	268	250	238

Magnitude and probability of seasonal low flow from March-June based on 67 seasons of record

Period of consecutive days	Discharge, in ft^3/s, for indicated recurrence interval, in years, and non-exceedance probability, in percent					
	2	5	10	20	50	100
	50%	20%	10%	5%	2%	1%
1	265	230	213	199	185	176
3	273	237	220	207	192	183
7	280	244	227	213	199	189
14	288	251	233	219	204	194
30	301	261	243	229	214	205

Magnitude and probability of seasonal low flow from November-February based on 67 seasons of record

Period of consecutive days	Discharge, in ft^3/s, for indicated recurrence interval, in years, and non-exceedance probability, in percent					
	2	5	10	20	50	100
	50%	20%	10%	5%	2%	1%
1	229	197	184	175	166	160
3	240	207	193	184	174	168
7	256	222	206	195	184	178
14	270	235	219	207	195	188
30	284	248	232	219	206	198

Duration of daily mean flows based on 67 years of record

Discharge, in ft^3/s, which was equaled or exceeded for indicated percent of time

99%	98%	95%	90%	80%	70%	60%	50%
196	204	226	264	303	338	374	437
40%	30%	20%	15%	10%	5%	2%	1%
506	654	1,000	1,410	2,050	3,010	4,100	4,980

Magnitude and probability of annual high flow based on 67 years of record

Period of consecutive days	Discharge, in ft^3/s, for indicated recurrence interval, in years, and exceedance probability, in percent					
	2	5	10	25	50	100
	50%	20%	10%	4%	2%	1%
1	4,620	5,920	6,650	7,460	7,990	8,470
3	4,310	5,580	6,320	7,150	7,710	8,230
7	3,960	5,170	5,880	6,690	7,250	7,770
15	3,590	4,680	5,300	5,990	6,460	6,880
30	3,160	4,040	4,530	5,040	5,380	5,680
60	2,500	3,150	3,510	3,910	4,160	4,390
90	2,000	2,500	2,780	3,090	3,290	3,470

Magnitude and probability of seasonal low flow from July-October based on 66 seasons of record

Period of consecutive days	Discharge, in ft^3/s, for indicated recurrence interval, in years, and non-exceedance probability, in percent					
	2	5	10	20	50	100
	50%	20%	10%	5%	2%	1%
1	379	318	289	267	244	229
3	393	330	299	275	249	233
7	403	337	306	281	255	238
14	411	343	310	285	259	242
30	425	351	317	291	264	247

Monthly and annual mean discharges

Month	Maximum (ft^3/s)	Minimum (ft^3/s)	Mean (ft^3/s)	Standard deviation (ft^3/s)	Years of record
October	721	238	447	102	67
November	589	247	375	74	68
December	488	214	313	56	67
January	428	200	302	51	67
February	407	220	299	45	67
March	465	206	307	52	67
April	899	263	503	149	67
May	3,140	873	1,790	541	67
June	5,110	643	2,910	1,010	68
July	3,670	345	1,270	576	68
August	1,160	270	602	170	68
September	788	233	483	112	68
Annual	1,180	408	802	174	67

Design Basis:

From: Regensburger, Eric [mailto:eregensburger@mt.gov]
Sent: Tuesday, September 26, 2006 12:59 PM
To: Terry Threlkeld
Subject: RE:

Nothing from up there. You'll have to figure out your basin area and compare it the the 825 square miles and 204 cfs for the 7Q10 at the Gallatin Gateway station.

---

end email

Design Calculation:
Gallatin Gateway Wastewater PER
By: Rich Fillbach

- Additional Drainage Basin Area = $56mi^2$ (source: USGS Quad; AutoCad)
- Proration of 7Q10 Flow

$$\frac{825\ mi^2}{204\ cfs} = \frac{(825\ mi^2 + 56mi^{2})}{Q_{7Q10}}$$

Q_{7Q10} = 218 cfs or 140.9 MGD

- 7Q10 for the Gallatin River at Gallatin Gateway is **218 cfs**

EPA "Technical Support Document of Water Quality-Based Toxics Control" 1991

C_{RP}	receiving water concentration (RWC) after mixing, mg/L
C_E	maximum project effluent concentration, mg/L
C_S	RWC upstream of discharge, mg/L
Q_S	applicable receiving water flow, % of 7Q10, mgd or cfs
Q_E	facility design flow rate, mgd or cfs

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S}$$

C_{RP}	=	0.011	mg/L	*Exceed limit by 0.001
C_E	=	30	mg/L	Standard Lagoon Effluent
C_S	=	0	mg/L	
Q_S	=	140.90	mgd	
Q_E	=	0.05	mgd	

EPA "Technical Support Document of Water Quality-Based Toxics Control" 1991

C_{RP}	receiving water concentration (RWC) after mixing, mg/L
C_E	maximum project effluent concentration, mg/L
C_S	RWC upstream of discharge, mg/L
Q_S	applicable receiving water flow, % of 7Q10, mgd or cfs
Q_E	facility design flow rate, mgd or cfs

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S}$$

C_{RP}	=	0.010	mg/L	*Meet trigger limit
C_E	=	29	mg/L	Treatment required
C_S	=	0	mg/L	
Q_S	=	140.90	mgd	
Q_E	=	0.05	mgd	

Adjacent to Surface Water
Dilution Model

Dilution Equation:

Change in Background Concentration = $\dfrac{Q_D*C_D+Q_L*C_L}{Q_D+Q_L}$

where
Q_D is the drainfield flow rate in gpd
C_D is the nitrate concentration in the effluent
Q_L 7Q10 flow rate in gpd
C_L nitrate or phosphorus in surface water, typically "0"

Q_D	45,000	gpd	
C_D	31	ppm	nitrate
Q_L	140,897,080	gpd	
C_L	0	ppm	

Change in Background Concentration = $\dfrac{1,395,000}{140,942,080}$ or 0.009897683

The change in concentration is less than .01 mg/L and so meets adjacent to surface water nondegradation

GALLATIN GATEWAY

45,000 - 50,000 Range of projected 20-yr WW flow
31 - 28 ppm nitrate limit range

Adjacent to Surface Water
Dilution Model

Dilution Equation:

$$\text{Change in Background Concentration} = \frac{Q_D*C_D+Q_L*C_L}{Q_D+Q_L}$$

where

Q_D is the drainfield flow rate in gpd
C_D is the nitrate concentration in the effluent
Q_L 7Q10 flow rate in gpd
C_L nitrate or phosphorus in surface water, typically "0"

Q_D	50,000	gpd	
C_D	28	ppm	nitrate
Q_L	140,897,080	gpd	
C_L	0	ppm	

$$\text{Change in Background Concentration} = \frac{1{,}400{,}000}{140{,}947{,}080} \text{ or } 0.009932806$$

The change in concentration is less than .01 mg/L and so meets adjacent to surface water nondegradation

Appendix F

Uniform Environmental Checklist

UNIFORM ENVIRONMENTAL CHECKLIST

As the engineer that prepared the preliminary engineering report, I Richard D. Fillbach,
(print name of engineer)

have reviewed the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources. In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

Engineer's Signature: Richard D Fillbach **Date:** 4/1/2010

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
P – Approval/Permits Required **M** – Mitigation Required

PHYSICAL ENVIRONMENT	
Key **N**	**1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)** *Comments and Source of Information*:
Key **N**	**2. Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)** *Comments and Source of Information*:
Key **A**	**3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)** *Comments and Source of Information*: Dust related to construction activity – Great West Engineering
Key **B, P**	**4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)** *Comments and Source of Information*: Groundwater Quality is expected to improve by providing a higher level of wastewater treatment. Monitoring program will also be instituted. Quantity of groundwater recharge will be the same. Distribution will change but is not expected to have any adverse effects. Groundwater Discharge Permit Required. – Great West Engineering

4/1/2010

Key	
A, P, M	**5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)** *Comments and Source of Information*: Temporary disturbance related to construction activity; storm water runoff potential adverse effects. Storm water discharge permit required. Stream crossing during installation of collection system increase in turbidity if stream is live during time of construction. 310 stream crossing permit to be expected. Mitigation via Best Management Practices (BMP) employed before, during, and after construction until all areas of disturbance have been fully reclaimed and/or re-vegetated. – Great West Engineering
N	**6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)** *Comments and Source of Information*: – FEMA Floodplain Map
N	**7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)** *Comments and Source of Information*: – Nation Wetland Inventory Map
A	**8. Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)** *Comments and Source of Information*: Specific project site not located but will likely disturb agricultural lands based on available and logical space that meets non degradation engineering requirements of proposed groundwater disposal. – Great West Engineering – NRCS Web Soil Survey
B	**9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats)** *Comments and Source of Information*: Improved water quality that is generally beneficial to fish, wildlife and habitat resources. – U.S. Fish and Wildlife Service
N	**10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish or wildlife)** *Comments and Source of Information*: Species of concern in the area include: Wolverine, Canada Lynx, Grizzly Bear, Great Blue Heron, and the Westslope Cutthroat Trout. No plants of concern in the area. – Natural Resources and Information System (NRIS)
N	**11. Unique Natural Features (e.g., geologic features)** *Comments and Source of Information*:
N	**12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways (including Federally Designated Wild & Scenic Rivers), and Public Open Space** *Comments and Source of Information*:

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
P – Approval/Permits Required **M** – Mitigation Required

HUMAN POPULATION	
Key N	**1. Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics** *Comments and Source of Information*: Most minimal visual impacts with preferred alternative – below grade system. – Great West Engineering
Key N	**2. Nuisances (e.g., glare, fumes)** *Comments and Source of Information*: Most minimal odor impacts with preferred alternative – below grade system. – Great West Engineering
Key A	**3. Noise – suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads)** *Comments and Source of Information*: Noise common to construction activates during the construction phase; otherwise, no adverse impacts from noise anticipated. – Great West Engineering
Key N	**4. Historic Properties, Cultural, and Archaeological Resources** *Comments and Source of Information*: Two previously recorded historic site are in the area but will not be impacted from the proposed project. – Great West Engineering – State Historic Preservation Office (SHPO)
Key B	**5. Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)** *Comments and Source of Information*: Project is expected to allow growth by offering wastewater treatment that is in compliance with current regulations. – Great West Engineering
Key N	**6. Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?)** *Comments and Source of Information*:
Key B	**7. General Housing Conditions - Quality, Quantity, Affordability** *Comments and Source of Information*: Project is likely to help the housing quality by enabling residents to make home improvements and apply for site permits without being confined by having to bring onsite septic systems into compliance. A centralized wastewater system will promote infill of vacant lots. – Great West Engineering
Key N	**8. Displacement or Relocation of Businesses or Residents** *Comments and Source of Information*:

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
P – Approval/Permits Required **M** – Mitigation Required

Key	
B	**9. Public Health and Safety** *Comments and Source of Information*: Project will improve water quality and provide a solution for the well/septic separation distances which currently create a high health risk for well water contamination. – Gallatin City-County Health Department – Gallatin Local Water Quality District
N	**10. Lead Based Paint and/or Asbestos** *Comments and Source of Information*:
B	**11. Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact** *Comments and Source of Information*: Project will allow growth within the community that is currently suppressed by non compliance with current health regulations. – Great West Engineering
B	**12. Local & State Tax Base & Revenues** *Comments and Source of Information*: Project will allow growth thereby increasing the tax base. – Great West Engineering
B	**13. Educational Facilities - Schools, Colleges, Universities** *Comments and Source of Information*: Project will improve the wastewater treatment capabilities for the Gallatin Gateway School. – Great West Engineering
B	**14. Commercial and Industrial Facilities - Production & Activity, Growth or Decline** *Comments and Source of Information*: Project will allow growth of commercial development in Gallatin Gateway. – Great West Engineering
N	**15. Health Care – Medical Services** *Comments and Source of Information*:
N	**16. Social Services – Governmental Services (e.g., demand on)** *Comments and Source of Information*:
N	**17. Social Structures & Mores (Standards of Social Conduct/Social Conventions)** *Comments and Source of Information*:

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
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Key **N**	**18. Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)** *Comments and Source of Information*:
Key **A**	**19. Energy Resources - Consumption and Conservation** *Comments and Source of Information*: New wastewater system will consume more energy. – Great West Engineering
Key **N**	**20. Solid Waste Management** *Comments and Source of Information*:
Key **B, P**	**21. Wastewater Treatment - Sewage System** *Comments and Source of Information*: Project is designed to improve the sewage system(s) and permits from MDEQ and other construction related permits will be required. – Great West Engineering
Key **A, P, M**	**22. Storm Water – Surface Drainage** *Comments and Source of Information*: Temporary disturbance related to construction activity; storm water runoff potential adverse effects. Storm water discharge permit required. Mitigation via Best Management Practices (BMP) employed before, during, and after construction until all areas of disturbance have been fully reclaimed and/or re-vegetated. – Great West Engineering
Key **B**	**23. Community Water Supply** *Comments and Source of Information*: Project will directly improve the water supply by removing the paramount concerns of well/septic separation distances. – Great West Engineering
Key **N**	**24. Public Safety – Police** *Comments and Source of Information*:
Key **N**	**25. Fire Protection – Hazards** *Comments and Source of Information*:

Key Letter: N – No Impact/Not Applicable **B** – Potentially Beneficial **A** – Potentially Adverse
P – Approval/Permits Required **M** – Mitigation Required

Key N	**26. Emergency Medical Services** *Comments and Source of Information*:
Key N	**27. Parks, Playgrounds, & Open Space** *Comments and Source of Information*:
Key N	**28. Cultural Facilities, Cultural Uniqueness & Diversity** *Comments and Source of Information*:
Key A	**29. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)** *Comments and Source of Information*: Temporary interruptions due to construction within public road right-of-ways; traffic control permits will be required. – Great West Engineering
Key A	**30. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** *Comments and Source of Information*: Project is consistent with the local resolutions and plans with the community neighborhood plan documents. – Great West Engineering – Gateway Community Plan – Gallatin County Planning Department
Key N	**31. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)** *Comments and Source of Information*:

BOZEMAN
602 Ferguson
Suite 1
Bozeman, MT 59718
6.587.0504
406.587.0541

GreatWest engineering

February 28, 2010

Kevin Smith
DNRC
P.O. Box 201601
Helena, MT 59620-1601

RE: Gallatin Gateway County Water & Sewer District
Community Wastewater Treatment System

Dear Mr. Smith:

The Gallatin Gateway County Water and Sewer District (District) primarily encompasses the town of Gallatin Gateway, Montana, which is located in the central part of Gallatin County in southwestern Montana. The nearest large city is Bozeman, which lies roughly nine miles to the northeast. The town is situated along US Highway 191 and adjacent to the Gallatin River. More specifically, the town is located at:

→ Township 3 South, Range 4 East, Section 11
→ 45° 35' 31" N latitude and 111° 11' 56" W longitude

Enclosed is a map (Figure 1-0) of the District and surrounding planning area to help identify our proposed project location.

Gallatin Gateway is an older community that for the most part was built prior to the establishment of Health Department regulations in 1966, thus many individual septic disposal systems do not comply with current regulations. The majority of these systems are cesspools, seepage pits or septic tank/drainfields that have either failed, or have a high potential of failing in the near future. The soils in this particular area consist of coarse grained sands and gravels, so when a system fails, there is an increasingly high probability of contaminating the water supply wells and groundwater. This situation creates a public health hazard for the community and warrants the need for a centralized wastewater collection and treatment system. Without this type of system in place, the local residents face a serious health risk. Additionally, the Gallatin County board of health will not allow the construction of new homes or businesses in the area unless the proposed septic systems can meet all the required regulations. The end result is a moratorium on new construction.

HELENA
PO Box 4817
2501 Belt View Drive
Helena, MT 59604
406.449.8627
Fax 406.449.8631

BILLINGS
115 N. Broadway
Suite 500
Billings, MT 59101
406.652.5000
Fax 406.248.1363

Great West Engineering was hired to help the District to write a Preliminary Engineering Report (PER) and develop a list of centralized wastewater collection, treatment and disposal alternatives for consideration. After evaluating many different alternatives, the District has chosen to move forward with a Level II treatment system as their preferred alternative. The project is currently planned to be built in 2011.

Enclosed is a schematic drawing (Figure 1-1) of the proposed wastewater treatment system for your review and comment. The drawing shows the underground collection system network and lift station. The exact treatment and groundwater disposal site is not yet determined; however, Figure 1-0 shows the potential areas. The proposed Level II treatment system is designed to discharge treated effluent to groundwater via a large infiltration gallery, more commonly referred to as a drainfield. This part of the system will be subsurface and requires approximately 6 to 10 acres of land depending the site specific soil characteristics. Level II systems typically remove at least 65 percent of the nitrogen in wastewater and have fairly consistent effluent quality throughout the year.

We would appreciate feedback and comments from the DNRC regarding this project. Please send your response back to me at:

Rich Fillbach
Great West Engineering
602 Ferguson, Suite 1
Bozeman, MT 59718

Sincerely,

Great West Engineering, Inc.

Rich Fillbach, PE
Project Engineer

BOZEMAN
602 Ferguson
Suite 1
Bozeman, MT 59718
..6.587.0504
_ . 406.587.0541

GreatWest engineering

February 28, 2010

Mark Wilson, Field Supervisor
U.S. Fish & Wildlife Service
585 Shepard Way
Helena, MT 59601

RE: Gallatin Gateway County Water & Sewer District
Community Wastewater Treatment System

Dear Mr. Wilson:

The Gallatin Gateway County Water and Sewer District (District) primarily encompasses the town of Gallatin Gateway, Montana, which is located in the central part of Gallatin County in southwestern Montana. The nearest large city is Bozeman, which lies roughly nine miles to the northeast. The town is situated along US Highway 191 and adjacent to the Gallatin River. More specifically, the town is located at:

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We would appreciate feedback and comments from the USFWS regarding this project. Please send your response back to me at:

Rich Fillbach
Great West Engineering
602 Ferguson, Suite 1
Bozeman, MT 59718

Sincerely,

Great West Engineering, Inc.

Rich Fillbach, PE
Project Engineer

BOZEMAN
602 Ferguson
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Bozeman, MT 59718
`~6.587.0504
_ 406.587.0541

GreatWest engineering

February 28, 2010

Mike Vaughn
MT FW&P
1400 South 19th
Bozeman, MT 59718

**RE: Gallatin Gateway County Water & Sewer District
Community Wastewater Treatment System**

Dear Mr. Vaughn:

The Gallatin Gateway County Water and Sewer District (District) primarily encompasses the town of Gallatin Gateway, Montana, which is located in the central part of Gallatin County in southwestern Montana. The nearest large city is Bozeman, which lies roughly nine miles to the northeast. The town is situated along US Highway 191 and adjacent to the Gallatin River. More specifically, the town is located at:

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B__GS
115 N. Broadway
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406.652.5000
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We would appreciate feedback and comments from the FWP regarding this project. Please send your response back to me at:

Rich Fillbach
Great West Engineering
602 Ferguson, Suite 1
Bozeman, MT 59718

Sincerely,

Great West Engineering, Inc.

Rich Fillbach, PE
Project Engineer

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406.587.0504
406.587.0541

GreatWest engineering

February 28, 2010

Jon Dilliard, Bureau Chief
Public Water Supply and Subdivisions Bureau
Montana Department of Envronmental Quality
P.O. Box 200901
Helena, MT 59620-0901

**RE: Gallatin Gateway County Water & Sewer District
Community Wastewater Treatment System**

Dear Mr. Dilliard:

The Gallatin Gateway County Water and Sewer District (District) primarily encompasses the town of Gallatin Gateway, Montana, which is located in the central part of Gallatin County in southwestern Montana. The nearest large city is Bozeman, which lies roughly nine miles to the northeast. The town is situated along US Highway 191 and adjacent to the Gallatin River. More specifically, the town is located at:

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We would appreciate feedback and comments from the MDEQ regarding this project. Please send your response back to me at:

Rich Fillbach
Great West Engineering
602 Ferguson, Suite 1
Bozeman, MT 59718

Sincerely,

Great West Engineering, Inc.

Rich Fillbach, PE
Project Engineer

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°°6.587.0504
406.587.0541

GreatWest engineering

February 28, 2010

Mr. Todd Tillinger, Project Manager
US Army Corps of Engineers
Montana Regulatory Program
10 West 15th Street, Suite 2200
Helena, Montana, 59626

RE: Gallatin Gateway County Water & Sewer District
Community Wastewater Treatment System

Dear Mr. Tillinger:

The Gallatin Gateway County Water and Sewer District (District) primarily encompasses the town of Gallatin Gateway, Montana, which is located in the central part of Gallatin County in southwestern Montana. The nearest large city is Bozeman, which lies roughly nine miles to the northeast. The town is situated along US Highway 191 and adjacent to the Gallatin River. More specifically, the town is located at:

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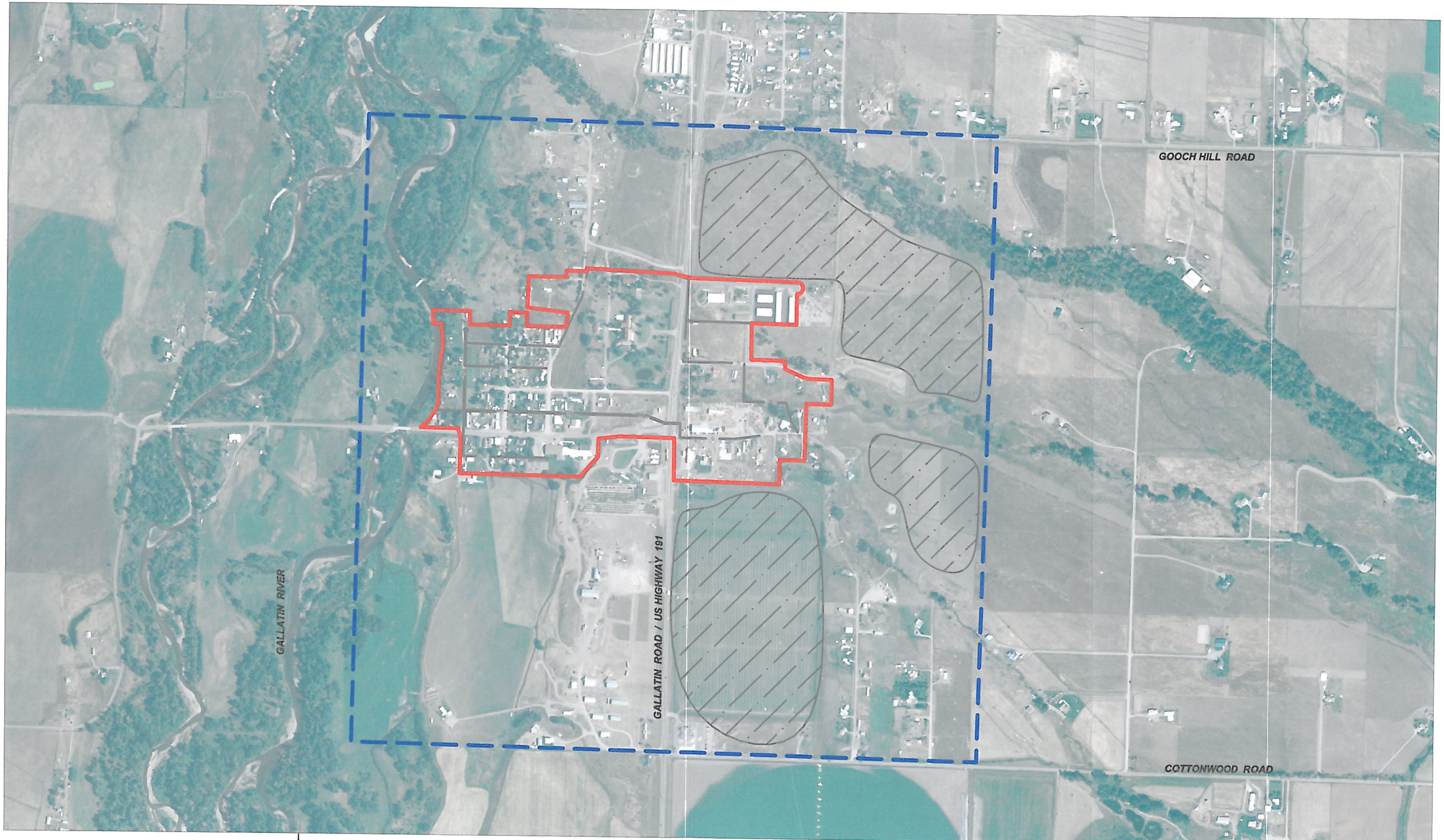
We would appreciate feedback and comments from the US Army Corps of Engineers regarding this project. Please send your response back to me at:

Rich Fillbach
Great West Engineering
602 Ferguson, Suite 1
Bozeman, MT 59718

Sincerely,

Great West Engineering, Inc.

Rich Fillbach, PE
Project Engineer



Scale:

0 400 800

SCALE IN FEET

NORTH

Legend:

EXISTING DISTRICT BOUNDARY

PER 20-YEAR PLANNING AREA

POTENTIAL TREATMENT AREAS

GreatWest engineering

Figure 1.0
District Boundary &
20-year Planning Area

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERING REPORT (PER)

C:\Documents and Settings\rfillbach\Desktop\CADD 1-08159\Exhibits\1-08159-Overall System Area.dwg

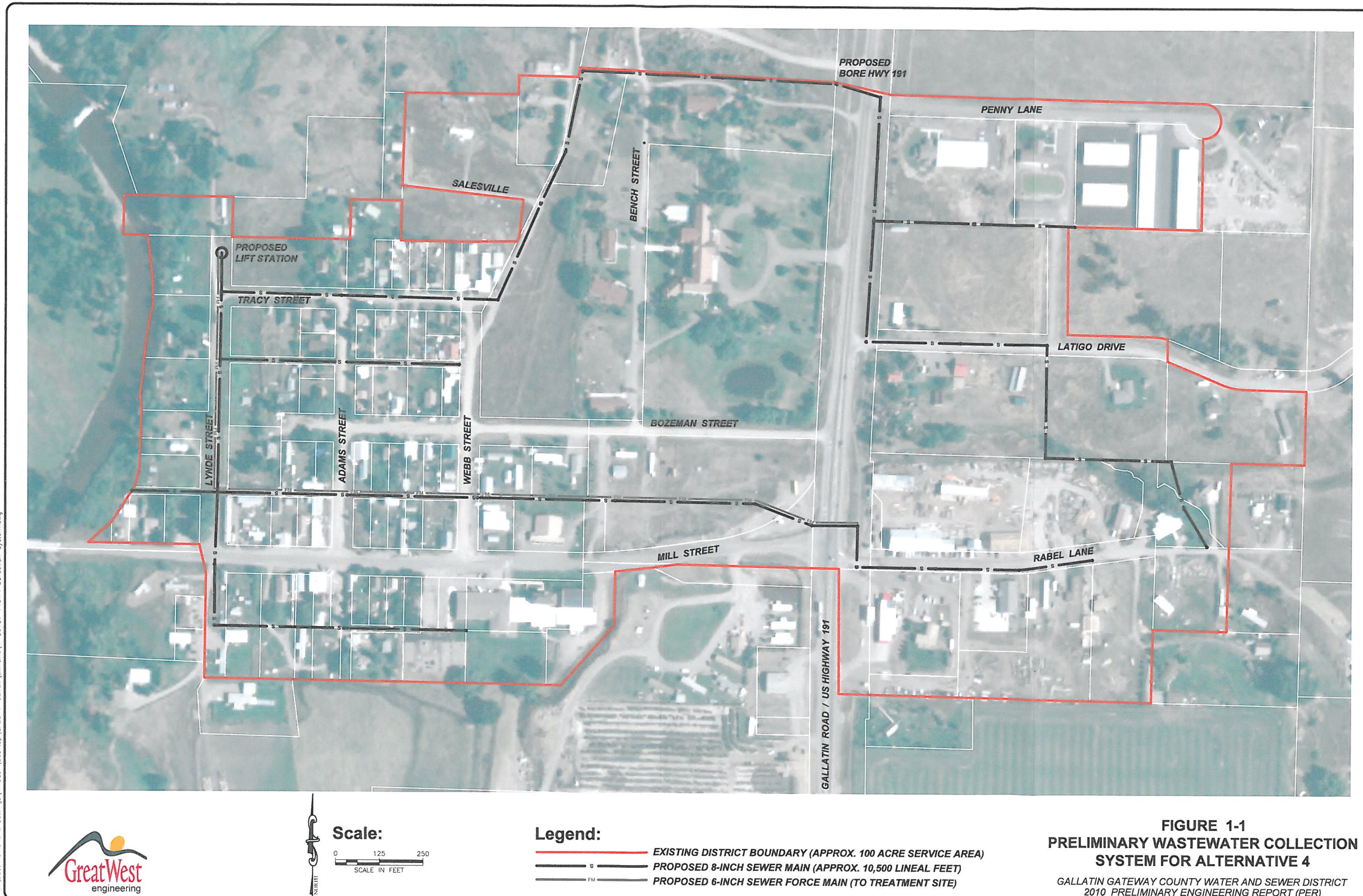


FIGURE 1-1
PRELIMINARY WASTEWATER COLLECTION SYSTEM FOR ALTERNATIVE 4

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERING REPORT (PER)

Appendix G

Floodplain Maps

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 12. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Gallatin County GIS Department.

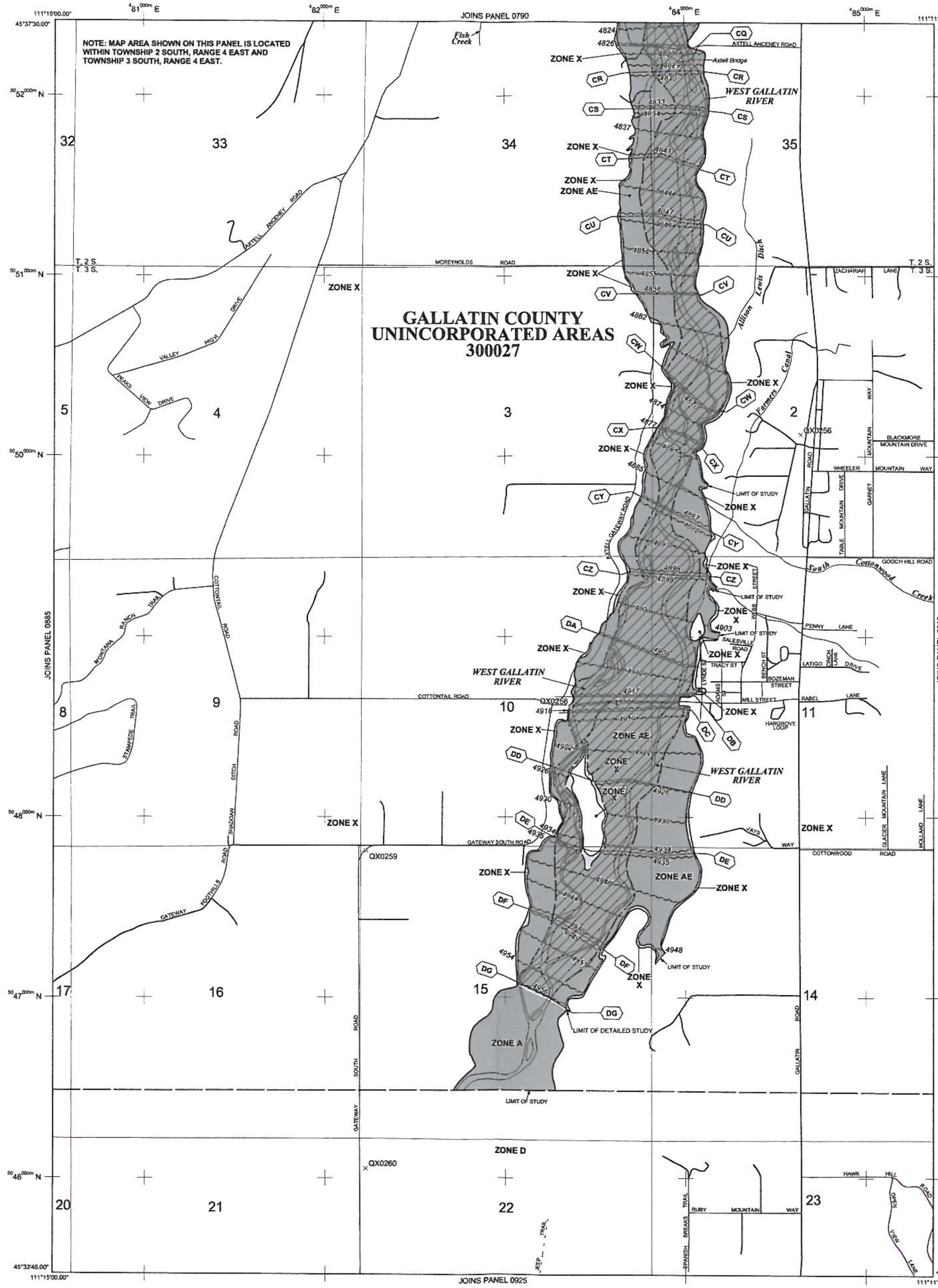
This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de- annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1- 800- 358- 9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1- 800- 358- 9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1- 877- 336- 2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

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

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

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

(A)——(A)	Cross section line
(23)- - - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 12
6000000 M	5000-foot grid ticks: Montana State Plane coordinate system, (FIPSZONE 2500), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1- 800- 638- 6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0905D

FIRM

FLOOD INSURANCE RATE MAP

GALLATIN COUNTY, MONTANA

AND INCORPORATED AREAS

PANEL 905 OF 1725

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

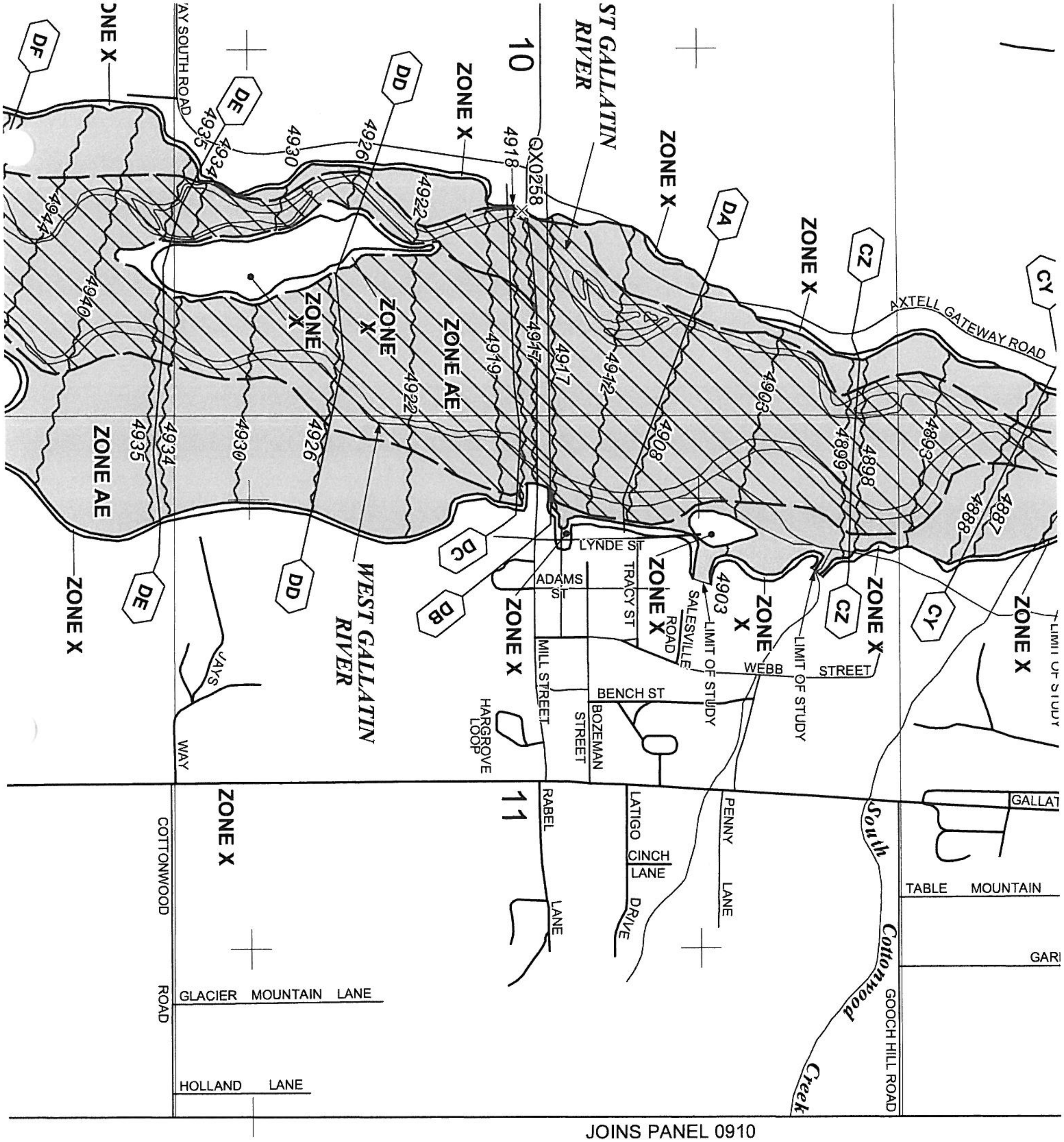
COMMUNITY	NUMBER	PANEL	SUFFIX
GALLATIN COUNTY	300027	0905	D

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

MAP NUMBER
30031C0905D

EFFECTIVE DATE

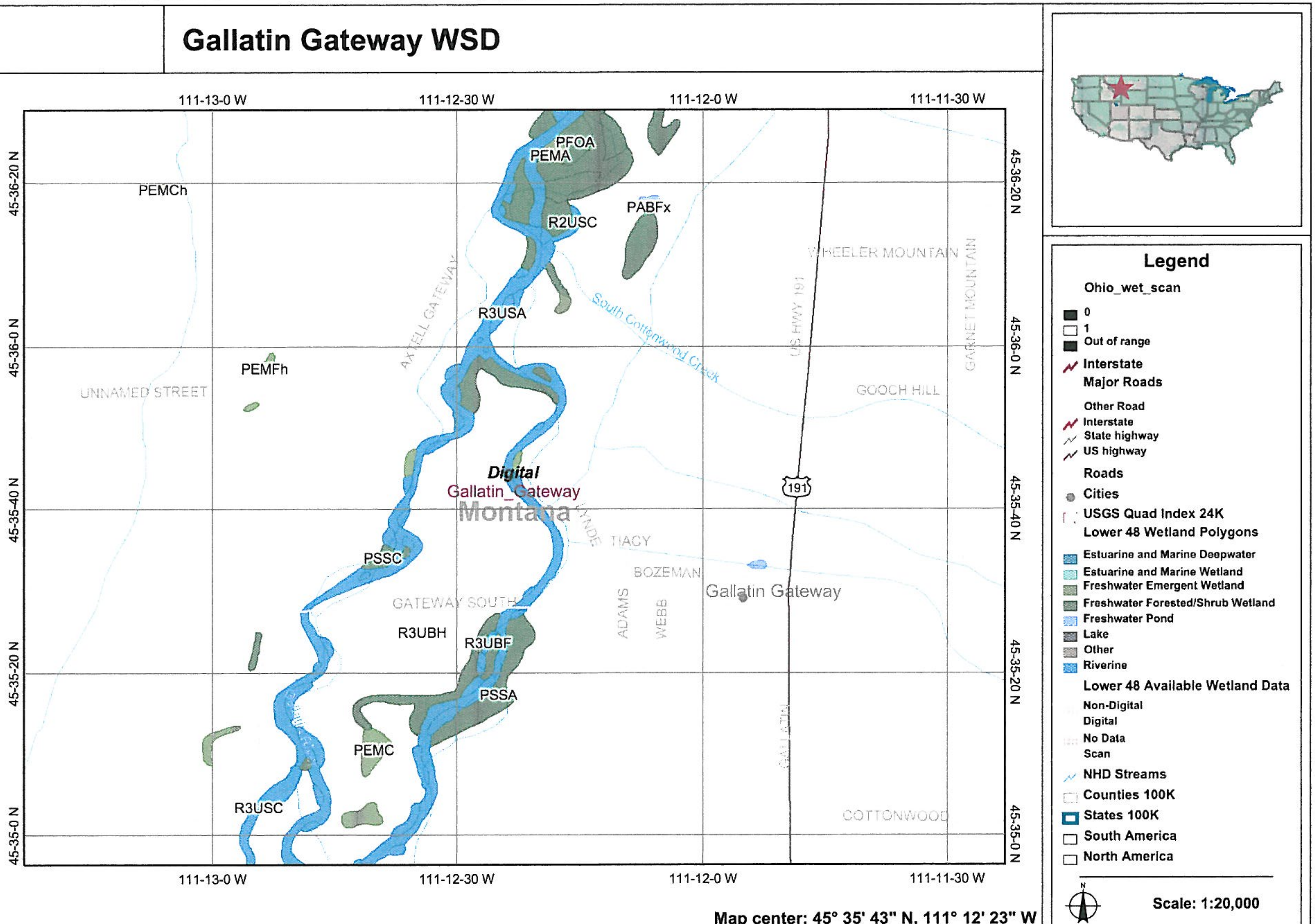
Federal Emergency Management Agency


ZONE X
ZONE AE
WEST GALLATIN RIVER
AXTELL GATEWAY ROAD
LYNDE ST
ADAMS ST
TRACY ST
SALESVILLE ROAD
LIMIT OF STUDY
WEBB STREET
BENCH ST
MILL STREET
BOZEMAN STREET
HARGROVE LOOP
JAYS WAY
RABEL LANE
LATIGO DRIVE
CINCH LANE
PENNY LANE
South Cottonwood Creek
TABLE MOUNTAIN
GOOCH HILL ROAD
COTTONWOOD ROAD
GLACIER MOUNTAIN LANE
HOLLAND LANE
GX0258
10
11
DF
DE
DD
DC
DB
DA
CZ
CY
4944
4940
4935
4934
4930
4926
4922
4919
4918
4917
4912
4908
4903
4899
4898
4893
4888
4887
JOINS PANEL 0910

Appendix H

Wetlands Map

Gallatin Gateway WSD



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Appendix I

Agency Response Letters

United States Department of the Interior
Fish and Wildlife Service

Ecological Services
Montana Field Office
585 Shepard Way
Helena, Montana 59601-6287

Phone: (406) 449-5225 Fax: (406) 449-5339

March 2, 2010

Mr. Rich Fillbach, P.E.
Project Engineer
Great West Engineering
602 Ferguson, Suite #1
Bozeman, MT 59718

Dear Mr. Fillbach:

We have examined the project description, the aerial photographic-maps and drawings that were included with your cover letter dated February 28, 2010, relative to new sewage treatment facilities proposed for the Gallatin Gateway County Water and Sewer District, southwest of Bozeman, Montana. We support any viable wastewater treatment option(s) that are likely to result in improved quality of the waters in the State of Montana, as this is generally beneficial to fish, wildlife, and habitat resources under the purview of the U.S. fish and Wildlife Service.

Please telephone me at 406/449-5225, ext. 205, if you have any questions regarding this matter.

Sincerely,

R. Mark Wilson

R. Mark Wilson
Field Supervisor

Rich Fillbach

From: Murdo, Damon [dmurdo@mt.gov]
Sent: Tuesday, February 16, 2010 1:07 PM
To: Rich Fillbach
Subject: RE: Historic Information Gallatin Gateway
Attachments: CRABS.pdf

February 16, 2010

Rich Fillbach
Great West Engineering
602 Ferguson Ave, Suite 1
Bozeman MT 59718

RE: GALLATIN GATEWAY WASTEWATER SYSTEM PROJECT (PER). SHPO Project #2010021603

Dear Mr. Fillbach:

I have conducted a cultural resource file search for the above-cited project located in Section 11, T3N R4E. According to our records there have been two previously recorded sites within the designated search locale. Site 24GA0746 is the historic Gallatin Gateway Inn, which is listed on the National Register of Historic Places. Site 24GA0998 is a historic irrigation ditch. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. I've attached a list of the reports. If you would like any further information regarding the sites or reports you may contact me at the number listed below.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old we would recommend that they be recorded and a determination of their eligibility be made.

As long as there will be no disturbance or alteration to structures over fifty years of age we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials be inadvertently discovered during this project we would ask that our office be contacted and the site investigated.

If you have any further questions or comments you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

File: DEQ/AIR&WATER WASTE MNG/2010

State Historic Preservation Office

Cultural Resource Annotated Bibliography System Report

Report Date: 02/16/2010

Township: 03S Range: 04E Section: 11

AXLINE JON A.
3/17/1994 *GALLATIN RIVER BRIDGES - GALLATIN GATEWAY*
CRABS Document Number: GA 4 15661

Township: 03S Range: 04E Section: 11

LOVEJOY MARY
6/1/1994 *PROPOSED POST OFFICE FACILITY, GALLATIN GATEWAY, GALLATIN COUNTY MT.*
CRABS Document Number: GA 6 16971

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
HELENA REGULATORY OFFICE
10 WEST 15TH STREET, SUITE 2200
HELENA, MONTANA 59626-9795

REPLY TO
ATTENTION OF

April 5, 2010

Regulatory Branch
Montana State Program
Corps No. **NWO-2010-00410-MTH**

Subject: Wastewater System Installation – Gallatin Gateway Community

Great West Engineering
Attn: Rich Fillbach, PE
602 South Ferguson Avenue, Suite 1
Bozeman, Montana 59718-6483

Dear Mr. Fillbach:

We have reviewed the pre-application consultation request submitted on behalf of the Gallatin Gateway Community to install a wastewater treatment system and sewer lines. The proposed project is located in Section 11, Township 3 South, Range 4 East, in Gallatin County, Montana.

Under the authority of Section 404 of the Clean Water Act, Department of the Army (DA) permits are required for the discharge of fill material into waters of the U.S. Waters of the U.S. include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis. The project site includes the East Fork of the Gallatin River and tributaries. The Gallatin River is a tributary of the Missouri River, a traditionally navigable water of the U.S. under DA jurisdiction.

Based on the information received, if the forced sewer or main lines are installed by boring beneath the creeks or canals, no DA permit is required for those crossings. If the sewer lines installation involves placement of fill within the East Fork of the Gallatin River, its tributaries or canals, below the ordinary high water mark, a DA permit is required. If the project involves placement of fill in wetlands adjacent to the East Fork of the Gallatin River or its tributaries, a DA permit is required. It is unclear if the project area includes wetlands or waters that have not been delineated by the U.S. Geological Survey. The project area should be reviewed by a qualified wetland delineator in order to determine if wetlands and jurisdictional waters are present.

This does not eliminate the requirement to obtain other applicable Federal, state, tribal and local permits. Information on DA permits and applications are available at *https://www.nwo.usace.army.mil/html/od-rmt/mthome.htm.*

Please contact Amy Gucker or myself at (406) 441-1375 if you have any questions and reference Corps File Number NWO-2010-00410-MTH.

Sincerely,

Todd N. Tillinger
Montana Program Manager

Printed on Recycled Paper

Montana Department of
ENVIRONMENTAL QUALITY

Brian Schweitzer, Governor
Richard H. Opper, Director

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

March 25, 2010

Rich Fillbach, PE
Great West Engineering, Inc.
602 Ferguson, Suite 1
Bozeman, MT 59718

RE: Gallatin Gateway County Water and Sewer District Proposed Community Wastewater Treatment System

Dear Mr. Fillbach:

This letter is in response to your request for comments from the DEQ on the proposed community wastewater treatment facility for the Gallatin Gateway community. Not enough information was provided to make any substantive review comments at this time.

The rapid infiltration basin and Level II drainfield alternatives referred to in your letter would most likely require a Montana Ground Water Pollution Control System permit. Information on permitting requirements may be obtained by contacting Lou Volpe at (406) 444-6769 or by accessing the Department's website at: www.deq.mt.gov. We appreciate the opportunity to comment.

Sincerely,

Michele Marsh

Michele Marsh, P.E.
Environmental Engineer
Technical & Financial Assistance Bureau

Appendix J

Gallatin City-County Health Department & Local Water Quality District Letters

Gallatin Local Water Quality District

1709 W. College Street, Suite 104 - Judge Guenther Memorial Center - Bozeman, MT 59715
406-582-3148 www.gallatin.mt.gov/GLWQD

February 11, 2010

Mr. Rich Fillbach, PE
Great West Engineering, Inc.
602 Ferguson Avenue, Suite 1
Bozeman, MT 59718

Subject: Water Quality Concerns in the Gallatin Area

Dear Mr. Fillbach:

It is my understanding that you are working with folks in the Gallatin Gateway area to prepare a Preliminary Engineering Report for a community sewage system. Current sewage treatment in this area is primarily by individual septic systems, and a few public sewage systems. Due to the hydrogeology in the area, there are several concerns with the continued use of individual septic systems, and potential expanded use of septic systems as the population in the area grows.

The existing high density development in Gallatin Gateway has resulted in a situation where individual wells are intermingled with septic systems on small lots. This places drinking water wells and septic systems in close proximity, increasing the public health risk. Specifically, much of the current development is on lots under 1/2-acre in size, resulting in wells that are closer than the standard 100-foot separation from nearby septic systems.

The close proximity of wells and septic systems is even more of a health risk in this area because the water table is shallow (typically less than 15 feet deep), and the aquifer materials are primarily coarse sands and gravels. In this setting bacteria and viruses can travel further and faster, increasing the risk of contamination of wells in the community.

For these reasons, the development of a community sewage system, if properly sited, would reduce the public health risk in the area and help improve water quality. In closing, I support and encourage development of a community wastewater treatment system in the Gallatin Gateway area, if there is anything I can do to assist the community, please let me know.

Sincerely,

Alan English

Alan English
Manager

Gallatin City-County Health Department

www. gallatin.mt.gov/health

Human Services
215 W. Mendenhall, Rm 117
Bozeman, MT 59715-3478
(406) 582-3100 ● Fax (406) 582-3112

Environmental Health Services
215 W. Mendenhall, Rm 108
Bozeman, MT 59715-3478
406-582-3120 ● Fax: 406-582-3128

February 17, 2010

Rich Fillbach, P.E.
Great West Engineering
602 Ferguson Ave., Suite #1
Bozeman, MT 59718

Re: Gallatin Gateway

Dear Mr. Fillbach,

On February 11, 2010, you requested a letter from the Gallatin City-County Health Department summarizing any possible public health concerns the Department may harbor regarding septic systems in Gallatin Gateway. As is well known, Gallatin Gateway (formally known as Salesville) was established a long time ago and many of the septic disposal systems pre-date Health Department regulations established in 1966.

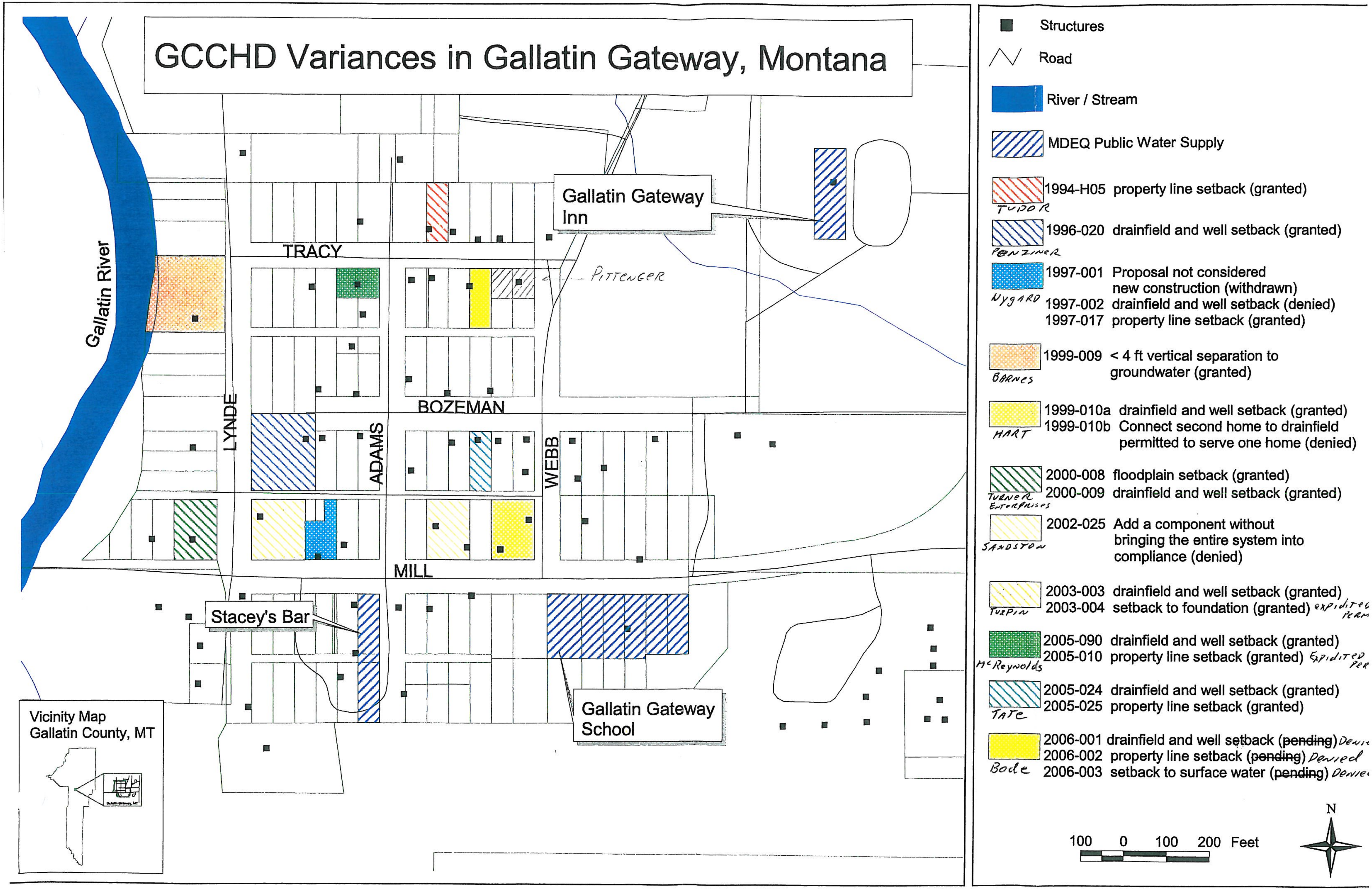
Gallatin Gateway is considered an "Area of Concern" by the Gallatin City-County Board of Health and Health Department. In Gallatin Gateway's case, small lot sizes within the town prohibit adherence to State and County septic regulations (e.g. a 100 foot separation requirement between a water well and a septic disposal area or a 10 foot separation from a septic disposal area and a property boundary line). The proximity of the Gallatin River, the poor filtering characteristics of the soils in the area, the age and effectiveness of the septic disposal systems are additional concerns.

Attached is a map showing variances from State and local septic regulations issued by the Health Department. For these reasons, the Board of Health and the Health Department endorses the establishment of a public wastewater treatment system to service Gallatin Gateway. If you have any questions, please don't hesitate to contact me at 582-3120.

Sincerely,

Tim Roark
Interim Health Officer
Gallatin City-County Health Department

C: Barbara Vaughn, Chairman, Gallatin City-County Board of Health



GCCHD Variances in Gallatin Gateway, Montana
Gallatin River
Gallatin Gateway Inn
PITTENGER
TRACY
BOZEMAN
MILL
LYNDE
ADAMS
WEBB
Stacey's Bar
Gallatin Gateway School
Vicinity Map
Gallatin County, MT
Structures
Road
River / Stream
MDEQ Public Water Supply
1994-H05 property line setback (granted)
TUDOR
1996-020 drainfield and well setback (granted)
1997-001 Proposal not considered new construction (withdrawn)
NYGARD
1997-002 drainfield and well setback (denied)
1997-017 property line setback (granted)
1999-009 < 4 ft vertical separation to groundwater (granted)
BARNES
1999-010a drainfield and well setback (granted)
1999-010b Connect second home to drainfield permitted to serve one home (denied)
HART
2000-008 floodplain setback (granted)
2000-009 drainfield and well setback (granted)
TURNER Enterprises
2002-025 Add a component without bringing the entire system into compliance (denied)
SANDSTON
2003-003 drainfield and well setback (granted)
2003-004 setback to foundation (granted)
TURPIN
2005-090 drainfield and well setback (granted)
2005-010 property line setback (granted)
McReynolds
2005-024 drainfield and well setback (granted)
2005-025 property line setback (granted)
TATE
2006-001 drainfield and well setback (~~pending~~)
2006-002 property line setback (~~pending~~) Denied
2006-003 setback to surface water (~~pending~~)
Bode
100 0 100 200 Feet
N

Appendix K

Climate Data

BOZEMAN 6 W EXP FARM, MONTANA (241047)

Period of Record Monthly Climate Summary

Period of Record : 11/1/1966 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	33.6	38.3	45.9	55.6	64.8	73.0	82.0	81.8	71.2	58.4	42.4	34.1	56.8
Average Min. Temperature (F)	12.4	16.3	22.4	29.8	37.7	44.1	49.0	47.6	39.9	31.3	20.8	13.0	30.3
Average Total Precipitation (in.)	0.58	0.51	1.05	1.63	2.67	2.78	1.42	1.27	1.48	1.42	0.86	0.59	16.28
Average Total SnowFall (in.)	8.7	6.1	10.1	7.6	1.4	0.1	0.0	0.1	0.4	3.6	8.0	8.4	54.3
Average Snow Depth (in.)	4	3	2	0	0	0	0	0	0	0	1	2	1

Percent of possible observations for period of record.
Max. Temp.: 99.8% Min. Temp.: 99.8% Precipitation: 99.7% Snowfall: 99.4% Snow Depth: 97.7%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

BOZEMAN 6 W EXP FARM, MONTANA

Period of Record General Climate Summary - Temperature

Station:(241047) BOZEMAN 6 W EXP FARM															
From Year=1966 To Year=2006															
	Monthly Averages			Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	Max.	Min.	Mean	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	F	F	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	33.6	12.4	23.0	61	16/1974	-32	28/1980	32.6	1994	4.8	1979	0.0	11.9	29.1	6.8
February	38.3	16.3	27.3	64	24/1995	-35	05/1989	36.9	1991	10.3	1989	0.0	6.9	26.1	3.7
March	45.9	22.4	34.2	76	30/2004	-20	03/1976	43.2	1986	23.5	1969	0.0	2.8	27.0	1.4
April	55.6	29.8	42.7	81	30/1987	-3	08/1982	50.5	1987	32.8	1975	0.0	0.3	19.7	0.1
May	64.8	37.7	51.3	90	12/2001	16	01/1967	55.8	1992	47.3	1975	0.1	0.0	7.3	0.0
June	73.0	44.1	58.5	98	30/1990	28	08/1979	66.2	1988	54.5	1998	0.6	0.0	1.1	0.0
July	82.0	49.0	65.5	101	31/2000	32	08/1981	70.3	2003	57.0	1993	4.1	0.0	0.0	0.0
August	81.8	47.6	64.7	100	24/1969	26	25/1992	70.2	2001	58.4	1993	4.3	0.0	0.2	0.0
September	71.2	39.9	55.5	95	03/2001	13	29/1985	62.5	1998	49.6	1985	0.7	0.0	4.8	0.0
October	58.4	31.3	44.8	85	11/1996	-10	30/1991	50.3	1988	37.7	1969	0.0	0.5	17.1	0.1
Novem	42.	20.	31.6	75	12/1999	-23	21/1977	42.5	199	17.2	198	0.0	5.8	26.2	1.9

ber	4	8							9		5				
December	34.1	13.0	23.6	63	27/1980	-39	24/1983	32.5	1980	8.1	1983	0.0	12.1	29.3	5.0
Annual	56.8	30.3	43.6	101	20000731	-39	19831224	46.2	1999	40.6	1975	9.7	40.4	188.0	19.0
Winter	35.4	13.9	24.6	64	19950224	-39	19831224	30.3	1992	14.6	1979	0.0	31.0	84.6	15.5
Spring	55.5	30.0	42.7	90	20010512	-20	19760303	48.2	1992	36.0	1975	0.1	3.1	54.1	1.5
Summer	78.9	46.9	62.9	101	20000731	26	19920825	66.2	1988	57.2	1993	9.0	0.0	1.3	0.0
Fall	57.3	30.7	44.0	95	20010903	-23	19771121	48.4	1998	36.5	1985	0.7	6.3	48.0	2.0

Table updated on Jul 28, 2006

For monthly and annual means, thresholds, and sums:

Months with 5 or more missing days are not considered

Years with 1 or more missing months are not considered

Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

BOZEMAN 6 W EXP FARM, MONTANA

Period of Record General Climate Summary - Precipitation

Station:(241047) BOZEMAN 6 W EXP FARM														
From Year=1966 To Year=2006														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	0.58	1.27	1995	0.10	1983	0.57	14/2003	6	2	0	0	8.7	25.0	1997
February	0.51	1.57	1980	0.00	1977	0.60	24/1996	5	2	0	0	6.1	20.5	1986
March	1.05	2.41	1967	0.29	1969	0.97	29/1967	9	4	0	0	10.1	28.7	1980
April	1.63	3.09	1971	0.39	1977	0.98	18/2005	10	5	1	0	7.6	20.9	1982
May	2.67	6.15	1981	0.63	2001	2.18	07/1988	13	7	1	0	1.4	16.0	1975
June	2.78	7.04	1969	0.43	1974	2.54	13/2001	13	7	2	0	0.1	2.0	1973
July	1.42	5.21	1993	0.06	1996	2.08	03/1993	8	4	1	0	0.0	0.0	1967
August	1.27	2.63	1987	0.00	2001	1.65	08/1995	8	4	0	0	0.1	2.5	1992
September	1.48	3.64	1978	0.05	1979	1.56	21/1984	8	4	1	0	0.4	3.0	1983
October	1.42	3.53	1975	0.12	2002	1.29	04/1992	8	4	1	0	3.6	14.1	1969
November	0.86	2.10	1983	0.14	2001	0.78	14/1996	7	3	0	0	8.0	19.0	1973

December	0.59	1.42	1975	0.07	1976	0.58	25/1996	6	2	0	0	8.4	36.0	1996
Annual	16.28	21.50	1975	11.47	2001	2.54	20010613	102	48	7	1	54.3	109.8	1975
Winter	1.68	2.93	1997	0.44	1977	0.60	19960224	18	6	0	0	23.1	77.0	1997
Spring	5.35	8.71	1981	2.04	2001	2.18	19880507	32	16	2	0	19.0	45.9	1982
Summer	5.47	11.39	1993	0.98	1996	2.54	20010613	29	15	3	0	0.2	2.5	1992
Fall	3.77	6.81	1983	1.03	2003	1.56	19840921	22	11	2	0	12.0	27.5	1996

Table updated on Jul 28, 2006
For monthly and annual means, thresholds, and sums:
Months with 5 or more missing days are not considered
Years with 1 or more missing months are not considered
Seasons are climatological not calendar seasons
Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May
Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Evaporation Stations

Standard daily pan evaporation is measured using the four-foot diameter Class A evaporation pan. The pan water level reading is adjusted when precipitation is measure to obtain the actual evaporation. Most Class A pans are installed above ground, allowing effects such as radiation on the side walls and heat exchnges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals b 0.70 or 0.80 to more closely estimate the evaporation from naturally existing urfaces such as a shallow lake, wet soil or other moist natural surfaces.

Many stations do not measure pan evaportation during winter months. A "0.00" total indicates no measuement is taken.

Stations marked with an asterisk (*) have estimated totals computed from meteorological measurements using a form of the Penman equation.

Click on a State: Arizona, California, Colorado, Hawaii & Pacific Islands, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

ALASKA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BROOKS RIVER	1967-1990	0.00	0.00	0.00	0.00	0.00	2.48	2.88	1.63	0.73	0.00	0.00	0.00	7.72
CENTRAL 2	1962-2005	0.00	0.00	0.00	0.00	0.00	3.97	4.00	2.43	2.19	0.00	0.00	0.00	12.59
COPPER CENTER	1961-1982	0.00	0.00	0.00	0.00	0.00	6.03	4.06	3.14	1.71	0.00	0.00	0.00	14.94
JUNEAU AP	1949-2005	0.00	0.00	0.00	0.00	3.33	3.29	3.82	3.14	1.02	0.00	0.00	0.00	14.60
MATANUSKA AES	1917-2005	0.00	0.00	0.00	0.00	4.22	4.44	3.92	3.05	1.83	0.00	0.00	0.00	17.46
MC GRATH WB AIRPORT	1939-2005	0.00	0.00	0.00	0.00	4.20	4.42	3.65	2.29	1.40	0.00	0.00	0.00	15.96
MCKINLEY PARK	1949-2005	0.00	0.00	0.00	0.00	0.00	2.96	2.55	1.75	0.53	0.00	0.00	0.00	7.79
OIL WELL ROAD E P	1967-1974	0.00	0.00	0.00	0.00	0.00	5.17	3.83	2.81	1.40	0.00	0.00	0.00	13.21
OLD EDGERTON	1970-1996	0.00	0.00	0.00	0.00	3.31	4.56	4.16	3.04	1.65	0.00	0.00	0.00	16.72
PALMER AAES	1949-2005	0.00	0.00	0.00	0.00	4.44	4.71	4.12	2.96	1.75	0.00	0.00	0.00	17.98
RAMPART 2	1963-1978	0.00	0.00	0.00	0.00	4.23	4.56	3.79	2.56	1.54	0.00	0.00	0.00	16.68
COLLEGE UNIV EXP STN	1931-2005	0.00	0.00	0.00	0.00	4.25	5.04	4.56	2.82	1.38	0.00	0.00	0.00	18.05

ARIZONA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BARTLETT DAM	1939-2005	3.92	4.92	7.10	10.02	13.77	16.21	15.56	13.95	12.10	9.66	5.86	4.47	117.54
BLACK RIVER PUMPS	1948-2005	0.00	0.00	0.00	6.93	8.83	10.12	7.99	7.02	5.70	3.94	0.00	0.00	50.53
DAVIS DAM # 2	1958-1977	7.49	7.46	9.75	12.78	16.71	19.48	19.87	17.91	14.64	12.03	8.40	7.80	154.32
DAVIS DAM	1948-1961	3.54	5.13	7.60	9.30	11.33	13.33	13.14	12.15	9.51	7.24	5.38	3.88	101.53
DOUGLAS	1948-2005	0.00	0.00	0.00	11.34	13.19	13.55	10.66	10.27	8.18	6.44	0.00	0.00	73.63
FORT VALLEY	1909-2005	0.00	0.00	0.00	0.00	5.86	7.37	6.03	4.91	3.35	0.00	0.00	0.00	27.52
GRAND CANYON NATL PARK	1957-1977	0.00	0.00	0.00	0.00	6.94	10.45	8.79	8.12	6.83	4.91	0.00	0.00	46.04
GRAND CANYON N P 2	1976-2005	0.00	0.00	0.00	0.00	7.46	9.80	8.94	7.29	6.10	4.45	0.00	0.00	44.04
HAWLEY LAKE	1967-1988	0.00	0.00	0.00	0.00	7.57	8.55	6.89	5.48	4.68	0.00	0.00	0.00	33.17
MANY FARMS SCHOOL	1951-1975	0.00	3.66	5.45	9.18	12.23	15.14	12.87	10.88	9.40	6.54	3.26	2.16	90.77
MC NARY 2 N	1933-2005	0.00	0.00	0.00	0.00	7.86	8.25	6.60	5.98	4.90	3.97	0.00	0.00	37.56
MESA	1896-2005	3.03	4.02	6.11	8.64	11.33	12.67	13.10	11.87	9.69	6.81	4.15	2.96	94.38
NOGALES 6 N	1952-2005	3.59	4.46	7.01	9.35	11.91	13.31	10.00	8.28	8.06	7.17	4.49	3.57	91.20
PAGE	1957-2005	0.00	2.60	5.84	8.27	10.72	12.86	13.06	11.38	8.42	5.13	2.29	0.00	80.57
ROOSEVELT 1 WNW	1905-2005	2.44	3.54	5.90	8.64	11.96	14.50	14.36	12.27	10.10	6.78	3.68	2.32	96.49
SACATON	1908-2005	3.83	5.15	7.51	10.06	13.56	14.89	13.69	12.05	10.20	7.91	4.94	3.63	107.42
SAFFORD AGRICULTRL CTR	1948-2005	2.63	3.83	7.14	10.54	13.81	15.38	13.13	10.68	8.73	5.90	3.28	2.52	97.57
SAN CARLOS RESERVOIR	1948-2005	2.25	3.27	5.66	8.40	11.70	13.94	13.43	11.40	9.23	6.31	3.53	2.18	91.30
SIERRA ANCHA	1913-1979	2.19	2.93	4.58	6.42	8.97	10.94	10.39	8.88	8.00	6.22	3.50	2.37	75.39
SNOWFLAKE 15 W	1965-1998	0.00	0.00	0.00	0.00	11.03	14.38	11.29	9.12	7.96	6.45	3.40	0.00	63.63
STEWART MOUNTAIN	1948-2005	3.52	4.56	6.94	10.04	13.11	14.27	14.44	13.10	10.69	7.95	4.53	3.08	106.23
TEMPE A S U	1953-2005	1.56	2.93	4.79	7.04	9.44	10.85	10.99	9.92	7.63	5.14	2.56	1.44	74.29
TUCSON UNIV OF ARIZONA	1894-2005	3.25	4.57	6.95	9.88	12.87	14.91	13.17	11.65	10.35	7.81	4.73	3.37	103.51
TUCSON U OF ARIZ # 1	1982-2005	3.94	4.68	7.53	10.57	14.14	16.51	14.61	12.17	10.71	8.05	4.93	3.23	111.07
WAHWEAP	1961-2005	1.95	2.77	6.30	9.42	12.82	14.94	15.26	13.31	10.06	7.06	3.69	2.60	100.18
WHITERIVER 1 SW	1900-2005	1.69	2.94	5.84	8.01	9.92	11.70	9.48	8.47	7.68	5.87	3.51	2.54	77.65
WINKELMAN 6 S	1942-1980	3.12	4.03	7.00	9.98	12.40	13.90	11.19	9.84	9.56	7.51	4.31	2.94	95.78
YUMA CITRUS STATION	1920-2005	3.58	4.36	6.81	9.17	11.75	13.19	13.85	12.28	9.51	6.91	4.43	3.37	99.21

CALIFORNIA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ANTIOCH PUMP PLANT 3	1955-2005	1.17	1.99	4.25	6.27	8.96	10.84	11.60	10.06	7.77	4.91	2.07	1.22	71.11
AUBURN DAM PROJECT	1972-1984	1.42	1.89	3.13	4.89	7.73	10.08	11.66	10.70	8.08	5.00	1.97	1.36	67.91

AVENAL 9 SSE	1955-1961	1.80	2.90	6.20	9.39	12.96	16.73	18.67	16.37	12.61	8.05	3.89	2.44	112.01
BACKUS RANCH	1948-1963	2.85	3.86	6.77	9.80	12.69	15.93	16.92	15.95	12.19	8.01	4.25	2.98	112.20
BEAUMONT PUMPING PLANT	1948-1975	2.90	3.29	4.08	5.03	6.40	8.15	10.64	9.97	7.90	5.87	3.22	2.90	70.35
BEAUMONT 1 E	1948-2001	3.10	3.73	4.99	5.23	7.60	9.31	10.97	10.66	8.85	6.53	5.16	3.95	80.08
BERRYESSA LAKE	1957-1970	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	5.72	2.48	1.66	77.00
BOCA	1948-2005	0.00	0.00	0.00	0.00	6.83	8.52	10.01	9.09	6.48	4.32	0.00	0.00	45.25
BRANNAN ISLAND	1968-1977	1.15	1.74	4.36	7.03	10.49	12.39	13.51	12.02	9.03	4.80	1.83	1.08	79.43
CACHUMA LAKE	1952-2005	2.44	3.53	4.41	6.01	7.55	8.56	9.50	8.98	7.00	5.42	3.49	2.79	69.68
CAMP PARDEE	1948-2005	0.72	1.12	2.32	4.18	7.04	9.43	11.17	9.50	6.51	3.77	1.40	0.72	57.88
CHICO EXPERIMENT STN	1906-2005	1.26	2.13	3.82	5.63	8.28	10.11	11.48	9.71	7.36	4.46	2.09	1.30	67.63
CHULA VISTA	1948-2005	2.81	3.45	5.03	6.06	6.76	6.96	7.63	7.48	6.21	5.02	3.58	2.78	63.77
COW CREEK	1948-1961	3.21	5.62	9.78	13.98	17.25	21.37	21.89	20.17	15.36	10.71	4.91	3.85	148.10
DAVIS 1 WSW	1917-2005	1.49	2.34	4.54	7.13	10.19	12.17	12.77	11.28	9.08	6.35	2.89	1.45	81.68
DEATH VALLEY	1961-2005	3.93	5.38	9.10	13.00	16.76	19.11	20.98	18.86	13.95	9.78	5.54	3.75	140.14
DUTTONS LANDING	1955-1977	1.42	2.09	3.87	5.70	7.74	9.34	9.34	8.27	6.75	4.65	2.25	1.46	62.88
FALL RIVER MILLS INTAKE	1948-2005	0.00	0.00	2.47	5.80	7.54	9.48	12.14	10.57	7.59	3.78	1.14	0.00	60.51
FERNDALE 2 NW	1963-1973	0.70	1.17	2.26	3.21	3.95	4.38	4.49	4.07	3.59	2.06	1.04	0.72	31.64
FOLSOM DAM	1955-1993	0.92	1.90	3.47	5.21	8.07	9.91	11.12	9.93	7.45	4.89	2.06	1.25	66.18
FRIANT GOVERNMENT CAMP	1948-2005	1.46	2.12	3.82	5.89	9.42	12.07	13.96	12.47	9.00	5.76	2.61	1.37	79.95
GRIZZLY ISLAND REFUGE	1971-1977	1.45	2.25	4.00	5.72	8.07	9.82	10.69	8.93	6.88	4.33	2.10	1.55	65.79
HETCH HETCHY	1931-2005	0.00	0.00	0.00	3.84	5.31	7.34	8.78	7.86	5.85	3.23	1.74	0.00	43.95
INDIO FIRE STATION	1927-2005	2.85	4.38	7.15	9.98	12.73	14.85	14.95	13.59	10.80	7.60	3.98	2.49	105.35
KETTLEMAN CITY 1 SSW	1955-2005	1.73	2.99	5.80	8.32	11.75	14.27	16.11	14.74	10.82	7.30	3.46	1.74	99.03
KNIGHTS FERRY 2 ESE	1959-1977	1.00	1.69	3.14	5.65	8.54	10.14	11.60	10.31	7.74	4.62	2.69	1.00	68.12
LAKE PILLSBURY 2	1964-1970	0.58	1.42	3.01	4.62	7.41	8.38	10.31	9.35	6.93	3.61	1.19	0.87	57.68
LAKESHORE 2	1948-1972	1.09	1.68	2.97	4.78	6.15	7.43	9.71	8.79	6.44	3.40	1.41	0.95	54.80
LAKE SOLANO	1975-2005	1.48	2.37	4.28	6.66	9.24	11.24	11.53	9.86	7.58	5.26	2.59	1.67	73.76
LAKE SPAULDING	1914-2003	0.00	0.00	0.00	0.00	4.57	6.52	8.16	6.78	4.54	1.98	0.00	0.00	32.55
LAKE SPAULDING DAM	1955-1971	0.00	0.00	0.00	0.00	7.20	9.98	12.38	11.85	8.94	6.64	0.00	0.00	56.99
LITTLE PANOCHE DET DAM	1968-1975	1.77	2.89	5.87	9.39	14.56	16.31	18.45	16.63	12.46	7.60	3.04	1.78	110.75
LODI	1948-2005	1.19	1.95	3.82	6.01	8.60	9.92	10.63	9.11	6.68	4.08	1.86	1.07	64.92
LOS BANOS DET RESV	1968-2005	1.57	2.71	5.44	9.34	14.18	16.58	17.85	15.63	11.87	7.49	3.34	1.82	107.82
MANDEVILLE ISLAND	1955-1965	1.10	2.38	4.77	6.95	8.55	10.44	11.22	9.71	7.41	5.12	2.47	1.13	71.25
MANTECA	1965-1977	1.20	1.71	4.04	6.33	9.24	10.53	11.64	10.22	7.19	4.13	1.78	1.16	69.17
MARKLEY COVE	1970-2005	1.03	1.51	3.03	4.80	7.33	9.60	10.82	9.45	6.99	4.35	1.75	1.01	61.67
MOJAVE	1948-2005	0.00	4.65	6.45	9.97	13.59	15.33	17.21	16.00	11.83	8.28	4.76	3.52	111.59
MONTICELLO DAM	1957-1970	1.02	1.83	3.24	4.96	7.35	9.36	11.20	10.07	7.56	4.82	1.98	1.08	64.47
NACIMIENTO DAM	1957-1978	1.58	2.20	3.92	5.53	7.92	9.85	11.28	10.43	7.76	5.16	2.57	1.66	69.86
NEWARK	1948-2005	1.71	2.15	4.16	5.76	7.77	8.64	9.04	8.00	6.64	4.52	2.36	1.55	62.30
NEW MELONES DAM	1979-1992	1.34	2.25	3.56	5.93	9.16	11.85	13.73	12.29	8.86	5.75	2.37	1.28	78.37
NEW MELONES DAM HQ	1992-2005	1.30	1.83	3.46	5.25	7.94	10.23	12.23	11.72	8.71	5.52	2.23	1.19	71.61
OAKDALE WOODWARD DAM	1948-1967	1.03	1.72	3.42	5.47	8.95	11.88	14.23	12.22	8.53	5.52	2.10	1.02	76.09
PLACERVILLE IFG	1955-1991	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	3.93	1.87	1.51	55.32
RIVERSIDE CITRUS EXP ST	1948-2005	3.32	3.59	4.86	6.28	7.33	8.59	10.88	10.28	7.84	5.85	3.81	3.03	75.66
SALT SPRINGS PWR HOUSE	1948-1998	1.84	2.47	3.27	4.86	6.49	7.92	10.30	9.95	7.89	5.18	2.68	2.26	65.11
SAN LUIS DAM	1963-2005	1.41	2.49	5.31	8.67	13.14	15.75	18.38	16.68	12.01	7.42	3.02	1.56	105.84
SHASTA DAM	1948-2005	1.50	2.08	3.17	5.05	7.28	9.18	11.36	10.36	7.55	4.85	2.29	1.63	66.30
STOCKTON MOWRY BRIDGE	1955-1965	0.72	1.58	3.87	5.97	8.47	10.95	10.82	9.56	6.60	3.93	1.70	0.74	64.91
TAHOE	1914-2005	0.00	0.00	0.00	0.00	4.27	5.23	5.98	5.35	3.16	1.57	0.00	0.00	25.56
TRACY PUMPING PLANT	1955-2005	1.53	2.47	5.30	8.20	12.01	14.88	16.92	14.55	10.64	6.57	2.93	1.48	97.48
TRINITY DAM VISTA POINT	1959-1973	0.00	0.00	2.83	3.98	6.56	8.32	10.67	9.15	5.97	2.74	0.57	0.85	51.64
TRINITY RIVER HATCHERY	1974-2005	0.58	1.00	2.77	4.43	6.78	8.32	9.71	8.91	6.15	3.20	0.99	0.51	53.35
TULELAKE	1932-2005	0.00	0.00	0.00	4.56	7.55	8.39	9.52	8.53	6.80	3.49	0.00	0.00	48.84
TURNTABLE CREEK	1948-1969	1.98	2.60	3.76	5.25	6.32	8.29	10.23	9.90	8.35	5.71	3.08	2.37	67.84
TWITCHELL DAM	1962-2005	3.08	3.33	4.47	5.89	7.36	8.15	9.22	8.69	7.42	5.92	4.07	3.14	70.74
WALNUT GROVE	1953-1961	1.53	2.90	4.74	5.73	7.76	10.04	10.22	8.81	6.40	3.60	2.10	1.32	65.15
WARM SPRINGS DAM	1973-1998	1.17	1.83	3.23	5.37	7.83	9.33	10.04	8.49	6.58	4.59	2.10	1.17	61.73
WHISKEYTOWN RESERVOIR	1960-2005	0.87	1.23	2.51	4.05	6.41	8.05	10.04	8.80	6.25	3.40	1.14	0.78	53.53
WILLOW CREEK 1 NW	1968-2005	0.58	1.35	1.81	2.74	4.73	6.50	7.53	6.05	3.79	1.94	0.75	0.92	38.69

COLORADO

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
AKRON 4 E	1918-2005	0.00	0.00	0.00	7.30	9.29	11.43	13.26	11.16	9.09	6.16	0.00	0.00	67.69
ALAMOSA WSO AP	1948-2005	0.00	0.00	0.00	7.06	9.01	10.08	9.16	7.81	6.40	4.39	0.00	0.00	53.91
ARBOLES	1957-1963	0.00	0.00	0.00	5.41	7.95	9.56	9.78	8.61	6.52	0.00	0.00	0.00	47.83
BONNY LAKE	1949-2005	0.00	0.00	0.00	7.26	8.69	10.86	11.78	10.61	8.12	6.12	4.57	0.00	68.01
CLIMAX	1949-2005	0.00	0.00	0.00	0.00	0.00	5.36	5.32	4.44	3.41	0.00	0.00	0.00	18.53
CONEJOS 3 NNW	1948-1960	0.00	0.00	0.00	6.30	7.14	7.67	7.41	6.87	7.19	5.74	0.00	0.00	48.32
ESTES PARK	1948-1994	0.00	0.00	0.00	5.78	5.26	7.09	7.13	6.15	5.04	4.04	0.00	0.00	40.49
FORT COLLINS	1900-2005	0.00	0.00	2.50	4.52	5.42	6.32	6.92	6.07	4.74	3.07	1.48	0.00	41.04
GRAND JUNCTION WALKER	1900-2005	0.00	0.00	4.67	8.53	12.18	15.96	16.53	14.02	10.98	7.05	2.42	0.00	92.34
GRAND JUNCTION 6 ESE	1962-2005	0.00	0.00	0.00	6.60	9.29	11.77	12.01	10.24	7.48	4.65	2.09	0.00	64.13
GRAND LAKE 6 SSW	1948-2005	0.00	0.00	0.00	0.00	4.82	7.75	7.81	6.79	5.24	3.10	0.00	0.00	35.51
GREEN MOUNTAIN DAM	1948-2005	0.00	0.00	0.00	0.00	4.96	6.56	6.93	5.90	4.65	2.90	0.00	0.00	31.90
JOHN MARTIN DAM	1941-2005	0.00	0.00	6.40	8.04	9.67	11.30	12.31	10.28	7.82	5.61	2.78	0.00	74.21
LAKE GEORGE 8 SW	1948-2005	0.00	0.00	0.00	0.00	5.15	8.26	7.39	6.02	5.72	0.00	0.00	0.00	32.54
MEREDITH	1963-2005	0.00	0.00	0.00	0.00	7.69	8.26	8.34	6.96	5.25	3.21	0.00	0.00	39.71
MONTROSE 1	1948-1982	1.68	1.49	3.34	5.69	7.49	9.47	9.04	7.39	5.54	3.45	1.61	1.26	57.45
PLATORO	1949-1991	0.00	0.00	0.00	0.00	5.86	8.10	6.57	5.24	5.52	3.33	0.00	0.00	34.62
PUEBLO WSO AP	1954-2005	0.00	0.00	0.00	8.71	9.50	11.51	12.14	10.41	8.17	6.14	0.00	0.00	66.58

PUEBLO CITY RESERVOIR	1948-1971	0.00	5.13	5.86	6.85	8.81	10.09	10.60	8.85	7.43	5.30	2.99	2.71	74.62
PUEBLO RESERVOIR	1975-2005	0.00	0.00	0.00	7.18	9.34	10.87	11.58	9.92	7.90	5.88	0.00	0.00	62.67
PUEBLO 6 SSW	1971-1985	0.00	0.00	4.82	7.47	8.57	10.65	11.30	9.40	7.13	5.53	0.00	0.00	64.87
SAN LUIS LAKES 3W	1948-1955	0.00	0.00	4.50	6.07	8.51	9.88	8.49	7.77	6.57	4.53	0.00	0.00	56.32
SPRINGFIELD 7 WSW	1956-2002	0.00	0.00	0.00	7.85	9.73	11.44	12.69	11.28	8.53	6.29	4.57	0.00	72.38
SUGARLOAF RESERVOIR	1948-2005	0.00	0.00	0.00	0.00	0.00	7.03	6.15	4.97	4.15	2.93	0.00	0.00	25.23
TRINIDAD LAKE	1989-2005	0.00	0.00	0.00	6.75	9.04	10.55	9.88	8.27	7.65	6.17	3.92	2.21	64.44
TWIN LAKES RESERVOIR	1949-2005	0.00	0.00	0.00	0.00	6.93	8.65	7.92	6.79	5.33	3.96	0.00	0.00	39.58
VALLECITO DAM	1948-2005	0.00	0.00	1.91	3.82	5.29	6.22	6.09	5.31	4.39	3.04	1.60	0.00	37.67
WAGON WHEEL GAP 3 N	1948-1972	0.00	0.00	0.00	0.00	6.69	7.90	7.15	5.81	5.30	2.61	0.00	0.00	35.46
WALSH 1 W	1951-2005	0.00	0.00	0.00	0.00	10.78	12.35	12.76	11.63	9.42	6.88	0.00	0.00	63.82
WIGGINS 7 SW	1960-1971	0.00	0.00	0.00	6.82	8.50	8.42	9.97	8.09	5.87	4.22	2.23	0.00	54.12

HAWAII

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
HILO WSO AP 87	1949-2005	5.06	4.87	5.15	5.40	5.66	6.49	6.44	6.13	5.40	5.37	4.06	4.46	64.49
HONOLULU OBSRVY 702.2	1962-2005	4.72	5.23	7.01	7.84	8.93	9.41	10.10	10.09	8.82	7.68	5.94	5.08	90.85
LIHUE WSO AP 1020.1	1950-2005	5.62	6.22	7.62	8.22	9.21	9.85	10.40	10.21	9.18	8.04	6.27	5.67	96.51
U S MAGNETIC OBSERVATOR	1949-1960	4.16	4.58	5.90	7.09	7.87	8.16	8.15	8.21	7.24	6.17	4.41	4.83	76.77

PACIFIC ISLANDS

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
GUAM NAS	1945-2005	6.98	C.00	0.00	7.96	7.20	6.58	6.22	5.53	4.68	4.70	0.00	0.00	49.85
GUAM WSMO	1957-1998	5.84	6.07	7.38	7.82	7.73	6.92	6.02	5.28	5.15	5.36	5.42	5.74	74.73
JOHNSTON ISLAND WSO AIR	1953-2004	8.69	8.76	10.29	10.25	10.79	11.42	11.50	10.82	9.81	9.53	8.19	8.75	118.80
MARCUS ISLAND WB	1953-1968	6.91	8.06	8.66	8.70	8.71	9.49	8.89	9.40	8.22	7.46	6.91	6.81	98.22
PAGO PAGO WSO AIRPORT	1966-2005	7.96	6.17	6.84	5.95	5.94	6.66	6.69	6.62	7.36	8.08	7.13	9.12	84.52
WAKE ISLAND WSO AP	1953-2004	0.00	0.00	0.00	7.57	0.00	5.89	0.00	0.00	0.00	0.00	0.00	0.00	13.46
YAP ISLAND WSO AIRPORT	1953-2005	6.31	6.20	7.37	7.40	6.97	5.51	5.61	5.68	5.61	5.85	5.50	5.93	73.94

IDAHO

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ABERDEEN EXPERIMNT STN	1914-2005	0.00	0.00	0.00	0.00	7.46	8.95	10.28	9.40	6.41	3.85	0.00	0.00	46.35
ARROWROCK DAM	1916-2005	0.00	0.00	0.00	0.00	5.94	7.53	10.18	8.93	5.75	2.35	0.00	0.00	40.68
BLACKFOOT DAM	1948-1971	0.00	0.00	0.00	0.00	0.00	7.56	9.19	7.42	3.97	0.00	0.00	0.00	28.14
EMMETT 2 E	1948-2005	0.00	0.00	0.00	5.62	7.09	8.82	10.58	9.44	6.56	4.57	0.00	0.00	52.68
ISLAND PARK	1937-2005	0.00	0.00	0.00	0.00	0.00	4.90	6.58	5.69	0.00	0.00	0.00	0.00	17.17
LIFTON PUMPING STN	1935-2005	0.00	0.00	0.00	4.08	5.97	7.41	8.70	7.80	5.35	3.02	0.00	0.00	42.33
MACKAY 4 NW	1965-1988	0.00	0.00	0.00	0.00	6.81	8.39	10.23	8.73	6.39	0.00	0.00	0.00	40.55
MINIDOKA DAM	1947-2005	0.00	0.00	0.00	6.79	8.17	10.76	13.01	11.48	8.26	4.63	2.94	0.00	66.04
MOSCOW UNIV OF IDAHO	1893-2005	0.00	0.00	3.03	3.85	5.66	6.53	8.62	8.23	5.29	3.03	2.85	0.00	47.09
PALISADES	1947-1993	0.00	0.00	0.00	4.01	5.56	7.04	9.38	8.32	5.48	3.58	0.00	0.00	43.37
PARMA EXPERIMENT STN	1922-2005	0.00	0.00	0.00	6.00	8.26	9.05	10.41	9.47	6.30	0.00	0.00	0.00	49.49
REXBURG RICKS COLLEGE	1977-2005	0.00	0.00	0.00	0.00	6.59	7.29	8.06	7.36	5.23	0.00	0.00	0.00	34.53
SANDPOINT EXPERMNT STN	1910-2005	0.00	0.00	0.00	0.00	4.96	5.51	7.47	6.78	4.47	0.00	0.00	0.00	29.19
TWIN FALLS WSO	1963-2005	0.00	0.00	0.00	5.80	8.09	9.15	10.24	9.09	6.65	4.25	0.77	0.00	54.04

MONTANA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BABB 6 NE	1948-2005	0.00	0.00	0.00	0.00	5.23	5.91	6.87	5.90	4.06	0.00	0.00	0.00	27.97
BOZEMAN MONTANA ST UNIV	1892-2005	0.00	0.00	0.00	3.34	5.58	6.03	8.34	7.17	4.57	2.62	0.00	0.00	37.65
BOZEMAN 6 W EXP FARM	1966-2005	0.00	0.00	0.00	4.24	[illegible]	[illegible]	[illegible]	7.73	4.88	2.99	0.00	0.00	40.33
CANYON FERRY DAM	1948-1957	0.00	0.00	0.00	0.00	7.98	7.13	8.17	7.41	5.50	3.11	0.00	0.00	39.30
CANYON FERRY DAM	1907-1996	0.00	0.00	0.00	3.15	5.04	6.21	7.91	7.04	4.18	1.93	0.00	0.00	35.46
DILLON WMCE	1895-2005	0.00	G.00	0.00	3.05	4.72	5.32	6.41	5.45	3.48	2.84	0.00	0.00	31.27
FORT ASSINNIBOINE	1917-2005	0.00	0.00	0.00	4.54	6.43	7.30	8.86	8.12	5.00	0.00	0.00	0.00	40.25
FORT PECK	1948-1956	0.00	0.00	0.00	0.00	5.99	8.17	9.51	8.04	5.36	4.25	0.00	0.00	41.32
FORT PECK POWER PLANT	1956-2005	0.00	0.00	0.00	0.00	7.34	8.45	10.42	9.81	5.83	3.53	0.00	0.00	45.38
HUNGRY HORSE DAM	1948-2005	0.00	0.00	0.00	0.00	4.83	5.62	7.81	6.63	3.46	1.37	0.00	0.00	29.72
HUNTLEY EXPERIMENT STN	1911-2005	0.00	0.00	0.00	5.03	6.71	7.40	8.88	8.15	5.10	0.00	0.00	0.00	41.27

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONESOME LAKE	1948-1981	0.00	0.00	0.00	0.00	7.42	7.60	9.25	8.31	5.70	0.00	0.00	0.00	38.28
MALTA 7 E	1972-2005	0.00	0.00	0.00	4.67	6.50	6.51	7.61	6.84	4.17	1.34	0.00	0.00	37.64
MEDICINE LAKE 3 SE	1911-2005	0.00	0.00	0.00	0.00	7.44	7.69	9.62	9.19	5.36	0.00	0.00	0.00	39.30
MOCCASIN EXPERIMENT STN	1909-2005	0.00	0.00	0.00	4.35	6.59	7.72	9.66	9.21	6.39	0.00	0.00	0.00	43.92
SIDNEY	1910-2005	0.00	0.00	0.00	3.99	5.63	6.44	6.93	5.45	2.89	1.81	0.00	0.00	33.14
TIBER DAM	1952-2005	0.00	0.00	0.00	0.00	4.51	6.46	7.65	5.56	4.34	0.00	0.00	0.00	28.52
VALIER	1911-2005	0.00	0.00	0.00	0.00	5.37	6.49	7.33	5.62	4.72	0.00	0.00	0.00	29.53
WESTERN AG RESEARCH CNT	1965-2005	0.00	0.00	0.00	0.00	5.08	6.03	7.26	6.07	4.14	2.25	0.00	0.00	30.83
YELLOWTAIL DAM	1948-2005	0.00	0.00	0.00	0.00	6.94	8.84	10.60	9.74	6.58	4.86	0.00	0.00	47.56

NEVADA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BEOWAWE U OF N RANCH	1972-2005	0.00	0.00	0.00	3.98	7.17	8.68	10.42	9.52	6.97	4.43	0.00	0.00	51.17
BOULDER CITY	1931-2004	3.71	4.68	7.56	10.67	13.79	16.57	16.45	14.41	11.51	8.11	4.87	3.69	116.02
CALIENTE	1928-2005	0.00	0.00	3.97	6.82	8.57	10.58	11.13	9.41	6.89	4.35	1.91	0.00	63.63
CENTRAL NEVADA FIELD LA	1965-1986	0.00	0.00	2.98	5.95	8.69	10.49	12.24	11.31	8.08	4.88	1.73	0.00	66.35
FALLON EXPERIMENT STN	1903-2005	0.14	0.93	2.50	3.82	4.85	5.63	6.20	5.41	3.83	2.42	1.17	0.21	37.11
LAHONTAN	1948-2005	0.00	0.00	0.00	7.18	9.64	11.58	13.75	12.23	7.83	4.51	2.09	0.00	68.81
LOGANDALE	1968-1992	2.55	3.61	5.26	8.96	12.44	14.20	14.38	12.07	8.67	7.66	3.86	2.89	96.55
RUBY LAKE	1948-2005	0.00	0.00	0.00	5.10	7.09	8.90	10.54	9.37	6.51	3.95	0.00	0.00	51.46
RYE PATCH DAM	1948-2005	0.00	0.00	3.71	5.83	7.38	9.23	11.15	10.06	6.95	4.30	0.77	0.00	59.38
SILVERPEAK	1967-2005	0.00	3.84	7.26	10.13	13.60	16.31	17.98	15.92	11.32	6.88	2.94	0.00	106.18
TOPAZ LAKE	1957-2005	0.00	0.00	0.00	7.15	9.11	10.94	12.68	11.56	8.80	5.95	2.79	0.00	68.98

NEW MEXICO

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ABIQUIU DAM	1957-2005	0.00	0.00	6.06	7.43	9.95	11.39	10.52	8.90	7.23	5.30	3.13	2.22	72.13
AGRICULTURAL COLLEGE	1892-1959	3.01	4.00	7.89	10.20	8.65	13.99	12.33	11.16	8.31	6.28	4.35	2.89	93.06
ALAMOGORDO DAM	1939-1975	3.73	4.35	8.21	11.30	12.88	14.43	13.66	11.59	9.17	7.19	4.89	3.46	104.86
ANIMAS	1923-2005	3.87	4.91	8.29	10.78	12.36	14.25	11.60	11.07	8.54	6.71	4.69	3.61	100.68
ARTESIA 6 S	1914-2005	4.38	3.03	7.25	7.66	12.11	13.13	10.86	10.44	9.36	6.34	3.12	0.00	87.68
BITTER LAKES WL REFUGE	1950-2005	2.67	3.93	6.82	9.60	11.31	12.62	11.88	10.16	8.02	5.85	3.53	2.50	88.89
BOSQUE DEL APACHE	1914-2005	3.21	4.20	7.76	10.20	11.61	13.13	11.56	10.36	8.03	6.25	3.66	2.54	92.51
BRANTLEY DAM	1987-2005	4.65	0.00	8.62	11.77	14.61	15.46	14.19	12.22	9.88	7.97	5.77	4.34	109.48
CABALLO DAM	1938-2005	4.42	5.10	8.56	11.37	13.59	14.80	13.08	11.35	9.26	7.27	4.78	3.48	107.06
CAPULIN NATL MONUMENT	1966-1979	0.00	0.00	0.00	0.00	9.08	10.57	9.71	9.18	7.65	0.00	0.00	0.00	46.19
CLOVIS 13 N	1929-2005	3.83	4.12	6.63	8.72	10.15	11.45	11.65	9.55	7.64	5.78	3.95	3.21	86.68
COCHITI DAM	1975-2005	0.00	4.14	6.44	8.48	11.07	12.95	12.38	10.62	8.91	6.29	3.94	2.79	88.01
CONCHAS DAM	1938-2005	0.00	0.00	7.35	8.88	10.29	11.69	11.37	10.06	8.24	6.18	4.04	2.79	80.89
EAGLE NEST	1937-2005	0.00	0.00	0.00	4.91	7.67	7.83	7.07	5.87	5.30	4.31	0.00	0.00	42.96
EL VADO DAM	1923-2005	0.00	0.00	3.61	5.43	7.46	8.84	8.52	6.91	5.66	3.84	1.72	0.00	51.99
ELEPHANT BUTTE DAM	1917-2005	3.47	4.87	8.61	12.22	14.94	16.37	14.15	12.05	9.78	7.70	4.91	3.34	112.41
ESTANCIA	1914-2005	0.00	0.00	3.26	6.79	8.56	9.27	8.61	7.10	5.60	3.82	2.62	0.00	55.63
FARMINGTON AG SCIENCE C	1978-2005	0.00	0.00	0.00	7.97	10.06	12.00	12.52	10.70	8.15	5.41	0.00	0.00	66.81
FLORIDA	1939-1992	3.54	4.81	8.10	10.94	13.03	14.80	11.84	10.10	8.51	6.58	4.57	3.11	99.93
GALLUP RANGER STN	1966-1975	0.00	0.00	0.00	6.61	9.31	12.12	10.50	8.70	7.95	5.07	2.20	0.00	62.46
JEMEZ DAM	1953-2005	0.00	0.00	0.00	9.91	12.27	13.95	14.29	11.45	9.80	6.72	3.65	0.00	82.04
JORNADA EXP RANGE	1925-2005	2.50	4.18	7.24	10.06	11.94	12.85	10.88	9.53	7.82	5.71	3.61	2.50	88.82
LAGUNA	1914-2005	0.00	0.00	0.00	8.47	9.33	11.98	10.76	8.88	6.83	5.00	1.98	0.00	63.23
LAKE AVALON	1914-1979	4.49	5.33	9.42	12.36	14.31	15.16	14.14	12.33	9.25	7.26	4.68	4.20	112.93
LAKE MC MILLAN	1941-1949	0.00	0.00	0.00	13.78	8.14	14.26	13.38	13.45	10.35	6.15	0.00	0.00	79.51
LOS LUNAS 3 SSW	1923-2005	1.87	2.81	5.27	7.77	9.74	10.49	10.06	8.67	6.58	4.64	2.75	2.45	73.10
NARROWS	1948-1964	3.09	5.67	7.62	11.07	13.37	15.44	13.07	11.42	9.97	7.20	4.32	2.64	104.88
NAVAJO DAM	1963-2005	0.00	0.00	0.00	6.58	9.10	11.07	11.24	9.66	7.22	4.74	0.00	0.00	59.61
PORTALES 7 WNW	1934-1960	3.26	4.57	8.24	8.85	10.72	12.16	10.44	9.28	7.95	5.98	4.15	3.53	89.13
HOOD RANGER STN	1954-2005	0.00	0.00	0.00	7.84	9.02	10.81	8.25	6.87	6.12	5.14	2.65	0.00	56.70
ROSWELL WSO AIRPORT	1893-1972	0.00	0.00	0.00	11.29	0.00	15.87	12.11	12.63	7.92	6.97	4.66	4.51	75.96
SANTA FE	1867-1972	0.00	0.00	3.00	7.28	8.73	10.93	9.95	8.26	7.15	5.10	2.50	0.00	62.90
SANTA FE 2	1972-2005	0.00	0.00	0.00	7.10	9.76	11.31	10.36	9.20	7.41	5.08	0.00	0.00	60.22
SHIPROCK	1926-2005	0.00	0.00	0.00	7.84	10.57	14.44	13.17	10.80	9.80	6.54	0.00	0.00	73.16
SOCORRO	1914-2005	0.00	0.00	4.83	7.09	9.17	9.35	8.56	7.57	5.73	4.14	0.00	0.00	56.44
STATE UNIVERSITY	1959-2005	3.00	4.33	7.40	9.90	12.03	12.91	12.05	10.34	8.14	6.17	3.85	2.79	92.91
SUMNER LAKE	1921-2005	0.00	0.00	7.33	10.22	12.35	13.54	13.36	11.16	9.02	6.97	4.92	3.17	92.04
TUCUMCARI 4 NE	1904-2005	0.00	0.00	0.00	9.83	11.53	13.31	13.00	11.13	8.96	6.74	0.00	0.00	74.30
UTE DAM	1965-2005	4.38	4.91	7.53	8.78	10.75	10.49	10.92	9.42	7.56	6.68	4.98	3.04	89.44

OREGON

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

| PERIOD |

	OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ASTOR EXPERIMENT STN	1948-1973	0.56	0.96	1.47	2.21	3.75	3.95	4.65	4.10	2.95	1.65	0.87	0.70	27.82
BEND 7 NE	1991-2005	0.00	0.00	0.00	4.25	6.14	6.69	8.66	7.91	5.42	0.00	0.00	0.00	39.07
CORVALLIS STATE UNIV	1889-2005	0.00	0.00	1.79	2.96	4.59	5.86	7.70	7.07	5.06	2.33	0.96	0.00	38.32
COTTAGE GROVE DAM	1943-2005	0.00	1.27	2.16	3.07	4.56	5.60	7.75	6.70	4.47	2.06	0.82	0.00	38.46
DETROIT DAM	1954-2005	0.19	1.16	1.69	2.51	4.38	5.90	7.68	6.64	4.24	2.05	0.88	0.46	37.78
DORENA DAM	1948-2005	0.00	1.01	1.94	2.95	4.98	6.11	8.19	7.15	4.66	2.01	0.00	0.00	39.00
FERN RIDGE DAM	1943-2005	0.39	0.79	1.92	3.17	5.03	6.21	8.12	7.09	4.76	2.21	0.67	0.34	40.70
HERMISTON 2 S	1928-1997	0.00	0.00	3.44	5.43	7.91	9.67	11.32	9.66	6.32	3.97	0.00	0.00	57.72
HOOD RIVER EXP STN	1928-2005	0.00	0.00	0.00	0.00	6.45	6.80	8.81	7.04	3.32	3.09	0.00	0.00	35.51
KLAMATH FALLS AGR STN	1949-2004	0.70	1.31	2.81	4.73	7.21	8.79	10.24	9.41	6.30	4.37	0.00	0.67	56.54
LOOKOUT POINT DAM	1955-2005	0.00	1.76	2.29	3.10	4.67	5.77	7.69	6.89	4.45	1.96	1.01	0.00	39.59
MADRAS 1 NNW	1952-2005	0.00	0.00	0.00	4.72	7.12	8.66	10.23	9.17	6.21	3.16	1.70	0.00	50.97
MALHEUR BRANCH EXP STN	1943-2005	0.00	0.00	0.00	5.68	7.71	8.94	11.06	9.57	6.17	3.14	0.72	0.00	52.99
VOLTAGE 2 NW	1959-2005	0.00	0.00	0.00	4.37	6.22	7.67	9.58	8.52	5.86	3.19	0.00	0.00	45.41
MEDFORD EXP STN	1937-2003	0.53	1.02	2.26	3.56	5.29	6.54	8.24	6.78	4.05	1.81	0.76	0.44	41.28
MORO	1928-2005	0.00	0.00	2.96	5.11	7.74	9.60	12.34	11.18	7.15	3.56	0.00	0.00	59.64
N WILLAMETTE EXP STN	1963-2005	0.63	1.18	2.29	3.31	5.15	6.01	7.40	6.78	4.68	2.39	1.05	0.57	41.44
ODELL LAKE LAND PAN	1948-1980	0.00	0.00	0.00	0.00	3.17	4.13	5.54	3.81	1.90	0.67	0.00	0.00	19.22
ODELL LAKE WATER PAN	1945-1959	0.00	0.00	0.00	0.00	1.87	2.71	3.97	4.01	3.44	2.02	0.00	0.00	18.02
PELTON DAM	1958-2005	0.00	0.00	0.00	4.48	6.77	8.26	9.98	8.12	5.22	2.49	0.00	0.00	45.32
PENDLETON BR EXP STN	1956-2005	0.00	0.00	3.41	5.09	6.93	8.81	11.78	10.85	7.02	3.80	0.00	0.00	57.69
SUMMER LAKE 1 S	1957-2005	0.00	0.00	0.00	5.19	7.28	8.71	10.88	9.79	6.48	3.48	1.90	0.00	53.71
UNION EXP STN	1928-2005	0.00	0.00	0.00	3.16	4.80	6.03	7.49	6.80	4.32	2.74	0.00	0.00	35.34
WARM SPRINGS RESERVOIR	1931-1974	0.00	0.00	0.00	4.85	7.21	8.66	11.73	10.19	6.77	3.49	0.00	0.00	52.90
WICKIUP DAM	1941-2005	0.00	0.00	0.00	2.99	5.14	6.46	7.99	6.84	4.68	2.46	0.00	0.00	36.56
WINCHESTER	1950-2005	0.00	0.00	0.00	2.25	3.79	5.51	6.93	6.38	4.51	1.33	0.00	0.00	30.70
WINCHESTER 3 W F STN	1981-1989	0.91	0.96	2.06	3.62	5.04	6.62	8.48	8.19	4.94	2.46	1.17	0.87	45.32

UTAH

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ARCHES NATL PARK HQ	1980-2005	0.00	0.00	0.00	7.44	9.81	12.33	12.94	11.15	8.16	4.73	0.00	0.00	66.56
BEAR RIVER BAY	1969-1996	0.00	0.00	0.00	6.27	10.17	12.59	13.86	12.29	7.83	4.89	0.00	0.00	67.90
BEAR RIVER REFUGE	1948-1984	0.00	0.00	0.00	4.80	7.21	8.66	10.46	9.30	6.13	3.27	1.27	0.00	51.10
BRYCE CANYON NAT'L PRK	1971-1978	0.00	0.00	0.00	0.00	6.86	7.86	8.07	7.21	5.30	0.00	0.00	0.00	35.30
FARMINGTON USU FLD STN	1948-2005	0.00	0.00	0.00	0.00	7.33	6.35	9.25	8.62	4.63	2.97	0.00	0.00	39.15
FERRON	1948-2005	0.00	0.00	0.00	5.20	5.66	8.06	6.58	6.39	5.49	3.53	0.00	0.00	40.91
FISH SPRINGS REFUGE	1960-2005	0.00	0.00	0.00	7.02	10.70	12.90	15.92	13.58	9.92	5.84	0.00	0.00	75.88
FLAMING GORGE	1957-2005	0.00	0.00	0.00	0.00	6.23	8.74	9.71	8.62	5.76	3.94	0.00	0.00	43.00
FORT DUCHESNE	1894-2005	0.00	0.00	0.00	5.16	7.41	8.61	9.06	7.98	5.57	3.25	0.00	0.00	47.04
GREEN RIVER AVIATION	1893-2005	0.00	0.00	0.00	6.07	8.07	9.29	9.49	7.97	5.74	3.52	1.60	0.00	51.75
GUNNISON	1956-1990	0.00	0.00	0.00	5.10	7.23	8.70	9.65	8.26	6.03	3.81	0.00	0.00	48.78
HITE	1949-1962	0.00	0.00	0.00	7.84	11.74	14.14	14.01	12.44	8.34	4.86	1.94	0.00	75.31
LOGAN USU EXP STN	1950-1978	0.00	0.00	0.00	4.01	5.98	7.05	8.37	7.50	5.02	2.92	0.00	0.00	40.85
LOGAN 5 SW EXP FARM	1969-2005	0.00	0.00	3.30	4.57	6.57	8.48	10.05	8.93	5.88	3.51	0.00	0.00	51.29
MANILA	1952-2005	0.00	0.00	0.00	0.00	7.31	8.66	9.83	8.37	6.50	4.63	0.00	0.00	45.30
MEXICAN HAT	1948-2005	0.00	0.00	6.31	8.45	11.99	14.42	14.87	12.48	9.37	5.52	2.25	0.00	85.66
MILFORD	1906-2005	0.00	0.00	0.00	7.47	10.22	13.54	15.47	13.24	9.88	6.16	2.32	0.00	78.30
MOAB	1889-2005	0.00	0.00	4.19	7.29	10.41	12.03	12.72	10.75	7.66	4.25	2.26	0.00	71.56
MORGAN	1948-2005	0.00	0.00	0.00	4.94	6.96	7.30	9.07	8.01	6.15	3.74	0.00	0.00	46.17
PIUTE DAM	1948-1971	0.00	0.00	0.00	0.00	7.91	9.98	10.13	8.40	6.98	4.60	0.00	0.00	48.00
PROVO AIRPORT	1948-1953	0.00	0.00	2.91	6.03	6.83	8.62	8.88	8.36	6.09	3.41	0.00	0.00	51.13
PROVO BYU	1980-2005	0.00	0.00	2.59	4.71	6.81	8.77	9.85	8.70	5.59	2.92	0.00	0.00	49.94
PROVO RADIO KAYK	1952-1977	0.00	0.00	0.00	4.38	5.94	7.53	8.32	7.58	5.40	3.21	1.53	0.00	43.89
ST GEORGE	1862-2005	0.00	0.00	4.57	7.36	10.08	12.22	13.17	11.55	8.22	4.83	2.68	0.00	74.68
SALTAIR SALT PLANT	1956-1991	0.00	0.00	3.66	6.20	9.19	11.88	14.40	12.67	8.58	4.86	2.32	0.00	73.76
SCOFIELD DAM	1948-1991	0.00	0.00	0.00	0.00	5.52	7.84	8.29	6.94	5.13	3.90	0.00	0.00	37.62
SEVIER DRY LAKE	1987-1993	0.00	0.00	2.93	6.33	13.52	16.06	18.32	0.00	0.00	0.00	0.00	0.00	57.16
STRAWBERRY RESERVOIR EA	1956-1977	0.00	0.00	0.00	0.00	5.82	7.28	7.87	7.31	5.08	3.02	0.00	0.00	36.38
UTAH LAKE LEHI	1928-2003	0.00	0.00	2.77	5.19	7.11	8.80	9.61	8.58	6.10	3.81	1.42	0.00	53.39
VERNAL ARPT	1928-2005	0.00	0.00	0.00	5.07	6.41	7.48	6.64	6.34	4.89	2.92	0.00	0.00	39.75
WANSHIP DAM	1955-2005	0.00	0.00	0.00	0.00	6.09	6.79	7.41	6.59	4.79	3.19	0.00	0.00	34.86

WASHINGTON

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BELLINGHAM 2 N	1948-1985	0.00	0.00	0.00	2.75	4.59	5.35	6.28	5.56	3.34	1.22	0.00	0.00	29.09
BELLINGHAM 3 SSW	1985-2005	0.00	0.00	0.00	0.00	3.77	4.69	5.31	4.50	2.65	1.39	0.00	0.00	22.31
BUMPING LAKE	1931-1967	0.00	0.00	0.00	0.00	4.01	4.13	5.58	4.63	3.19	2.34	0.00	0.00	23.88
CONNELL 1 W	1960-2003	0.00	0.00	0.00	5.43	8.35	9.89	11.90	10.77	6.88	3.00	0.00	0.00	56.22
ELTOPIA 6 W	1954-1973	0.00	0.00	3.23	5.46	6.61	7.73	9.36	7.56	4.93	2.45	0.83	0.00	48.16
ELTOPIA 8 WSW	1974-2005	0.00	0.00	0.00	4.44	6.10	7.05	8.07	7.04	4.44	2.06	0.62	0.00	39.82
LAKE KACHESS	1931-1977	0.00	0.00	0.00	2.37	3.78	4.82	6.12	5.12	3.20	0.00	0.00	0.00	25.41

LIND 3 NE EXP STN	1931-2005	0.00	0.00	0.00	5.35	8.02	9.40	12.02	10.44	6.87	2.59	0.00	0.00	54.69
MOSES LAKE 3 E	1943-1979	0.00	0.00	0.00	5.51	7.50	8.78	10.29	8.10	5.53	2.79	0.00	0.00	48.50
OROVILLE 1 S	1960-1970	0.00	0.00	0.00	4.49	5.82	6.36	7.42	6.22	4.28	1.99	0.00	0.00	36.58
OTHELLO 6 ESE	1941-2002	0.00	0.00	0.00	5.40	7.60	9.00	10.77	9.14	6.12	2.92	0.00	0.00	50.95
PROSSER 4 NE	1931-2005	0.00	0.00	2.49	4.86	6.57	7.50	8.61	7.09	4.73	2.48	0.80	0.69	45.82
PUYALLUP 2 W EXP STN	1931-1995	0.00	0.71	1.58	2.46	3.97	4.63	5.61	4.97	2.92	1.28	0.61	0.00	28.74
QUINCY 1 S	1941-2005	0.00	0.00	0.00	5.76	8.05	9.00	10.20	8.52	5.52	2.60	0.00	0.00	49.65
RIMROCK TIETON DAM	1947-1977	0.00	0.00	0.00	0.00	5.35	7.08	15.41	6.71	3.70	1.63	0.00	0.00	39.88
SEATTLE MAPLE LEAF R	1941-1960	0.61	0.82	1.80	3.26	4.64	5.12	6.70	5.19	3.49	1.62	0.74	0.53	34.52
SPOKANE WSO AIRPORT	1889-2005	0.00	0.00	0.00	4.66	7.27	8.57	11.28	10.22	6.41	0.00	0.00	0.00	48.41
WALLA WALLA 3 W ENT LA	1931-1962	0.00	0.00	0.00	4.79	6.26	7.61	9.72	7.95	4.78	2.58	0.00	0.00	43.69
WENATCHEE EXP STN	1950-1997	0.00	0.00	0.00	4.74	6.87	7.87	9.38	7.83	4.19	0.00	0.00	0.00	40.88
WHITMAN MISSION	1962-2005	0.00	0.00	0.00	4.58	6.58	8.17	10.34	9.08	5.52	2.84	0.00	0.00	47.11
WIND RIVER	1901-1977	0.00	0.00	0.00	2.91	4.19	4.64	6.15	4.97	3.31	1.62	0.00	0.00	27.79
YAKIMA WSO AP	1946-2005	0.00	0.00	0.00	5.27	7.62	8.71	10.42	9.29	5.90	0.00	0.00	0.00	47.21

WYOMING

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ANCHOR DAM	1961-1979	0.00	0.00	0.00	0.00	6.46	7.57	9.66	8.31	5.95	5.33	0.00	0.00	43.28
ARCHER	1948-2005	0.00	0.00	0.00	3.66	5.71	7.08	8.30	7.94	5.94	4.45	0.00	0.00	43.08
BOYSEN DAM	1948-2005	0.00	0.00	0.00	5.44	6.72	8.24	9.86	9.08	5.92	3.20	0.00	0.00	48.46
FARSON	1915-2005	0.00	0.00	0.00	0.00	7.45	9.37	10.67	8.94	6.53	3.80	0.00	0.00	46.76
GILLETTE 9 ESE	1925-2005	0.00	0.00	0.00	4.52	6.40	7.50	9.88	9.44	6.18	4.36	2.39	0.00	50.67
GREEN RIVER	1915-2005	0.00	0.00	0.00	0.00	8.22	9.71	11.08	9.80	6.82	4.62	0.00	0.00	50.25
HEART MOUNTAIN	1949-2005	0.00	0.00	0.00	3.50	5.82	6.37	7.35	6.67	4.37	3.43	0.00	0.00	37.51
KEYHOLE DAM	1949-1958	0.00	0.00	0.00	4.99	6.06	7.25	9.56	9.01	6.04	3.68	0.00	0.00	46.59
LARAMIE 2 NW	1966-2005	0.00	0.00	0.00	0.00	8.21	10.26	10.71	9.58	7.48	4.76	0.00	0.00	51.00
LOOKOUT 14 NE	1948-1965	0.00	0.00	0.00	0.00	7.50	11.32	10.89	10.40	7.76	7.30	0.00	0.00	55.17
MORTON 1 NW	1949-1968	0.00	0.00	0.00	3.91	5.59	6.73	8.27	7.31	4.96	3.35	0.00	0.00	40.12
PATHFINDER DAM	1948-1991	0.00	0.00	3.20	5.07	6.78	8.78	10.53	9.75	7.17	4.95	2.81	0.00	59.04
SEMINOE DAM	1948-2005	0.00	0.00	0.00	0.00	5.24	8.27	8.99	8.12	5.59	0.00	0.00	0.00	36.21
SHERIDAN FIELD STN	1920-2005	0.00	0.00	0.00	3.55	6.29	7.88	10.21	9.73	6.48	0.00	0.00	0.00	44.14
WHALEN DAM	1949-1991	0.00	0.00	3.32	5.17	7.44	9.00	10.39	9.09	6.24	4.18	0.00	0.00	54.83

Appendix L

Utility Solutions Correspondence

GREAT WEST ENGINEERING

SHEET NO. 1 OF 1

PROJECT NAME Gallatin Gateway WW PER PROJECT NO. 1-08159

SUBJECT Utility Solutions Coordination Meeting.

MADE BY Rich Fillbach DATE 1/15/10 CHECKED BY ______ DATE ______

REVISED BY ______ DATE ______ RECHECKED BY ______ DATE ______

@ Morrison-Maierle Bozeman

Attendance:

Barb Campbell – Utility Solutions

Ryan Rittal – Utility Solutions

Marty Gagnon – Morrison-Maierle Inc. engineer

Matt Donnelly, Merle Adams } Gateway WSD

Craig Pozega, Rich Fillbach } Great West Eng.

→ Connection to U.S. treatment facility / 1.5 M Gallons cap.
- Gravity Trunk Main – have adequate capacity
- Forcemain – have permitting in place

(EDU = 250 gpd | Connection service)

→ Connection Fee $5,000 treatment & Disposal

(+) O&M – only accept if they operate entire system
– responsible ~~for~~ for effluent

$80.42 tarrif @ Elk Grove

★ → b/w $54.00 and $80.00 $82.00
Dist Rate, Elk Grove Rate

82 x 12 = 984

tie @ MH prior to plant commercial area.

WW treatment only ??

★ includes O&M of entire system

GGCWSD estm.
$5,000 + $82/mo./EDU

One user vs. individuals

Appendix M

Total Retention – Preliminary Design Calculations

Gallatin Gateway Wastewater PER

Pond Sizing Calculations - Total Retention Alternative
Average Day Flows

I. General

Summer Time FTE's=	500
Winter Time FTE's =	500
People/FTE =	1
GPD/FTE =	100
Pounds BOD_5/person/day =	0.2

Summer Flow (gpd) = 50,000
Winter Flow (gpd) = 50,000

Summer BOD_5 Load (lbs/day) = 100.0
Winter BOD_5 Load (lbs/day) = 100.0

II. Primary Pond - Total Retention

Design BOD_5 Load (lbs/acre/day) =	30
Freeboard (ft) =	3
Operating Depth (ft) =	4
Sludge Depth (ft) =	2
Corner Radius at Top of Dikes (ft) =	50

Required Surface Area (acres) = [redacted]

Water Surface Width (ft) =	380
Water Surface Length (ft) =	380

Top Dike Width (ft) = 398
Top Dike Length (ft) = 398

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
2	356	356	29	126,014			
3	362	362	32	130,165	958,110	958,110	19
4	368	368	35	134,372	989,370	1,947,480	39
5	374	374	38	138,636	1,021,053	2,968,533	59
6	380	380	41	142,957	1,053,160	4,021,693	80

Primary Pond Water Surface Area (acres) = [redacted]
Calculated BOD_5 Surface Load (lbs/acre/day) = 30.5
Pond Top Surface Area (acres) = 3.6

Primary Pond Volume = **4.0 MG**

III. Storage Pond - Total Retention Alternative

Average Day Flow (gpd) =	50,000
Freeboard (ft) =	3
Operational Depth (ft) =	7
Sludge Depth (ft) =	1
Corner Radius at Top of Dikes (ft) =	50

Water Surface Width (ft) =	933
Water Surface Length (ft) =	933

Top Dike Width (ft) =	951
Top Dike Length (ft) =	951

Minimum Size (acres) =	27.5

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
1	891	891	20	793,538			
2	897	897	23	804,155	5,975,326	5,975,326	120
3	903	903	26	814,829	6,054,955	12,030,281	241
4	909	909	29	825,559	6,135,007	18,165,288	363
5	915	915	32	836,346	6,215,481	24,380,769	488
6	921	921	35	847,189	6,296,379	30,677,148	614
7	927	927	38	858,089	6,377,700	37,054,848	741
8	933	933	41	869,046	6,459,443	43,514,291	870

Storage Pond 1-foot Surface Area (acres) =	18.2
Storage Pond Surface Area (acres) =	20.0
Volume (MG) =	43.5

*Please refer to Table 93-1 in Circular DEQ-2

Gallatin Gateway PER
Monthly Water Balance
Total Retention Lagoon

Design flow	**50,000**	**gpd**
Total Minimum Lagoon Area	30.7	**acres**
Max Annual Seepage Rate	**6**	**inches**

Month	Days	Wastewater Flows (gallons)	10-yr Wet Precip. (inches)	Precip. (gallons)	Evaporation (inches)	Evaporation (gallons)	Seepage (inches)	Seepage (gallons)	Net Volume (gallons)	Cumulative Volume (gallons)
January	31	1,550,000	0.71[illegible]	592,542	0.3[illegible]	292,098	[illegible]	425,285	1,425,158	3,680,034
February	28	1,400,000	0.64[illegible]	534,122	0.70[illegible]	584,196	[illegible]	384,129	965,797	4,645,832
March	31	1,550,000	1.29[illegible]	1,076,590	1.40[illegible]	1,168,392	[illegible]	425,285	1,032,912	5,678,744
April	30	1,500,000	2.12[illegible]	1,769,279	2.80[illegible]	2,336,784	[illegible]	411,567	520,929	6,199,673
May	31	1,550,000	3.33[illegible]	2,779,103	4.[illegible]	3,797,273	[illegible]	425,285	106,545	6,306,217
June	30	1,500,000	3.44[illegible]	2,870,906	4.90[illegible]	4,089,371	[illegible]	411,567	-130,032	6,176,185
July	31	1,550,000	1.71[illegible]	1,427,107	6.6[illegible]	5,549,861	[illegible]	425,285	-2,998,039	3,178,146
August	31	1,550,000	1.5[illegible]	1,285,231	5.9[illegible]	4,965,665	[illegible]	425,285	-2,555,720	622,426
September	30	1,500,000	1.80[illegible]	1,502,218	3.8[illegible]	3,213,077	[illegible]	411,567	-622,426	0
October	31	1,550,000	1.8[illegible]	1,510,564	2.1[illegible]	1,752,588	[illegible]	425,285	882,691	**882,691**
November	30	1,500,000	1.0[illegible]	892,985	1.05[illegible]	876,294	[illegible]	411,567	1,105,125	1,105,125
December	31	1,550,000	0.7[illegible]	609,233	0.70[illegible]	584,196	[illegible]	425,285	1,149,752	2,254,876
Totals	365	18,250,000	**20.19"**	16,849,879	**35.00"**	29,209,795	**6.00"**	5,007,393	**882,691**	

Gallatin Gateway PER
Determining the 2 Yr in 10 Yr Wet Precipitation
Based on Western Regional Climate Center Records for Bozeman 6 W EXP FARM (WRCC ID #241047)

Year	Annual Precip	Ranking in 10-Year Cycle	2nd Wettest Yr Each Cycle	2nd Driest Yr Each Cycle	10 Yr Freq Precip
1969	19.83	2	19.83		
1970	18.83	3			
1971	14.24	9		14.24	
1972	15.45	7			
1973	15.96	5			
1974	13.29	10			
1975	21.5	1			21.5
1976	14.3	8			
1977	17.28	4			
1978	15.94	6			
1979	12.85	9		12.85	
1980	18.45	4			
1981	19.23	2	19.23		
1982	18.8	3			
1983	20.11	1			20.11
1984	15.76	6			
1985	11.63	10			
1986	17.11	5			
1987	15.55	7			
1988	14.16	8			
1989	16.77	5			
1990	15.44	8			
1991	16.01	6			
1992	19.1	3			
1993	21.31	1			21.31
1994	13.83	10			
1995	18.86	4			
1996	14.57	9		14.57	
1997	21.16	2	21.16		
1998	15.71	7			
1999	11.98	8			
2000	16.31	3			
2001	11.47	9		11.47	
2002	8.66	10			
2003	13.68	7			
2004	15.1	4			
2005	16.32	2	16.32		
2006	15.09	5			
2007	17.81	1			17.81
2008	14.09	6			
		Avg of 10 Yr Freq			20.18
		Ave of 2 yr dry		13.28	
*Precipitation in inches		Avg of 2 year wet	19.14		

1484

Estimation of Evaporation from Shallow Ponds And Impoundments in Montana

Donald F. Potts

Miscellaneous Publication #48
March 1988

Montana Forest and Conservation Experiment Station
School of Forestry, University of Montana
Missoula, MT 59812

slightly lower estimates of wintertime loss than do the 47.5 degree north latitude potential radiation data. Note also, however, that the May - October evaporation estimated from the radiation data is only 71% of annual. This indicates that the summer percentages determined by the Bozeman data might be more accurate. The slightly lower wintertime loss estimates are also reasonable. Evaporation continues from an ice- and snow-covered pond, but additional latent heat is required to go from solid to vapor rather from just liquid to vapor (677 vs. 597 cal/gm).

TABLE 1. Percentage of annual lake evaporation per month determined from A.) relative potential radiation at 47.5 degrees north latitude and B.) relative pan evaporation at Bozeman, MT.

Month	A. % from rad. data	B. % from pan data
April	9	8
May	12	13
June	13	14
July	15	19
August	14	17
September	10	11
October	7	6
November	4	3
December	3	2
January	3	1
February	4	2
March	6	4

EXAMPLE: Both the Kohler and SCS maps of annual lake evaporation indicate that a location near Missoula experiences annual lake evaporation of 35 inches (890 mm). What is the expected (average) evaporation loss for the month of August?

By Method A. - 14% of 890 mm = 125 mm = 4.2 mm/day

By Method B. - 17% of 890 mm = 151 mm = 5.0 mm/day

Appendix N

Facultative Lagoon with Storage & Irrigation – Preliminary Design Calculations

Gallatin Gateway

Pond Sizing Calculations - Stroage & Irrigation Alternative
Average Day Flows

I. General

Summer Time FTE's=	500
Winter Time FTE's =	500
People/FTE =	1
GPD/FTE =	100
Pounds BOD_5/person/day =	0.2

Summer Flow (gpd) =	50,000
Winter Flow (gpd) =	50,000
Summer BOD_5 Load (lbs/day) =	100.0
Winter BOD_5 Load (lbs/day) =	100.0

II. Primary Pond - Faculative

Design BOD_5 Load (lbs/acre/day) =	30
Freeboard (ft) =	3
Operating Depth (ft) =	4
Sludge Depth (ft) =	2
Corner Radius at Top of Dikes (ft) =	50
Required Surface Area (acres) =	3.3
Water Surface Width (ft) =	380
Water Surface Length (ft) =	380
Top Dike Width (ft) =	398
Top Dike Length (ft) =	398
Top of Dike Surface Area (acres) =	3.6

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
2	356	356	29	126,014			
3	362	362	32	130,165	958,110	958,110	19
4	368	368	35	134,372	989,370	1,947,480	39
5	374	374	38	138,636	1,021,053	2,968,533	59
6	380	380	41	142,957	1,053,160	4,021,693	80

Primary Pond Water Surface Area (acres) = 3.3

Calculated BOD_5 Surface Load (lbs/acre/day) = 30.5

Volume = 4.0 MG

III. Storage Pond - Storage & Irrigation

Average Day Flow (gpd) =	50,000
Freeboard (ft) =	3
Operational Depth (ft) =	7
Sludge Depth (ft) =	1
Corner Radius at Top of Dikes (ft) =	50

Water Surface Width (ft) =	425
Water Surface Length (ft) =	425

Top Dike Width (ft) =	443
Top Dike Length (ft) =	443
Top of Dike Surface Area (acres) =	4.5

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
1	383	383	20	146,346			
2	389	389	23	150,867	1,111,532	1,111,532	22
3	395	395	26	155,445	1,145,563	2,257,095	45
4	401	401	29	160,079	1,180,017	3,437,111	69
5	407	407	32	164,770	1,214,893	4,652,005	93
6	413	413	35	169,517	1,250,193	5,902,198	118
7	419	419	38	174,321	1,285,916	7,188,114	144
8	425	425	41	179,182	1,322,061	8,510,175	170

Storage Pond 1-foot Surface Area (acres) =	3.4
Storage Pond Surface Area (acres) =	4.1
Volume (MG) =	8.5

Gallatin Gateway Wastewater PER

Monthly Water Balance / Irrigation Requirements

Storage & Irrigation Alternative

I. Precipitation and Evaporation for Gallatin Gateway, Montana

The Western Regional Climate Center (WRCC) station Bozeman 6 W Exp Farm, located west of Bozeman adjacent to Huffine Lane (US Hwy 191) on the south side, is listed in the table below along with respective average annual precipitation and station elevation. See attachments for NOAA and/or NRCS data summaries. The source of the data in the table below is indicated in the parenthesis under the station location.

Table 1
Precipitation Data

Climatological Station	Station Elevation (ft)	Average Annual Precipitation (inch)	2 yr/10 yr Wet Precipitation (inch)
Bozeman 6 W EXP FARM (WRCC ID #241047)	4775	16.28	19.14

The following precipitation and evaporation data will be used in this analysis of alternatives.

Average annual precipitation	**= 16.28 in**	
2 yr in 10 yr dry precipitation	= 13.28 in	
2 yr in 10 yr wet precipitation	= 19.14 in	
10-yr. frequency precipitation rate	**= 20.18 in**	
Evaporation:		***Input Precipitation and Evaporation Data***
Estimation of Evaporation from Shallow Ponds & Impoundments in Montana (Donald F. Potts)	= 35.00 in	
Average Annual Evaporation	**= 35.00 in**	

The annual precipitation data was taken directly from the Western Regional Climate Center (WRCC) website. Data from the website was collected from 1966 to 2009 and is attached to these calculations. The 1 year / 10 year wet precipitation rate was found to be 20.18 inches from the WRCC data (see attached sheets). The 10 year wet precipitation will be used in the water balance to determine the storage volume required.

The *Estimation of Evaporation from Shallow Ponds & Impoundments in Montana,* by Donald F. Potts (March 1988) was used to determine the Average Annual Evaporation for Gallatin Gateway, MT. The derived evaporation rate for this region is 35.0". This data was used in the water balance. A copy of the data is attached.

To allow the preparation of the a water balance, monthly 10-yr. return period precipitation rates are calculated by multiplying the 10-yr annual wet precipitation (20.18 inches) by the ratio of average monthly precipitation (16.29 inches). Consumptive use estimates are based on data from Natural Resource & Conservation Service (NRCS). Net irrigation requirements are based on the 50% chance year provided by the NRCS. The NRCS data is summarized on the attached Irrigation Water Requirments - Crop Data Summary sheets.

Table 2
Precipitation / Evaporation / Consumptive Use Data

Month	Precipitation	10-Year Annual / Monthly	Monthly Evaporation	Consumptive Use Grass Hay	Consumptive Use Alfalfa	Net Irrigation Requirement Grass Hay	Net Irrigation Requirement Alfalfa
Jan.	0.57"	0.71"	0.35"	0.00"	0.00"	0.00"	0.00"
Feb.	0.52"	0.64"	0.70"	0.00"	0.00"	0.00"	0.00"
Mar.	1.04"	1.29"	1.40"	0.00"	0.00"	0.00"	0.00"
Apr.	1.71"	2.12"	2.80"	0.73"	0.00"	0.00"	0.00"
May	2.69"	3.33"	4.55"	3.04"	2.19"	1.70"	0.79"
Jun.	2.78"	3.44"	4.90"	4.60"	5.62"	3.21"	4.15"
Jul.	1.38"	1.71"	6.65"	5.94"	7.15"	5.08"	6.23"
Aug.	1.24"	1.54"	5.95"	5.16"	6.04"	4.39"	5.23"
Sep.	1.45"	1.80"	3.85"	2.90"	2.56"	2.03"	1.42"
Oct.	1.46"	1.81"	2.10"	1.04"	0.00"	0.10"	0.00"
Nov.	0.86"	1.07"	1.05"	0.00"	0.00"	0.00"	0.00"
Dec.	0.59"	0.73"	0.70"	0.00"	0.00"	0.00"	0.00"
Annual	16.29"	20.19"	35.00"	23.41"	23.56"	16.51"	17.82"

II. Other Variables

Average Wastewater Flow (GPD):			
Winter	= 50,000	GPD	***Input Flow and Pond Data***
Summer	= 50,000	GPD	
Allowable Seepage (inches / year)	= 6.00	Inches	
Primary Treatment Cell (Acre):	= 3.28	Acres	
Primary Cell Total Volume (MG)	= 4.02	MG	
Primary Cell Storage Volume Available (MG)	= 2.07	MG	
Single Storage Cell (Acre):	= 4.11	Acres	
Storage Cell Available Volume (MG)	= 8.51	MG	

III. Water Balance for Storage and Irrigation Treatment

Precipitation is based on the 10-yr frequency wet precipitation rate. Evaporation is based on average monthly evaporation rates. Irrigation data is from the NRCS normal year 50% chance. As allowed by the Montana Department of Environmental Quality, a value of 6 inches/year for seepage from the pond was included in the water balance calculations.

Table 3
Monthly Water Balance
Storage and Irrigation (alfalfa)
(Volumes in 1,000 Gallons)

Month	Wastewater Inflow	Precipitation	Evaporation	Irrigation	Seepage	Volume	Storage
October	1550.00	395.29	421.68	0.00	100.40	1423.21	1423.21
November	1500.00	233.68	210.84	0.00	100.40	1422.44	2845.65
December	1550.00	159.43	140.56	0.00	100.40	1468.47	4314.11
January	1550.00	155.06	70.28	0.00	100.40	1534.38	5848.49
February	1400.00	139.77	140.56	0.00	100.40	1298.81	7147.30
March	1550.00	281.73	281.12	0.00	100.40	1450.21	8597.51
April	1500.00	462.99	562.24	0.00	100.40	1300.35	9897.86
1/2 May	775.00	363.62	456.82	319.78	50.20	311.82	10209.68
Off-Season Subtotals	**11375.00**	**2191.56**	**2284.10**	**319.78**	**753.00**	**10209.68**	**10209.68**
1/2 May	775.00	363.62	456.82	319.78	50.20	311.82	10521.50
June	1500.00	751.27	983.92	3359.71	100.40	-2192.77	8328.74
July	1550.00	373.45	1335.32	5043.62	100.40	-4555.89	3772.85
August	1550.00	336.32	1194.76	4234.05	100.40	-3642.89	129.96
September	1500.00	393.11	773.08	1149.59	100.40	-129.96	0.00
Subtotals	**6875.00**	2217.77	**4743.90**	**14106.75**	**451.80**	**-10209.68**	**0.00**
Annual	**18250.00**	**4409.33**	**7028.00**	14426.53	**1204.80**	**0.00**	**0.00**

Total Available Storage (MG) = **10.582** **Available Greater Than Required**
Total Required Storage (MG) = **10.522**

The above water balance determined that 10.5 million gallons of storage is required and approximately 14.4 million gallons would have to be disposed of by irrigation. The water balance verifies that the pond sizes are sufficient to meet the demands of the system.

IV. Irrigation Requirements

The following section evaluates the irrigation requirements for the proposed system using three separate approaches. The irrigation of two crops was considered for each approach, grass hay/pasture and alfalfa. The first two evaluation techniques, hydraulic loading and nitrogen uptake, are EPA approaches to design that must be satisfied prior to receiving approval from EPA for construction. The third approach is based on determining the minimal agricultural needs to ensure the water is used most efficiently. This approach would be more typical of an agricultural community. The irrigation requirement was distributed on a monthly basis based on monthly consumptive use data.

The equations used in the preparation of the following tables were taken from the "Process Design Manual, Land Application of Municipal Wastewater", an EPA publication and the Draft DEQ-2 chapter 120. Percolation rates for soils were determined from NRCS soils data and utilized for the hydraulic loading calculation. Only 4% of the selected percolation rate of 4 in/hr was used per the EPA manual and recomendations in the Draft DEQ-2 chapter 120. Allowable nitrogen uptake for grass hay / pasture was set at 80 kg/ha/yr and the nitrogen uptake for alfalfa was set at 225 kg/ha/yr per USDA/NRCS web based crop nutrient program. Effective precipitation was used in the tables to account for inefficiencies of light precipitation events (Bauder, MSU). Irrigation application efficiency was assumed to be 100%.

Table 4
Irrigation Based on Hydraulic Loading (EPA Formula)
Grass Hay / Pasture

Month	Consumptive Use (inch)	10-year Wet Precip. (inch)	Allowable Percolation (inch)	Maximum Irrigation Application (inch)
April	0.73"	2.12"	76.80"	75.41"
May	3.04"	3.33"	80.64"	80.35"
June	4.60"	3.44"	76.80"	77.96"
July	5.94"	1.71"	80.64"	84.87"
August	5.16"	1.54"	80.64"	84.26"
September	2.90"	1.80"	76.80"	77.90"
October	1.04"	1.81"	76.80"	76.03"
Total	**23.41"**	**15.75"**	**549.12"**	**556.78"**
Irrigation Volume Available (Gallons)				14,426,527.66
Irrigated Acreage Required (Acres)				**0.95**

Table 5
Irrigation Based on Hydraulic Loading (EPA Formula)
Alfalfa

Month	Net Consumptive Use (inch)	10-year Wet Precip. (inch)	Allowable Percolation (inch)	Maximum Irrigation Application (inch)
April	0.00"	2.12"	76.80"	74.68"
May	2.19"	3.33"	80.64"	79.50"
June	5.62"	3.44"	76.80"	78.98"
July	7.15"	1.71"	80.64"	86.08"
August	6.04"	1.54"	80.64"	85.14"
September	2.56"	1.80"	76.80"	77.56"
Total	**23.56"**	**13.94"**	**472.32"**	**481.94"**
Irrigation Volume Available (Gallons)				14,426,527.66
Irrigated Acreage Required (Acres)				**1.10**

Table 6
Irrigation Based on Nitrogen Uptake (EPA Formula)
Grass Hay / Pasture

Month	Consumptive Use (inch)	Nitrogen Uptake (kg/ha year)	Applied Nitrogen Concentration (mg/l)	Application Efficiency	f	Maximum Irrigation Application (inches)
April	0.73"	2.49	25	100%	20%	0.49"
May	3.04"	10.39	25	100%	20%	2.05"
June	4.60"	15.72	25	100%	20%	3.09"
July	5.94"	20.30	25	100%	20%	4.00"
August	5.16"	17.63	25	100%	20%	3.47"
September	2.90"	9.91	25	100%	20%	1.95"
October	1.04"	3.55	25	100%	20%	.70"
Total	**23.41"**	80.0				**15.75"**
Irrigation Volume Available (Gallons)					14,426,527.66	
Irrigated Acreage Required (Acres)					**33.74**	

Table 7
Irrigation Based on Nitrogen Uptake (EPA Formula)
Alfalfa

Month	Consumptive Use (inch)	Nitrogen Uptake (kg/ha year)	Applied Nitrogen Concentration (mg/l)	Application Efficiency	f	Maximum Irrigation Application (inches)
April	0.00"	0.00	25	100%	20%	0.00"
May	2.19"	20.91	25	100%	20%	4.12"
June	5.62"	53.67	25	100%	20%	10.57"
July	7.15"	68.28	25	100%	20%	13.44"
August	6.04"	57.68	25	100%	20%	11.35"
September	2.56"	24.45	25	100%	20%	4.81"
Total	**23.56"**	225.0				**44.29"**
Irrigation Volume Available (Gallons)					14,426,527.66	
Irrigated Acreage Required (Acres)					**12.00**	

Table 8
Irrigation Based on Minimum Agricultural Needs
Grass Hay / Pasture

Month	Consumptive Use (inch)	Effective Precip. (50% Chance)	Irrigation Requirement (inch)	Irrigation Application w/ Efficiency Loss/Leaching (inches)
May	3.04"	1.32"	1.72"	2.46"
June	4.60"	1.39"	3.21"	4.59"
July	5.94"	0.86"	5.08"	7.26"
August	5.16"	0.78"	4.38"	6.26"
September	2.90"	0.86"	2.04"	2.91"
Total	**21.64"**	**5.21"**	**16.43"**	**23.47"**
Irrigation Volume Available (Gallons)				14,426,527.66
Irrigated Acreage Required (Acres)				**22.64**

Table 9
Irrigation Based on Minimum Agricultural Needs
Alfalfa

Month	Consumptive Use (inch)	Effective Precip. (50% Chance)	Irrigation Requirement (inch)	Irrigation Application w/ Efficiency Loss/Leaching (inches)
May	2.19"	0.90"	1.29"	1.84"
June	5.62"	1.48"	4.14"	5.91"
July	7.15"	0.92"	6.23"	8.90"
August	6.04"	0.82"	5.22"	7.46"
September	2.56"	0.64"	1.92"	2.74"
Total	**21.00"**	**4.76"**	**16.88"**	**24.11"**
Irrigation Volume Available (Gallons)				14,426,527.66
Irrigated Acreage Required (Acres)				**22.03**

The analysis shows the irrigation site is not hydraulically limited and there is plenty of available water stored to support the crop. The irrigation area is controlled by the nutrient uptake of the crop.

Gallatin Gateway PER
Determining the 2 Yr in 10 Yr Wet Precipitation
Based on Western Regional Climate Center Records for Bozeman 6 W EXP FARM (WRCC ID #241047)

Year	Annual Precip	Ranking in 10-Year Cycle	2nd Wettest Yr Each Cycle	2nd Driest Yr Each Cycle	10 Yr Freq Precip
1969	19.83	2	19.83		
1970	18.83	3			
1971	14.24	9		14.24	
1972	15.45	7			
1973	15.96	5			
1974	13.29	10			
1975	21.5	1			21.5
1976	14.3	8			
1977	17.28	4			
1978	15.94	6			
1979	12.85	9		12.85	
1980	18.45	4			
1981	19.23	2	19.23		
1982	18.8	3			
1983	20.11	1			20.11
1984	15.76	6			
1985	11.63	10			
1986	17.11	5			
1987	15.55	7			
1988	14.16	8			
1989	16.77	5			
1990	15.44	8			
1991	16.01	6			
1992	19.1	3			
1993	21.31	1			21.31
1994	13.83	10			
1995	18.86	4			
1996	14.57	9		14.57	
1997	21.16	2	21.16		
1998	15.71	7			
1999	11.98	8			
2000	16.31	3			
2001	11.47	9		11.47	
2002	8.66	10			
2003	13.68	7			
2004	15.1	4			
2005	16.32	2	16.32		
2006	15.09	5			
2007	17.81	1			17.81
2008	14.09	6			
		Avg of 10 Yr Freq			20.18
		Ave of 2 yr dry		13.28	
*Precipitation in inches		Avg of 2 year wet	19.14		

Appendix O

Aerated Lagoon with Storage & Irrigation – Preliminary Design Calculations

Gallatin Gateway

Pond Sizing Calculations - Stroage & Irrigation Alternative
Average Day Flows

I. General

Summer Time FTE's=	500
Winter Time FTE's =	500
People/FTE =	1
GPD/FTE =	100
Pounds BOD_5/person/day =	0.2

Summer Flow (gpd) =	50,000
Winter Flow (gpd) =	50,000

Summer BOD_5 Load (lbs/day) =	100.0
Winter BOD_5 Load (lbs/day) =	100.0

II. Primary Pond - Aerated

Freeboard (ft) =	3
Operating Depth (ft) =	10
Sludge Depth (ft) =	2
Corner Radius at Top of Dikes (ft) =	50

Water Surface Width (ft) =	148
Water Surface Length (ft) =	148
Length to Width Ratio (x:1) =	1
Top Dike Width (ft) =	166
Top Dike Length (ft) =	166
Top of Dike Surface Area (acres) =	0.58

Total Number of Aerated Cells =	1
Minimum Days Under Aeration =	20

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
2	88	88	11	7,640			
3	94	94	14	8,668	60,951	60,951	1
4	100	100	17	9,752	68,850	129,801	3
5	106	106	20	10,893	77,171	206,972	4
6	112	112	23	12,090	85,916	292,888	6
7	118	118	26	13,344	95,083	387,971	8
8	124	124	29	14,654	104,674	492,645	10
9	130	130	32	16,021	114,687	607,332	12
10	136	136	35	17,444	125,123	732,455	15
11	142	142	38	18,924	135,982	868,437	17
12	148	148	41	20,461	147,264	1,015,701	20

Primary Pond 2' Surface Area (acres) =	0.2
Pond Top Surface Area (acres) =	0.5
Volume (MG) =	1.0

III. Storage Pond - Storage & Irrigation

Average Day Flow (gpd) =	50,000
Freeboard (ft) =	3
Operational Depth (ft) =	7
Sludge Depth (ft) =	1
Corner Radius at Top of Dikes (ft) =	50

Water Surface Width (ft) =	475
Water Surface Length (ft) =	475

Top Dike Width (ft) =	493
Top Dike Length (ft) =	493
Top of Dike Surface Area (acres) =	5.5

Water Depth from Pond Bottom (ft)	Width (ft)	Length (ft)	Interior Radius (ft)	Area (sf)	Incremental Volume (gal)	Useable Cumulative Volume (gal)	Cumulative Detention Time (days)
1	433	433	20	187,146			
2	439	439	23	192,267	1,418,960	1,418,960	28
3	445	445	26	197,445	1,457,479	2,876,438	58
4	451	451	29	202,679	1,496,420	4,372,859	87
5	457	457	32	207,970	1,535,785	5,908,644	118
6	463	463	35	213,317	1,575,573	7,484,217	150
7	469	469	38	218,721	1,615,783	9,100,000	182
8	475	475	41	224,182	1,656,417	10,756,417	215

Storage Pond 1-foot Surface Area (acres) =	4.3
Storage Pond Surface Area (acres) =	5.1
Volume (MG) =	10.8

Gallatin Gateway Wastewater PER

Monthly Water Balance / Irrigation Requirements
Storage & Irrigation Alternative

I. Precipitation and Evaporation for Gallatin Gateway, Montana

The Western Regional Climate Center (WRCC) station Bozeman 6 W Exp Farm, located west of Bozeman adjacent to Huffine Lane (US Hwy 191) on the south side, is listed in the table below along with respective average annual precipitation and station elevation. See attachments for NOAA and/or NRCS data summaries. The source of the data in the table below is indicated in the parenthesis under the station location.

Table 1
Precipitation Data

Climatological Station	Station Elevation (ft)	Average Annual Precipitation (inch)	2 yr/10 yr Wet Precipitation (inch)
Bozeman 6 W EXP FARM (WRCC ID #241047)	4775	16.28	19.14

The following precipitation and evaporation data will be used in this analysis of alternatives.

Average annual precipitation	**= 16.28 in**	
2 yr in 10 yr dry precipitation	= 13.28 in	
2 yr in 10 yr wet precipitation	= 19.14 in	
10-yr. frequency precipitation rate	**= 20.18 in**	
Evaporation:		***Input Precipitation and Evaporation Data***
Estimation of Evaporation from Shallow Ponds & Impoundments in Montana (Donald F. Potts)	= 35.00 in	
Average Annual Evaporation	**= 35.00 in**	

The annual precipitation data was taken directly from the Western Regional Climate Center (WRCC) website. Data from the website was collected from 1966 to 2009 and is attached to these calculations. The 1 year / 10 year wet precipitation rate was found to be 20.18 inches from the WRCC data (see attached sheets). The 10 year wet precipitation will be used in the water balance to determine the storage volume required.

The *Estimation of Evaporation from Shallow Ponds & Impoundments in Montana,* by Donald F. Potts (March 1988) was used to determine the Average Annual Evaporation for Gallatin Gateway, MT. The derived evaporation rate for this region is 35.0". This data was used in the water balance. A copy of the data is attached.

To allow the preparation of the a water balance, monthly 10-yr. return period precipitation rates are calculated by multiplying the 10-yr annual wet precipitation (20.18 inches) by the ratio of average monthly precipitation (16.29 inches). Consumptive use estimates are based on data from Natural Resource & Conservation Service (NRCS). Net irrigation requirements are based on the 50% chance year provided by the NRCS. The NRCS data is summarized on the attached Irrigation Water Requirments - Crop Data Summary sheets.

Table 2
Precipitation / Evaporation / Consumptive Use Data

Month	Precipitation	10-Year Annual / Monthly	Monthly Evaporation	Consumptive Use Grass Hay	Consumptive Use Alfalfa	Net Irrigation Requirement Grass Hay	Net Irrigation Requirement Alfalfa
Jan.	0.57"	0.71"	0.35"	0.00"	0.00"	0.00"	0.00"
Feb.	0.52"	0.64"	0.70"	0.00"	0.00"	0.00"	0.00"
Mar.	1.04"	1.29"	1.40"	0.00"	0.00"	0.00"	0.00"
Apr.	1.71"	2.12"	2.80"	0.73"	0.00"	0.00"	0.00"
May	2.69"	3.33"	4.55"	3.04"	2.19"	1.70"	0.79"
Jun.	2.78"	3.44"	4.90"	4.60"	5.62"	3.21"	4.15"
Jul.	1.38"	1.71"	6.65"	5.94"	7.15"	5.08"	6.23"
Aug.	1.24"	1.54"	5.95"	5.16"	6.04"	4.39"	5.23"
Sep.	1.45"	1.80"	3.85"	2.90"	2.56"	2.03"	1.42"
Oct.	1.46"	1.81"	2.10"	1.04"	0.00"	0.10"	0.00"
Nov.	0.86"	1.07"	1.05"	0.00"	0.00"	0.00"	0.00"
Dec.	0.59"	0.73"	0.70"	0.00"	0.00"	0.00"	0.00"
Annual	16.29"	20.19"	35.00"	23.41"	23.56"	16.51"	17.82"

II. Other Variables

Average Wastewater Flow (GPD):			
Winter	= 50,000	GPD	
Summer	= 50,000	GPD	***Input Flow and Pond Data***
Allowable Seepage (inches / year)	= 6.00	Inches	
Primary Treatment Cell (Acre):	= 0.47	Acres	
Primary Cell Total Volume (MG)	= 1.01	MG	
Primary Cell Storage Volume Available (MG)		MG	
Single Storage Cell (Acre):	= 5.15	Acres	
Storage Cell Available Volume (MG)	= 10.75	MG	

III. Water Balance for Storage and Irrigation Treatment

Precipitation is based on the 10-yr frequency wet precipitation rate. Evaporation is based on average monthly evaporation rates. Irrigation data is from the NRCS normal year 50% chance. As allowed by the Montana Department of Environmental Quality, a value of 6 inches/year for seepage from the pond was included in the water balance calculations.

Table 3
Monthly Water Balance
Storage and Irrigation (alfalfa)
(Volumes in 1,000 Gallons)

Month	Wastewater Inflow	Precipitation	Evaporation	Irrigation	Seepage	Volume	Storage
October	1550.00	300.46	320.24	0.00	76.25	1453.98	1453.98
November	1500.00	177.62	160.12	0.00	76.25	1441.26	2895.23
December	1550.00	121.18	106.75	0.00	76.25	1488.19	4383.42
January	1550.00	117.86	53.37	0.00	76.25	1538.24	5921.66
February	1400.00	106.24	106.75	0.00	76.25	1323.25	7244.91
March	1550.00	214.14	213.49	0.00	76.25	1474.40	8719.32
April	1500.00	351.92	426.98	0.00	76.25	1348.69	10068.01
1/2 May	775.00	276.39	346.92	340.23	38.12	326.11	10394.12
Off-Season Subtotals	**11375.00**	**1665.83**	**1734.62**	**340.23**	**571.85**	**10394.12**	**10394.12**
1/2 May	775.00	276.39	346.92	340.23	38.12	326.11	10720.23
June	1500.00	571.05	747.22	3574.62	76.25	-2327.04	8393.19
July	1550.00	283.86	1014.09	5366.23	76.25	-4622.70	3770.49
August	1550.00	255.64	907.34	4504.88	76.25	-3682.82	87.67
September	1500.00	298.80	587.10	1223.12	76.25	-87.67	0.00
Subtotals	**6875.00**	**1685.75**	**3602.67**	**15009.08**	**343.11**	**-10394.12**	**0.00**
Annual	**18250.00**	**3351.58**	**5337.30**	**15349.31**	**914.97**	**0.00**	**0.00**

Total Available Storage (MG) = **10.754**
Total Required Storage (MG) = **10.720**

Available Greater Than Required

The above water balance determined that 10.5 million gallons of storage is required and approximately 14.4 million gallons would have to be disposed of by irrigation. The water balance verifies that the pond sizes are sufficient to meet the demands of the system.

IV. Irrigation Requirements

The following section evaluates the irrigation requirements for the proposed system using three separate approaches. The irrigation of two crops was considered for each approach, grass hay/pasture and alfalfa. The first two evaluation techniques, hydraulic loading and nitrogen uptake, are EPA approaches to design that must be satisfied prior to receiving approval from EPA for construction. The third approach is based on determining the minimal agricultural needs to ensure the water is used most efficiently. This approach would be more typical of an agricultural community. The irrigation requirement was distributed on a monthly basis based on monthly consumptive use data.

The equations used in the preparation of the following tables were taken from the "Process Design Manual, Land Application of Municipal Wastewater", an EPA publication and the Draft DEQ-2 chapter 120. Percolation rates for soils were determined from NRCS soils data and utilized for the hydraulic loading calculation. Only 4% of the selected percolation rate of 4 in/hr was used per the EPA manual and recomendations in the Draft DEQ-2 chapter 120. Allowable nitrogen uptake for grass hay / pasture was set at 80 kg/ha/yr and the nitrogen uptake for alfalfa was set at 225 kg/ha/yr per USDA/NRCS web based crop nutrient program. Effective precipitation was used in the tables to account for inefficiencies of light precipitation events (Bauder, MSU). Irrigation application efficiency was assumed to be 100%.

Table 4
Irrigation Based on Hydraulic Loading (EPA Formula)
Grass Hay / Pasture

Month	Consumptive Use (inch)	10-year Wet Precip. (inch)	Allowable Percolation (inch)	Maximum Irrigation Application (inch)
April	0.73"	2.12"	76.80"	75.41"
May	3.04"	3.33"	80.64"	80.35"
June	4.60"	3.44"	76.80"	77.96"
July	5.94"	1.71"	80.64"	84.87"
August	5.16"	1.54"	80.64"	84.26"
September	2.90"	1.80"	76.80"	77.90"
October	1.04"	1.81"	76.80"	76.03"
Total	**23.41"**	**15.75"**	**549.12"**	**556.78"**
Irrigation Volume Available (Gallons)				15,349,314.62
Irrigated Acreage Required (Acres)				**1.02**

Table 5
Irrigation Based on Hydraulic Loading (EPA Formula)
Alfalfa

Month	Net Consumptive Use (inch)	10-year Wet Precip. (inch)	Allowable Percolation (inch)	Maximum Irrigation Application (inch)
April	0.00"	2.12"	76.80"	74.68"
May	2.19"	3.33"	80.64"	79.50"
June	5.62"	3.44"	76.80"	78.98"
July	7.15"	1.71"	80.64"	86.08"
August	6.04"	1.54"	80.64"	85.14"
September	2.56"	1.80"	76.80"	77.56"
Total	**23.56"**	**13.94"**	**472.32"**	**481.94"**
Irrigation Volume Available (Gallons)				15,349,314.62
Irrigated Acreage Required (Acres)				**1.17**

Table 6
Irrigation Based on Nitrogen Uptake (EPA Formula)
Grass Hay / Pasture

Month	Consumptive Use (inch)	Nitrogen Uptake (kg/ha year)	Applied Nitrogen Concentration (mg/l)	Application Efficiency	f	Maximum Irrigation Application (inches)
April	0.73"	2.49	25	100%	20%	0.49"
May	3.04"	10.39	25	100%	20%	2.05"
June	4.60"	15.72	25	100%	20%	3.09"
July	5.94"	20.30	25	100%	20%	4.00"
August	5.16"	17.63	25	100%	20%	3.47"
September	2.90"	9.91	25	100%	20%	1.95"
October	1.04"	3.55	25	100%	20%	.70"
Total	**23.41"**	80.0				**15.75"**
Irrigation Volume Available (Gallons)					15,349,314.62	
Irrigated Acreage Required (Acres)					**35.90**	

Table 7
Irrigation Based on Nitrogen Uptake (EPA Formula)
Alfalfa

Month	Consumptive Use (inch)	Nitrogen Uptake (kg/ha year)	Applied Nitrogen Concentration (mg/l)	Application Efficiency	f	Maximum Irrigation Application (inches)
April	0.00"	0.00	25	100%	20%	0.00"
May	2.19"	20.91	25	100%	20%	4.12"
June	5.62"	53.67	25	100%	20%	10.57"
July	7.15"	68.28	25	100%	20%	13.44"
August	6.04"	57.68	25	100%	20%	11.35"
September	2.56"	24.45	25	100%	20%	4.81"
Total	**23.56"**	225.0				**44.29"**
Irrigation Volume Available (Gallons)					15,349,314.62	
Irrigated Acreage Required (Acres)					**12.76**	

Table 8
Irrigation Based on Minimum Agricultural Needs
Grass Hay / Pasture

Month	Consumptive Use (inch)	Effective Precip. (50% Chance)	Irrigation Requirement (inch)	Irrigation Application w/ Efficiency Loss/Leaching (inches)
May	3.04"	1.32"	1.72"	2.46"
June	4.60"	1.39"	3.21"	4.59"
July	5.94"	0.86"	5.08"	7.26"
August	5.16"	0.78"	4.38"	6.26"
September	2.90"	0.86"	2.04"	2.91"
Total	**21.64"**	**5.21"**	**16.43"**	**23.47"**
Irrigation Volume Available (Gallons)				15,349,314.62
Irrigated Acreage Required (Acres)				**24.08**

Table 9
Irrigation Based on Minimum Agricultural Needs
Alfalfa

Month	Consumptive Use (inch)	Effective Precip. (50% Chance)	Irrigation Requirement (inch)	Irrigation Application w/ Efficiency Loss/Leaching (inches)
May	2.19"	0.90"	1.29"	1.84"
June	5.62"	1.48"	4.14"	5.91"
July	7.15"	0.92"	6.23"	8.90"
August	6.04"	0.82"	5.22"	7.46"
September	2.56"	0.64"	1.92"	2.74"
Total	**21.00"**	**4.76"**	**16.88"**	**24.11"**
Irrigation Volume Available (Gallons)				15,349,314.62
Irrigated Acreage Required (Acres)				**23.44**

The analysis shows the irrigation site is not hydraulically limited and there is plenty of available water stored to support the crop. The irrigation area is controlled by the nutrient uptake of the crop.

Gallatin Gateway PER					
Determining the 2 Yr in 10 Yr Wet Precipitation					
Based on Western Regional Climate Center Records for Bozeman 6 W EXP FARM (WRCC ID #241047)					
Year	**Annual Precip**	**Ranking in 10-Year Cycle**	**2nd Wettest Yr Each Cycle**	**2nd Driest Yr Each Cycle**	**10 Yr Freq Precip**
1969	19.83	2	19.83		
1970	18.83	3			
1971	14.24	9		14.24	
1972	15.45	7			
1973	15.96	5			
1974	13.29	10			
1975	21.5	1			21.5
1976	14.3	8			
1977	17.28	4			
1978	15.94	6			
1979	12.85	9		12.85	
1980	18.45	4			
1981	19.23	2	19.23		
1982	18.8	3			
1983	20.11	1			20.11
1984	15.76	6			
1985	11.63	10			
1986	17.11	5			
1987	15.55	7			
1988	14.16	8			
1989	16.77	5			
1990	15.44	8			
1991	16.01	6			
1992	19.1	3			
1993	21.31	1			21.31
1994	13.83	10			
1995	18.86	4			
1996	14.57	9		14.57	
1997	21.16	2	21.16		
1998	15.71	7			
1999	11.98	8			
2000	16.31	3			
2001	11.47	9		11.47	
2002	8.66	10			
2003	13.68	7			
2004	15.1	4			
2005	16.32	2	16.32		
2006	15.09	5			
2007	17.81	1			17.81
2008	14.09	6			
		Avg of 10 Yr Freq			20.18
		Ave of 2 yr dry		13.28	
*Precipitation in inches		Avg of 2 year wet	19.14		

Gallatin Gateway Wastewater PER

Storage and Irrigation Alternative - Aerated Primary Cell

	Primary Pond		Storage Pond
Top of Dike Width (ft) =	10.0	Top of Dike Width (ft) =	10.0
Slope ?:1 =	3.0	Slope ?:1 =	3.0
Top of Pond Width (ft) =	166.0	Top of Pond Width (ft) =	493.0
Top of Pond Length (ft) =	166.0	Top of Pond Length (ft) =	493.0
Total Depth of Pond (ft) =	15.0	Total Depth of Pond (ft) =	11.0
Depth of Cut (ft) =	9.7	Depth of Cut (ft) =	3.4
Top Soil Removal Depth (ft) =	0.75	Top Soil Removal Depth (ft) =	0.75
Bottom of Pond Width (ft) =	76	Bottom of Pond Width (ft) =	427
Bottom of Pond Length (ft) =	76	Bottom of Pond Length (ft) =	427
Total Top Soil Removal (cyds) =	1,024	Total Top Soil Removal (cyds) =	7,677
Total Excavation (cyds) =	3,721	Total Excavation (cyds) =	18,760
Total Embankment (cyds) =	3,720	Total Embankment (cyds) =	18,760
Net Borrow (cyds) =	0	Net Borrow (cyds) =	0
Liner Material Required (sf) =	48,928	Liner Material Required (sf) =	263,653
Cushion (cy)=	906	Cushion (cy)=	4882
Cover (cy)=	453	Cover (cy)=	2441

Irrigation Water Requirements
Crop Data Summary

Job: **Gallatin Gateway Wastewater System**
Location: **Gallatin Gateway, Montana**
By: **Threlkeld**
Weather Station: **BOZEMAN 6 W EXP FARM**
Latitude: **4540** Longitude: **11109**
Computation Method: **Blaney Criddle (TR21)**
Crop Curve: **Blaney Criddle Perennial Crop**
Begin Growth: **5/10** End Growth: **9/22**

Crop: **Alfalfa Hay**
County: **Gallatin, MT**
Date: **12/07/09**
Sta No: **MT1047**
Elevation: **4780** feet above sea level

Net irrigation application: **1** inches
Estimated carryover moisture used at season:
Begin: **0.5** inches End: **0.5** inches

Month	Total Monthly ET (3) inches	Dry Year 80% Chance (1) Effective Precipitation inches	Dry Year 80% Chance (1) Net Irrigation Reqirements inches (2)	Normal Year 50% Chance (1) Effective Precipitation inches	Normal Year 50% Chance (1) Net Irrigation Reqirements inches (2)	Average Daily ETc inches	Peak Daily ETPk inches
January	0.00	0.00	0.00	0.00	0.00	0.00	
February	0.00	0.00	0.00	0.00	0.00	0.00	
March	0.00	0.00	0.00	0.00	0.00	0.00	
April	0.00	0.00	0.00	0.00	0.00	0.00	
May	2.19	0.69	0.99	0.90	0.79	0.10	
June	5.62	1.14	4.48	1.48	4.15	0.19	0.22
July	7.15	0.71	6.44	0.92	6.23	0.23	0.29
August	6.04	0.63	5.41	0.82	5.23	0.19	0.24
September	2.56	0.49	1.56	0.64	1.42	0.12	
October	0.00	0.00	0.00	0.00	0.00	0.00	
November	0.00	0.00	0.00	0.00	0.00	0.00	
December	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL	**23.56**	**3.66**	**18.90**	**4.74**	**17.82**		

(1) For 80 percent occurrence, growing season effective precipitation will be equaled or exceeded 8 out of 10 years. For 50 percent chance occurrence, effective precipitation will be equaled or exceeded 1 out of 2 years.

(2) Net irrigation requirements is adjusted for carryover moisture used at the beginning of the season and carryover moiature used at the end of the growing season.

(3) ET Evapotranspiration) is adjusted upwards 10% per 1000 meters above sea level.

Date: 12/7/2009

Irrigation Water Requirements
Crop Data Summary

Job: **Gallatin Gateway Wastewater System**
Location: **Gallatin Gateway, Montana**
By: **Threlkeld**
Weather Station: **BOZEMAN 6 W EXP FARM**
Latitude: **4540** Longitude: **11109**
Computation Method: **Blaney Criddle (TR21)**
Crop Curve: **Blaney Criddle Perennial Crop**
Begin Growth: **4/20** End Growth: **10/20**

Crop: **Grass Hay**
County: **Gallatin, MT**
Date: **12/07/09**
Sta No: **MT1047**
Elevation: **4780** feet above sea level

Net irrigation application: **1** inches
Estimated carryover moisture used at season:
Begin: **0.5** inches End: **0.5** inches

Month	Total Monthly ET (3) inches	Dry Year 80% Chance (1) Effective Precipitation inches	Dry Year 80% Chance (1) Net Irrigation Reqirements inches (2)	Normal Year 50% Chance (1) Effective Precipitation inches	Normal Year 50% Chance (1) Net Irrigation Reqirements inches (2)	Average Daily ETc inches	Peak Daily ETPk inches
January	0.00	0.00	0.00	0.00	0.00	0.00	
February	0.00	0.00	0.00	0.00	0.00	0.00	
March	0.00	0.00	0.00	0.00	0.00	0.00	
April	0.73	0.19	0.04	0.24	0.00	0.07	
May	3.04	1.02	2.02	1.32	1.70	0.10	0.11
June	4.60	1.08	3.52	1.39	3.21	0.15	0.18
July	5.94	0.66	5.28	0.86	5.08	0.19	0.24
August	5.16	0.60	4.56	0.78	4.39	0.17	0.20
September	2.90	0.67	2.23	0.86	2.03	0.09	0.11
October	1.04	0.34	0.20	0.44	0.10	0.05	
November	0.00	0.00	0.00	0.00	0.00	0.00	
December	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL	**23.41**	**4.55**	**17.86**	**5.89**	**16.52**		

(1) For 80 percent occurrence, growing season effective precipitation will be equaled or exceeded 8 out of 10 years. For 50 percent chance occurrence, effective precipitation will be equaled or exceeded 1 out of 2 years.

(2) Net irrigation requirements is adjusted for carryover moisture used at the beginning of the season and carryover moiature used at the end of the growing season.

(3) ET Evapotranspiration) is adjusted upwards 10% per 1000 meters above sea level.

Date: 12/7/2009

GREAT WEST ENGINEERING

SHEET NO. ______ OF ______

PROJECT NAME Gallatin Gateway PER PROJECT NO. ______

SUBJECT ______

MADE BY Rich DATE ______ CHECKED BY ______ DATE ______

REVISED BY ______ DATE ______ RECHECKED BY ______ DATE ______

Irrigation / Crops

Randy Peirce, irrigation engineer Bozeman NRCS

587-6860

Avg. Grass/Hay ~ 2.5 tons/yr.

Avg. Alfalfa ~ 4.0 - 4.5 tons/yr.

* Good manager gets 3rd cut in Sept. and could yield 5 to 6 tons of Alfalfa.

Alfalfa mix: usually
- orchard grass
- brome grass
- timothy grass

Irrigation Water Management When and How Much to Irrigate

by USDA Soil Conservation Service in cooperation with MSU Extension Service Staff

Profitability of producing irrigated crops is directly related to water management. Applying too much or too little water at the wrong time is a common problem in Montana. Applying too much water causes leaching of nutrients, erosion, high water tables and salinity problems. Many times problems show up on a neighbor's property, down slope of irrigated land. Too much water at the wrong time can retard plant growth and production. Too little water at critical crop stages can significantly reduce production.

Irrigation water management is managing soil moisture so that an optimum quantity of irrigation water is applied at appropriate times. Good water management can both increase crop production and reduce costs.

The first step in good irrigation water management is knowledge of basic soil, water and crop relationships.

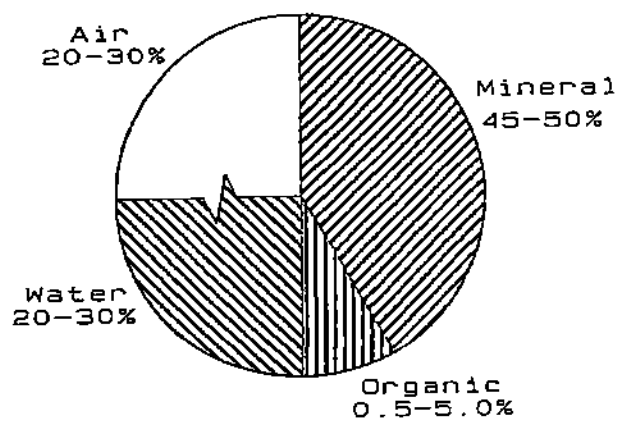


Figure 1. Composition of a typical agricultural soil

PRINCIPLES OF IRRIGATION WATER MANAGEMENT

Soil Water Holding Capacity

Soil is made up of minerals, organic matter, air and water in the approximate proportions illustrated in Figure 1. The mineral fraction consists of various particle sizes, including sand, silt, clay and rock. As a plant growth medium, soil serves to supply plant nutrients, to provide mechanical support and to store water. Effective irrigation water management requires knowledge of how much water soil can store.

When soil is irrigated, water moves down through pores or openings between soil particles, forming a film around each individual soil particle. This film of water is tightly held around soil particles when small amounts of water are present. When the amount of water increases, the film becomes so thick that surface tension will no longer resist the pull of gravity, and the extra water moves downward. This gravitational water is measured in atmospheres (A), which is a measure of the effort required by plant roots to extract water from the soil. The maximum amount of water that can be held around soil particles against the pull of gravity is called the field capacity (FC). This moisture condition for a well-drained soil occurs one to three days after a thorough irrigation.

Water films around soil particles become thinner and more tightly held as plants use water from a soil. Plants wilt when water films become so thin that plants can no longer pull water from around the soil particles. When plants wilt to the point that they can no longer fully recover, the soil is at the permanent wilting point (PWP). Available water holding capacity (AWC) of a soil is the amount of water that can be held between field capacity and permanent wilting point, as shown in Figure 2.

In irrigated crop production it is convenient to think of water holding capacity in terms of inches of water held per foot of soil depth. Moisture held in any given soil profile depth or crop root zone is the sum of amounts held in each soil layer. The amount of stored water depends on soil texture, depth, organic matter content, structure, bulk density, stratification and crop rooting depth.

Figure 3 illustrates how soil texture affects AWC. Generally, as the percentage of fine particles increase, AWC will increase. However, since clay particles and small spaces (voids) between them hold soil water more tightly than do sand and silt particles, most soils which

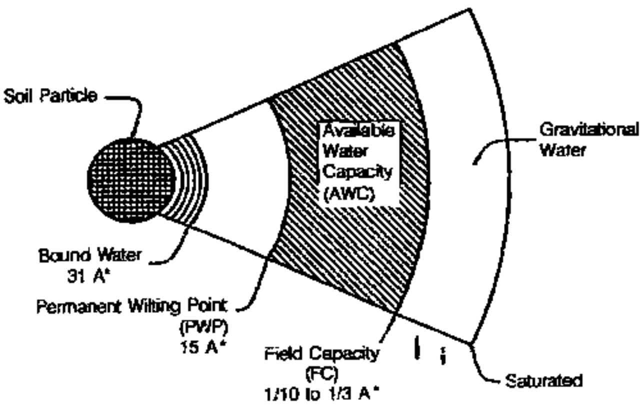


Figure 2. Soil Moisture Characteristics of Individual Soil Particles

* Atmosphere (A) = 14.72 psi

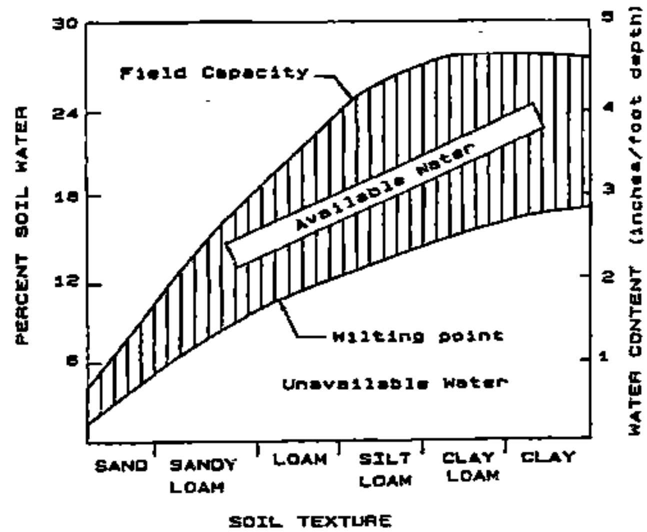


Figure 3. Soil texture as it affects "average" available water capacity

are predominantly clay tend to hold less "available" water than do silt soils.

Although AWC is not constant for each soil textural class, general values have been determined. Table 1 lists average AWC values along with the expected range for different textural classes. Note these AWC values are expressed as inches per foot of soil depth. Total water-holding capacity is estimated by multiplying the AWC by soil depth or depth of rooting.

Many areas in Montana have published Soil Conservation Service soil surveys which give detailed information about soil in the area, including soil textures and available water-holding capacity.

The most accurate way of determining AWC is to determine it in the field. This can be done by heavily

Table 1
Soil textural groupings and associated average water-holding capacities.

Soil Textural Class	Soil Texture	Average Available Water Holding Capacity (AWC) inches/foot[1]	AWC Range inches/foot
Coarse Textured	Sands	0.5	0.1-1.4
	Loamy Sands	1.0	0.5-1.7
	Loamy Fine Sands Loamy Very Fine Sands Very Fine Sands	1.25	0.7-2.2
Moderately Coarse Textured	Sandy Loam Fine Sandy Loam	1.5	1.0-2.2
Medium Textured	Very Fine Sandy Loam Loam Silt Loam Silt	2.0	1.4-2.6
Moderately Fine Textured	Clay Loam Sandy Clay Loam Silty Clay Loam	2.2	1.4-2.9
Fine Textured	Sandy Clay Silty Clay Clay	2.0	1.2-2.6

1/ Soluble salts and gravel will decrease plant available water-holding capacity; organic matter and good soil structure will increase available water-holding capacity. The water-holding capacity increases about 0.1 inch per foot for each 1 percent increase in organic matter. Soils with compact subsoils, shallow bedrock, or stratification can increase plant AWC in the overlying layer; but shallow rooting depth, often caused by these layers, can decrease the total amount of available water. Soils that are deep, medium texture, and uniform can have decreased plant AWC but allow for deeper rooting.

watering a representative soil which has been summer fallowed. Then, three days after watering, the soil should be sampled to the depth of maximum wetting. This method will provide a measure of AWC as affected by texture and soil stratification. An alternative, but less accurate method is to have a lab analyze the soil. Three data items are required: 1) moist bulk density, 2) ⅓ atmosphere moisture content (field capacity), and 3) 15 atmosphere moisture content (permanent wilting point). The Extension Service, Soil Conservation Service or private consultants can provide information on where these tests can be conducted.

Crop Root Zone

The root zone determines soil depth from which the crop can draw moisture. The active root zone is that part of the soil profile where the major portion of plant roots is located. Water below the active root zone is

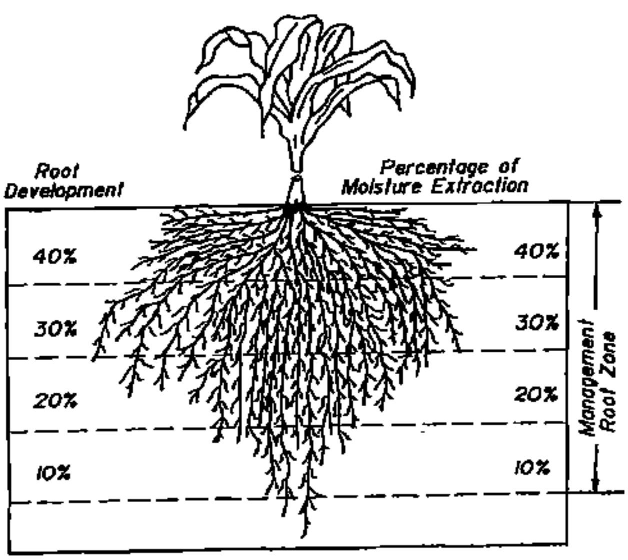


Figure 4. Root development and percentage of moisture extraction from the active root zone in deep, uniform soil

lost to deep percolation or is not immediately used by the plant. Root distribution in the root zone and water use from the root zone by a crop is not uniform in depth. This point is illustrated in Figure 4. About 70 percent of the crop's water requirement is taken up from the upper one-half of the root zone.

Rooting depths are determined by characteristics of the plant and soil. Rooting depths are often modified by soil compaction, stratification and moisture conditions. Roots of only a few plant species will penetrate dry soil, thus a layer of dry soil below the surface can restrict root growth. A high water table limits root growth. Fluctuating ground water may kill roots that have previously grown below the rising groundwater surface. High salt concentrations will also restrict root development.

Table 2 shows recommended management root zones (MRZ) for mature crops in deep soil without restrictive soil characteristics. Where impediments to root growth are encountered, rooting depth must be determined in the field. This is accomplished by using a bucket auger or other device to collect soil samples and examining the samples for presence of live roots.

Root depth varies with the growth stage of a crop. Figure 5 and Table 2 provide information as to how long it will take roots to reach their mature depth in

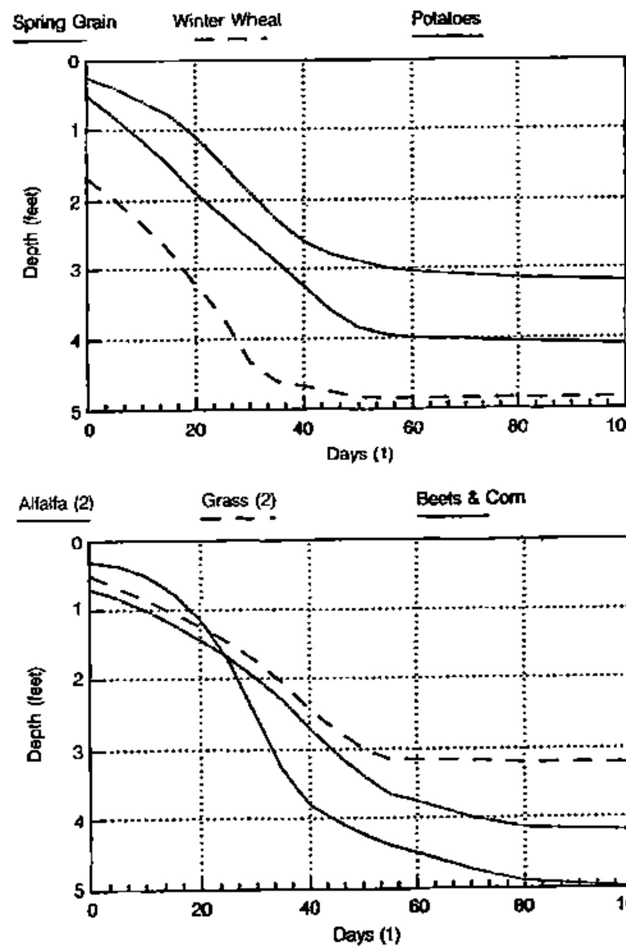


Figure 5. Root development over time.
(1) Days after plant has emerged from ground
(2) New planting

deep, unrestricted soils with adequate moisture. Awareness of the root depth during all stages of crop development will enhance your ability to manage nutrients and water in those layers containing active roots.

Management Allowed Depletion

Plant-available water remaining in the soil is held under increasingly higher tensions with each increment of water removal. As soil moisture tension increases, it becomes progressively more difficult for the crop to remove water from the soil. The crop may begin to exhibit symptoms of moisture stress when from 40 to 85 percent of the AWC has been used. Because of root distribution, plant-available water will be depleted more rapidly and to a greater extent in the upper portion of the active root zone. The amount of plant-available soil

Table 2
Root Zone Depths for Selected Crops

Crop	Management Root Zone (Deep Soil) (ft)	Typical Management Allowed Depletion (MAD%)*	Approximate Time to Reach Mature Root Depth (Good growing cond.)
Alfalfa	5	50	60 days new planting
Beans	3	40	50 days after emergence
Corn (field)	4	50	10 days after tasseling
Corn (sweet)	3	40	10 days after tasseling
Grass Pasture	3	50	50 days new planting
Orchard	5 +	50	–
Potatoes	3	35	60 days after emergence
Small Grains	4	50	Heading
Sugar Beets	5	50	110 days after planting

* This value is the recommended maximum allowable depletion of Available Water Holding Capacity.

mositure depletion that can be tolerated without having an adverse effect on crop yield and quality depends upon the crop being grown, the stage of crop development, root distribution, soil texture and rate of water use by the crop.

As a general rule, stress sensitive crops such as potatoes and sweet corn should be irrigated when 35 to 40 percent of AWC has been used. Other crops should be irrigated when 50 percent of the available water has been depleted. Table 2 gives recommended management allowed depletion (MAD) levels for several crops.

Critical Periods of Growth

For most crops there are critical periods in the growth season when high moisture level must be maintained for high yields. The critical period for annual crops almost always occurs in the later part of the season during the flowering and ripening stages. The critical period for commonly irrigated crops is shown below:

Potatoes...... Flowering, tuber set to harvest
Corn .... Tasseling, silk stage until grain becomes firm
Sugar beets ... Entire growing season*
Small grains ... Boot, blossom and early head stage. Malting barley, soft dough stage
Pasture....... First 90 days of establishment
Alfalfa .... Seedling and immediately after cutting
Orchards ..... Any point during growing season

* There is no real significant period that is critical for sugar beets. In Montana the length of the growing season is limiting to production. Any drought period becomes critical, so soil moisture should be kept above 50 percent until 2 or 3 weeks before harvest to ensure rapid plant development and highest production.

Water Use by Crops

The amount of water used by crops depends on the rate of water vapor lost to the atmosphere through evaporation and transpiration. The term consumptive use (CU) is used to describe the amount of water lost through evapo-transpiration. CU depends upon a number of factors including radiant energy, humidity, temperature, length of growing season, wind, crop and soil moisture supply.

The net irrigation requirement for a given crop is that portion of the CU which is not satisfied by precipitation. Based on CU values computed for 90 locations in Montana, using the modified Blaney-Criddle formula, the state can be divided into five climatic areas, as depicted in Figure 6.

An irrigation system must be designed to apply enough water to satisfy crop requirements during the period of peak consumptive use. The consumptive use rate determines the quantity of water used during the period of peak demand and consequently the frequency of irrigation. Typical peak period consumptive use rates by crop and climatic areas are given in Table 3.

Table 3
Typical peak consumptive use rates by climatic area for selected crops grown in Montana*

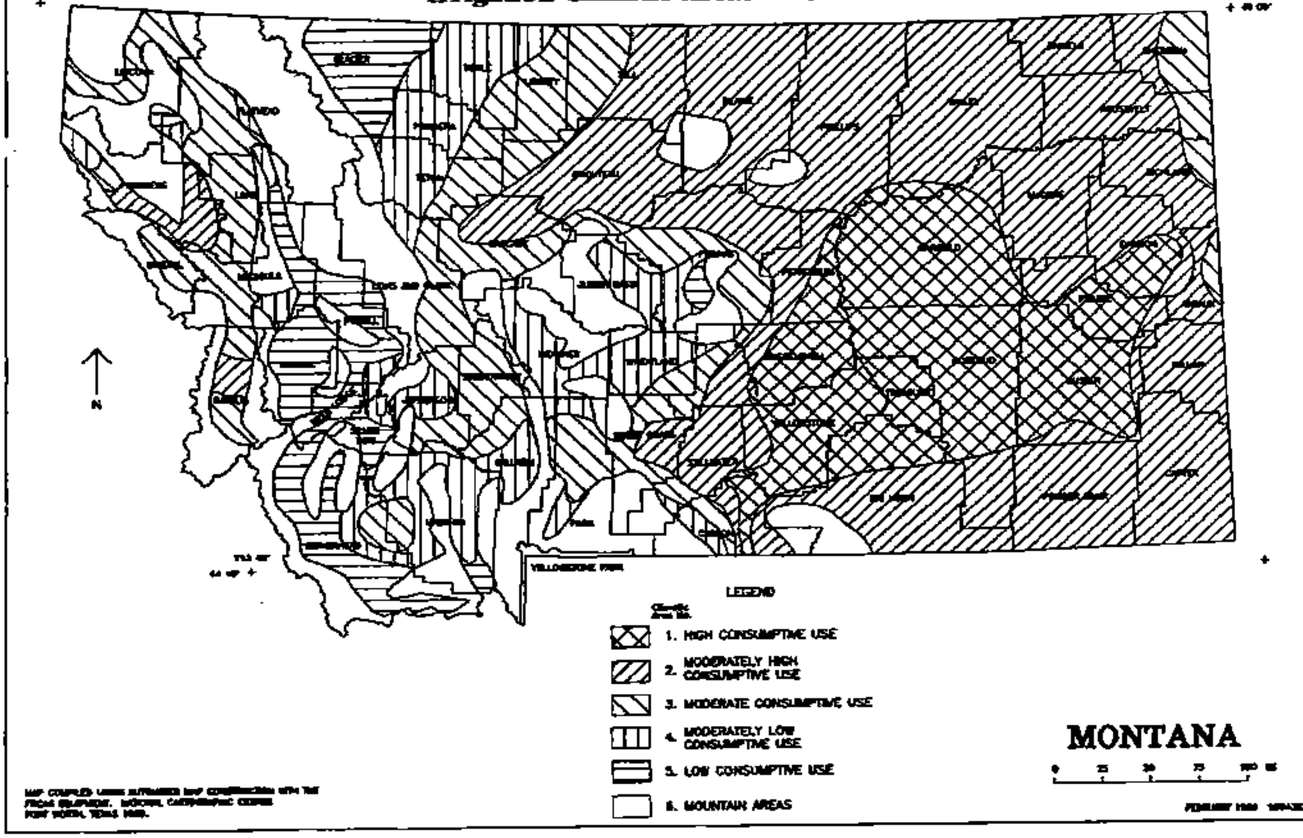
Crop	Climatic Area 1	2	3	4	5
	inches/day				
Alfalfa	.31	.28	.25	.23	.20
Grass	.25	.23	.20	.19	.16
Small Grains	.27	.25	.24	.24	.18
Corn Silage	.26	.23	.20	.18	–
Sugarbeets	.30	.28	.25	–	–
Potatoes	.34	.31	.26	.25	–

* Adopted from USDA-SCS Irrigation Guide for Montana

Calculating the Net Irrigation Requirement

Computing the net irrigation requirement is relatively easy, if the right information is available. The following example illustrates how this can be done. In this

Figure 6
Irrigation Climatic Areas—Montana



example we will use spring grain with a root zone of 4 feet. The root zone was selected from Table 2. Soil texture is listed below and was obtained from the published soil survey for the area where the irrigated field is located. The AWC value was obtained from Table 1.

From Table 2, the recommended MAD for spring grain is 50 percent. Calculation of allowable moisture depletion, in terms of inches of water depleted, is as follows:

$$\frac{\text{MAD\% x AWC in.}}{100} = \frac{50\% \text{ x } 7.5 \text{ in.}}{100} = 3.75 \text{ in. depleted}$$

Therefore, if moisture is allowed to be depleted to the 50% MAD level, a 3.75-inch net irrigation will be required to bring the soil moisture back to field capacity.

The following calculations then need to be completed to determine the total AWC for the management root zone.

Irrigation System Efficiencies Determine Total Irrigation Requirement

Efficiency of applying water through an irrigation system will dictate how much water must be delivered to the field to get the net irrigation requirement into the soil. Typical irrigation system efficiencies for well managed and maintained irrigation systems in Montana are illustrated in Table 4. Irrigation efficiency refers to the percentage of water pumped or diverted which actually enters and remains in the soil root zone during irrigation.

Soil Texture	Soil Layer Thickness (inches)	Soil Layer Thickness (feet)	AWC for Texture* (inches/foot)	AWC for Texture** (inches/layer)
Loamy fine sand	0-12	1.0	1.25	1.25
Sandy loam	12-18	0.5	1.50	.75
Sandy clay loam	18-48	2.5	2.20	+ 5.50
			Total AWC in 4 foot layer =	7.50 in.

* From Table 1; **Soil Layer thickness (ft) x AWC for Texture.

Table 4
Typical irrigation efficiencies for well managed and maintained systems

System Type	Efficiency (%)
Hand move or Side roll sprinkler	65%
Periodic move gun or boom sprinkler	50%
Traveling gun sprinkler	60%
Center pivot sprinkler	65%
Graded borders	50%
Graded furrows	50%
Contour ditches, border ditches	20%

Irrigation efficiency is determined by many factors, some of which are wind losses, ditch seepage, runoff, and deep percolation. Efficiency can be increased by improved water management and by system maintenance and improvements. The gross amount of irriation water to apply is calculated as follows:

$$\text{Gross requirement (inches)} = \frac{\text{Net requirements (inches)} \times 100}{\text{Efficiency (\%)}}$$

Assuming water is applied with a side roll sprinkler system and using data from the example above, the gross irrigation requirements would be calculated as follows:

$$\frac{3.75 \text{ in. net} \times 100}{65\% \text{ efficiency}} = 5.77 \text{ in. gross irrigation requirement}$$

If you had 50 acres to irrigate, the following total amount of water should be applied:

$$50 \text{ acres} \times 5.77 \text{ in.} = 289 \text{ acre in. or } \frac{289}{12} = 24 \text{ acre ft.}$$

Other Water Management Considerations

Additional factors must be considered for complete water management. They are:

Determining how much of the available water has been used at any given time and thus when to irrigate. There are several ways to do this. The most common methods are:

- Probing and using the feel and appearance method to determine soil moisture.
- Using an evaporation pan to keep track of moisture used by the crop.
- Using a "checkbook" method of keeping track of moisture used by the crop, based on daily temperature readings and crop use estimates.
- Other methods such as tensiometer, resistance blocks and neutron probe procedures.

A home computer can aid with the bookkeeping required with some of these methods.

Knowing how much water has been put on during an irrigation is valuable information. Such information will help determine when to shut the water off. This is accomplished by:

- Knowing how much water is applied per hour by your sprinkler system.
- Using a flow measuring device such as a flume, weir or pipeline flow meter to measure the flow rate through any type of system.

You can find out more about these water management techniques by contacting your Extension agent or the Soil Conservation Service in your county.

FILE UNDER: SOIL AND WATER
C-3 (Soil & Water) MT8901AG
Revised September 1990

SPECS

TREATMENT CHAMBER

Model	: Inline 400+
Drawing	: INLN+06HA
Number per system	: 1
Material	: 316L stainless steel
Dimensions	
- length	: 18.3 in (465 mm)
- width	: 30.2 in (768 mm)
Weight	
- dry	: 115 lbs (52 kg)
- wet	: 143 lbs (65 kg)
Degree of protection	: NEMA12 (IP54)
Pressure rating	
- test	: 225 psi (15 bar)
- operational	: 150 psi (10 bar)
Operational water temperature	: 32–113 °F (0–45 °C)
Storage temperature	: 32–158 °F (0–70 °C)
UV lamp type	: B2020
Lamp life	: 8000 hrs (PL1, 2, and 3)
	: 6000 hrs (PL2 and 3)
	: 4000 hrs (PL3)
Number lamps per chamber	: 4
Inlet/Outlet connections	: 6 in ANSI
Features included	
- Access hatch	- UV sensor
- Temperature detector	- Cleaning mechanism (automatic)
- Manual air release valve	- Drain port

Options available
- Cleaning mechanism (manual or chemical assisted)
- Skid mounting
- Drain valve

POWER/CONTROL MODULE

Model	: 2020HSC4
Drawing	: CLIN400+
Number per system	: 1
Material	: Wall mounted epoxy coated steel
Dimensions	
- height	: 47.2 in (1200 mm)
- width	: 31.5 in (800 mm)
- depth	: 15.7 in (400 mm)
Weight	: 385 lbs (175 kg)
Degree of protection	: NEMA12 (IP54)
Operational temperature	: 32–113 °F (0–45 °C)
Storage temperature	: 32–158 °F (0–70 °C)
Lamp power	
- level 1	: 1500 W
- level 2	: 1880 W
- level 3	: 2240 W
Power level control	: Manual
Controls	: Ectronic+

Displays

LEDs

- UV on	- Warning
- Power on	- Alarm

Alphanumeric Scrolling Screen Menu (two line, 16 characters)

- Power	- Flow (m^3/hr)
- Mode	- Total (hours)
- Language	- Lamps (hours)
- UV Int. (%)	- Wipes
- Water temp (deg C)	

Inputs

- Remote ON/OFF	- Lamp power level
- Clear message	- Wipe

Outputs

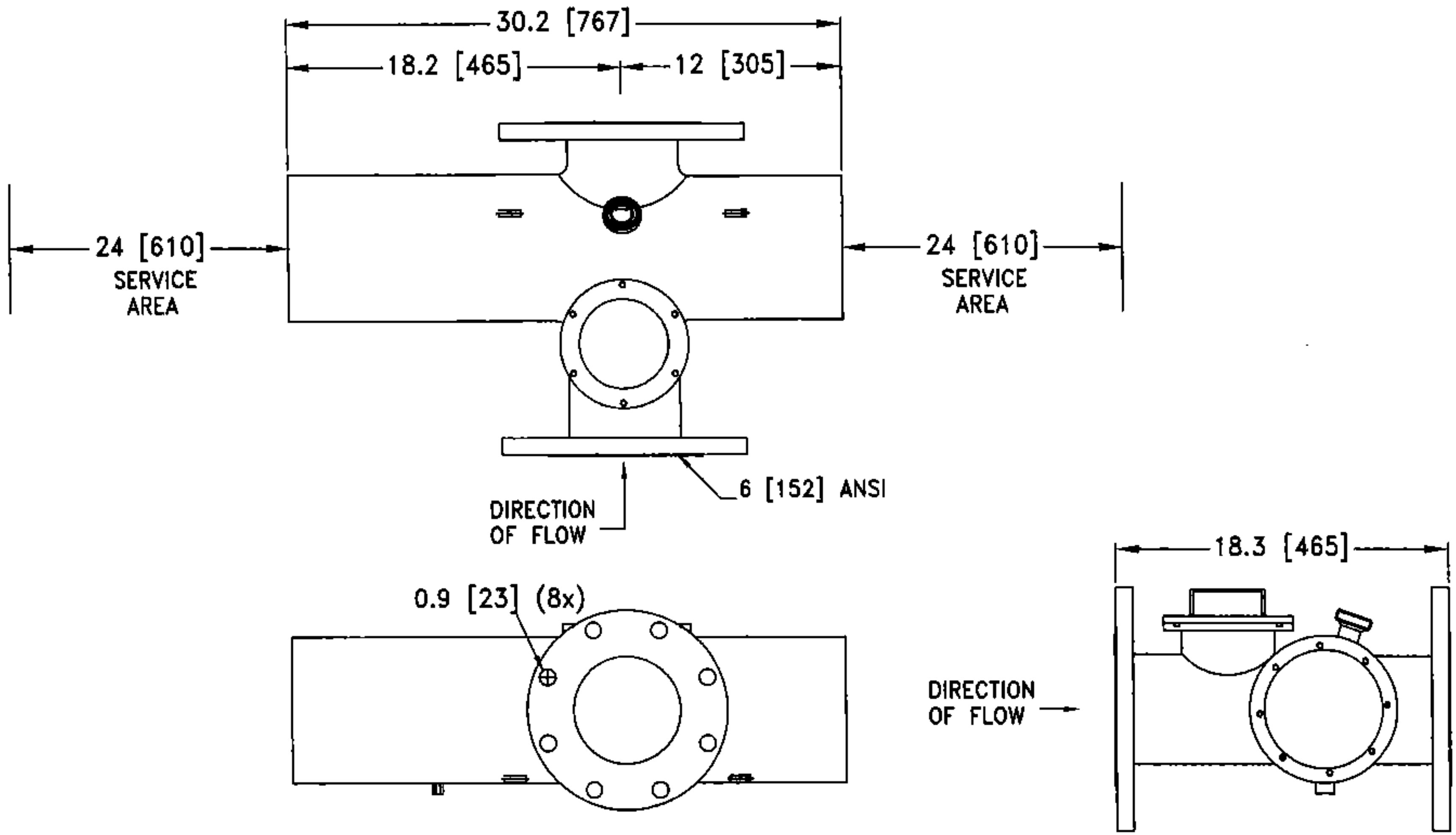
- Ready (PFC)	- Warning (PFC)
- UV intensity (mA)	- Alarm (PFC)

- UV failure (low intensity or lamp failure) (PFC)

Electrical supply	
- voltage	: 480 V
- phase	: 3
- frequency	: 60 Hz
Power consumption (max.)	: 10 kW

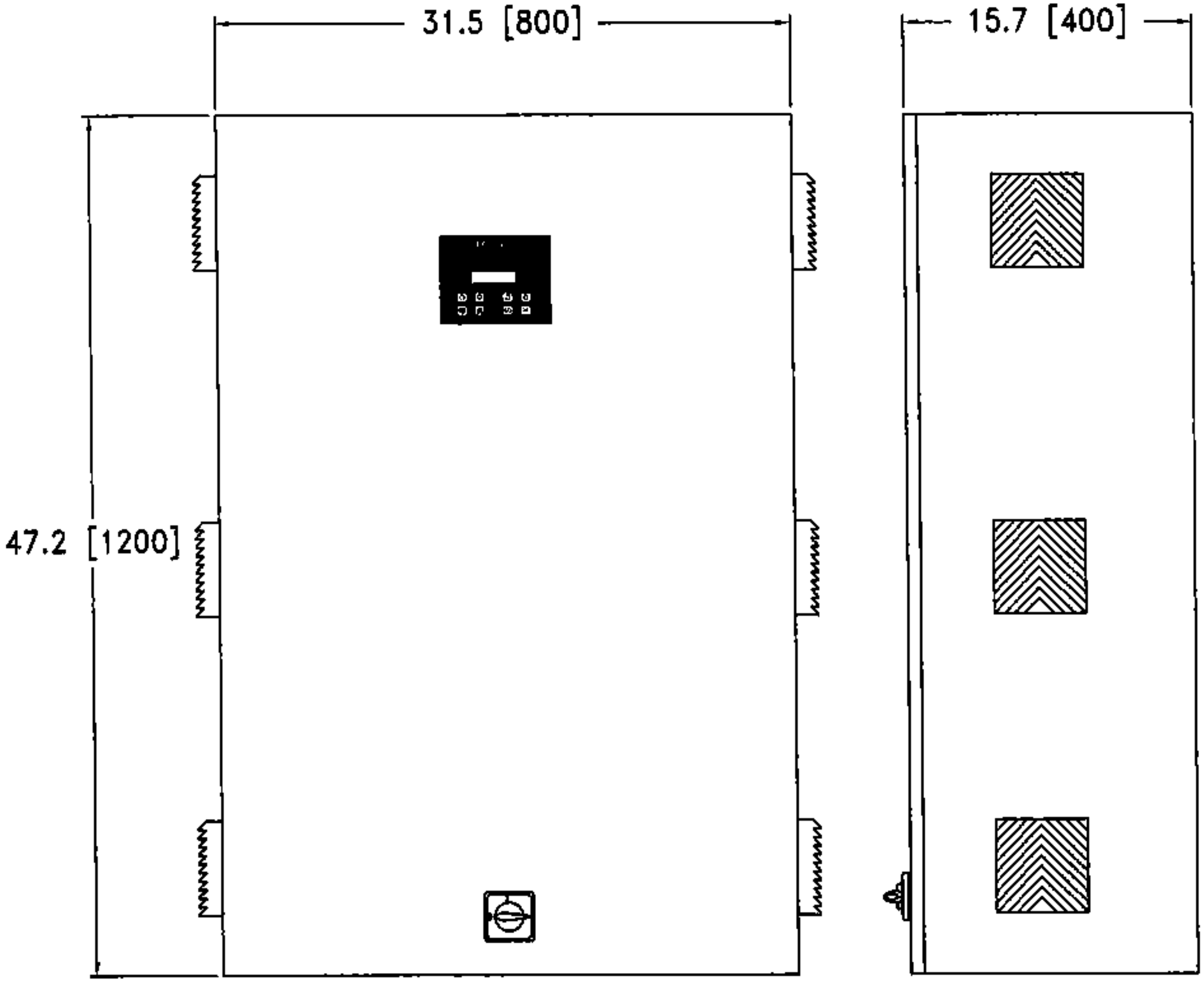
Options available

- NEMA 4X
- UVtronic control system (microprocessor based)

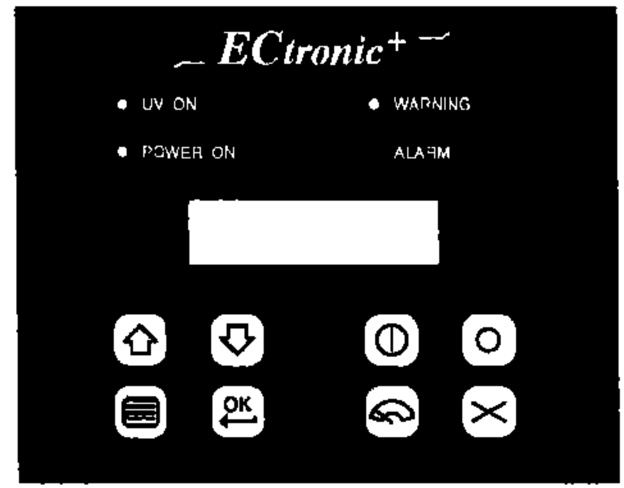


NOTES:
1. DIMENSIONS IN INCHES [MILLIMETERS].
2. DO NOT SCALE DRAWING.
3. CLEARANCE REQUIRED FOR SERVICE AND MAINTENANCE OF SYSTEM.
4. DIMENSIONS SUBJECT TO CHANGE.
5. ACCESS HATCH SHOULD BE PLACED UPSTREAM.

Title: INLINE 400+ WITH HATCH & AUTOMATIC WIPER		Scale: NTS / Page 1 of 1
6" ANSI FLANGES	Drawn: GCK	Date: 3/11/04
AQUIONICS HALMA GROUP COMPANY	Appd: MJG	Date: 8/03/04
	Mat. 316L SS	Rev. B
	Part No.: INLN+06HA	

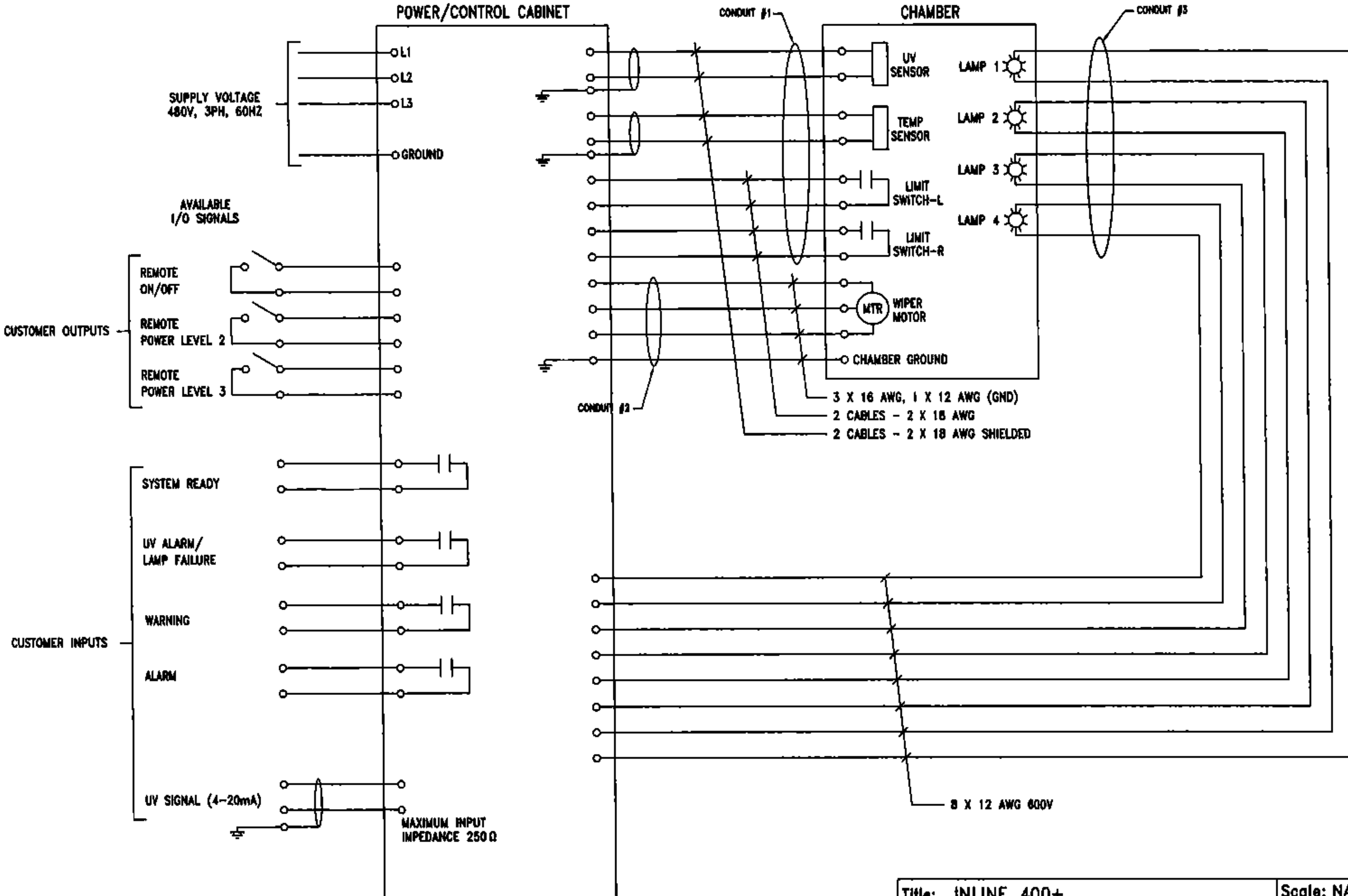


Standard Controls



NOTES:
1) DIMENSIONS IN INCHES [MILLIMETERS].
2) 30" FRONT CLEARANCE REQUIRED FOR SERVICE.
3) 12" SIDE CLEARANCE RECOMMENDED FOR AIR FLOW.

Title: INLINE 400+			Scale: NA
POWER AND CONTROL CABINET LAYOUT			Page 1 of 1
	Drawn: BG	Date: 2/21/06	
AQUIONICS HALMA GROUP COMPANY	Appd: PJB	Date:	
	Mat.		Rev. A
	Dwg. No: CLIN400+		

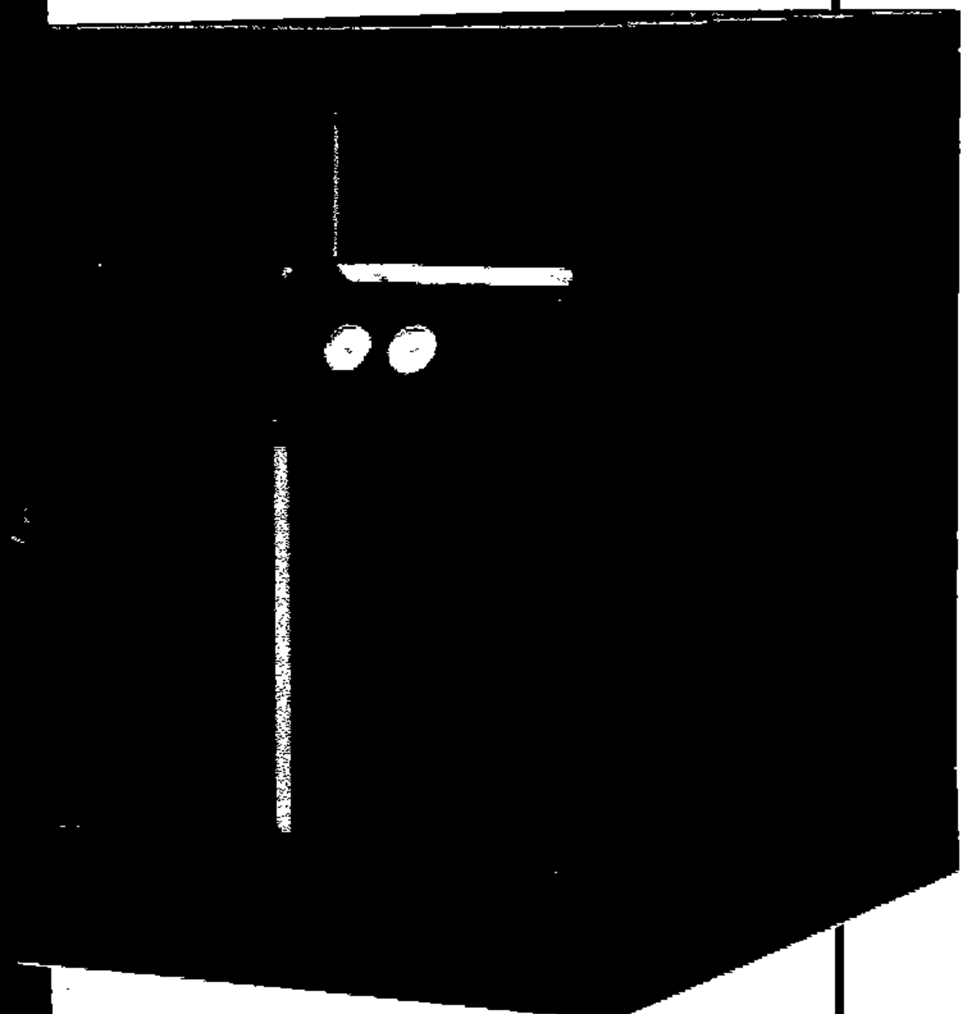


Title: INLINE 400+			Scale: NA
FIELD WIRING DIAGRAM			Page 1 of 1
	Drawn: BG	Date: 6/28/06	
AQUIONICS HALMA GROUP COMPANY	Appd:	Date:	
	Mat.		Rev. B
	Dwg. No: FWIN400+		

AERZEN

Delta Blower Generation 5

BLOWER Packages

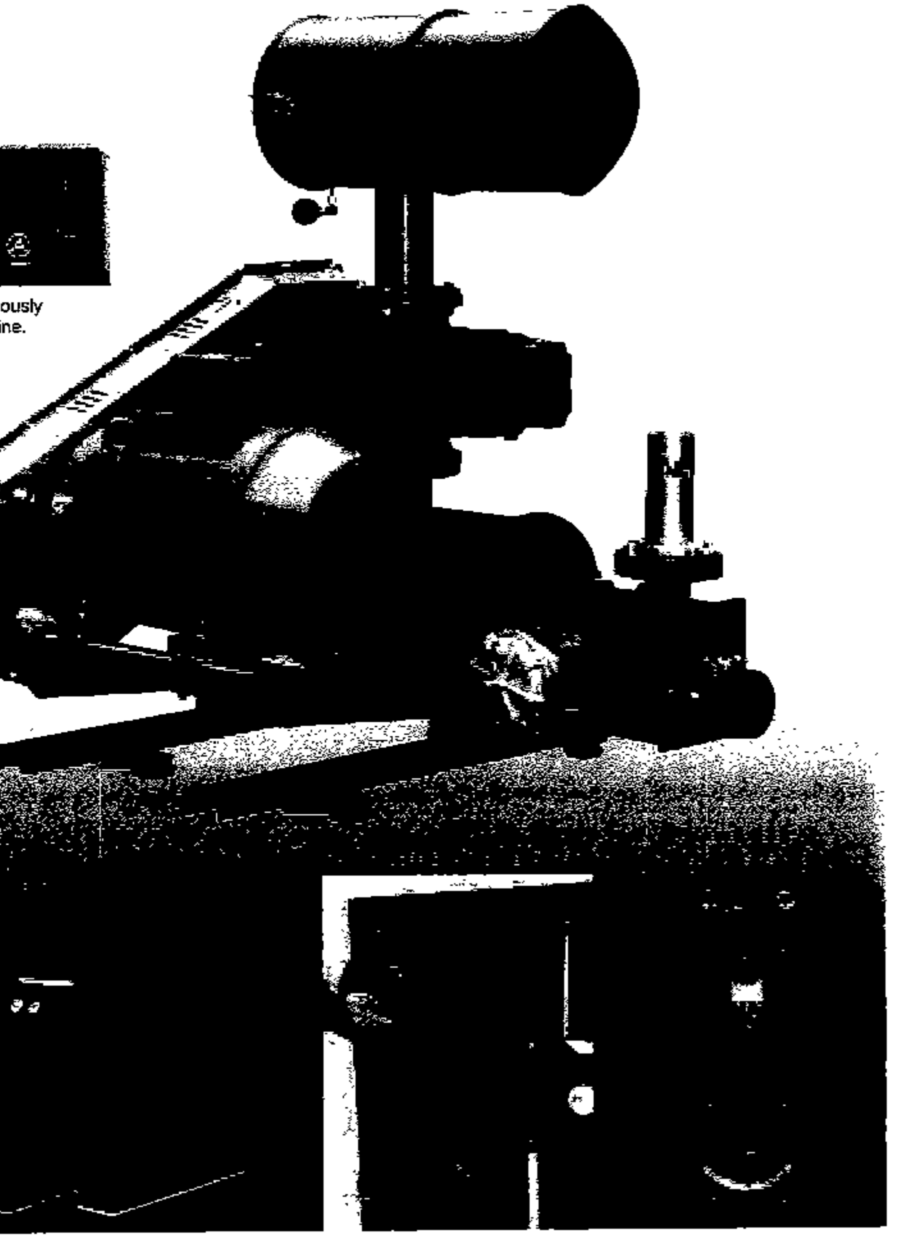


Now

Aerzen's G-5 Blower

The 5th generation of Aerzen modular compact packages combine tradition and innovation in a unique way.

Control continuously monitors machine.



Ease of Maintenance

- Ease of access to all components
- Oil level can be observed from the outside
- One oil drain and one oil fill point
- Fully automatic belt tensioning
- Superior functionality

Discharge Silencer without Absorption Material

- "Aerzen 10" combi-mount silencer with 10 inherent key advantages combined in this unique key component

Room-Saving

- Compact
- Side-by-side installation

Improved Sound Reduction

- By an average of 6–8 dB(A) with redesigned acoustic hood with added functionality

Cooling Fan for Forced Ventilation of the Enclosure is Shaft-Mounted

- No need for additional electric motor and interlocks

Cover photo: vacuum package.
Similar design available for gases other than air.

Aerzen means trouble-free compression.

Aerzen's modular blower packages have been offered since the 1960s. The Delta Blower packages have been in successful operation since the 1990s. They are just one of the offerings in our single stage positive displacement program. Whatever your application and installation requirements, be sure to consider Aerzen.

Warranty: 5 years optional with our Delta Care Maintenance Contract.

For Pressure

- Up to 15 psi: Delta Blower packages
- Up to 51 psi: Oil-free and air-cooled VM and VML screw compressors

For Vacuum (Dry)

- Up to 15″ Hg: Delta Blower packages
- Up to 25″ Hg: Delta Blower packages with pre-inlet cooling
- Up to 25.5″ Hg: Oil-free and air-cooled VM screw compressors at same flow (30% more efficient than PD blowers)
- Vacuum boosters to 10^{-3} mbar absolute

For gases other than air, please consult factory.

AERZEN

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www.wastewater.com edi@wastewater.com

December 30, 2009

Mr. Rich Fillbach, PE
Great West Engineering, Inc.
602 Ferguson Avenue, Suite 1
Bozeman, MT 59718

RE: Gallatin Gateway WWTP
EDI FlexAir™ Aeration-Mixing System
Submerged Lateral Configuration

Dear Mr. Fillbach:

Environmental Dynamics Inc (EDI) appreciates receiving the design request for the Gallatin Gateway WWTP. A preliminary design is enclosed for a submerged lateral aeration system with fine bubble diffusers.

Process Review:
EDI understands that the treatment plant is designed to include one aerated lagoon basin plus additional non aerated basin(s). The aerated lagoon has the dimensions of 150 feet X 150 feet at the waterline. The lagoon will have a total depth of 12 feet and 3:1 side slopes. This provides an aerated treatment volume of 1.2 million gallons.

The design conditions for the WWTP are as follows:

Average Design Flow = 0.05 MGD
Average Organic Load as BOD = 225 mg/l

The anticipated performance capabilities of the proposed system in terms of BOD reduction are summarized in the attached modeling calculations. This modeling is based on design coefficients recommended by the US EPA as presented in Municipal Wastewater Stabilization Ponds Design Manual. The model provides the required retention time as a function of the anticipated BOD removals. As presented for a standard 1-cell aerated system, an estimated effluent BOD equal to 52 mg/l under controlling winter operations and 26 mg/l under summer operations is anticipated.

If additional treatment in terms of BOD reduction is required, increasing the volume of the lagoon or subdividing the lagoon into multiple treatment zones with a baffle will increase the treatment capacity of the basin.

Diffuser Selection:
EDI recommends the FlexAir Magnum™ diffuser for this application. From a design standpoint, the FlexAir diffuser is a sleeve type, rubber membrane, fine bubble diffuser. This diffuser offers high oxygen transfer capabilities with the added advantage of maximum fouling or clogging resistance for minimum maintenance. EDI has been manufacturing the FlexAir Magnum™ diffuser unit for over 10 years. We have extensive field experience with this unit and have numerous field installations demonstrating the excellent mechanical and process performance capabilities of this unit.

Aeration System Design:
EDI uses design briefs in order to calculate the airflow requirement and the necessary number of FlexAir diffuser tubes. The design criteria employed for the aeration system design is as follows. The specific calculations utilized for the design of the aeration system are summarized in the attached design briefs:

- Design flow rate = 0.05 MGD.
- Influent organic loading as measured by BOD = 225 mg/l or 94 lb/d.
- No reduction in BOD or ammonia in pretreatment unit operations.
- Alpha = 0.75. Alpha is the ratio of oxygen transfer rate in field conditions versus clean water.
- Beta = 0.95. Beta is the ratio of solubility of oxygen in field conditions versus clean water.
- Site elevation = 4950 ft.
- Minimum dissolved oxygen to be maintained in the system of 2 mg/l.
- Winter and summer wastewater temperature of 5 and 20°C, respectively.
- 100% removal of BOD. This is a conservative value. EDI recommends using this value since the full-applied organic load may be exerted in the facility under specific conditions.
- 2.5 lb oxygen per lb BOD removed as required by the State of Montana. This is a conservative factor and includes sufficient oxygen for complete stabilization of BOD and biomass, as well as a nominal amount of nitrification.

The design AOR for the system is 9.8 pounds per hour. The FlexAir diffuser will operate at a standard oxygen transfer efficiency of 15 % at a submergence depth of 11 feet and an air rate of 4.3 scfm per 1/2-meter Magnum tube. The required number of tubes based on these criteria is 64. The total airflow required to support satisfactory reduction of BOD is 138 scfm at an estimated operating pressure of 6.3 psig. EDI recommends an additional 0.5 psig for design overpressure.

System Configuration:
EDI recommends the use of a submerged lateral system with floor mounted units in order to minimize any issues associated with ice on the lagoon surfaces during the winter. Please keep in mind that the diffuser assemblies are completely retrievable allowing the units to be field inspected and maintained without taking the basins out of service.

EDI layout drawing #40890, is enclosed showing the proposed configuration of the system. EDI recommends the provision of one (1) aeration lateral constructed of 3 inch diameter HDPE piping. A total of eight (8) FlexAir 44F Magnum diffusers will be installed in the aeration basin.

The FlexAir 44F Magnum diffuser has four 1/2-meter Magnum tubes per assembly. A detail drawing of this diffuser is enclosed for your reference.

Budget Cost
The budget cost for the proposed equipment including complete in-basin aeration components will be provide under separate cover. This cost estimate includes high-density polyethylene piping, diffuser units, and stainless steel anchoring components. Concrete for ballasting the aeration system and diffuser is to be provided by the installing contractor. Blower and blower controls are not included in EDI's scope of supply. An allowance for freight and on-site service and commissioning is included in this estimate.

Mr. Fillbach, EDI appreciates the opportunity to present our design recommendations. If you require any additional information, please feel free to contact me at 573-474-9456.

Sincerely yours,

Darin Starr

Darin Starr
Regional Manager

Attachments
Modeling Calculations
Design Briefs
Layout Drawing

cc: Doug Mitch, Able Wright

Environmental Dynamics Inc.
5601 Paris Road
Columbia, MO 65202
573-474-9456

EDI Aerated Stabilization Basin
Process Modeling Design r1.2

Municipal Wastewater Stabilization Ponds
US EPA, Design Manual, October 1983

Aerated Pond Option

Project: **Gallatin Gateway MT**
Date: **18-Dec-09**

Design Assumptions

Parameter	Designation	Design Value	Units
Design Flow	Qi	0.05	MGD
Influent Water Temperature (max)	Ti, max	20	degrees C
Influent Water Temperature (min)	Ti, min	5	degrees C
BOD Influent	Co	225	ppm
BOD Effluent	Cn	30	ppm
Ambient Air Temperature (max)	Ta, max	25	degrees C
Ambient Air Temperature (min)	Ta, min	0	degrees C
Oxygen Requirement, lb O2/lb BOD applied			
Design AOR, lb O2/lb BOD applied	Design AOR (unit)	2	lb O2/lb BODapplied
Peak AOR, lb O2/lb BOD applied	Peak AOR (unit)	0	lb O2/lb BODapplied

Reactor Characteristics

Number of Reactors in Series	n	1

	Volume, MG	Surface Area, ft	Operating Regime
Stage No. 1	1.20	22500	PM
Stage No. 2	Not Applicable	Not Applicable	Not Applicable
Stage No. 3	Not Applicable	Not Applicable	Not Applicable
Stage No. 4	Not Applicable	Not Applicable	Not Applicable

Biological Process Assumptions

Reaction Rate, Partial Mix Conditions	Kpm20	0.276	1/day
Temp Coef, Partial Mix Conditions	TCpm	1.036	
Reaction Rate, Complete Mix Conditio	Kcm20	2.5	1/day
Temp Coef, Complete Mix Conditions	TCcm	1.085	

Environmental Dynamics Inc.
5601 Paris Road
Columbia, MO 65202
573-474-9456

EDI Aerated Stabilization Basin
Process Modeling Design r1.2

Process Modeling Calculations

Estimated System Performance

	Retention Time, day	Temp C(min)	k rate (min)	Temp C(max)	k rate (max)
Stage No. 1	24.0	0.8	0.140	24.2	0.321
Stage No. 2	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Stage No. 3	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Stage No. 4	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Parameter	Winter Conditions		Summer Conditions	
	BOD, ppm	% Removal	BOD, ppm	% Removal
Stage No. 1 Influent	225		225	
BOD Removed Stage No. 1	173	0.77	199	0.88
Stage No. 1 Effluent	52		26	
Stage No. 2 Influent	52		26	
BOD Removed Stage No. 2	#VALUE!	Not Applicable	#VALUE!	Not Applicable
Stage No. 2 Effluent	#VALUE!		#VALUE!	
Stage No. 3 Influent	#VALUE!		#VALUE!	
BOD Removed Stage No. 3	#VALUE!	Not Applicable	#VALUE!	Not Applicable
Stage No. 3 Effluent	#VALUE!		#VALUE!	
Stage No. 4 Influent	#VALUE!		#VALUE!	
BOD Removed Stage No. 4	#VALUE!	Not Applicable	#VALUE!	Not Applicable
Stage No. 4 Effluent	#VALUE!		#VALUE!	

Aeration Taper Calculations

Design AOR	188	lb/day	7.8	lb/hr
Peak AOR	0	lb/day	0.0	lb/hr

	Max BOD Red	Diffuser Distribution		
	ppm	Winter	Summer	Max
Cell One	199	87%	100%	100%
Cell Two	0	0%	0%	0%
Cell Three	0	0%	0%	0%
Cell Four	0	0%	0%	0%
Total	199	87%	100%	100%

FINE BUBBLE DESIGN BRIEF - FLEXAIR™ TUBE DIFFUSER

EDI™ FlexAir™ AERATION SYSTEM FOR AEROBIC TREATMENT

Environmental Dynamics, Inc.
5601 Paris Road, Columbia, Missouri 65202
ph. 573-474-9456 fax 573-474-6988
email edi@wastewater.com http://www.wastewater.com

DB - Aeration basin

Date: December 22, 2009

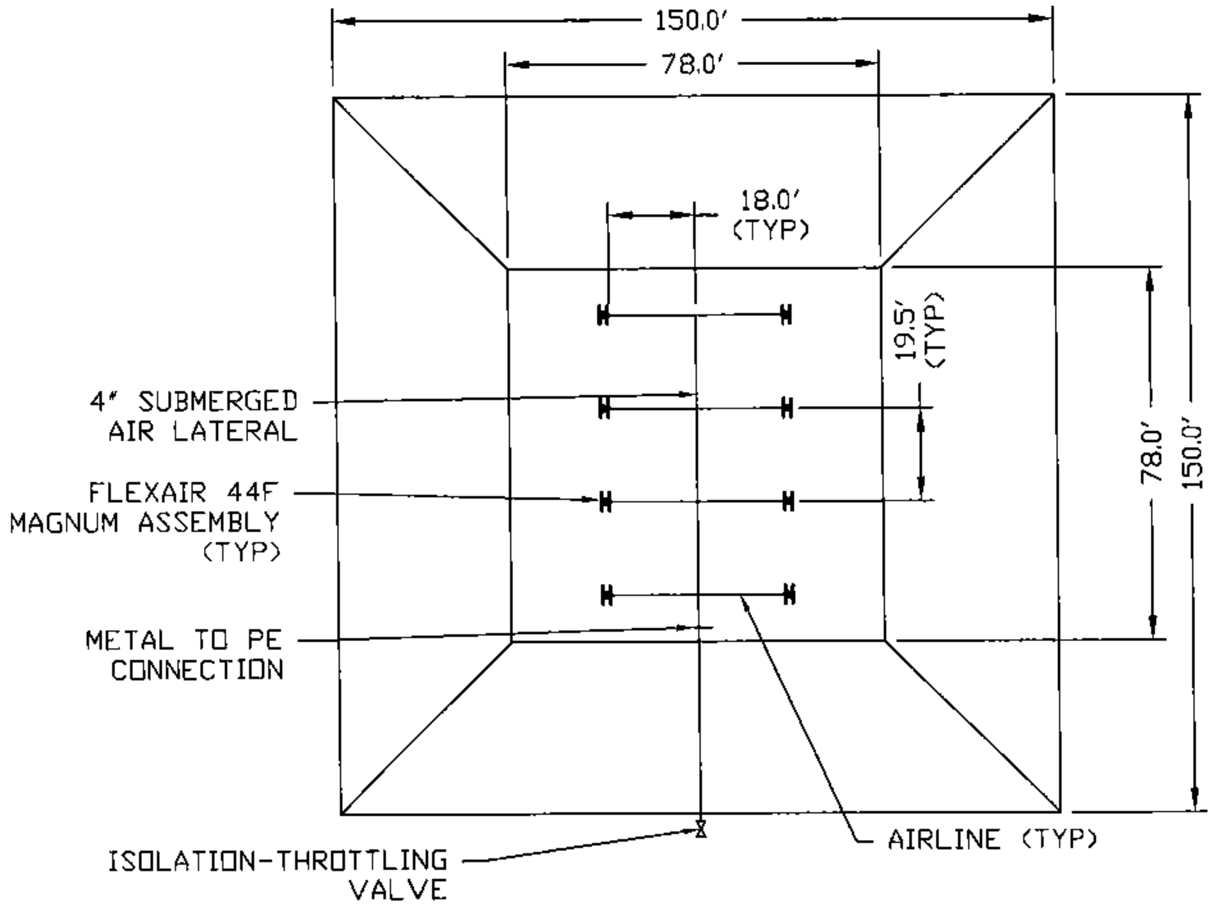
Project:
Gallatin Gateway, MT
Aerated lagoon

Consulting Engineer:

DESIGN CALCULATIONS		English Units	Metric Units
(1) Type Waste and Process -			
(2) Design Flow		**0.05** MGD	**189** m^3/d
(3) BOD Raw Waste	a) concentration	**225** mg/L	**225** mg/L
	b) weight/d	**94** lb/d	**43** kg/d
(4) Primary Treatment (% BOD Removal)		**0.0** %	**0.0** %
(5) % BOD for biological process (100% - Item 4)		**100.0** %	**100.0** %
(6) ALPHA = Ratio of oxygen transfer in waste to transfer in tap water		**0.75** Alpha	**0.75** Alpha
BETA = Ratio of solubility of oxygen in wastewater to solubility in tap water		**0.95** Beta	**0.95** Beta
(7) Site Elevation		**4950** ft	**1509** m
(8) Operating ambient pressure, winter		**12.21** psia	**841.81** millibar
Operating ambient pressure, summer		**12.34** psia	**850.58** millibar
(9) Dissolved O_2 level in the aeration basin		**2.00** mg/L	**2.00** mg/L
(10) Temperature of waste in aeration basin:			
Winter Temperature		**41.0** °F	**5.0** °C
Summer Temperature		**68.0** °F	**20.0** °C
(11) Design BOD removal		**100.0** %	**100.0** %
(12) Carbonaceous BOD to the aeration basin (Item 3b) x (Item 5)		**93.9** lb/d	**42.6** kg/d
(13) Oxygen per unit of carbonaceous BOD removed		**2.50** lb/lb	**2.50** kg/kg
(14) Carbonaceous oxygen requirements for aeration at field conditions (Item 11)x(Item 12)x(Item 13)		**234.7** lb O_2/d	**106.5** kg O_2/d
(15) Ammonia to aeration basin	a) concentration	**0.0** mg/L	**0.0** mg/L
	b) weight/d	**0.0** lb/d	**0.0** kg/d
(16) Oxygen requirements for ammonia (Item 15b) x (4.6#O_2/#NH_4-N)		**0.0** lb O_2/d	**0.0** kg O_2/d
(17) Total oxygen requirements, AOR (Item 14 + Item 16) / 24		**9.8** lb O_2/h	**4.4** kg O_2/h
(18) Air supply for each EDI FlexAir™ diffuser tube		**4.31** scfm	**7.33** sm^3/h **6.83** nm^3/h

	DB - Aeration basin	
(19) Active surface area per diffuser tube	183 in^2	1181 cm^2
(20) Air release depth of diffusers	11.00 ft	3.35 m
(21) Tank floor surface area	– ft^2	– m^2
(22) % Oxygen transfer, SOTE	15.0 %	15.0 %
(23) lb oxygen per h per tube, SOR	0.68 lb O_2/h/unit	0.31 kg O_2/h/unit
(24) Winter surface saturation, Csmt	12.77 mg/L	12.77 mg/L
Summer surface saturation, Csmt	9.09 mg/L	9.09 mg/L
(25) Effective depth correction factor	0.40	0.40
(26) Standard condition aerated O2 saturation in the tank, C^*_{20}=9.09*(29.92+0.8828*Item20*Item 25)/29.92	10.27 mg/L	10.27 mg/L
(27) Theta value=	1.024	1.024
(28) AOR/SOR=ALPHA[BETA(C^*_{20})(C_{smt}/9.09)(P_{site}/P_{sc})-(Item 9)](THETA)^(Item 10-20)/(C*20)		
Winter AOR/SOR	0.480	0.480
Summer AOR/SOR	0.452	0.452
(29) Number of EDI FlexAir™ tubes required for oxygen demand (Item 17) / [(Item 23) x (Item 28)]	32 units	32 units
(30) Air requirements for oxygenation (Item 18) x (Item 29)	138 scfm	235 sm^3/h
		219 nm^3/h
(31) Assumed Mixing Design Criteria (air requirements)	0.12 scfm/ft^2	2.19
(32) Air requirements for mixing (Item 31) x (Item 21)	138 scfm	235 sm^3/h
		219 nm^3/h
(33) Number of tubes for mixing and/or proper distribution	32 units	32 units
(34) Airflow per tube (mixing only)	4.31 scfm per unit	7.33 sm^3/h per unit
		6.83 nm^3/h per unit
(35) Design diffuser air fluxrate based on oxygenation or mixing requirements, use the larger.	3.40 scfm per ft^2	62.1 $sm^3/h/m^2$
		57.9 $nm^3/h/m^2$
(36) Diffuser Density: (Area of Tank/Area of Diffusers) ratio [floor area/(# diffusers x active diffuser area)]	–	–
(37) Estimated system operating pressure:		
(a) Static liquid head	11.00 ft	3.35 m
(b) Pressure loss at blower building and header	1.50 ft	0.46 m
(c) Pressure loss lateral piping	0.50 ft	0.15 m
(d) Pressure loss though FlexAir™ tube	1.50 ft	0.46 m
(f) Normal compressor operating pressure (a+b+c+d)	14.50 ft	4.42 m
(38) Normal operating pressure	6.29 psig	433.56 millibar
(39) Design over-pressure APPROXIMATE	0.50 psig	34.48 millibar
(40) Peak design pressure	6.79 psig	468.03 millibar

Notes:



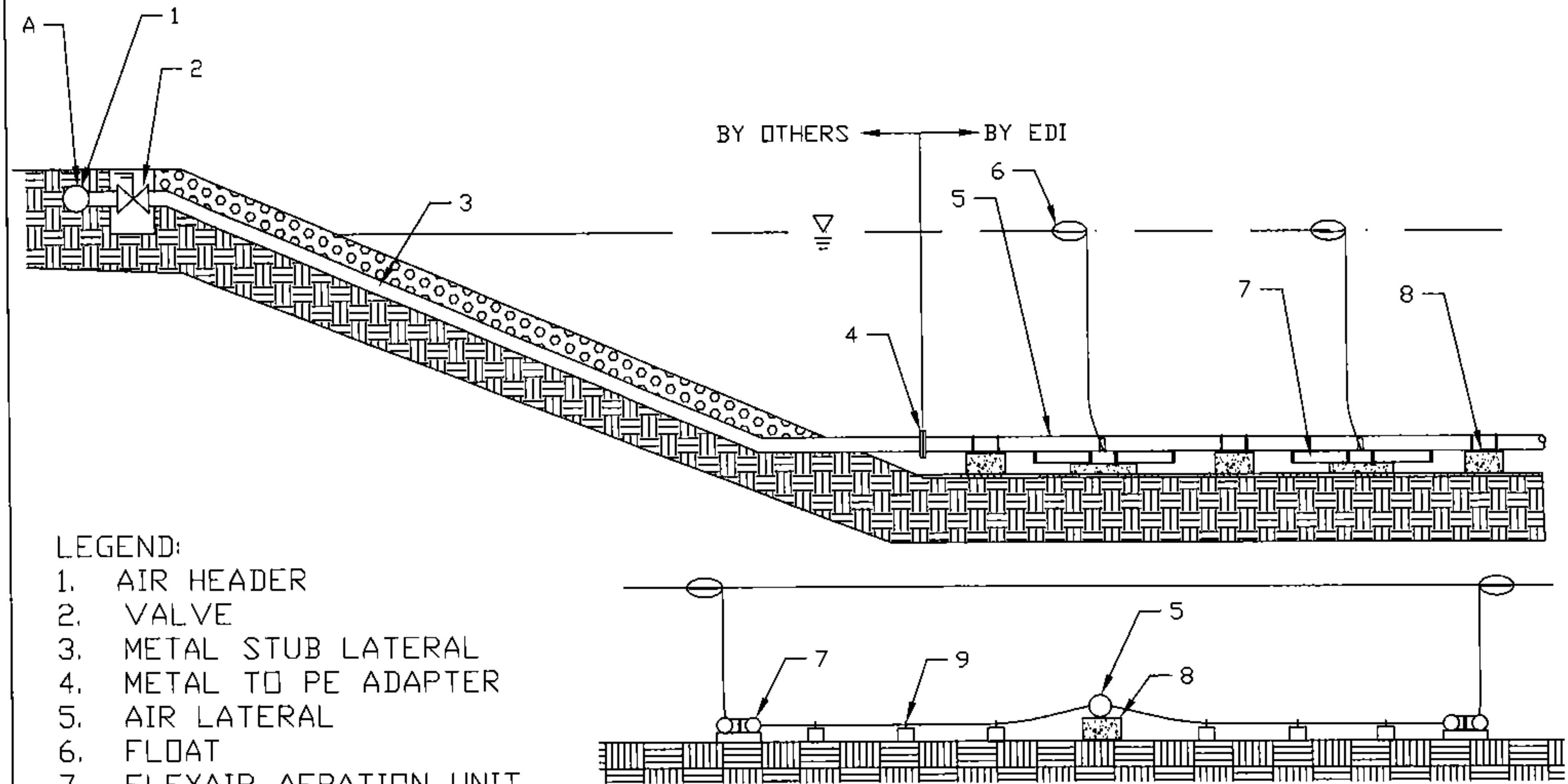
NOTES:

1. SIDE WATER DEPTH IS 12.0 FT. DIFFUSER DEPTH IS 11.0 FT.
2. TOTAL= 8 FLEXAIR 44F MAGNUM ASSEMBLIES.

TITLE: GALLATIN GATEWAY, MT			FOR: ZG	
DESCRIPTION: AERATION BASIN			BY: TSP	
EDI FLEXAIR® AERATION-MIXING SYSTEM			DATE: 12/17/09	
PROJECT ID:	SHEET NO: 1 OF 1	DWG NO: 40890	SCALE: 1" = 40'	

ENVIRONMENTAL DYNAMICS INC.
5601 PARIS ROAD
COLUMBIA, MISSOURI 65202
PHONE: 573-474-9456
FAX: 573-474-6988
WWW.WASTEWATER.COM

REV.	DATE
A	12/22/09

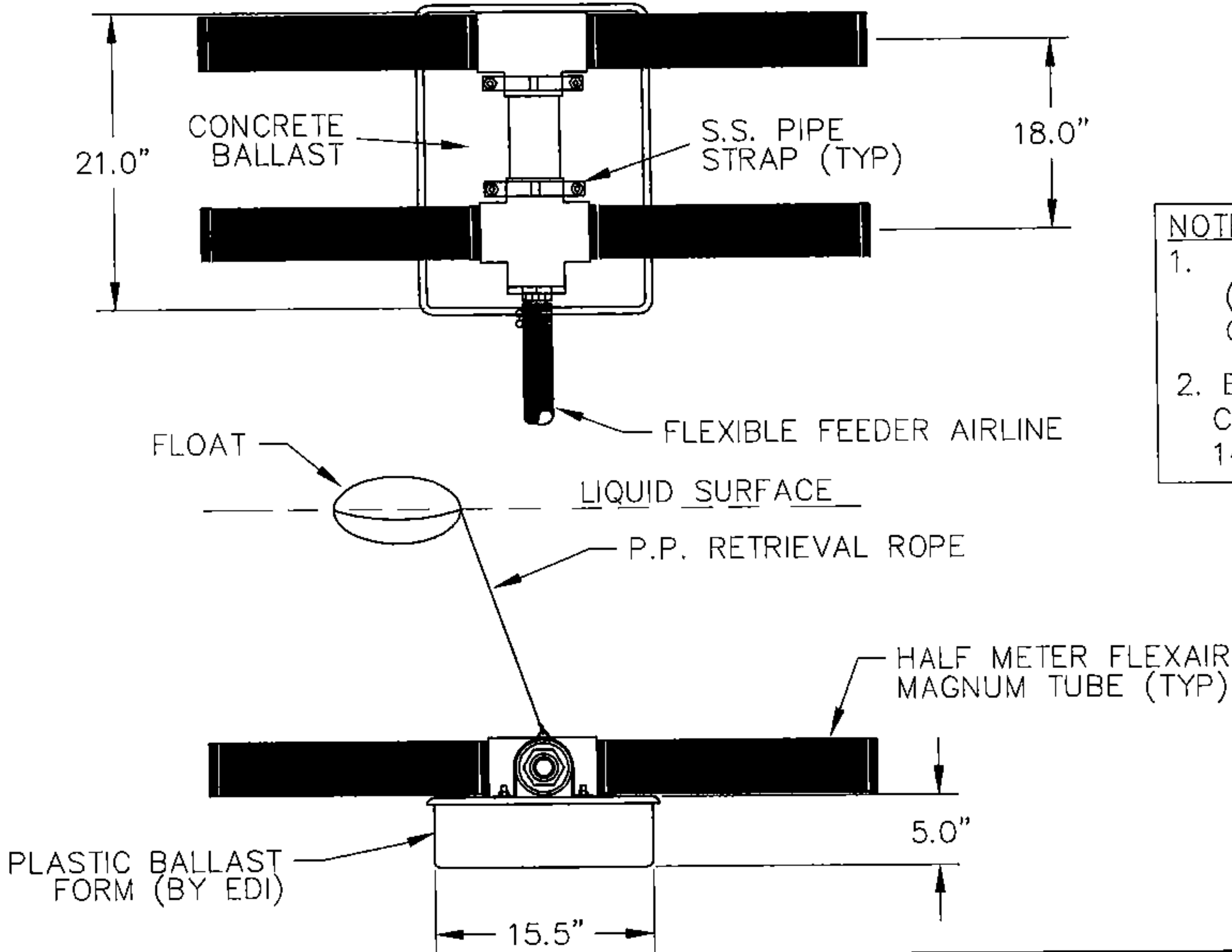


LEGEND:
1. AIR HEADER
2. VALVE
3. METAL STUB LATERAL
4. METAL TO PE ADAPTER
5. AIR LATERAL
6. FLOAT
7. FLEXAIR AERATION UNIT
8. BALLAST BLOCK
9. AIRLINE SINKER
10. FEEDER AIRLINE

NOTE:
A. HEADER INVERT ELEVATION MUST BE LOCATED ABOVE HIGH WATER LEVEL.

TYPICAL SECTION VIEW		ENG. BY: PJE	DWG. BY: TEM
		REV	DATE
TYPICAL INSTALLATION DETAIL		DWG NO: 8899	
DATE: 10-03-96	SCALE: N.T.S.		

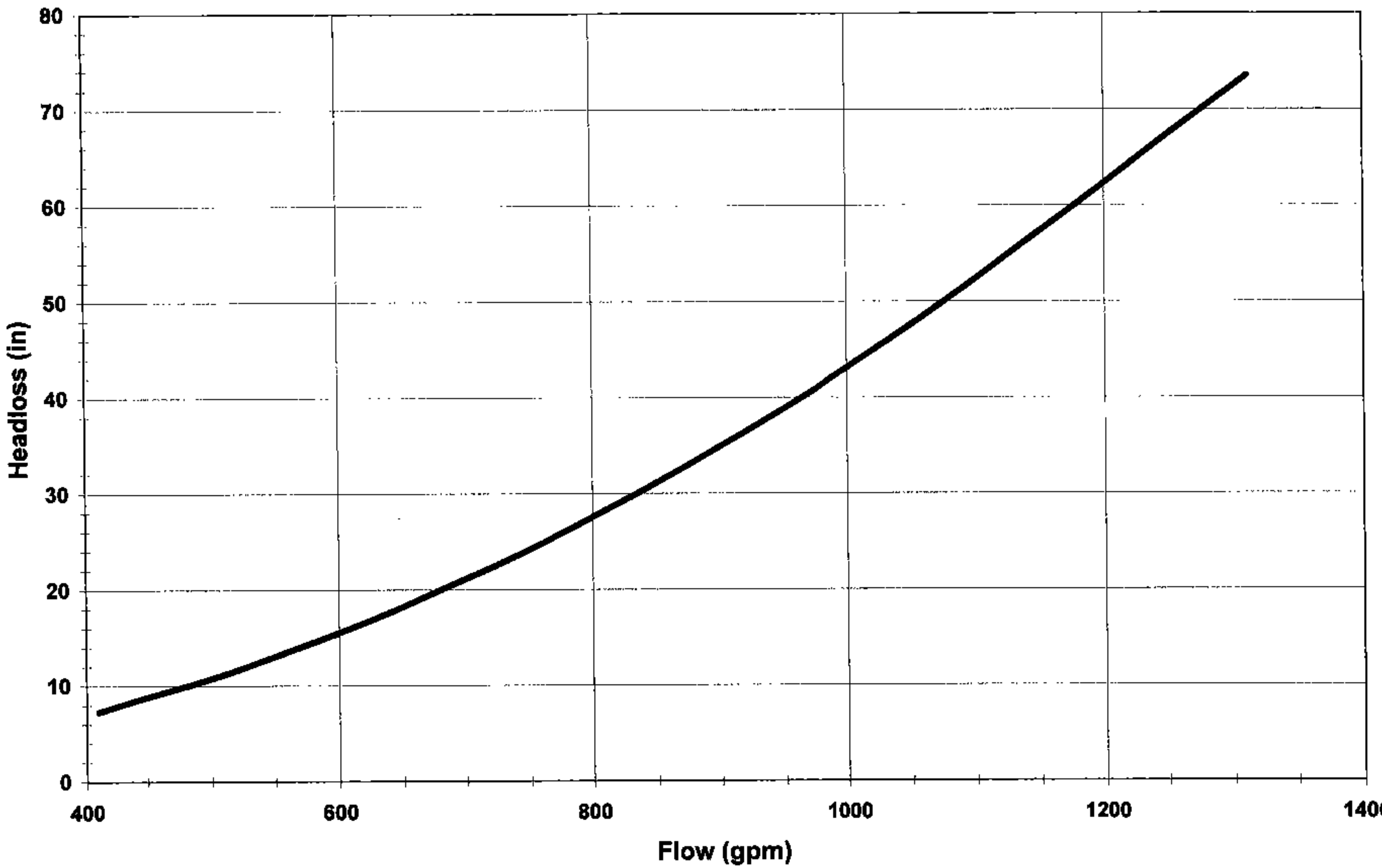
ENVIRONMENTAL DYNAMICS INC.
5601 PARIS ROAD
COLUMBIA, MISSOURI 65202
PHONE: 573-474-9456
FAX: 573-474-6988
WWW.WASTEWATER.COM



NOTES:
1. S.S. COMPONENTS (BY EDI) TO BE CAST IN CONCRETE
2. BALLAST USES CONCRETE @ 145#/CU FT. DENSITY

FLEXAIR™ 44F–18 MAGNUM DIFFUSER UNIT WITH PLASTIC BALLAST FORM SALES DRAWING			
SCALE: N.T.S.	ENG: DHS	DWN: TEM	DATE: 3–29–00
REF.DWG:	REV.DATE:		REV:
ENVIRONMENTAL DYNAMICS INC. COLUMBIA, MISSOURI USA			DWG.NO. A–13458

InLine 400+
UV System Headloss



Aquionics Company Confidential

Environmental Dynamics Inc.

5601 Paris Rd. Columbia, MO 65202-9399 USA
Telephone (573) 474-9456 Fax (573) 474-6988

AERATION DESIGN INFORMATION

1. Project Name: Gallatin Gateway Wastewater
   Project Location: Gallatin Gateway, Montana

2. Consulting Engineer or Plant Information

Co. Name Great West Engineering
Street 602 Ferguson Ave.
P.O. Box
City/State/Zip Bozeman, MT 59718
Country USA

Contact Name Rich Fillbach
Position Design Engineer
Phone (406) 587-0504
~~Fax~~ rfillbach@greatwesteng.com

3. Type of Project: New X Upgrade ______.
   If upgrade give blower model or specifications.

4. Type of Waste: municiple / domestic.

5. Treatment Process: 1 aerated cell w/ storage and irrigation

6. Basin Liquid Temperature: Summer 20 F/C Win ter 5 F/C

7. Elevation (Plant site elevation above sea level): 4,950 ft.

8. Basin Dissolved Oxygen Concentration 2 mg/l

9. Alpha and Beta Factors: Alpha 0.5 Beta 0.95

10. Design Avg. Flow 50,000 GPD Peak Flow 100,000 GPD

11. Influent - BOD mg/l 225 Effluent Required - 30. Assume 100% removal

12. Influent - NH_3-N mg/l 25 Effluent Required - ______.

13. Number of Aerated Basins: 1
    Depth 12 Length 150' Width 150'.

14. When do you need this information? ASAP

15. From: Name see #2
    Address
    Phone ______ Fax ______

16. Show sketch on back of this form.

Please call me @ 587-0504 or 539-5347
Thank You!

short data form
020923

Appendix P

Nondegradation Calculations / AdvanTex

INFILTRATION CHAMBERS

Gallatin Gateway Wastewater PER - Groundwater Discharge **DEQ-4**

DESIGN FLOW=	50,000	GPD	
	6,684	CF/DAY	
ESTIMATED PERC RATE=	6.0	MIN/IN	(NRCS SOILS; SITE DATA)
APPLICATION RATE=	0.6	GPD/SQFT	(FROM DEQ-4 TABLE 8-1)
MINIMUM TREATMENT AREA=	83,333	SQFT	(NOT INCL. REPLACEMENT AREA)
	1.91	ACRES	
CHAMBER WIDTH=	3.0	FT	(36" CHAMBER)
TOTAL CHAMBER LENGTH =	27,778	LF	
50% LEVEL II REDUCTION=	13,889	LF	
LATERAL LENGTH=	200.0	LF	(USER DEFINED)
TOTAL NUMBER OF LATERALS=	69		
TOTAL AREA REQUIRED=	106,944	SQFT	
	2.46	ACRES	
TOTAL AREA REQUIRED=	213,889	SQFT	
WITH REPLACEMENT AREA	4.91	ACRES	

*NOTE THAT THE TOTAL AREA REQUIRED IS AN ESTIMATE WHICH INCLUDES 10% ADDITIONAL AREA FOR PIPING, ZONES, SETBACKS, ETC. ACTUAL DIMENSIONS / AREAS SHALL BE CALCULATED FOR EACH SPECIFIC SITE AFTER THE GEOMETRIC DESIGN LAYOUT.

INFILTRATION CHAMBERS

Gallatin Gateway Wastewater PER - Groundwater Discharge **DEQ-4**

DESIGN FLOW=	30,000	GPD	
	4,011	CF/DAY	
ESTIMATED PERC RATE=	6.0	MIN/IN	(NRCS SOILS; SITE DATA)
APPLICATION RATE=	0.6	GPD/SQFT	(FROM DEQ-4 TABLE 8-1)
MINIMUM TREATMENT AREA=	50,000	SQFT	(NOT INCL. REPLACEMENT AREA)
	1.15	ACRES	
CHAMBER WIDTH=	3.0	FT	(36" CHAMBER)
TOTAL CHAMBER LENGTH =	16,667	LF	
50% LEVEL II REDUCTION=	8,333	LF	
LATERAL LENGTH=	200.0	LF	(USER DEFINED)
TOTAL NUMBER OF LATERALS=	42		
TOTAL AREA REQUIRED=	64,167	SQFT	
	1.47	ACRES	
TOTAL AREA REQUIRED=	128,333	SQFT	
WITH REPLACEMENT AREA	2.95	ACRES	

*NOTE THAT THE TOTAL AREA REQUIRED IS AN ESTIMATE WHICH INCLUDES 10% ADDITIONAL AREA FOR PIPING, ZONES, SETBACKS, ETC. ACTUAL DIMENSIONS / AREAS SHALL BE CALCULATED FOR EACH SPECIFIC SITE AFTER THE GEOMETRIC DESIGN LAYOUT.

INFILTRATION CHAMBERS

Gallatin Gateway Wastewater PER - Groundwater Discharge **DEQ-4**

*Standard Septic/Drainfield not Level 2.

DESIGN FLOW=	50,000	GPD	
	6,684	CF/DAY	
ESTIMATED PERC RATE=	6.0	MIN/IN	(NRCS SOILS; SITE DATA)
APPLICATION RATE=	0.6	GPD/SQFT	(FROM DEQ-4 TABLE 8-1)
MINIMUM TREATMENT AREA=	83,333	SQFT	(NOT INCL. REPLACEMENT AREA)
	1.91	ACRES	
CHAMBER WIDTH=	3.0	FT	(36" CHAMBER)
TOTAL CHAMBER LENGTH =	27,778	LF	
50% LEVEL II REDUCTION=	27,778	LF	***NOT APPLIED***
LATERAL LENGTH=	200.0	LF	(USER DEFINED)
TOTAL NUMBER OF LATERALS=	139		
TOTAL AREA REQUIRED=	213,889	SQFT	
	4.91	ACRES	
TOTAL AREA REQUIRED=	427,778	SQFT	
WITH REPLACEMENT AREA	9.82	ACRES	

*NOTE THAT THE TOTAL AREA REQUIRED IS AN ESTIMATE WHICH INCLUDES 10% ADDITIONAL AREA FOR PIPING, ZONES, SETBACKS, ETC. ACTUAL DIMENSIONS / AREAS SHALL BE CALCULATED FOR EACH SPECIFIC SITE AFTER THE GEOMETRIC DESIGN LAYOUT.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

NITRATE SENSITIVITY ANALYSIS

Model Updated 01/24/96

SITE NAME: Gallatin Gateway PER
COUNTY: Gallatin
LOT #: 30,000 GPD
NOTES: Level II Traetment; Initial Desgin Flow

VARIABLES	DESCRIPTION	VALUE	UNITS
K	Hydraulic Conductivity	104.0	ft/day
I	Hydraulic Gradient	0.013	ft/ft
D	Depth of Aquifer (usually constant)	15.0	ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii)	500	ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	404	ft
Ng	Background Nitrate (as Nitrogen)	1.03	mg/L
Nr	Nitrate (as Nitrogen) in Precipitation (usually constant)	1.0	mg/L
Ne	Nitrates in Effluent (50 for conventional; 24 for level II)	24	mg/L
#I	Number of Single Family Homes on the Drainfield	120.0	
Ql	Quantity of Effluent per Single Family Home (constant)	26.70	ft3/day
P	Precipitation	16.3	in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20	
EQUATIONS			
W	Width of Mixing Zone Perpendicular to Ground Water Flow = (0.175)(L)+(Y)	491.50	ft
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	7372.50	ft2
As	Surface Area of Mixing Zone = (L)(W)	245750.00	ft2
Qg	Ground Water Flow Rate = (K)(I)(Am)	9967.62	ft3/day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	182.80	ft3/day
Qe	Effluent Flow Rate = (#I)(QI)	3204.00	ft3/day
SOLUTION			
Nt	**Nitrate (as Nitrogen) Concentration at End of Mixing Zone =((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))**	**6.54**	**mg/L**

BY: Rich Fillbach
DATE: December 3, 2009

REV. 12/98

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

NITRATE SENSITIVITY ANALYSIS

Model Updated 01/24/96

SITE NAME: Gallatin Gateway PER
COUNTY: Gallatin
LOT #: 50,000 GPD
NOTES: Level II Traetment; 20-yr Desgin Flow

VARIABLES	DESCRIPTION	VALUE	UNITS
K	Hydraulic Conductivity	104.0	ft/day
I	Hydraulic Gradient	0.013	ft/ft
D	Depth of Aquifer (usually constant)	15.0	ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii))	500	ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	678	ft
Ng	Background Nitrate (as Nitrogen)	1.03	mg/L
Nr	Nitrate (as Nitrogen) in Precipitation (usually constant)	1.0	mg/L
Ne	Nitrates in Effluent (50 for conventional; 24 for level II)	24	mg/L
#I	Number of Single Family Homes on the Drainfield	200.0	
QI	Quantity of Effluent per Single Family Home (constant)	26.70	ft3/day
P	Precipitation	16.3	in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20	

EQUATIONS			
W	Width of Mixing Zone Perpendicular to Ground Water Flow = (0.175)(L)+(Y)	765.50	ft
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	11482.50	ft2
As	Surface Area of Mixing Zone = (L)(W)	382750.00	ft2
Qg	Ground Water Flow Rate = (K)(I)(Am)	15524.34	ft3/day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	284.70	ft3/day
Qe	Effluent Flow Rate = (#I)(QI)	5340.00	ft3/day

SOLUTION

Nt	**Nitrate (as Nitrogen) Concentration at End of Mixing Zone =((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))**	6.83	mg/L

BY: Rich Fillbach
DATE: December 3, 2009

REV. 12/98

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: Gallatin Gateway PER
COUNTY: Gallatin
LOT #: 30,000 GPD
NOTES: Initial Design Flow

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	404.0	ft
L	Length of Primary Drainfield's Long Axis	404.0	ft
W	Width of Primary Drainfield's Short Axis	140.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	40.0	ft
D	Distance from Drainfield to Surface Water	500.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	0.5	ft
Ne	1.0 ft for fine soils)**		
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Number of Single Family Homes on the Drainfield	120.0	
CONSTANTS			
PI	Phosphorous Load per Single Family Home (constant)	6.44	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (PI)(#I)	772.80	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	226240000.0	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	11193750.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	47486.8	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	61.4	years

BY: Rich Fillbach
DATE: December, 2009

NOTES: ** Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*
*** Material type is usually based on test pit. A soil that contains more than 35% silt and clay sized particles is considered fine grained.*

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: Gallatin Gateway PER
COUNTY: Gallatin
LOT #: 50,000 GPD
NOTES: 20-yr Design Flow

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	678.0	ft
L	Length of Primary Drainfield's Long Axis	678.0	ft
W	Width of Primary Drainfield's Short Axis	140.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	40.0	ft
D	Distance from Drainfield to Surface Water	500.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	0.5	ft
Ne			
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Number of Single Family Homes on the Drainfield	200.0	
CONSTANTS			
PI	Phosphorous Load per Single Family Home (constant)	6.44	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (PI)(#I)	1288.00	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	379680000.0	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	18043750.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	79544.8	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	61.8	years

BY: Rich Fillbach
DATE: December, 2009

NOTES: ** Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*
*** Material type is usually based on test pit. A soil that contains more than 35% silt and clay sized particles is considered fine grained.*

BRIDGER
ANALYTICAL LAB. INC

7539 Pioneer Way Suite C, Bozeman, MT 59718 Phone: (406) 582-0822 Fax: (406) 582-0967

Company Name:	Innovative Engineering,Inc	***Report Date:***	7/10/2008
Chain of Custody:	02748	***Collection Date:***	07/07/2008 - 09:00
PO / Project Number	Kawaski	***Collected By:***	Terry Threlkeld
Client Sample ID:	Kawasaki E Well	***Date Recieved:***	7/7/2008
Lab Sample ID:	BAL200801639	***Matrix:***	Water
PWSID:		***Workorder ID:***	1879

Analyses	*Results*	*Units*	*Qualifiers*	*RL*	*MCL*	*Method*	*Analysis Date / by*	*Reviewed Date / by*
Inorganic								
Conductivity	395	µS/cm	0	0.00		SM2510B	07/07/08 10:00 / RI	07/09/08 07:40 / ED
Nitrate + Nitrite as N	1.03	mg/L	0	0.04	10	EPA 300.1	07/09/08 13:00 / RI	07/10/08 17:54 / ED
Microbiological								
E-coli	Absent	cfu/100 mL	0	1.00		SM 9223B	07/07/08 15:30 / RI	07/09/08 07:39 / ED
Total Coliform	Absent	cfu/100 mL	0	1.00		SM 9223B	07/07/08 15:30 / RI	07/09/08 07:39 / ED

Comment:

MCL - Maximum Contaminant Level   ND - Not Detected

RL - Reporting Limit   cfu - Colony Forming Unit

Hydraulic Conductivity and Transmissivity Calculations

Project: 08-04 Kawasaki Minor Subdivision
Date: June 26, 2008

Fetter

Gwic Id	170521	Gwic Id	99141	Gwic Id	99151	Gwic Id	99156
Name	Bright	Name	Phillips	Name	Snell	Name	Houston
Legal Description	Section 11 T 3 S R 4 E	Legal Description	Section 11 T 3 S R 4 E	Legal Description	Section 11 T 3 S R 4 E	Legal Description	Section 11 T 3 S R 4 E
Q (gpm)	20	Q (gpm)	20	Q (gpm)	20	Q (gpm)	30
Static level	45	Static level	43	Static level	45	Static level	40
Pump level	130	Pump level	53	Pump level	48	Pump level	65
S (drawdown)	65	S (drawdown)	10	S (drawdown)	3	S (drawdown)	25
b* (aquifer thicknese)	10	b* (aquifer thickness)	10	b* (aquifer thickness)	20	b* (aquifer thickness)	20
K	**43.24**	**K**	**181.38**	**K**	**203.19**	**K**	**64.41**

Average **123.06**

* Well Completion Type	Aquifer Thickness
Perforated or screened	Perforation/screen thickness
Open Bottom	10 feet
Open Hole	Open hole interval (i.e. distance between bottom of casing and bottom of borehole)

K= 104 from Nicklin Report

- more conservative
- from more likely DF location
- many GWIC wells were air tested. (K) hard to determin

Gallatin Gateway

Groundwater Discharge Calculation

Dilution calculation utilizing the following mass balance equation:

$$C_2 = \frac{C_3(Q_1+Q_2) - C_1Q_1}{Q_2} \qquad \textit{(equ. 1)}$$

where:

C_1 = Ambient (background) ground water nitrate+nitrite (as N) concentration (mg/L).

C_2 = Allowable nitrate (as N) discharge concentration (mg/L).

C_3 = Ground water concentration limit for nitrate (as N) at the end of the mixing zone

Q_1 = Ground water volume mixing with the discharge (ft^3/day)

Q_2 = Design discharge volume (ft^3/day)

Known:

C_1 =	1.04	mg/L
C_2 =		mg/L
C_3 =	10	mg/L
Q_1 =		ft^3/day
Q_2 =	6,684	ft^3/day

Solve Q_1:

$$Q_1 = KiA \qquad \textit{(equ. 2)}$$

where:

Q_1 = Ground water volume (ft^3/day)

K = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

A = cross-section area of flow at the down-gradient boundary of the 500-foot mixing zone (ft2)

Q_1 =		ft^3/day
K =	104	ft/day
i =	0.013	ft/ft
A =	8,805	ft^2

Q_1 = 11,904 ft^3/day

Solve C_2:

$$C_2 = \frac{C_3(Q_1+Q_2) - C_1Q_1}{Q_2} \qquad \textit{(equ. 1)}$$

C_2 = **26.0** mg/L

1/28/2010
T:dr

AdvanTex supplier cost estimate:
Gallatin Gateway WW PER

	low	high	Avg	3/5 of Avg	Use	40% install	RND
Recirculation Tanks	$105,000	$123,750	$114,375	$68,625	$68,625	$96,075	$96,000
Septic Tanks	$210,000	$247,500	$228,750	$137,250	$137,250	$192,150	$192,000
Tank Access Equipment	$5,492	$6,590	$6,041	$3,625	$3,625	$5,074	$5,000
Pumping Equipment	$24,511	$29,234	$26,873	$16,124	$16,124	$22,573	$23,000
Control Panel	$10,000	$15,000	$12,500		$12,500	$17,500	$18,000
Auto Distributing Valve	$0	$0	$0	$0	$0	$0	$0
Misc. Equipment	$2,500	$3,800	$3,150	$1,890	$1,890	$2,646	$3,000
Recirculation Valve	$1,076	$1,400	$1,238		$1,238	$1,733	$2,000
Heat/Vent Fan Assem.	$12,891	$17,866	$15,379	$9,227	$9,227	$12,918	$13,000
AdvanTex Equipment	$360,604	$360,604	$360,604	$216,362	$216,362	$302,907	$303,000

Advanced Pump & Equipment supplied the LOW and HIGH estimates for a 50,000 GPD design flow. Steve Anderson advised to prorate most items by 3/5 to get an estimate for 30,000 GPD. The control panal and recirulating valve should not be prorated.

The average cost was used along with the 3/5 proration, and then the estimates were increased by 40% to account for installation. This percent increase came for several past projects and recommended by Dave Aune.

The estimates were then rounded for use in the Cost Tables.I

Operation and Maintenance Cost Estimating Worksheet

Orenco Systems® Incorporated
1-800-348-9843

Application

Due to variations in system design, labor rates, and power usage costs, this Operation and Maintenance Cost Estimating Worksheet should be used as a guideline only. This worksheet does not include estimates for primary treatment, sludge handling,

Project: Belfry Subdivision - 171 Lot
Date Prepared: 23-Dec-09
Prepared by: Steve Anderson

System Data

System Design Flow (gpd)	50,000
Number of AdvanTex Cells	1
Number of AX100 Pods per Cell	20
Total Number of Pumping Packages	10
Total Number of Automatic Distributing Val	0
Number of Recirculating Splitter Valves	1
Number of Ventilation Fans	4
Maintenance Provider Costs, $/hr	$75.00
Power Usage Costs, $/kWh	$0.09
Pump Run Time	15.0%
Monthly fee for phone service	$50.00

Component Maintenance					
Clean Pumping Packages	10	1	0.75	7.5	$562.50
Clean Biotube Filters	10	1	0.5	5	$375.00
Clean Recirculating Splitter Valve	1	1	1	1	$75.00
Inspect Automatic Distributing Valve	0	4	0.25	0	$0.00
Inspect Ventilation Fan Assembly	4	4	0.25	4	$300.00
Telemetry Control Panel, Data Logging	1	12	1	12	$900.00
System Maintenance					
Visual Inspection of System	20	24	0.4	192	$14,400.00
Measure Sludge Levels in Septic Tank	3	1	0.25	0.75	$56.25
Measure Sludge Level, Recirc. Tank	2	1	0.25	0.5	$37.50
Measure Pod Inlet Pressure	20	1	0.25	5	$375.00
Flush Distribution Laterals	20	1	0.1	2	$150.00
Clean AdvanTex Nozzles	20	1	1	20	$1,000.00
Misc. Record Keeping	1	4	1	4	$300.00
Emergency Maintenance	1	4	1	4	$300.00

Estimated Annual Maintenance Costs: [illegible]

Operational Costs					
Power Usage, Pumping Systems	20	8760 hrs	15%	26280	$3,807.97
Power Usage, Ventilation Fans	4	8760 hrs	100%	35040	$394.20
Other Costs			**Monthly Fee**		
TeleComm™ Control Panel, Phone Lin	1	12 months	$50.00		$600.00

[illegible]

AdvanTex®-AX100 Treatment System Cost E$timating Worksheet

Orenco Systems® Incorporated
1-800-348-9843

Application

This cost estimating worksheet should be used for preliminary cost estimating only. Due to variances in products specified, recirculation tank costs, as well as labor and engineering costs, a low and high range estimate is provided. Shipping and handling charges are not included, except as noted.

Project: Gallatin Gateway Community System
Date 12/22/09
Prepared by: Steve Anderson

System Data

System Design Flow (gpd)	50,000 → 30,000
Design Loading Rate (gal/sq.ft./day)	25
Number of AdvanTex AX100 Pods	20
Recirculating Tank Capacity (gallons)	75,000
Septic Tank Capacity	150,000
Number of Duplex Pumping Packages	10
Number of Automatic Distributing Valves	0
Number of Recirculating Splitter Valves	1
Number of Ventilation Fan Assemblies	4

3/5 Avg. Cost
30,000 GPD

[redacted]

Materials

	Low	High	Low	High
Recirculation Tank Delivered to site	$1.40	$1.65	$105,000	$123,750
[redacted] Delivered to site	$1.40	$1.65	$210,000	$247,500
Tank Access Equipment Risers, lids, adapters, epoxy	$499	$599	$5,492	$6,590
Pumping Equipment Pumps, vault, discharge, splice box, float assembly,	$2,451	$2,923	$24,511	$29,234
Control Panel Control panel with Remote Telemetry	$10,000	$15,000	$10,000	$15,000
Automatic Distributing Valve Distributing valve, enclosure, lid	$573	$661	$0	$0
Miscellaneous Equipment Piping, fittings, glue	$125	$190	$2,500	$3,800
Recirculating Valve Recirc. splitter or ball valve, grommets	$1,076	$1,400	$1,076	$1,400
Heater/Ventilation Fan Assembly Fan basin, carbon basin, air inlet	$3,223	$4,467	$12,891	$17,866
AdvanTex Equipment AdvanTex Filter (AX100)	$18,026	$18,026	$360,604	$360,604
		Materials Subtotal	**$732,073**	**$805,745**

Misc.

Operation and Maintenance Manual Two copies of project-specific O&M Manual	$300	$300	$300	$300

***Total Treatment Material, Start-up and Operational Costs**	**$732,373**	**$806,045**
Cost per Treated Gallon	**$14.65**	**$16.12**

** Cost estimate does not include materials costs for collection, dispersal system or any installation costs.*

Rev. 4.1 - 5/07

Advanced
Pump &
Equipment, Inc.
1408 Gold Ave. #6, Bozeman, MT 59715
Ph 406-586-1700 – Fax 406-586-1710

Gallatin Gateway Community System - [redacted]

Estimated Actual 30-Day Average Flow

12/20/2009

Facility	Number of Guests	GPD / Guest	Flow	Influent BOD Concentration mg/L	Actual lb BOD5/day lb
Residential Homes			24,000	[redacted]	42.03
Commercial			6,000		40.03
			Total Flow gpd		**Total lb BOD_5/day**
			30000		82.07

GPD/Pod	**# pods required**	**lb BOD_5 / AX-20 Pod**
[redacted]	[redacted]	4.05
	# of pods proposed	
	[redacted]	

Design Flow / Peak Daily Flow

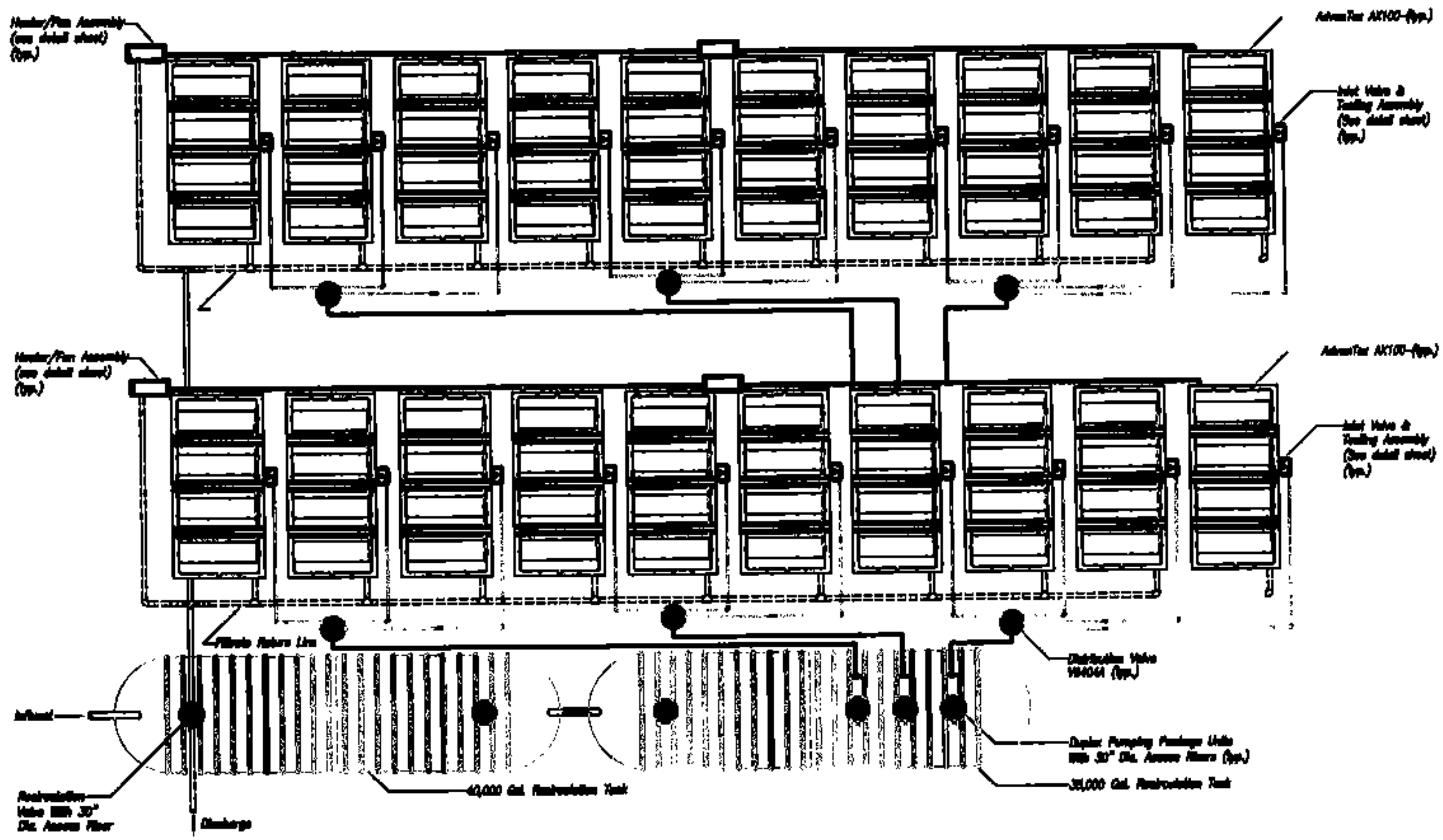
Facility	Number of Guests	GPD / Guest	Flow	Influent BOD Concentration mg/L	Design lb BOD5/day lb
Residential Homes			40,000	[redacted]	91.74
Commercial			10,000		66.72
			Total Flow gpd		**Total lb BOD_5/day**
			[redacted]		158.46

Notes:

GPD/Pod	**# pods required**	**lb BOD_5 / AX-20 Pod**
[redacted]	[redacted]	8.10
	# of pods proposed	
	[redacted]	

* Minimum Recurculation Tank is 1.5x Design Flow
  or 75,000 Gallons
* Minimum Primary Septic Tank is 3.0x Design Flow
  or 150,000 Gallons for a central tank, or use individual tanks sized to DEQ4.
* Expected TN reduction is 60%, dependent on available alkalinity and other unknown factors.
* Maximum TN reduction is possible with the addition of a carbon upflow filter.
* Expected BOD reduction is ≥95%
* Expected Phosphorous reduction is 0%

AdvanTex® - AX100 System
Heated Air System



Design Notes:

Expected Flows
$Q_{ave.} \leq 30{,}000$ gpd
$Q_{design/peak} \leq 50{,}000$ gpd

Expected Influent Quality
Grease & Oil: <20 mg/L
BOD: <210 mg/L
TSS: <150 mg/L
TN: <75 mg/L

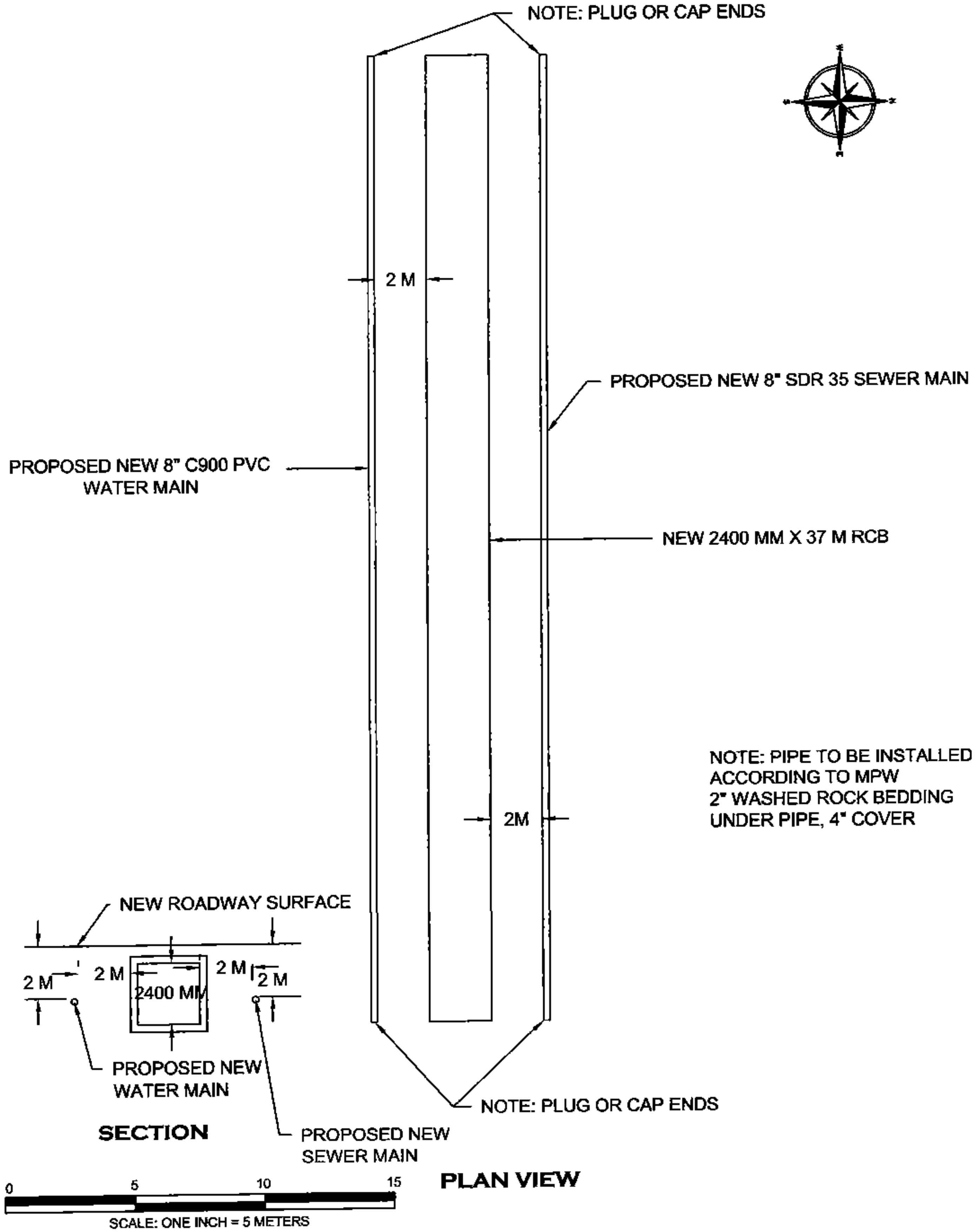
Typical Effluent Quality
BOD: < 20 mg/L
TSS: < 20 mg/L
TN: < 24 mg/L or 60% Reduction

U.S. Patents 5,540,920, 5,480,561, 4,439,323 and 5,492,635. Other Patents Pending. 2002 Orenco Systems®, Inc.	Designed By:	Drawn By:	Title: 9 POD AX100 SYSTEM-HEATED AIR
	Approved By:	Drawing: 1 OF 1	Drawing No.
	Date Approved:	Revision: 3	Date: / Scale: 1" = 8'-0"

Orenco Systems® Incorporated

Appendix Q

Gallatin Gateway Tunnel Plan Sheet

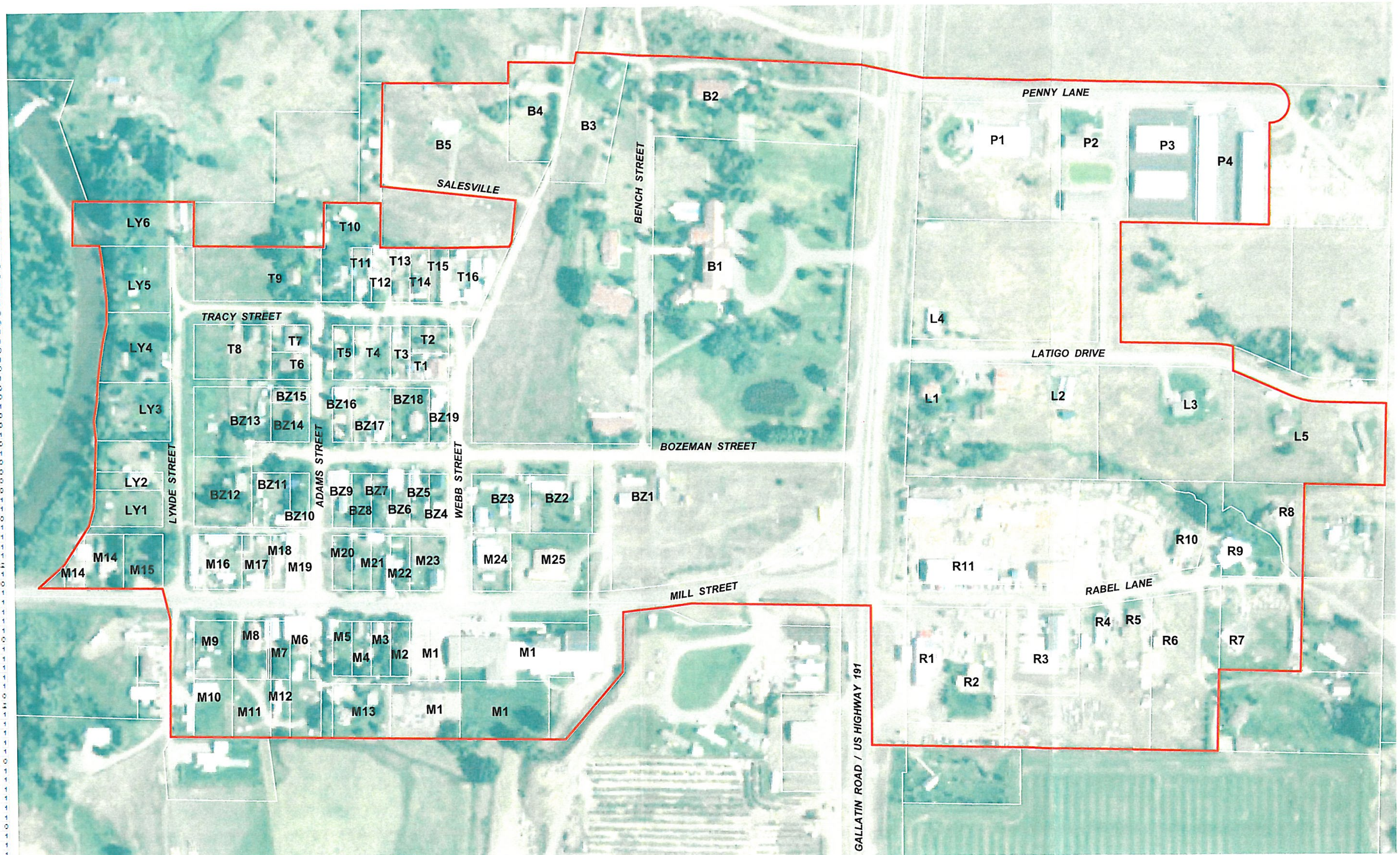


GATEWAY TUNNEL **GALLATIN GATEWAY, MT**	**INNOVATIVE ENGINEERING** 12140 GOOCH HILL ROAD GALLATIN GATEWAY, MT 406-763-4185	**ENCROACHMENT PERMIT** **FUTURE WATER AND SEWER MAINS**

Appendix R

Existing Flow Estimate / Key Map

	GPD	# RES
R1	1,000	0
	250	1
R2	250	1
R3	40	0
R4	250	1
R5	250	1
R6	250	1
R7	250	1
R8	250	1
R9	40	0
R10	0	0
R11	240	0
L1	250	1
L2	250	1
L3	250	1
L4	250	1
L5	500	2
P1	40	0
P2	60	0
	250	1
P3	0	0
P4	0	0
M1	3,000	0
M2	250	1
M3	0	0
M4	250	1
M5	250	1
M6	500	0
M7	0	0
M8	250	1
M9	250	1
M10	250	1
M11	0	0
M12	0	0
M13	250	1
	250	1
M14	0	0
	250	1
M15	0	0
M16	250	1
	0	0
M17	300	0
M18	250	1
M19	0	0
M20	0	0
M21	250	1
	0	0
M22	150	1
M23	0	0
	0	0
M24	175	0
M25	300	0
BZ1	250	1
BZ2	250	1
BZ3	10	0
	250	1
	250	1
BZ4	250	1
BZ5	250	1
BZ6	500	2
BZ7	250	1
BZ8	0	0
BZ9	250	1
BZ10	250	1
BZ11	250	1
BZ12	250	1
BZ13	250	1
BZ14	300	0
BZ15	250	1
BZ16	250	1
BZ17	250	1
BZ18	250	1
BZ19	250	1
B1	3,358	0
B2	500	2
B3	250	1
B4	250	1
B5	250	1
T1	250	1
T2	250	1
T3	0	0
T4	250	1
T5	250	1
T6	250	1
T7	250	1
T8	250	1
T9	250	1
T10	10	0
	250	1
T11	250	1
T12	250	1
T13	250	1
T14	250	1
T15	0	0
T16	250	1
LY1	0	0
LY2	0	0
LY3	0	0
LY4	250	1
LY5	0	0
LY6	250	1
	25,033	67



GreatWest engineering

SCALE:

0 125 250

SCALE IN FEET

LEGEND:

EXISTING DISTRICT BOUNDARY (APPROX. 100 ACRE SERVICE AREA)

R3 PARCEL ID

KEY MAP
EXISTING WASTEWATER FLOW ESTIMATE 01/2010, REVISED 02/2010

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERINGREPORT (PER)

	Gallatin Gateway Wastewater	(Existing WW Flow Estimate)				
		Mailing Address per County tax info.	Legal Description	GPD	EDU's	# RES
	RABEL LANE					
R1	Gateway Store / The Game **GATEWAY MARKET INC**	PO BOX 100 GALLATIN GTWY, MT 59730-0100	S11, T03 S, R04 E, TR LOC IN NW COR NW4SE4 SEC 11 3S 4E 1.74AC	1,000	4	0
	RESIDENCE **GATEWAY MARKET INC**		S11, T03 S, R04 E, TR LOC IN NW COR NW4SE4 SEC 11 3S 4E 1.74AC	250	1	1
R2	RESIDENCE **GATEWAY MARKET INC**	PO BOX 100 GALLATIN GTWY, MT 59730-0100	S11, T03 S, R04 E, TR LOC IN NW COR NW4SE4 SEC 11 3S 4E 1.74AC	250	1	1
R3	Post Office **PEREZ LUCIEN & SARAH**	800 TAMARACK DR SAN RAFAEL, CA 94903-3718	MINOR SUB 56B, S11, T03 S, R04 E, Lot 05A, MINOR SUB #56B E2 SEC 11 3S 4E 1.00AC	40	0	0
R4	RESIDENCE (mobile home) **GATEWAY MARKET INC**	PO BOX 100 GALLATIN GTWY, MT 59730-0100	MINOR SUB 56B, S11, T03 S, R04 E, Lot 04A, MINOR SUB 56B E2 SEC 11 3S 4E 2.22AC	250	1	1
R5	RESIDENCE **GATEWAY MARKET INC**	PO BOX 100 GALLATIN GTWY, MT 59730-0100	MINOR SUB 56B, S11, T03 S, R04 E, Lot 04A, MINOR SUB 56B E2 SEC 11 3S 4E 2.22AC	250	1	1
R6	RESIDENCE **WAGNER DONALD & PATSY**	PO BOX 373 GALLATIN GTWY, MT 59730-0373	MINOR SUB 56, S11, T03 S, R04 E, Lot 003, MINOR SUB 56 E2 SEC 11 3S 4E LOT 3 1.6135AC	250	1	1
R7	RESIDENCE **STRANDBERG STEPHEN L**	PO BOX 371 GALLATIN GTWY, MT 59730-0371	S11, T03 S, R04 E, PARCEL D E2 SEC 11 3S 4E 1.158AC COS 706	250	1	1
R8	RESIDENCE **AMEND JOHN ERIC**	PO BOX 322 GALLATIN GTWY, MT 59730-0322	S11, T03 S, R04 E, 706A, PARCEL N/A, PARCEL A-2 NE4 SEC 11 3S 4E .6639AC COS 706A	250	1	1
R9	SHOP **AMEND JOHN ERIC**	PO BOX 322 GALLATIN GTWY, MT 59730-0322	S11, T03 S, R04 E, 706B, PARCEL 0A1, PARCEL A-1-A NE4 SEC 11 3S 4E .7914AC COS 706B	40	0	0
R10	BIG TIMBER WORKS **ADAMS MERLE D & TANNIS HART**	216 N CHURCH AVE BOZEMAN, MT 59715-3706	MINOR SUB 56, S11, T03 S, R04 E, Lot 02A, LOT 2A NE4 SEC 11 3S 4E 1.782AC COS 706B	0	0	0
R11	BIG TIMBER WORKS **ADAMS MERLE D & TANNIS H**	216 N CHURCH AVE BOZEMAN, MT 59715-3706	MINOR SUB 56A E2 SEC 11 3S 4E 2.563AC LOT 1A LESS HWRW	240	1	0
	LATIGO ROAD					
L1	RESIDENCE **JOHNSON DAVID & CAROL ANN**	76370 GALLATIN RD GALLATIN GTWY, MT 59730-8609	MINOR SUB 213, S11, T03 S, R04 E, BLOCK XXX, Lot 005, MINOR SUB 213 SW4NE4 SEC 11 3S 4E 3.319AC LOT 5	250	1	1
L2	RESIDENCE **JOHNSON DAVID & CAROL ANN**	76370 GALLATIN RD GALLATIN GTWY, MT 59730-8609	MINOR SUB 213, S11, T03 S, R04 E, BLOCK XXX, Lot 005, MINOR SUB 213 SW4NE4 SEC 11 3S 4E 3.319AC LOT 5	250	1	1
L3	RESIDENCE **MUSIAL MICHAEL E JR**	804 E SEBREE ST DILLON, MT 59725-3151	MINOR SUB 213, S11, T03 S, R04 E, BLOCK XXX, Lot 004, MINOR SUB 213 SW4NE4 SEC 11 3S 4E 2.3263AC LOT 4	250	1	1
L4	RESIDENCE **GRIFFITH LESTER & CHERYL LIVIN**	164 CLOUDNINE LN DILLON, MT 59725-7356	MINOR SUB 213, S11, T03 S, R04 E, BLOCK XXX, Lot 001, MINOR SUB 213 SW4NE4 SEC 11 3S 4E 3.3607AC LOT 1	250	1	1
L5	RESIDENCE **GRIFFITH LESTER & CHERYL LIVIN**	164 CLOUDNINE LN DILLON, MT 59725-7356	MINOR SUB 213, S11, T03 S, R04 E, BLOCK XXX, Lot 003, MINOR SUB 213 SW4NE4 SEC 11 3S 4E 2.069AC LOT 3	500	2	2
	PENNY LANE					
P1	BUSINESS **RENNEBERG HARDWOODS INC**	PO BOX 188 MENAHGA, MN 56464-0188	MINOR SUB 262, S11, T03 S, R04 E, BLOCK XXX, Lot 001, MINOR SUB 262 NE4 SEC 11 3S 4E 2.50AC LOT 1	40	0	0
P2	ROCKY MTN CHOPPERS **MEYERS SCOTT S REV TRUST DATED**	504 N BAILEY AVE FORT WORTH, TX 76107-1004	MINOR SUB 262, S11, T03 S, R04 E, BLOCK XXX, Lot 002, MINOR SUB 262 NE4 SEC 11 3S 4E 1.210AC LOT 2	60	0	0
	ROCKY MTN CHOPPERS **MEYERS SCOTT S REV TRUST DATED**		MINOR SUB 262, S11, T03 S, R04 E, BLOCK XXX, Lot 002, MINOR SUB 262 NE4 SEC 11 3S 4E 1.210AC LOT 2	250	1	1
P3	STORAGE UNITS **DAVIDSON DENNIS & SHIRLEY**	406 PEACE PIPE DR BOZEMAN, MT 59715-1768	MINOR SUB 262, S11, T03 S, R04 E, BLOCK XXX, Lot 003, MINOR SUB 262 NE4 SEC 11 3S 4E 1.21AC LOT 3	0	0	0
P4	STORAGE UNITS **DAVIDSON DENNIS & SHIRLEY**	406 PEACE PIPE DR BOZEMAN, MT 59715-1768	MINOR SUB 213A, LOT 4A	0	0	0

Gallatin Gateway Wastewater (Existing WW Flow Estimate)

		Mailing Address per County tax info.	Legal Description	GPD	EDU's	# RES
	MILL STREET					
M1	GALLATIN GATEWAY SCHOOL	GENERAL DELIVERY	S11, T03 S, R04 E, SEC 11 3S 4E LOTS 1-6 SCHOOL HSE PLUS VACATED STREET	3,000	12	0
	SCHOOL DIST 35	GALLATIN GTWY, MT 59730-9999				
M2	RESIDENCE	PO BOX 405	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 3 BLK 13	250	1	1
	VARGO FRANCIS T	GALLATIN GTWY, MT 59730-0405				
M3	VACANT	PO BOX 405	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 4 BLK 13	0	0	0
	VARGO FRANCIS T	GALLATIN GTWY, MT 59730-0405				
M4	RESIDENCE	PO BOX B	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 5 BLK 13	250	1	1
	STEIN PETER BALKE	GALLATIN GTWY, MT 59730-				
M5	RESIDENCE	PO BOX B	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 6 BLK 13	250	1	1
	STEIN PETER BALKE	GALLATIN GTWY, MT 59730-				
M6	STACY'S	PO BOX 35	SALESVILLE AMND SEC 11 3S 4E LOT 1A BLK 12 PLAT C-25-B	500	2	0
	SALESVILLE PROPERTIES LLC	GALLATIN GTWY, MT 59730-0035				
M7	SHED	PO BOX 35	SALESVILLE SEC 11 3S 4E LOT 2 BLK 12 PLUS ABNDN ALLEY	0	0	0
	SALESVILLE PROPERTIES LLC	GALLATIN GTWY, MT 59730-0035				
M8	RESIDENCE	180 WILLIAMS RD E	SALESVILLE SEC 11 3S 4E W 40' LOT 3 & ALL LOT 4 BLK 12 PLUS ABNDN ALLEY	250	1	1
	STURGIS TAMARA LEE	GALLATIN GTWY, MT 59730-8557				
M9	RESIDENCE	PO BOX 476	SALESVILLE SEC 11 3S 4E LOTS 5 & 6 BLK 12 PLUS ABNDN ALLEY	250	1	1
	FLATEGRAFF BRADLEY A	GALLATIN GTWY, MT 59730-0476				
M10	RESIDENCE (TRAILER NOT NOTED)	PO BOX 425	SALESVILLE SEC 11 3S 4E LOTS 7 & 8 BLK 12 PLUS ABNDN ALLEY	250	1	1
	HARGROVE RUTH	GALLATIN GTWY, MT 59730-0425				
M11	VACANT	PO BOX 35	SALESVILLE SEC 11 3S 4E LOTS 9 & 10 BLK 12 PLUS ABNDN ALLEY	0	0	0
	SALESVILLE PROPERTIES LLC	GALLATIN GTWY, MT 59730-0035				
M12	VACANT	PO BOX 35	SALESVILLE SEC 11 3S 4E LOT 11 BLK 12 PLUS ABNDN ALLEY	0	0	0
	SALESVILLE PROPERTIES LLC	GALLATIN GTWY, MT 59730-0035				
M13	RESIDENCE	PO BOX 59	SALESVILLE SEC 11 3S 4E LOTS 7,8 & 9 BLK 13 PLUS PART OF ABNDN ADAMS ST & ALLEY	250	1	1
	BLEVINS RICHARD L & SUE A	GALLATIN GTWY, MT 59730-0059				
	RESIDENCE (2)	PO BOX 59	SALESVILLE SEC 11 3S 4E LOTS 7,8 & 9 BLK 13 PLUS PART OF ABNDN ADAMS ST & ALLEY	250	1	1
	BLEVINS RICHARD L & SUE A	GALLATIN GTWY, MT 59730-0059				
M14	SHED	PO BOX 245	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 8 BLK 8	0	0	0
	WORTMAN EARL J	GALLATIN GTWY, MT 59730-0245				
	RESIDENCE	PO BOX 245	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 9-10 BLK 8	250	1	1
	WORTMAN EARL J	GALLATIN GTWY, MT 59730-0245				
M15	VACANT	206 RIDGE TRL	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 11 & 12 BLK 8	0	0	0
	LAFOLEY J RYAN & HILARY GRAHAM	BOZEMAN, MT 59715-9253				
M16	RESIDENCE	PO BOX 201	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 7,8 & W2 9 BLK 9	250	1	1
	TURPIN HELEN ZINNER	GALLATIN GTWY, MT 59730-0201				
	VACANT	PO BOX 201	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 7,8 & W2 9 BLK 9	0	0	0
	TURPIN HELEN ZINNER	GALLATIN GTWY, MT 59730-0201				
M17	PIZZERIA	190 TWO BEAR WAY	SALESVILLE SEC 11 3S 4E E30' OF LOT 10 BLK 9 X S90' E1/2 OF LOT 9 & S90' OF W 20' OF LOT 10 BLK 9	300	1	0
	NYGARD ROBERT WILLIAM	GALLATIN GTWY, MT 59730-9728				
M18	RESIDENCE	PO BOX 192	S11, T03 S, R04 E, SALESVILLE SEC11 3S 4E LOT 11 BLK 9	250	1	1
	GREER DAN	GALLATIN GTWY, MT 59730-0192				
M19	VACANT	PO BOX 585	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 12 BLK 9	0	0	0
	TRIANGLE E HOLDINGS	GALLATIN GTWY, MT 59730-0585				
M20	VACANT	PO BOX 490	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 7 BLK 10	0	0	0
	ROBERTS JANINE G &	GALLATIN GTWY, MT 59730-0490				
M21	RESIDENCE	215 MILL	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 8 BLK 10	250	1	1
	SANDSTON STEPHANIE	GALLATIN GTWY, MT 59730-0527				
	SHED	215 MILL	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 9 BLK 10	0	0	0
	SANDSTON STEPHANIE	GALLATIN GTWY, MT 59730-0527				
M22	ARCHITECT / RENTER	PO BOX 585	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 10 BLK 10	150	1	1
	ENGLER EDWIN JOHN	GALLATIN GTWY, MT 59730-0585				
M23	VACANT	PO BOX 186	SALESVILLE SEC 11 3S 4E LOT 11 & 12 BLK 10 PLAT C-25	0	0	0
	HAJ JAVAD LLC	BOZEMAN, MT 59771-0186				
	VACANT	PO BOX 186	SALESVILLE SEC 11 3S 4E LOT 11 & 12 BLK 10 PLAT C-25	0	0	0
	HAJ JAVAD LLC	BOZEMAN, MT 59771-0186				
M24	FIRE STATION	PO BOX 238	S11, T03 S, R04 E, SEC 11 3S 4E LOTS 7 & 8 BLK 11	175	1	0
	GALLATIN GATEWAY RURAL FIRE DI	GALLATIN GTWY, MT 59730-0238				
M25	COMMUNITY CENTER	PO BOX 329	S11, T03 S, R04 E, O P SALESVILLE LOTS 10,11 & 12 LOT 9 LESS RW & RR	300	1	0
	WILLING WORKERS LADIES AID	GALLATIN GTWY, MT 59730-0329				

Gallatin Gateway Wastewater (Existing WW Flow Estimate)

		Mailing Address per County tax info.	Legal Description	GPD	EDU's	# RES
	BOZEMAN STREET					
BZ1	TRAILER HOUSE **HARGROVE DONALD R & ELOISE M**	37 BIG CHIEF TRL BOZEMAN, MT 59718-9419	S11, T03 S, R04 E, TR IN E2NW4 SEC 11 3S 4E 3.98AC PLAT FILM 8 PAGE 1482	250	1	1
BZ2	TRAILER HOUSE **PAYNE RUSSELL DEAN**	PO BOX 34 GALLATIN GTWY, MT 59730-0034	OP SALESVILLE SEC 11 3S 4E LOT 1,2 & 3 BLK 11 & W 10' OF VACATED BENCH ST	250	1	1
BZ3	GUN SHOP **PAYNE BERNICE L REVOC LIVING T**	PO BOX 264 GALLATIN GTWY, MT 59730-0264	SALESVILLE SEC 11 3S 4E LOT 4,5 & 6 BLK 11 PLUS VACATED ALLEY	10	0	0
	TRAILER HOUSE **PAYNE BERNICE L REVOC LIVING T**	PO BOX 264 GALLATIN GTWY, MT 59730-0264	SALESVILLE SEC 11 3S 4E LOT 4,5 & 6 BLK 11 PLUS VACATED ALLEY	250	1	1
	TRAILER HOUSE **PAYNE BERNICE L REVOC LIVING T**	PO BOX 264 GALLATIN GTWY, MT 59730-0264	SALESVILLE SEC 11 3S 4E LOT 4,5 & 6 BLK 11 PLUS VACATED ALLEY	250	1	1
BZ4	RESIDENCE **HART LEE & SANDRA**	73800 GALLATIN RD GALLATIN GTWY, MT 59730-8520	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 1 BLK 10	250	1	1
BZ5	RESIDENCE **ROBERTS JANINE G &**	PO BOX 490 GALLATIN GTWY, MT 59730-0490	S11, T03 S, R04 E, OP GALLATIN GATEWAY SEC 11 3S 4E LOT 2 BLK 10	250	1	1
BZ6	RESIDENCE - DUPLEX **TATE MEREDITH C**	PO BOX 4027 BOZEMAN, MT 59772-	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 3 BLK 10	500	2	2
BZ7	RESIDENCE **BROWN RICHARD W JR**	PO BOX 84 GALLATIN GTWY, MT 59730-0084	S11, T03 S, R04 E, BLOCK 10, Lot 4, GALLATIN GATEWAY ORIGINAL PLAT SEC 11 3S 4E LOT 4 BLK 10	250	1	1
BZ8	VACANT **BROWN RICHARD W JR**	76900 GALLATIN RD TRLR 6 BOZEMAN, MT 59718-9137	S11, T03 S, R04 E, BLOCK 10, Lot 5, GALLATIN GATEWAY-OP SEC 11 3S 4E LOT 5 BLK 10	0	0	0
BZ9	RESIDENCE **RODAS HEIDI A**	PO BOX 50 GALLATIN GTWY, MT 59730-0050	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 6 BLK 10	250	1	1
BZ10	RESIDENCE **ROBERTS JANINE GAILE**	PO BOX 490 GALLATIN GTWY, MT 59730-0490	S11, T03 S, R04 E, SALESVILLE NW4 SEC 11 3S 4E .161AC LOT 1 BLK 9	250	1	1
BZ11	RESIDENCE **ROBERTS JANINE G &**	PO BOX 490 GALLATIN GTWY, MT 59730-0490	S11, T03 S, R04 E, SALESVILLE NW4 SEC 11 3S 4E .321AC LOTS 2-3 BLK 9	250	1	1
BZ12	RESIDENCE **PENZINER ANDREW J**	186 MANWEL DIMECH ST #9STJULIA , XX 00000-0000	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 4,5 & 6 BLK 9	250	1	1
BZ13	RESIDENCE **ALLEN GWEN ROBIN**	PO BOX 753 GALLATIN GATEWAY, MT 59730-	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 7-10 BLK 5	250	1	1
BZ14	CHURCH **CHRISTIAN CH OF GAL GATEWAY**	GENERAL DELIVERY GALLATIN GTWY, MT 59730-9999	S11, T03 S, R04 E	300	1	0
BZ15	RESIDENCE **CARPENTER BRAD E &**	PO BOX 696 GALLATIN GTWY, MT 59730-0696	S11, T03 S, R04 E, BLOCK 005, Lot 011, SALESVILLE SEC 11 3S 4E N 40' LOTS 11 & 12 BLK 5	250	1	1
BZ16	RESIDENCE **METZ JOHN W &**	PO BOX 686 GALLATIN GTWY, MT 59730-0686	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 7 BLK 6	250	1	1
BZ17	RESIDENCE **LUCE GEORGE S JR & LENA V**	1615 BLARNEY ST BILLINGS, MT 59105-1817	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 8 & 9 BLK 6	250	1	1
BZ18	RESIDENCE **TURNER ENTERPRISES INC**	5048 GATEWAY SOUTH RD GALLATIN GTWY, MT 59730-8560	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 10 & 11 BLK 6	250	1	1
BZ19	RESIDENCE **EVANS DARLENE K**	PO BOX 44 GALLATIN GTWY, MT 59730-0044	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 12 BLK 6	250	1	1
	BENCH STREET					
B1	GALLATIN GATEWAY INN **GALLATIN FOOD SERVICE LLC**	PO BOX 557 GALLATIN GTWY, MT 59730-0557	GALLATIN GATEWAY INN, S11, T03 S, R04 E, TRACT E2NW4 SEC 11 3S 4E 9.549AC COS 951	3,368	13	0
B2	CARETAKER HOUSE - DUPLEX **GALLATIN FOOD SERVICE LLC**	PO BOX 557 GALLATIN GTWY, MT 59730-0557	TRACT A NW4 SEC 11 3S 4E 9.687AC COS 2018	500	2	2
B3	RESIDENCE **MAWHINNEY DOUGLAS & NANCY ZITZ**	PO BOX 92 GALLATIN GTWY, MT 59730-0092	S11, T03 S, R04 E, TRACT B-1A NW4 SEC 11 3S 4E 1.033AC COS 2018	250	1	1
B4	RESIDENCE **TATE FORREST W 50% INT** **COX LINDA J & 25% INT** **ANDERSON CHRISTOPHER E 25% INT**	PO BOX 4027 BOZEMAN, MT 59772	S11, T03 S, R04 E, TRACT 2 E2NW4 SEC 11 3S 4E .853AC COS 104	250	1	1
B5	RESIDENCE **TATE FORREST W 50% INT** **COX LINDA J & 25% INT** **ANDERSON CHRISTOPHER E 25% INT**	PO BOX 4027 BOZEMAN, MT 59772	S11, T03 S, R04 E, TRACT IN NW4 SEC 11 3S 4E 2.427AC COS 104A	250	1	1

Gallatin Gateway Wastewater (Existing WW Flow Estimate)

		Mailing Address per County tax info.	Legal Description	GPD	EDU's	# RES
	TRACY STREET					
T1	RESIDENCE	PO BOX 83	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E S2 LOTS 1 & 2 BLK 6	250	1	1
	HARRISON SAMUEL E & RONDA K	GALLATIN GTWY, MT 59730-0083				
T2	RESIDENCE	PO BOX 314	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E N2 LOT 1 & 2 BLK 6	250	1	1
	PITTENGER DANIEL LEE	GALLATIN GTWY, MT 59730-0314				
T3	VACANT	80455 GALLATIN RD	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 3 BLK 6	0	0	0
	DOBBS WALLACE & THERESA REVOCA	BOZEMAN, MT 59718-9173				
T4	RESIDENCE	PO BOX 482	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 4 & E 46' LOT 5 BLK 6	250	1	1
	DOHLE ALICE & STACY	GALLATIN GTWY, MT 59730-0482				
T5	RESIDENCE	PO BOX 672	SALESVILLE AMND SEC 11 3S 4E W4' LOT 5 & LOT 6 BLK 6 PLAT C25-A	250	1	1
	SAVAGE BROOKE	GALLATIN GTWY, MT 59730-0672				
T6	RESIDENCE	PO BOX 340	S11, T03 S, R04 E, SALESVILLE SEC11 3S 4E S2 LOTS 1 & 2 BLK 5	250	1	1
	COLEMAN LAUREN	GALLATIN GTWY, MT 59730-0340				
T7	RESIDENCE	1755 MCREYNOLDS RD	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E N2 LOTS 1 & 2 BLK 5	250	1	1
	MCREYNOLDS LINDA LOU	BOZEMAN, MT 59718-7657				
T8	RESIDENCE	PO BOX 270	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOTS 3-6 BLK 5	250	1	1
	SPRING VERA E	GALLATIN GTWY, MT 59730-0270				
T9	RESIDENCE	PO BOX 169	SALESVILLE LOTS 7-12 BLK 2 & TR 6 IN NE4SW4NW4 SEC 11 3S 4E 2.09	250	1	1
	SULLIVAN DAVID G REVOCABLE TRU	BELGRADE, MT 59714-0169				
T10	RESIDENCE	PO BOX 330	S11, T03 S, R04 E, SALESVILLE S2NW4 SEC 11 3S 4E .30AC LOT 7 BLK 1 & TR 5	250	1	1
	BORDER THEODORE A	GALLATIN GTWY, MT 59730-0330				
	SHOP	PO BOX 330	S11, T03 S, R04 E, SALESVILLE S2NW4 SEC 11 3S 4E .30AC LOT 7 BLK 1 & TR 5	10	0	0
	BORDER THEODORE A	GALLATIN GTWY, MT 59730-0330				
T11	RESIDENCE	PO BOX 323	ORIGINAL PLAT GALLATIN GATEWAY SEC 11 3S 4E LOT 8 BLK 1 PLAT C-25	250	1	1
	TOCCO JACOB	GALLATIN GTWY, MT 59730-0323				
T12	RESIDENCE	PO BOX 488	S11, T03 S, R04 E, SALESVILLE LOT 9 BLK 1 SEC 11 3S 4E	250	1	1
	BRIESE MELVIN C & DEBRA A	GALLATIN GTWY, MT 59730-0488				
T13	RESIDENCE	PO BOX 361	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 10 BLK 1	250	1	1
	DANCING BEE LIMITED COMPANY	GALLATIN GTWY, MT 59730-0361				
T14	RESIDENCE	PO BOX 346	S11, T03 S, R04 E, SALESVILLE LOT 11 1	250	1	1
	BORODINE ANNE E	GALLATIN GTWY, MT 59730-0346				
T15	The Fort	73800 GALLATIN RD	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 12 BLK 1	0	0	0
	HART LEE & SANDRA L	GALLATIN GTWY, MT 59730-8520				
T16	RESIDENCE (The Fort)	73800 GALLATIN RD	S11, T03 S, R04 E, TRACT T SE4NW4 SEC 11 3S 4E	250	1	1
	HART LEE & SANDRA L	GALLATIN GTWY, MT 59730-8520				
	LYNDE STREET					
LY1	VACANT	22 POPPY ST	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 6 & 7 BLK 8	0	0	0
	GRONEWOLD RAY L & NANCY BEE	CASPER, WY 82604-3814				
LY2	VACANT	2010 BITTERN DR	S11, T03 S, R04 E, SALESVILLE SEC 11 3S 4E LOT 5 BLK 8	0	0	0
	FALLER MICHAEL P & SHANNON R	AMMON, ID 83406-6659				
LY3	VACANT	PO BOX 23	S11, T03 S, R04 E, SALESVILLE LOT 1,2 & 3 BLK 4	0	0	0
	LEMON CLARA LOU BARNES	GALLATIN GTWY, MT 59730-0023				
LY4	RESIDENCE	PO BOX 23	S11, T03 S, R04 E, SALESVILLE LOTS 4,5 & 6 BLK 4	250	1	1
	LEMON CLARA L BARNES 1/3	GALLATIN GTWY, MT 59730-0023				
LY5	VACANT	PO BOX 132	SEC 11 3S 4E LOT 1,2 & 3 BLK 3 WITH N2 VACATED TRACY ST ABUTTING LOT 1 BLK 3	0	0	0
	SCOTT SAM M	DUPUYER, MT 59432-0132				
LY6	RESIDENCE	PO BOX 207	S11, T03 S, R04 E, TRACT SW4NW4 SEC 11 3S 4E .81AC	250	1	1
	KURLAND SYDNEY	GALLATIN GTWY, MT 597300207				
			Totals:	26,033	104	67

EVALUATION OF EXISTING SEWER SYSTEM

Existing Sewer System

The existing sewer system for Gallatin Gateway School was permitted on December 13, 1977. According to the Gallatin County wastewater permit, the system currently consists of one 3000-gallon single compartment concrete septic tank, followed by one 1000-gallon single compartment concrete septic tank. Secondary wastewater exits the septic tank and enters a two-way manual distribution box which discharges to 2 separate drainfields zones. It is my understanding that the drainfield zones are manually alternated on a yearly basis. According to the permit, each drainfield zone consists of a header consisting of 80.5' of perforated pipe, with 14 perforated laterals, each 45' long. Assuming the looped lines are also perforated (80.5'), each drainfield zone consists of 791 lineal feet of drainfield trench. Two drainfield zones would total 1,582 lineal feet (3,164 square feet) of drainfield trench (791' X 2 zones).

Information obtained from school records indicates the trenches are 2-feet wide and contain 4-inch PVC perforated pipe. Also, this data indicated the existing drainfield consists of 1612 lineal feet, which is 30 feet more than our determination from the permit. According to the as-constructed drawings, each drainfield zone contains of a header consisting of 81' of perforated pipe, with 14 perforated laterals. The west zone consists of 47' long laterals and the east zone consists of 45' long laterals. Assuming the looped lines are also perforated (81'), the west drainfield zone consists of 820 lineal feet (1,640 square feet) of drainfield trench, and the east drainfield zone consists of 792 lineal feet (1,584 square feet). Two drainfield zones would total 1612 lineal feet (3,224 square feet) of drainfield trench. A site inspection indicates that no wastewater effluent pump currently exists. We will utilize information from the as-built drawings for the purpose of this report.

Observation of the distribution box indicates the outlets are approximately 30" - 36" deep. Since the system utilizes gravity flow from the distribution box, and the groundsurface is approximately the same in the area of the distribution box as the drainfield area, we would estimate the drainfield trenches are also 30" - 36" below ground surface. On-site test pits indicate the system was installed in imported fill material (gravel and topsoil). *See Appendix Table of Contents*

Future student populations and predicted sewer flows

According to Gallatin Gateway Enrollment records, there were 158 students enrolled at the beginning of the 2000 school year. Utilizing the current number of faculty members (23), a total of 181 students and faculty occupy the school. Under todays MDEQ regulations for Typical Wastewater Flows from Industrial Sources (Table 5-2), typical flows per student for a school (with cafeteria only) is 15 gpd/student. The same flow would be utilized for faculty members. Therefore, todays estimated wastewater flow is approximately 2,715 gpd (15 gpd x 181 students-faculty). Gaston Engineering evaluated the actual water usage by recording pump run times for the existing water system. This study was conducted during full classroom use for a one month period (April 12 - May 16, 2001) and provides insight on existing flows. Our evaluation indicates approximately 2,362 gpd domestic wastewater is being produced. This correlates to a flow per student of 13 gpd (2,362 gpd / 181 students-faculty = 13 gpd).

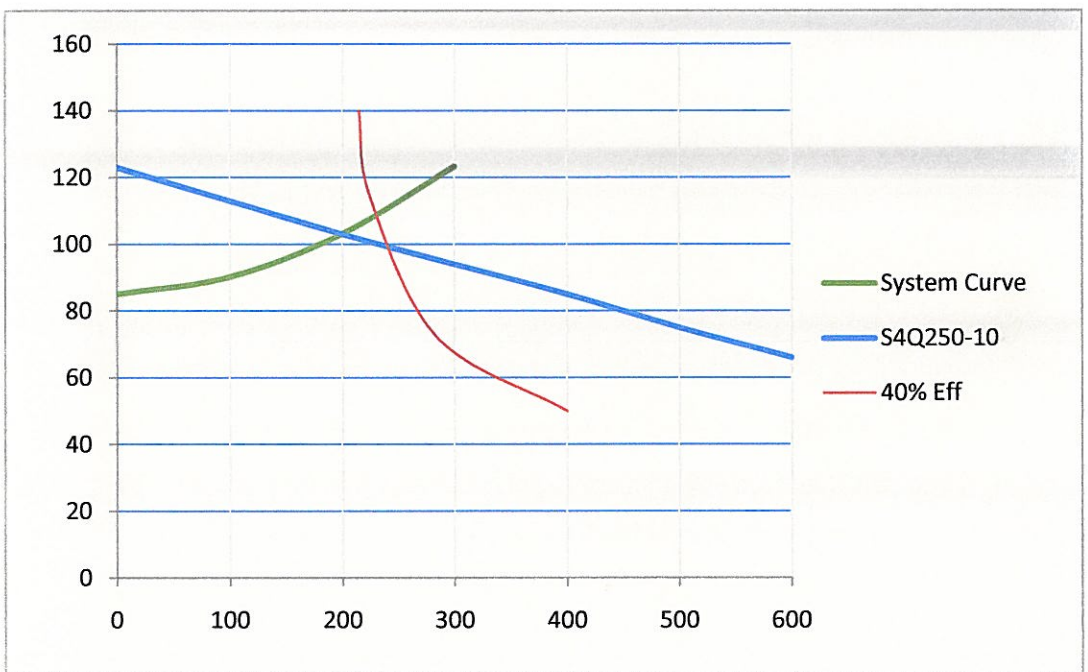
Appendix S

Pump Sizing Calculations

Project Name	Gateway Sewer

System Inputs

GPM	100	200	300	
Static Lift, ft	85	55	85	
Forcemain Diamter, in	6	6	6	
Forcemain Length, ft	5000	5280	5000	
Forcemain C Value	140	140	140	
Dual Disc CV Diameter, in	6	6	6	
Residule Pressure at Hyd (psi)	0	0	0	(Pitot PSI)
Suction Pipe Diameter, in	10	10	10	
Suction Pipe Length, ft	0	0	0	
Suction Lift, ft (+/-)	0	0	0	
Suction C Value	140	140	140	
Pump Elevation, ft	5060	5060	5060	
Water Temperature, f	70	70	70	



System TDH

GPM	100	200	300
Static	85	55	85
FM Friction	4.60 ft	17.51 ft	35.11 ft
SUC Friction	0.00 ft	0.00 ft	0.01 ft
CV Friction	0.100	0.175	0.250
Hydrant Friction	0.2	0.5	0.9
Res Pressure (ft)	0	0	0
TDH	90	73	121

NPSH

Pump Model	GPM			
APE-66103	100	200	300	
NPSHr	1.73913	3.478261	5.2	
NPSHa @ Max GPM			27.00	
NPSHa - NPSHr			21.78	(must be >2)

System Curve Points

GPM	TDH
0	85
100	90
200	73
300	121

APE-6610300 30HP 10.00"

0	95
250	94
500	92
750	90
1000	85
1250	75
1500	64
1750	50
2000	35

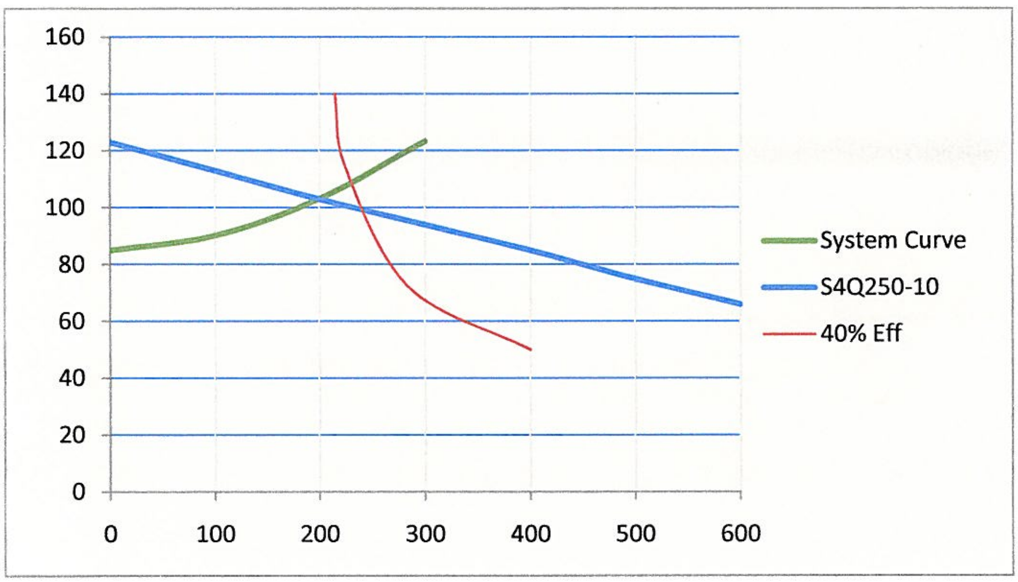
Discharge Friction Calculations

L	5000.0 ft	L	5280.0 ft	L	5000.0 ft
Q	100.0	Q	200.0	Q	300.0
D	6.0 in	D	6.0 in	D	6.0 in
C	140	C	140	C	140
TDH	4.60 ft	TDH	17.51 ft	TDH	35.11 ft

Suction Friction Calculations

L	0.0 ft	L	0.0 ft	L	0.0 ft
Q	100.0	Q	200.0	Q	300.0
D	10.0 in	D	10.0 in	D	10.0 in
C	140	C	140	C	140

Project Name	Gateway Sewer			
	System Inputs			
GPM	100	200	300	
Static Lift, ft	85	85	85	
Forcemain Diamter, in	6	6	6	
Forcemain Length, ft	5280	5280	5280	
Forcemain C Value	140	140	140	
Dual Disc CV Diameter, in	6	6	6	
Residule Pressure at Hyd (psi)	0	0	0	(Pitot PSI)
Suction Pipe Diameter, in	10	10	10	
Suction Pipe Length, ft	0	0	0	
Suction Lift, ft (+/-)	0	0	0	
Suction C Value	140	140	140	
Pump Elevation, ft	5060	5060	5060	
Water Temperature, f	70	70	70	



System TDH

GPM	100	200	300
Static	85	85	85
FM Friction	4.86 ft	17.51 ft	37.07 ft
SUC Friction	0.00 ft	0.00 ft	0.01 ft
CV Friction	0.100	0.175	0.250
Hydrant Friction	0.2	0.5	0.9
Res Pressure (ft)	0	0	0
TDH	90	103	123

NPSH

Pump Model	GPM		
APE-6610300	100	200	300
NPSHr	1.73913	3.478261	5.2
NPSHa @ Max GPM			27.00
NPSHa - NPSHr			21.78 (must be >2)

System Curve Points

GPM	TDH
0	85
100	90
200	103
300	123

APE-6610300 30HP	10.00"
0	95
250	94
500	92
750	90
1000	85
1250	75
1500	64
1750	50
2000	35

Discharge Friction Calculations

L	5280.0 ft	L	5280.0 ft	L	5280.0 ft
Q	100.0	Q	200.0	Q	300.0
D	6.0 in	D	6.0 in	D	6.0 in
C	140	C	140	C	140
TDH	4.86 ft	TDH	17.51 ft	TDH	37.07 ft

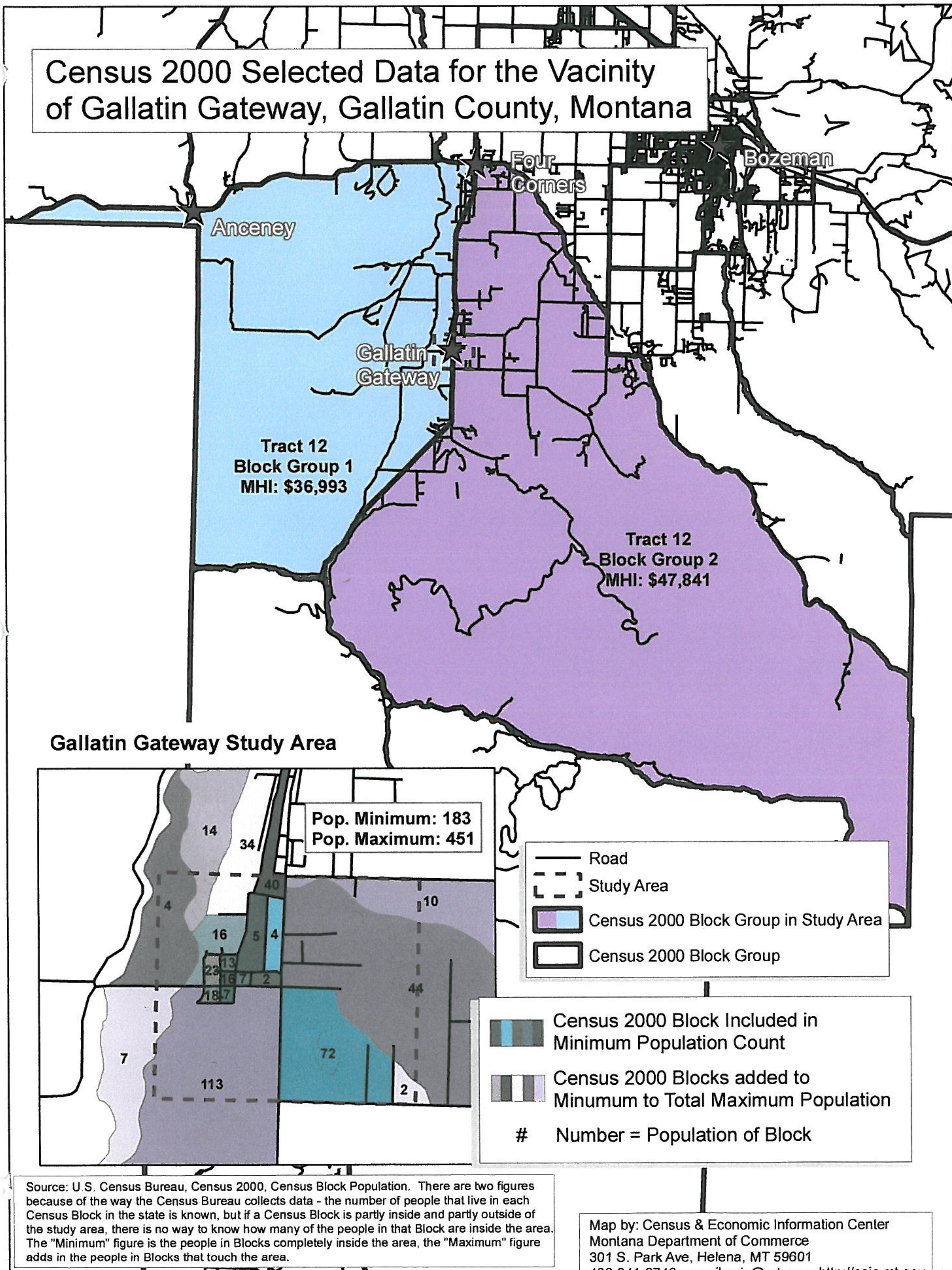
Suction Friction Calculations

L	0.0 ft	L	0.0 ft	L	0.0 ft
Q	100.0	Q	200.0	Q	300.0
D	10.0 in	D	10.0 in	D	10.0 in
C	140	C	140	C	140

Appendix T

Census Data

Census 2000 Selected Data for the Vacinity of Gallatin Gateway, Gallatin County, Montana



Source: U.S. Census Bureau, Census 2000, Census Block Population. There are two figures because of the way the Census Bureau collects data - the number of people that live in each Census Block in the state is known, but if a Census Block is partly inside and partly outside of the study area, there is no way to know how many of the people in that Block are inside the area. The "Minimum" figure is the people in Blocks completely inside the area, the "Maximum" figure adds in the people in Blocks that touch the area.

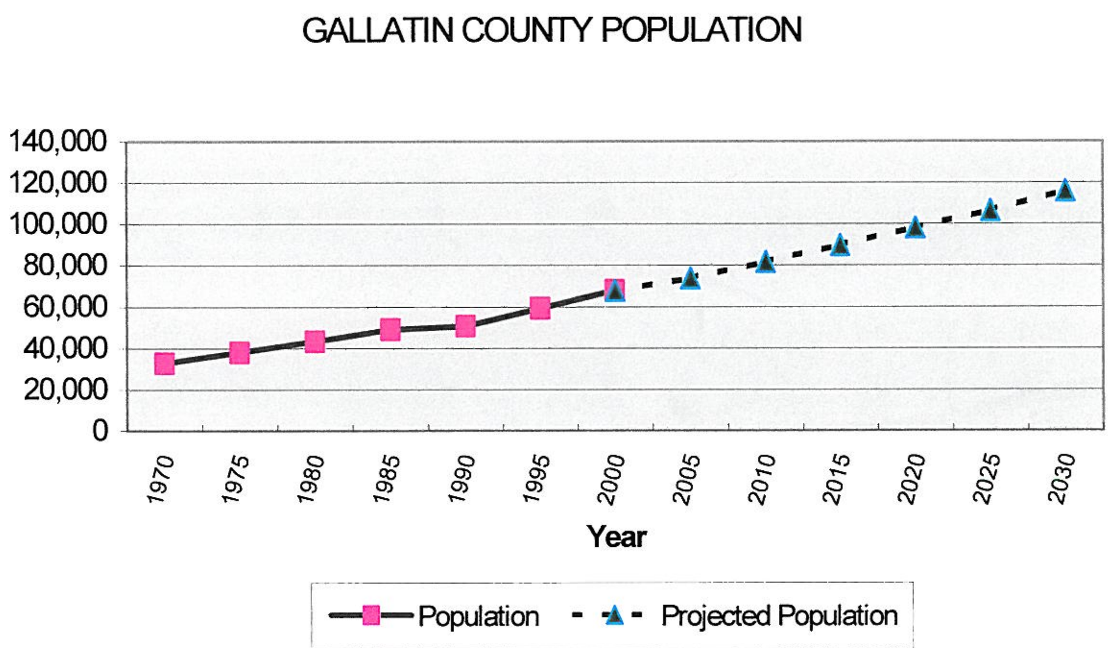
Map by: Census & Economic Information Center
Montana Department of Commerce
301 S. Park Ave, Helena, MT 59601
406-841-2740 email:ceic@mt.gov http://ceic.mt.gov

GallatinGateway_pop.mxd - December 2009

2.1 Projected Trends

Population and Housing

Population. The 2000 Census reported Gallatin County's population to be 67,831–representing an increase of over 17,000 since 1990. Projections show a similar increase over the next 10 years, with an additional 16,000 people calling this county home for a total of 82,000. By the year 2030, the Gallatin County population is expected to be 116,000, representing a 30-year increase of nearly 50,000 people. Gallatin County is growing at a rate of approximately three percent a year.



Population Projection 2000-2030. Growth over the last ten years pushed Gallatin County into second place, as the second fastest growing Montana County. Overall state growth is more conservative. The state as a whole grew 12.9 percent from 1990 to 2000, with over 20 Montana counties (mostly eastern Montana) losing population. As a comparison, the U.S. population grew slightly over 13 percent over the same period.

Current household size in Gallatin County is approximately 2.5 persons. If this trend continues, we will need an *additional* 6,400 housing units, or 640 new homes per year during the first decade of this millennium. As would be expected of a university town, homeownership in Gallatin County falls below the state, although not surprisingly the median value of housing units is greater. The rate of homeownership in Gallatin County is

P53. MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) [1] - Universe: Households
Data Set: Census 2000 Summary File 3 (SF 3) - Sample Data

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

	Block Group 1, Census Tract 12, Gallatin County, Montana	Block Group 2, Census Tract 12, Gallatin County, Montana
Median household income in 1999	36,993	47,841

U.S. Census Bureau
Census 2000

Standard Error/Variance documentation for this dataset:
Accuracy of the Data: Census 2000 Summary File 3 (SF 3) - Sample Data (PDF 141.5KB)

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School District Demographics System

SDDS Publications & Products | Data Tools | Staff

School District Profile

Demographic 2000 Data (STP2) - Profile Data

School district profiles

Download this profile (.zip)

Format for printing

Click to change data set to

(•) Demographic 2000 Data (STP2) ( ) Agency Finance Survey FY 2000 Data (F-33) ( ) P.L.94-171 (Race & Ethnicity)

A set of basic characteristics for the School District you selected is provided below.
GALLATIN GATEWAY ELEMENTARY, GALLATIN COUNTY, Montana [3011790]
See listing in the NCES School District Locator

Subject		
Total Population	Number	Percent
SEX AND AGE	1,406	N/A
Male		
Under 5 Years	738	52.5
5 to 9 years	44	3.1
10 to 14 years	46	3.3
15 to 17 years	47	3.3
18 to 19 years	38	2.7
Female	13	0.9
Under 5 Years	668	47.5
5 to 9 years	50	3.6
10 to 14 years	46	3.3
15 to 17 years	44	3.1
18 to 19 years	16	1.1
	17	1.2
RELATIONSHIP BY HOUSEHOLD TYPE (INCLUDING LIVING ALONE)		
Total Population in Households		
In Family Households	1,406	100
Householder	1,193	N/A
Male	404	100
Female	322	79.7
TENURE	82	20.3
Total Occupied Housing Units		
Owner Occupied Housing Units	579	100
Renter Occupied Housing Units	421	72.7
AVERAGE HOUSEHOLD SIZE	158	27.3
Average Household Size		
AVERAGE FAMILY SIZE	2.43	N/A
Average Family Size		
SEX BY EDUCATIONAL ATTAINMENT FOR THE POPULATION 25 YEARS AND OVER	2.85	N/A
Total		
	1,065	N/A

Male	540	50.7
12th grade, no diploma	4	0.7
High school graduate (includes equivalency)	175	32.4
Some college, 1 or more years, no degree	105	19.4
Bachelor's degree	95	17.6
Master's degree	25	4.6
Professional school degree	15	2.8
Doctorate degree	10	1.9
Female	525	49.3
12th grade, no diploma	4	0.8
High school graduate (includes equivalency)	155	29.5
Some college, 1 or more years, no degree	105	20.0
Bachelor's degree	125	23.8
Master's degree	35	6.7
Professional school degree	4	0.8
Doctorate degree	4	0.8

MEDIAN GROSS RENT (DOLLARS)

Median gross rent	600	N/A

MEDIAN VALUE (DOLLARS) FOR ALL OWNER-OCCUPIED HOUSING UNITS

Median value	173,000	N/A

PER CAPITA INCOME IN 1999 (DOLLARS)

Per capita income in 1999	20,807	N/A

MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) BY TENURE

Total	40,172	N/A
Owner occupied	44,018	N/A
Renter occupied	34,306	N/A

Common Core of Data, Local Education Agency Universe Survey, 1999-2000 (NCES)

Total Students	172
Total FTE Teachers	10.8
Total Schools	2

Source:

National Center for Education Statistics, US Department of Education
Bureau of the Census, US Department of Commerce

mt.gov

Montana's Official State Website

Search for census data, used by the **Treasure State Endowment Program** and the **Community Development Block Grant Program**. Target rates are calculated for the community or county.

Select the City/Designated location Choose City **or** select the County Gallatin

County	Gallatin
Total Population	67,831
Total Households	26,323
Median Household Income	$38,120
Low & Moderate Income Percent	38.7
Percent Poverty	12.8

> 2.57 people/house Avg.

Target Rates	
Water & Waste Water	$73.06
Water Only	$44.47
WasteWater Only	$28.59
Solid Waste Only	$9.53

Amounts are computed using the 2000 census and target percentages based on a target rate survey completed in 2003. The target percentages are:

- 2.3% combined (water and wastewater)
- 1.4% for water alone
- 0.9% for wastewater alone
- 0.3% for solid waste

To see a map of the City/Town/CDP you are interested in, go to the U.S. Census Bureau (http://ftp2.census.gov/geo/maps/blk2000/st30_Montana/Place/) web site which includes an Index of all Places in Montana. Maps are in PDF format.

Instructions on how to view and print Census Bureau PDF maps.
(http://www.census.gov/geo/www/tiger/rd_2ktiger/pl_maps/pdfprint.html)
For more information about Census 2000 maps, please contact the Census and Economic Information Center, at (406) 841-2743 or email ceic@mt.gov (mailto:ceic@mt.gov) .

Contacts:

Treasure State Endowment Program (TSEP)	406 841-2770
Community Development Block Grant Program (CDBG)	406 841-2770
Census & Economic Information Center	406 841-2740
Community Development Block Grant - (Business Resources)	406 841-2733

Definitions page for LMI web site

Census Designated Place (CDP): Census designated places (CDPs) have been created for each decennial census as the statistical counterparts of incorporated places. CDPs are delineated to provide census data for concentrations of population, housing, and commercial structures that are identifiable by name but are not within an incorporated place. CDP boundaries usually are defined in cooperation with state, local, and tribal officials. These boundaries, which usually coincide with visible features or the boundary of an adjacent incorporated place or other legal entity boundary, have no legal status, nor do these places have officials elected to serve traditional municipal functions.

Household: A household includes all the people who occupy a housing unit as their usual place of residence.

Income of households: This includes the income of the householder and all other individuals 15 years old and over in the household, whether they are related to the householder or not.

Individuals for whom poverty status is determined: Poverty status was determined for all people except institutionalized people, people in military group quarters, people in college dormitories, and unrelated individuals under 15 years old.

Low and Moderate Income Percent: Low and Moderate Income Percent is calculated by U.S. Housing and Urban Development (HUD) using data from the U.S. Census Bureau's Decennial Census, specifically for the Community Development Block Grant Program (CDBG). LMI families are defined as those families whose income does not exceed 80% of the county median income for the previous year or 80% of the median income of the entire non-metropolitan area of the State of Montana, whichever is higher.

Median income: The median income divides the income distribution into two equal groups, one having incomes above the median, and other having incomes below the median.

Population: All people (male and female, child and adult) living in a given geographic area.

Notes: Total Population and Total Households are from Summary File (SF) 1, 100% data. Poverty Rates and Median Household Income are from Summary File (SF) 3, Sample data. Low and Moderate Income Percentage was developed by HUD using Census 2000 data.

Sources: U.S. Census Bureau, Census 2000, Decennial Census of Population and Housing, Summary File (SF) 1 and Summary File (SF) 3 and U.S. Department of Housing and Urban Development (HUD), Community Planning and Development

TaxID	Market Value	Taxable Value	EDUs	Number Lots	Total Area (sq m)	Est. Rate (Monthly)	Est. Tax for Scenario 1 (Annual)	Est. Tax for Scenario 2 (Annual)	Name1
RHF12491	385807	11304	1	1	11062.09	$25.64	$2,292	$397	ADAMS MERLE D & TANNIS H
RHF22430	51076	1497		1	7270.6915	$0.00	$842	$397	ADAMS MERLE D & TANNIS HART
RHF12748	78565	2302	1	4	3134.7067	$25.64	$549	$1,588	ALLEN GWEN ROBIN
RHF21705	152880	4479	1	1	3220.6316	$25.64	$800	$397	AMEND JOHN ERIC
RHF43319	169224	4958		1	2673.9967	$0.00	$803	$397	AMEND JOHN ERIC
RHF12428	72612	2127	2	6	2484.1254	$51.28	$469	$2,382	BLEVINS RICHARD L & SUE A
RHF12475	111729	3274	1	3	2573.9465	$25.64	$605	$1,191	BORDER THEODORE A
RHF12741	47314	1386	1	1	645.46776	$25.64	$215	$397	BORODINE ANNE E
RHF12515	56162	1645	1	1	645.41219	$25.64	$244	$397	BRIESE MELVIN C & DEBRA A
RHF12447	56634	1659	1	1	645.47742	$25.64	$246	$397	BROWN RICHARD W JR
RHF32474	12132	355		1	645.32686	$0.00	$100	$397	BROWN RICHARD W JR
RHF12751	46566	1365	1	2	368.804	$25.64	$187	$794	CARPENTER BRAD E &
RHF12426	72680	2130	1	2	645.38423	$25.64	$298	$794	COLEMAN LAUREN
RHF12450	45996	1347	1	1	645.42781	$25.64	$211	$397	DANCING BEE LIMITED COMPANY
RHF43243	407782	11948		1	4951.8744	$0.00	$1,798	$397	DAVIDSON DENNIS & SHIRLEY
RHF43244	556822	16315	1	1	18078.376	$25.64	$3,504	$397	DAVIDSON DENNIS & SHIRLEY
RHF12411	12219	358		1	645.4062	$0.00	$100	$397	DOBBS WALLACE & THERESA REVOCABLE TRUST
RHF12771	58721	1721	1	2	1238.7597	$25.64	$308	$794	DOHLE ALICE & STACY
RHF12887	103904	3045	1	1	645.36605	$25.64	$401	$397	ENGLER EDWIN JOHN
RHF12774	15293	448	1	1	645.39279	$25.64	$110	$397	EVANS DARLENE K
RHF12440	44785	1312		1	742.89018	$0.00	$216	$397	FALLER MICHAEL P & SHANNON R
RHF12629	25965	761	1	2	1382.9341	$25.64	$213	$794	FLATEGRAFF BRADLEY A
RHF12530	645913	18926	13	1	38885.85	$333.32	$5,726	$397	GALLATIN FOOD SERVICE LLC
RHF27532	1493266	43779	2	1	38767.802	$51.28	$8,499	$397	GALLATIN FOOD SERVICE LLC
RHF51795			1	2	1394.2866				GALLATIN GATEWAY FIRE DEPARTMENT
RHF12627			12	3	2489.4512				GALLATIN GATEWAY SCHOOL
RHF33732				1	3031.6688				GALLATIN GATEWAY SCHOOL
RHF33733				1	1106.3793				GALLATIN GATEWAY SCHOOL
RHF33734				1	691.5289				GALLATIN GATEWAY SCHOOL
RHF33735				6	4505.0065				GALLATIN GATEWAY SCHOOL
RHF33736				4	3203.5756				GALLATIN GATEWAY SCHOOL
RHF33731			1	2	921.95224				CHRISTIAN CHURCH OF GALLATIN GATEWAY
RHF12817	477870	14001	5	1	7021.7384	$128.20	$2,220	$397	GATEWAY MARKET INC
RHF26066	143505	4205	2	1	8989.2365	$51.28	$1,305	$397	GATEWAY MARKET INC
RHF26067	38887	1139	1	1	1391.6528	$25.64	$257	$397	GATEWAY MARKET INC
RHF12783	52138	1527	1	1	645.37634	$25.64	$231	$397	GREER DAN
RHF41163	72035	2111	2	1	13647.65	$51.28	$1,502	$397	GRIFFITH LESTER & CHERYL LIVING TRUST
RHF41165	116368	3410	1	1	8384.6832	$25.64	$1,159	$397	GRIFFITH LESTER & CHERYL LIVING TRUST
RHF12441	18774	550		2	1539.7924	$0.00	$204	$794	GRONEWOLD RAY L & NANCY BEE
RHF12393	19379	568		2	1290.8386	$0.00	$183	$794	HAJ JAVAD LLC
RHF12429	62787	1840	1	1	16349.905	$25.64	$1,722	$397	HARGROVE DONALD R & ELOISE M
RHF12899	23863	699	1	2	1382.9432	$25.64	$207	$794	HARGROVE RUTH
RHF12843	53522	1568	1	2	645.41244	$25.64	$236	$794	HARRISON SAMUEL E & RONDA K
RHF12709	59416	1740		1	645.33984	$0.00	$255	$397	HART LEE & SANDRA
RHF12653	12132	355		1	645.30992	$0.00	$100	$397	HART LEE & SANDRA L
RHF12654	78441	2299	2	1	2011.1271	$51.28	$444	$397	HART LEE & SANDRA L
RHF12509	156540	4587	2	1	13432.045	$51.28	$1,759	$397	JOHNSON DAVID & CAROL ANN
RHF12630	31731	930	1	1	3115.1843	$25.64	$393	$397	KURLAND SYDNEY
RHF12414	64205	1881	1	3	2899.0883	$25.64	$480	$1,191	LEMON CLARA L BARNES 1/3 INT
RHF12415	32866	963		3	2648.9813	$0.00	$354	$1,191	LEMON CLARA LOU BARNES
RHF12642	56255	1648	1	2	1290.828	$25.64	$304	$794	LUCE GEORGE S JR & LENA V
RHF39079	97863	2867	1	1	4261.346	$25.64	$716	$397	MAWHINNEY DOUGLAS & NANCY ZITZER
RHF12803	64841	1900	1	2	645.37034	$25.64	$273	$794	MCREYNOLDS LINDA LOU
RHF12537	69401	2033	1	1	645.39985	$25.64	$288	$397	METZ JOHN W &
RHF27316	552432	16187		1	4952.4511	$0.00	$2,273	$397	MEYERS SCOTT S REV TRUST DATED 2/2/1993
RHF41166	123750	3625	1	1	9424.5354	$25.64	$1,280	$397	MUSIAL MICHAEL E JR
RHF12907	52521	1539	1	5	968.02063	$25.64	$262	$1,985	NYGARD ROBERT WILLIAM
RHF12742	31302	99	2	3	2091.4845	$51.28	$205	$1,191	PAYNE BERNICE L REVOC LIVING TRUST
RHF12743	34476	1011	1	3	2231.0134	$25.64	$320	$1,191	PAYNE RUSSELL DEAN
RHF12752	50557	1482	1	3	2489.2685	$25.64	$397	$1,191	PENZINER ANDREW J
RHF26065	304805	8931		1	4032.1913	$0.00	$1,374	$397	PEREZ LUCIEN & SARAH
RHF12395	87489	2564	1	2	645.45041	$25.64	$347	$794	PITTENGER DANIEL LEE
RHF43242	793662	23254	1	1	10229.638	$25.64	$3,554	$397	RENNEBERG HARDWOODS INC
RHF12767	43368	1270		1	645.39968	$0.00	$202	$397	ROBERTS JANINE G &
RHF12768	16506	484	1	1	645.40391	$25.64	$114	$397	ROBERTS JANINE G &
RHF44692	93697	2745	1	2	1290.7946	$25.64	$427	$794	ROBERTS JANINE G &
RHF12769	55866	1636	1	1	645.39945	$25.64	$243	$397	ROBERTS JANINE GAILE
RHF12453	23464	688	1	1	645.3947	$25.64	$137	$397	RODAS HEIDI A
RGH28562	12618	370		1	691.49439	$0.00	$106	$397	SALESVILLE PROPERTIES LLC
RHF12389	18965	556		1	691.53271	$0.00	$126	$397	SALESVILLE PROPERTIES LLC
RHF12390	17910	525		2	1382.9383	$0.00	$187	$794	SALESVILLE PROPERTIES LLC
RHF12454	84711	2482	2	1	1802.7807	$51.28	$445	$397	SALESVILLE PROPERTIES LLC
RHF12827	73043	2139	1	2	1290.8318	$25.64	$359	$794	SANDSTON STEPHANIE
RHF12645	46797	1372	1	2	697.40053	$25.64	$218	$794	SAVAGE BROOKE
RHF12412	34944	1024		3	2692.1251	$0.00	$364	$1,191	SCOTT SAM M
RHF12811	56771	1663	1	4	2581.4258	$25.64	$426	$1,588	SPRING VERA E
RHF12442	85181	2496	2	2	1383.0147	$51.28	$408	$794	STEIN PETER BALKE
RHF12492	41942	1229	1	1	4673.13	$25.64	$571	$397	STRANDBERG STEPHEN L
RHF12391	66301	1942	1	3	1327.2225	$25.64	$341	$1,191	STURGIS TAMARA LEE
RHF12722	6972	204		1	55.763199	$0.00	$28	$397	STURGIS TAMARA LEE
RHF12888	124485	3647	1	6	4259.4815	$25.64	$804	$2,382	SULLIVAN DAVID G REVOCABLE TRUST DATED 1
RHF12656	83190	2438	1	1	3396.1167	$25.64	$588	$397	TATE FORREST W 50% INT
RHF12890	78125	2289		1	1672.8944	$0.00	$412	$397	TATE FORREST W 50% INT

RHF23850	48784	1429	1	1	9440.8422	$25.64	$1,035	$397	TATE FORREST W 50% INT
RHF12825	83097	2434		1	645.40842	$0.00	$333	$397	TATE MEREDITH C
RHF12845	58690	1720	2	1	10692.464	$51.28	$1,184	$397	TATE MEREDITH C
RHF12842	51516	1509	1	1	645.36471	$25.64	$229	$397	TOCCO JACOB
RHF12618	36497	1070		1	645.45448	$0.00	$180	$397	TRIANGLE E HOLDINGS
RHF12790	56087	1800	1	2	1301.2548	$25.64	$322	$794	TURNER ENTERPRISES INC
RHF12524	23157	679	1	3	1613.5405	$25.64	$226	$1,191	TURPIN HELEN ZINNER
RHF12394	39866	1168	1	1	691.50753	$25.64	$195	$397	VARGO FRANCIS T
RHF12413	48904	1432		1	691.46568	$0.00	$225	$397	VARGO FRANCIS T
RHF26064	44599	1307	1	1	6565.8614	$25.64	$755	$397	WAGNER DONALD & PATSY
RHF12643			1	4	2788.6874				WILLING WORKERS LADIES AID
RHF12905	47849	1402	1	2	1301.2441	$25.64	$278	$794	WORTMAN EARL J
RHF12906	12891	378		1	464.74697	$0.00	$85	$397	WORTMAN EARL J
RHF61799	67168	1968		2	1290.8081	$0.00	$340	$794	LAFOLEY J RYAN

Appendix U

Letters of Support / Public Participation/ Community Plan / Newspaper Articles

Letters of Support

GATEWAY VILLAGE, LLC
105 W. MAIN STREET
BOZEMAN, MT 59715
April 1, 2010

Mr. Matt Donnelly
GM, Gateway Water/Sewer District

Dear Matt,

As you know, I am the managing member and majority owner of Gateway Village, LLC which owns a 54 acre undeveloped parcel of land located within the Gallatin Gateway core area under the Gallatin Gateway Neighborhood Planning area. (see attached).

While our parcel is not located within the Gateway water/sewer district, it runs adjacent to it. Due to our prior efforts in evaluating a potential major subdivision on our land parcel, we undertook a number of engineering studies of the property and received engineering guidance from various parties including Mr. Terry Threlkeld and based on those inputs, we believe that our land parcel would be extremely well suited for the installation of a waste treatment site and drainfield.

While we are not in any position to make any commitments at this time, we are fully supportive of the Gateway water/sewer district's efforts to establish a wastewater treatment facility, we are aware of their land requirements and we would be willing to enter into negotiations with the Gateway water/sewer district to enable them to address their property needs.

Sincerely,

David Loseff
Managing Member
Gateway Village, LLC

County Commission

GALLATIN COUNTY

311 West Main, Rm. 306 • Bozeman, MT 59715

William A. Murdock
Joe P. Skinner
Steve White

Phone (406) 582-3000
FAX (406) 582-3003

COPY

March 22, 2010

Matt Donnelly, President
Gallatin Gateway County Water and Sewer District
P.O. Box 383
Gallatin Gateway, MT 59730

Dear Matt and Board Members:

The Gallatin County Commission supports your efforts to secure state and federal financial assistance for improvements to your wastewater treatment system.

We are aware of your plan to build a centralized wastewater collection, treatment and disposal system and that the new system will be designed for 50,000 gallons per day, which will replace over 80 individual septic systems and allow for the reasonable growth of Gallatin Gateway. We believe that the proposed project is a well conceived plan to eliminate a public health risk by taking out of service septic systems and drainfields that were designed in the mid-1960's and do not comply with current regulations. Many of the individual septic systems in Gallatin Gateway have failed, or have a high potential of failing in the near future thereby increasing the already high probability that water supply wells and groundwater will become contaminated. Your current situation not only represents a serious a public health hazard, but also threatens Gallatin County's precious water resources and for these reasons we strongly support the development of your project.

Please keep of informed of your progress and good luck on your grant applications.

Sincerely,

Joe P. Skinner, Chairman

William A. Murdock, Member

R. Stephen White, Member

GALLATIN GATEWAY SCHOOL
PO BOX 265, GALLATIN GATEWAY, MT 59730

April 7, 2010

Matt Donnelly, General Manager
Gallatin Gateway County Water and Sewer District
PO Box 383
Gallatin Gateway, MT 59730

Dear Matt and Board Members:

We are aware of your plan to build a centralized wastewater collection, treatment and disposal system.

The Gallatin Gateway School District No. 35 supports your efforts to secure state and federal financial assistance and continue forth with wastewater improvements for our community.

Please keep us informed of your progress and good luck on your grant applications.

Sincerely,

Erik Yager
School Board Chair

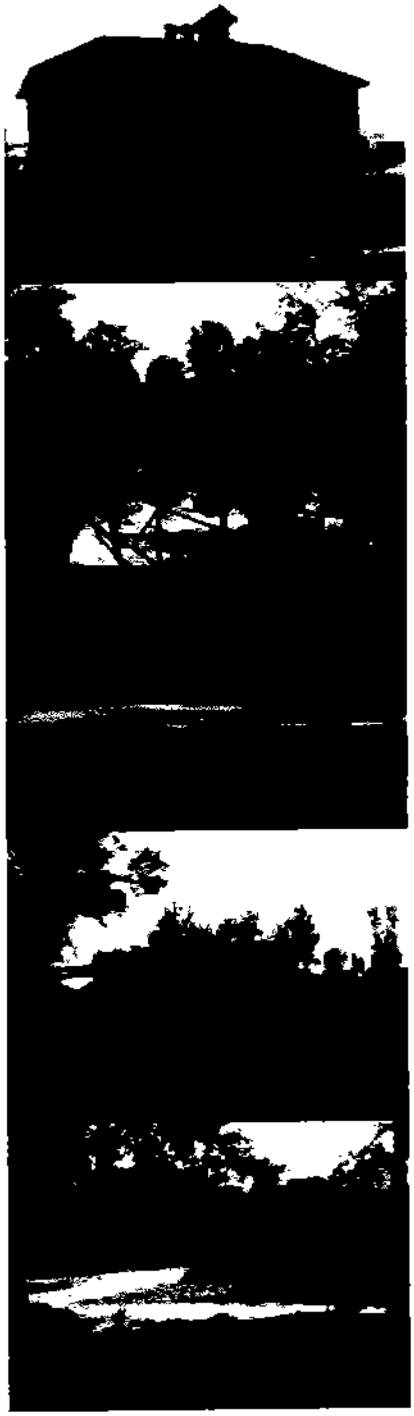
Celia O'Connor
School Board Vice-Chair

Jess Holloway
School Board Trustee

Cheryl Arnaud
School Board Trustee

Wayne Thiem
School Board Trustee

Community Plan



GALLATIN GATEWAY COMMUNITY PLAN

A Revision to the Gallatin County Growth Policy

Adopted ____

Planning Board Hearing: January 13, 2009

County Commission Hearing: January 27, 2009

Table of Contents

Chapter 5: Highway 191 Corridor

Chapter 6: District-Wide Policies

Chapter 7: Continuing the Conversation and Implementing the Plan

A Changing Community

1

A Brief History

In 1865, a man named Zachariah Sales and his family decided to end their journey from Ontario, Canada and homestead on a scenic spot next to the Gallatin River in Montana territory. Mr. Sales started a sawmill on his homestead. He and his fellow homesteaders were successful enough to need a name for this little burg and decided on Slab town. The little area of Slab town flourished during those years and they built a church, school, post office, blacksmith shop and a few Saloons. On July 13, 1883, Slab town honored Mr. Zachariah Sales by renaming the little town Salesville and filing an official plat of the town with the Montana Territorial capital in Helena.

The years following 1883 saw much activity in and around the area of Salesville. Area residents of the day made a living from farming, ranching, logging and developing the land. In 1885 the property on the corner of Bozeman St. and Adams St. was donated to build a church which later led to the creation of the Ladies Aid in 1912, now known as the Willing Workers Ladies Aid, Inc. (WWLA).

Change and growth were in the cards for the little area of Salesville with the launching of new businesses like a livery stable and Mercantile built in 1906, along with a grocery store and later a gas station. A novelty store on the east side of Salesville, complete with a dance hall upstairs, gave proof to the adage, "build and they will come" because Salesville continued to grow and change. The Salesville State Bank was built in 1910 . The growth also brought more children, and the Gallatin Gateway school was constructed in 1914. The school continued to grow and expand with additions in 1961, 1966, 1978 and 1989, with the latest addition in 2005.

The needs of the surrounding area were not the only growth influencing Salesville. In 1906 the Gallatin Valley Railway Company began construction of a track from Salesville to Bozeman, and by 1908 the Inter Urban Electric car had completed its first trip. In 1927 the Milwaukee built a spur line from Three Forks to carry travelers to Yellowstone National Park.

The Gallatin Gateway Inn was built to serve and refresh these travelers. Constructed in only four months, a grand opening held June 17, 1927 for the 42,000 square Colonial Spanish-style building attracted 23,000 people. Although tourism increased, the railroads suffered financially as highway travel improved and the Inn fell into disrepair. After extensive restoration, the Gallatin Gateway Inn is once again a gracious, full service hotel, offering superb dining, conferences, weddings, swimming, fishing with superb accommodations for today's traveler. The popularity created by the Milwaukee Railroad of Salesville as the "Gateway" to Yellowstone Park lead to Salesville becoming known by what we call it today, Gallatin Gateway.

The community has long had a history of service and involvement. WWLA, inc., a community service organization, has operated continuously since its origin in 1912. Its mission is to assist those in need and to promote unity and goodwill.

Incorporated by the State of Montana in 1992, WWLA, Inc. has federal and state non-profit, tax-exempt status. To achieve its goal of establishing a permanent community center, land at 145 Mill Street was purchased from Lumber Enterprises, Inc. in 1990. Grants and fund-raising activities provided money for construction. Designed by a local architect, constructed by volunteers, and completed in 1995, the Gallatin Gateway Community Center is the site for community meetings, school events, social activities, and a polling place for elections. Rentals, donations, and fund-raisers finance maintenance and operations. WWLA, Inc. conducts charitable work throughout the year and awards scholarships to Gallatin Gateway youth.

Over the last several decades, the Gallatin Gateway area has continued to grow and change. As the Big Sky Ski Resort has expanded, the amount of traffic traveling through the community has increased. As residents have moved to the area, school enrollment has steadily swelled. Businesses have been founded, and existing businesses expanded. The Fire Department has seen a growing demand for emergency services. Change has been happening to Gallatin Gateway for over 100 years, and examining the community within the context of the greater Gallatin Valley shows that change can be expected to continue for some time to come.

What's Next?

This is the first community plan for Gallatin Gateway. Over the last several months, residents have expressed a desire to use the planning process to preserve the rural nature of the area, direct growth into the core of downtown Gallatin Gateway, preserve the river and other water resources, explore the possible formation of a water and sewer district, and have a serious discussion about zoning to mitigate potentially incompatible uses.

Several of these discussions have been controversial, and it remains to be seen how successful they will be. This plan represents a new approach to growth in Gallatin Gateway. It attempts to balance the rights of individuals with the desire of the community to allow growth that doesn't infringe on the rights of existing neighbors, and to encourage a better school and emergency services, improve traffic controls on highway 191, and preserve the open space and rural atmosphere that so many people love. Before detailing policies to implement this vision, however, the remainder of this chapter deals with compliance with state statute, the county growth policy, and describes the process leading to this plan's adoption.

The Planning Process

The planning process for the Gateway Community Plan formally began in February of 2007. The process has been coordinated by the Gateway Community Planners, a steering committee of volunteers who have partnered with Gallatin County to guide the process. The steering committee has met twice a month at the Gallatin Gateway Community Center and has hosted several community events to present information and gather feedback. The steering committee has also solicited information and feedback from several agencies and professionals, including the Montana Department of Transportation, Montana Fish, Wildlife, and Parks, the Gallatin Gateway School Board, the Gallatin Gateway Fire Department, the Gallatin City/County Environmental Health Department, and several consulting engineers. This Plan is a result of that conversation.

The following events have been held over the course of the last year:

- March 2007: Survey mailed to 650 landowners announcing the beginning of the planning process and asking initial questions (120 returned);
- May 18, 2007: Held a kickoff meeting to formally begin the process and establish general direction (70 community members participating);
- August 15, 2007: Meeting held to focused on historic downtown (40 community members participating);
- October 17, 2007: Meeting held to receive feedback on the initial direction of the planning process (87 community members participating)
- November 7, 2007: Meeting held to discuss sewer and water district formations and zoning regulations;
- January 25, 2008: Meeting held with large landowners to discuss policy options;
- January 30, 2008: Meeting held to discuss policy for rural Gallatin Gateway (67 community members participating);
- March 13' 2008: Meeting held with large landowners to discuss policy options;
- March 13, 2008: Meeting held to discuss policy for the downtown core (55 community members participating);
- April 30, 2008: Meeting held to discuss goals and policies of the Highway 191 corridor.
- June 4, 2008: Presentation of the first draft of the Gallatin Gateway Community Plan.
- October 8, 2008: Presentation of the final draft of the Gallatin Gateway Community Plan

Authority

This plan will be adopted as the Gallatin Gateway Community Plan Chapter of the Gallatin County Growth Policy. Authority of this community plan is authorized by Montana State Statute and the Gallatin County Growth Policy. Section 76-1-106 of the Montana Code Annotated (MCA) requires local planning boards to prepare growth policies, and Section 76-1-601 offers general guidance for the contents of a growth policy and/or neighborhood plan. Sections 76-1-602 through 76-1-604 give the procedure for adoption of growth policy or growth policy amendment.

Additionally, Chapter 4.3 of the Gallatin County Growth Policy authorizes the development of Neighborhood, or Community, Plans throughout Gallatin County. Those community plans must be drafted in compliance with the County Growth Policy, and are designed to give greater specificity within a certain defined area.

Organization of the Plan

This plan contains three layers of guidance for residents and decision makers:

- The overall vision and guiding principles presented below, which set the stage for more specific direction that follows;
- Goal statements in each chapter, which are broad statements about how the community will address a particular issue or need;
- Policies, which are specific action statements about how the community will achieve each goal.

The plan calls for exploring three primary strategies for managing growth in the Gallatin Gateway area:

- **Partnerships.** Partnerships, or agreements, between two agencies are a primary strategy communities can use to implement their planning policies. A primary strategy to implement plan policies in Gallatin Gateway are is a partnership between Gallatin County and the Montana Department of Transportation.

- **Investments.** A second strategy to implement the Gallatin Gateway Community Plan policies involve investments. Investments require the residents of Gallatin Gateway, the County, or perhaps outside agencies (such as MDT or federal grant programs) to invest time, energy, money, or a combination thereof. Investments include exploring the option of public water and sewer for downtown Gateway.

- **Requirements.** Requirements can take several different forms. The most common type of requirement is a set of development standards which new development or changes in land use would have to meet (also known as zoning). These standards could include setbacks from canals or ditches, landscape buffers between commercial and residential uses to help compatibility, lighting standards for new commercial buildings, density requirements for new subdivisions, requirements for central sewer/water, etc. Other types of requirements could take the form of plan policy. Examples include planned road connections, trail connections, or sidewalk connections which new development would have to build as a condition of their approval.

The plan is divided into three geographic areas: the Town Core, Rural Gallatin Gateway, and the Highway 191 corridor. Partnerships, investments, and strategies are all discussed as implementation strategies for achieving the goals and policies of each geographic area.

Gallatin Gateway's Community Vision and Guiding Principles

2

Gallatin Gateway has seen slow but steady change over the past 100 years, from the platting of the original town of Salesville, to the development of numerous subdivisions in the area, to the operation of several local businesses and the development and use of property ongoing today. As residents of Gallatin Gateway discuss these changes, the questions that have arisen during this planning process are:

- How does the community grow without eroding many of the values attracting people to the area?
- How do we ensure that new uses are compatible with existing uses?
- How do we meet the growing demand for public facilities?
- How do we protect environmental quality and the rural landscape?
- How do we balance the right of individuals to use their property with the responsibility to the community that comes with new development?

In this changing landscape, these questions are what planning is all about. The conversation is ongoing and will evolve over time. Gallatin Gateway's answers begin below, with the community vision and the Guiding Principles.

2.1 Vision for the Future

Gallatin Gateway recognizes it will continue to grow and change over the next several years. The following statements begin to discuss how, as it develops, Gallatin Gateway will continue to enjoy its rural, small town atmosphere and continue to be a place its residents want to call home:

- **Downtown Gateway** will explore opportunities to invest in new facilities, including a water and sewer district, roads, schools, parks, and trails as necessary, to ensure downtown Gateway grows in a healthy and moderate manner;
- **Rural Gateway** will sustain its rural, working, and agricultural

landscapes by exploring both regulatory and non-regulatory tools to protect its open spaces, wildlife habitat, water quality, natural resources, and property values;
- Gallatin Gateway, Gallatin County, and the Montana Department of Transportation will cooperate to ensure that **Highway 191** receives necessary improvements to safely handle increasingly higher traffic loads and to improve the aesthetic character of the corridor;
- Gallatin Gateway will continue to respect **private property rights** by ensuring that new uses do not degrade the value of existing landowners, and by ensuring that any new regulations are flexible and not overly burdensome;

Residents of Gallatin Gateway believe **responsibility** comes with new development. New development should be consistent with the custom, culture, and historic pattern of development of the community.

Policy 2.2 Guiding Principles

The following Guiding Principles have been used to guide specific policy direction in each of the three geographic areas of the planning jurisdiction.

Rural Lifestyle. Repeatedly, residents have stressed that Gallatin Gateway is a unique place. The quality of life, the night sky, access to recreational areas, and the sense of community and neighborliness of people were continually mentioned as principle values. Residents stressed that new development, whether residential, commercial, or industrial, should be appropriate to the area and its neighbors.

Compatibility between existing residential and new commercial. Many residents expressed concern with the compatibility of residential, commercial, and industrial use. Generally, residents feel that Gallatin Gateway should primarily be residential and agricultural in the rural parts of the planning area, with most of the commercial development limited to the downtown core, including the area between Gooch Hill Road and Cottonwood Road along Highway 191.

Property Rights Protection. Basic property rights protection is always in the background (if not the forefront) of every discussion regarding planning. Discussion showed that property rights is a two-sided coin: the right to use property goes hand in hand with responsibility to your neighbors and your community.

Pride in the Gallatin Gateway School. According to recent surveys, there is strong community support for the school, including the idea that the school helps provide an identity for the community and will need to be supported in the future.

A Healthy, Vibrant Downtown. Many residents expressed a desire for a safe, walkable, and vibrant town center with adequate services for residents, including appropriate commercial development, a functioning school, a volunteer-constructed community center, central water and sewer, and parks and trails.

Protected Natural Resources. Elements such as clean water, clean air, wildlife, and the surrounding open space and agricultural lands are crucial to maintaining the quality of life of the community.

Sufficient Infrastructure, Including Central Sewer and Water for Downtown Gallatin Gateway. As Gateway grows, sufficient infrastructure should be in place, including central sewer and water, a strong, well-funded school, and a fire department which can provide efficient and safe services.

A dominant issue has been the need for central sewer and water for downtown Gateway and the protection of groundwater in the area. With this discussion, however, two primary cautions have emerged regarding central water and sewer: the presence of infrastructure could potentially lead to greater density than was desired, and the fear that a heavy financial burden could be imposed on residents who may not have an immediate need for hookup to a central system. Any exploration of central water and sewer will need to take these questions into account.

Protected Viewsheds Through Control of Signage and Billboards. All participation efforts showed that control of new signs and billboards, primarily along Highway 191, was a priority.

Better Transportation. Good, safe, and efficient traffic safety on Highway 191 is critical to the quality of life of the area, as is traffic and pedestrian safety on Mill Street in Downtown Gateway. Additionally, many residents expressed a desire to see paths and trails incorporated into the area.

Protected Open Spaces and Agricultural Landscapes. Open spaces and healthy agricultural landscapes are critical to maintaining the rural nature of the area.

Implementation and Results. Many residents expressed a desire to have a successful and meaningful planning process, resulting in a thoughtful community plan ensuring the appropriateness of new development in the area. In addition, residents have expressed a willingness to explore zoning, central water and sewer, and other tools to implement the plan.

Gallatin Gateway Town Core

3

The Gallatin Gateway Town Core, defined as Cottonwood Road to the south, Gooch Hill Road to the north, the Gallatin River to the west, and a quarter-mile east of Highway 191 on the east, is where residents of the area collect their mail, gather for community events, send their children to school, eat out, and live. Historically, the town has had several lives, many of them lived at the same time: among these are the logging and farming town of its origins, the dude ranches and tourist stops for Yellowstone of the 1920' and 1930's, and presently as a distinct Gallatin Valley community situated between Bozeman and Big Sky.

The following policies ensure that, as the Gallatin Gateway Town Core continues to grow, it continues to function as a community center and to be the residential, retail, service, social, and cultural center of the surrounding Gallatin Gateway area:

3.1 Land Use Map

3.2 Central Business District

3.3 Central Water and Sewer

3.4 Historic Mix of Uses

3.5 Pattern of Streets and Alleys

3.6 Flexibility of Design and Use

3.7 Land Use Compatibility

3.8 Gallatin River

3.9 Underground Utilities

3.10 Mail Service

3.11 Streamline Bus/Big Sky Shuttle System

Policy 3.1 Land Use Map

Adopt a land use map designating a Town Core growth area around the existing platted town. Generally, the boundaries of this area run from Cottonwood Road to the south, Gooch Hill Road to the north, the Gallatin River to the west, and a quarter-mile east of Highway 191 on the east. New development in the Gallatin Gateway area will be focused within this Town Core to allow for natural extension of the existing townsite.

To preserve the rural character, the natural resources, and wildlife habitat of the greater Gallatin Gateway area, and to reduce conflict between new residential development and existing agricultural operations in the area, the majority of new growth will be focused into the Town Core rather than throughout rural Gallatin Gateway.

3.1.1 The existing platted town of Gallatin Gateway consists of 140 lots on 31 acres, resulting in a gross density of 4 lots per acre. Many lots have multiple uses on each lot (such as residences and businesses). This pattern shall continue throughout the existing platted town (see also Policy 3.2 for a discussion of a central business district on Mill Street).

As the Town Core grows, this basic pattern may continue. New development in the Town Core matching the existing density of four lots per gross acre (with the potential for multiple uses on each lot) shall be considered appropriate growth, as long as infrastructure needs, such as those of the Gallatin Gateway School and affordable and efficient central water and wastewater treatment, are addressed.

Dense development east of Highway 191 and within the Town Core has been a concern for Gateway residents and a catalyst to this process. While this Plan calls for the historically mixed use development currently existing in the original town plat to be continued as the Town Core expands (see Policy 3.4), the Plan also recognizes that existing conditions on the edges of the Town Core should be respected. Given existing conditions on the edges of the Town Core, density will gradually decrease to the perimeter edges of the Town Core boundary as described below.

On the west, the Town Core is bounded by the Gallatin River, and new development should be designed to avoid the floodplain and provide a setback from riparian habitat (see Policy 3.8). On the east, the Town Core is bounded by existing rural residential properties between one and ten acres. New development along the far eastern edge of the Town Core should be designed to transition smoothly to the more rural lots to the east. Potential mitigation measures along the eastern boundary may include the use of larger lots, parks and open space, and landscaping.

As both the zoning district process and the water and sewer district process proceed, every effort will be made to include the community in addressing acceptable density levels and mitigating concerns arising from any design that doesn't respect surrounding land uses and constraints.

3.1.2 As the Town Core develops over time, the amendment process will allow for annexations.

Policy 3.2 Central Business District

Adopt a Land Use Map and Zoning Regulations delineating a central business district along Mill Street.

Historic Downtown has always centered on Mill Street. Currently, the Gateway School, the Fire Department, restaurants, offices, and the Community Center are located on Mill Street. The land use map and zoning regulations adopted to implement this plan will delineate a central business district to allow Mill Street to develop as a traditional "historic downtown" main street with mixed residential and commercial uses as sewer and water infrastructure becomes available.

Policy 3.3 Central Sewer and Water

The Gallatin Gateway community and Gallatin County will jointly explore options to form a public water and sewer district and provide central water and sewer in the Town Core to protect the area's water quality. Specifically, the following policies are adopted:

3.3.1 Formation of a public water and sewer district in the Town Core will require significant investment of time and energy from local residents and Gallatin County. Adoption of this policy shows commitment from both the Gallatin Gateway community and Gallatin County to explore options for system types, funding mechanisms, and location of facilities.

3.3.2 To protect the rural character of the area, dense development shall only be allowed in the Town Core area, as shown in the adopted Land Use Map. The development standards and map adopted to implement this plan will provide standards assigning densities in the Gallatin Gateway Town Core area and rural Gallatin Gateway.

3.3.3 Residents of Gallatin Gateway also recognize that provision of central water and sewer could, with careful control, be provided in other ways. New development in the Town Core requiring centralized water and wastewter shall coordinate with the water and sewer district for eventual inclusion in the District. It is the general policy of the Gallatin Gateway Community Plan that new develoment in the Town Core connect to the water and sewer systems controlled and operated by the District. In the event that new develoment requiring central water and/or sewer precedes the District's construction of central water and/or sewer infrastructure, the develoment could coordinate with the District to jointly provide service or infrastructure for existing development.

Policy 3.4 Historic Mix of Uses

The Gallatin Gateway Town Core will continue to allow the historic mix of residential and commercial development already found in the original townsite.

Historically, the original townsite of Gallatin Gateway has consisted of residences, schools, bars and restaurants, community centers, churches, service businesses for surrounding agricultural and logging operations, and services for tourists passing through. Development standards adopted to implement this plan will continue to allow the historic mix in both the existing downtown away from Mill Street and in new development as the Town Core expands.

Policy 3.5 Pattern of Streets and Alleys

New development in the Gallatin Gateway Town Core should continue the pattern of streets similar to the original townsite where feasible.

The original townsite of Salesville was platted in a grid pattern of streets and alleys that provides the structure for the existing town. As new development occurs in the Town Core, this general pattern of connectivity shall continue to the north and the south to facilitate an even flow of car and bike, pedestrian, and equestrian traffic. To keep the small-town feel of new development, current County subdivision standards may have to be waived.

New development in the Town Core shall provide a connection to the old town of Salesville where feasible. West of Highway 191, development in some areas will be constrained by the presence of the Gallatin River floodplain, but several options exist both to the north and the south. Across Highway 191 to the east, new development should use pedestrian trails to connect with the pedestrian underpass.

Policy 3.6 Flexibility of Design and Use

Allow flexibility of building design and use within the Town Core.

Historical development in the original townsite was a mix of single- and multi-family residential uses with commercial uses. In many cases, structures were built to the lot line. While limitations are currently imposed on new development because of sewer and water, the development standards adopted to implement this plan shall maintain this historic flexibility in both use and site design.

Policy 3.7 Land Use Compatibility

It shall be the policy of Gallatin Gateway to ensure that new development in the Town Core is compatible with existing and adjacent land uses. This policy will be pursued using the following strategies:

3.7.1 Adopt development standards allowing residential uses to mix with retail uses, professional offices, restaurants and bars, and light manufacturing. Heavy industrial uses and gravel pits will not be allowed within the Town Core. Industrial uses such as those historically located on the Model Log property and on the Big Timberworks property are not considered "heavy industrial" as defined by this community plan and will continue to be allowed in the Town Core adjacent to Highway 191.

The Gallatin County Growth Policy and this Community Plan defines heavy industrial as uses engaged in the basic process and manufacturing of materials or products predominantly from extracted or raw materials, or a use engaged in storage of or manufacturing processes that potentially involve hazardous or commonly recognized offensive conditions, including large animal feeding operations. Heavy industry is also defined in terms of intensity and impact, and with respect to acceptable standards regarding noise, air pollution, emissions, odors, vibration, dust, dirt, glare, heat, fire hazards, wastes, traffic impacts, and visual impacts.

3.7.2 Adopt development standards requiring mitigation of potential nuisances, including noise, glare, and the improper handling of solid waste.

3.7.3 Adopt development standards establishing size limits for commercial signs and limiting billboards in the Town Core to those already in place.

3.7.4 Study possible routes that would allow high-tonnage commercial vehicles to by-pass Mill St. when accessing Highway 191. Any future expansions of gravel pits in the Gateway area provide the opportunity to explore alternative routes for high-tonnage commercial vehicles. Possible routes include Gateway South Road, Axtell Gateway Road, and/or Axtell Anceney Road. Any of these would require significant road improvements and the input of the people who live on those routes.

3.7.5 Adopt development standards prohibiting commercial sand and gravel mining operations in the Town Core.

3.7.6 All existing businesses within the Town Core shall be grandfathered.

Policy 3.8 Gallatin River

New growth in the Town Core shall be designed to protect the Gallatin River.

> As the Town Core expands to the south and north of the existing historic townsite, new development should be designed to avoid the floodplain and provide a setback from the river to protect both groundwater and riparian areas. Existing lots within the Town Core and the original platted townsite shall be grandfathered.

Policy 3.9 Underground Utilities

To preserve the historic nature of the Town Core and to enhance the safety of the residents, all new utilities shall be underground. Furthermore, the community will strive to "underground" the existing overhead utilities where and when feasible.

Policy 3.10 Mail Service

As the Town Core grows in the future, this policy provides the basis for future conversations with the Postmaster regarding establishment of mail delivery service in the downtown core.

Policy 3.11 Streamline Bus/Big Sky Shuttle System

The Streamline Bus/Big Sky shuttle system has begun service to the Gallatin Gateway area. This policy provides the basis for a future conversation regarding expansion of the Streamline Bus/Big Sky shuttle system as Gallatin Gateway and the County continues to grow. Future Expansion of the Streamline Bus/Big Sky Shuttle system offers more travel options and could improve traffic flow. Streamline should consult with local businesses on placement of bus stops to avoid conflicts with parking and traffic.

Rural Gallatin Gateway

4

Rural Gallatin Gateway provides many of the amenities that make the area a desirable place to live. Agricultural landscapes, natural amenities such as wildlife habitat, the Gallatin River and other watercourses, wetlands, rural lifestyle, and the night sky all provide the context for rural Gallatin Gateway. Additionally, uses such as home-based businesses and gravel pits are a rural reality in the area and will continue in a way that is compatible with surrounding land uses. The following policies will ensure that, as rural Gateway grows, these amenities and rural realities are protected:

4.1 Land Use Map

4.2 Natural Assets

4.3 Land Use Compatibility

4.4 Existing Agricultural Operations and the Rural Character of the Area

Policy 4.1. Land Use Map

Adopt a land use map designating three land use classifications in rural Gallatin Gateway. Generally, Rural Gallatin Gateway is defined as land outside of the Downtown Core and the Highway 191 classifications.

Rural Gallatin Gateway has seen varied development over the past 100 years resulting in several different neighborhoods. Each neighborhood has different characteristics and needs. The land use and zoning map adopted to implement this plan will recognize those different needs.

Existing subdivision and COS development. Parts of Rural Gallatin Gateway were subdivided and developed years ago, including the Little Bear and Bear Creek Properties developments in the southern portion of the district, the extensive Certificate of Survey (COS) development in the northeast portion of the district, and COS and minor subdivision development west of the river. All of this development is large lot, using well and septic systems. This land use classification and zoning district will provide protection of the character of these existing residential neighborhoods by allowing continued residential uses while limiting commercial uses to home occupations and home-based businesses. In areas with appropriate access, lot splits and other minor subdivisions will be allowed.

Rural West. This classification consists primarily of the undeveloped parcels west of the river. Many of these parcels continue to be part of working farms and are somewhat constrained by the Gallatin River floodplain. Given the riparian nature of all land adjacent to the river, these parcels contain significant riparian habitat that should be considered with all new development proposals. New subdivision in this area should be low density, with the opportunity for increased density if an open space development pattern is used.

Rural East. This classification consists of the undeveloped parcels along the eastern border of the planning jurisdiction. Most of these parcels continue to be part of working farms and many have significant constraints regarding access. The southern portion of this area has been identified by Montana Fish, Wildlife, and Parks as having significant value to wildlife, and as a wildlife corridor for elk and deer winter range. Given the agricultural nature of the area, the constraints on access (and, consequently, to emergency service vehicles), and the high wildlife value, future development should be restricted to low density. Higher-density development could be allowed if an open space development pattern (clustering) is used.

Rural South. This classification includes parcels in the southeast area of the planning jurisdiction. As with the Rural East classification, new development should consider the significant wildlife habitat in the area, and density and design requirements should be similar in both districts.

Policy 4.2. Natural Assets

Adopt standards protecting natural assets in the area. The natural environment is one of the primary values of residents of the Gallatin Gateway area. It shall be the policy of rural Gallatin Gateway to protect and maintain the natural assets of the area, such as wetlands, groundwater, the Gallatin River, and wildlife habitat. This policy will be pursued using the following strategies:

4.2.1 **Adopt standards requiring minimum setbacks to watercourses and wetlands, including the Gallatin River.** The Gallatin County Subdivision Regulations currently require setbacks of 300 feet to the Gallatin River and 150 feet to all other watercourses as a condition of subdivision approval. Adopting zoning standards would extend these setbacks to all existing lots in rural Gallatin Gateway and would provide significant protection to riparian and wildlife resources, as well as avoid potential floodplain issues.

4.2.2 **Protect rural character, open space resources, and wildlife habitat by requiring open space development patterns.** Preserving the rural landscape that occupies approximately 75% of the planning area is an important goal of this plan. As countywide zoning standards are established for development outside of the planning jurisdiction, large landowners within the planning area shall be afforded greater development potential. As a group participating in the planning process, large landowners have agreed that an average future density of one lot per 10 acres (average density, rather than minimum lot size) for new residential development is acceptable, with development clustered and sixty-five percent (65%) of the site preserved in open space. Development shall be designed on-site to protect existing agricultural operations, wildlife habitat, and natural assets such as watercourses and wetlands. Approval of development remains the authority of the Gallatin County Commission, and each development plan will be considered individually and with respect to the overall guidance of the Gallatin Gateway Community Plan and the Gallatin County Growth Policy.

4.2.3 **Require wildfire mitigation plans for new development.** The entire Gallatin Gateway Planning Jurisdiction has been classified by the Department of Natural Resources Management (DNRC) as being within the Wildland-Urban Interface (WUI) and at increased risk to wildfire. New development in rural Gallatin Gateway should work closely with the Gateway Rural Fire Department, the DNRC and the United States Forest Service to mitigate risks of wildfire.

Policy 4.3 Land Use Compatibility

Rural Gallatin Gateway is currently a mix of agricultural operations, residential development, light commercial and manufacturing, and a few gravel pits. As the area grows, it shall be the policy of rural Gallatin Gateway to ensure that new development is compatible with existing land uses. This policy will be pursued using the following strategies.

4.3.1 **Respect rural realities.** Future growth in the rural Gateway area shall respect rural realities. Home-based businesses, gravel pits, and other commercial operations currently exist, and future development should consider this reality. Gallatin County will adopt development standards to ensure compatibility between new industrial, commercial uses, and residential uses in rural Gallatin Gateway.

4.3.1.a It is generally understood that the primary use of property in rural Gateway shall be agricultural and/or residential. Secondary uses may be commercial. Commercial operations will be limited to businesses which have a small number of employees on parcels where the primary use is agricultural or residential. This policy is not intended to restrict any home occupations or businesses conducted by agricultural users or other diverse uses compatible with rural property, nor gravel pit operations as described in Policy 4.3.3 below.

4.3.1.b Existing commercial uses shall be grandfathered and allowed to continue.

4.3.2 **Adopt standards for mitigation of potential nuisances.** Gallatin County will use the development standards to require mitigation of potential nuisances, including noise, glare, and the improper handling of solid waste.

4.3.3 **Adopt standards for gravel pits.** Much of the greater Gallatin Gateway area is old floodplain of the Gallatin River. Consequently, gravel resources in the area are plentiful. As more and more development has taken place in rural Gallatin Gateway, however, conflicts have arisen between residential development and gravel extraction. The development standards adopted to implement this plan will require new and expanded gravel pit operations to obtain a conditional use permit to address off-site mitigation measures. If temporary and appropriately mitigated, gravel pits are expected to continue being a part of rural life in the area.

Policy 4.4 Existing Agricultural Operations And The Rural Character Of The Area

Recognize the importance of existing agricultural operations in the area by requiring protection of agricultural canals and ditches and by directing the majority of growth in the area into the core area identified on the land use map.

The Gallatin Gateway area has over 9,000 acres in existing agricultural production. All of these agricultural lands contribute to the character of the area, and the impact on agriculture has been identified as one of the primary concerns of residents of the Gateway area.

The character of the soils and the climate create large demands for water to support crops. Since the early 1800's, surface water has been diverted from the Gallatin River to meet these demands. Within this area, there are several major canals and numerous smaller ditches. These supply systems are fragile and require continual maintenance to provide this valuable resource for agriculture. State statues provide for access and easements for the owners of these ditches and canals and are in place to provide for access and easement for the owners of these ditches and canals. The water systems can be as large as 18 feet in width for a canal, to 18 inches in width for a small ditch. The equipment used to maintain these structures can vary from a large excavator to a small tractor. Maintenance often includes cleaning the grass and trash, as well as occasional removal of trees and other vegetation which remove water and impede water flow.

Within the Gallatin Gateway Planning Jurisdiction, there are five major and several smaller irrigation ditches carrying large amounts of water. The larger ditches are the West Gallatin Canal, High Line Ditch, Noble Ditch, Farmer's Canal, and the Allison-Lewis Ditch. Other identified ditches are the Gilmore-Todd, Bush-Etherington, Cockrell, and Shadoan. The large ditch companies have water flowing from April through October of each year with volumes which have the potential to produce hazards near these systems. The large canals depend on natural water ways to release water during time of emergencies. It is essential for development to be educated on these features to avoid placing structures in places which impede operation and maintenance of these water way areas.

Agricultural lands and waterways shall be protected through the following policies:

4.4.1 **Adopt development standards requiring new development to mitigate its impact on existing canals and ditches.** Generally, these standards will:

- 4.4.1.a Require new development adjacent to a canal or ditch to contact the appropriate canal company prior to approval;
- 4.4.1.b Require acknowledgment by the canal company that contact has been made, along with any comments or conditions they require to mitigate impacts;
- 4.4.1.c Prohibit channeling of stormwater or snowmelt runoff into a canal or ditch without express consent of the company;
- 4.4.1.d Establish a setback from the centerline of any canal or ditch;
- 4.4.1.e Require agreement by canal company prior to alteration of a canal or ditch;
- 4.4.1.f Require new subdivision to locate canals or ditches in parkland or open space.

4.4.2 **Exempt agricultural practices and structures from future zoning regulations.**

4.4.3 **Exempt family transfer exemptions from any future zoning regulations.**

4.4.5 **Recognize the right to farm and ranch in the Gallatin Gateway area.**

Agricultural operations are abundant throughout rural Gallatin Gateway. This policy states that non-agricultural landowners accept and are aware that standard agricultural and farming practices can result in smoke, dust, animal odors, flies and machinery noise, and that standard agricultural practices feature the use of heavy equipment, burning, chemical sprays and the use of machinery sometimes 24 hours a day.

Highway 191 Corridor

5

State Highway 191 runs north-south through the planning jurisdiction east of the Gallatin River, leading to Big Sky and Yellowstone National Park to the south and providing access to Bozeman, Belgrade, and the interstate to the north and east. The location of a major state highway providing access to areas of high recreational value to the south and access to the outside world to the north place Gallatin Gateway in context as it continues to see growth pressure.

This plan recognizes that Highway 191 is a major transportation route bisecting Gallatin Gateway Additionally, Highway 191 serves as the gateway to Gallatin Gateway. As the community grows, necessary improvements should be made to ensure maximum safety. Additionally, while the area fronting Highway 191 is a natural location for commercial use, the following policies ensure that new development does not follow the standard pattern of strip commercial:

5.1 Land Use Map

5.2 Commercial Development Along Highway 191

5.3 Highway 191 Improvements

Policy 5.1. Land Use Map

Adopt a land use map designating two land use classifications within the Highway 191 Corridor. Generally, the boundaries of these subdistricts area are defined as Cottonwood Road south for one mile along 191, and Gooch Hill Road north to the northern boundary of the planning jurisdiction. Both subdistricts extend one half mile one either side of Highway 191.

Land along the Highway 191 corridor requires special consideration in order to ensure orderly commercial development occurs without infringing on the values discussed by this plan. Two land use classifications are defined.

Northern Highway District. This classification includes several large parcels west and north of the Peak View Subdivision along Highway 191, and is the area first encountered by visitors and traffic approaching Gallatin Gateway from the north. Approximately 180 acres have been placed under conservation easement, and a number of parcels west of Highway 191 are constrained by the Gallatin River floodplain. There is, however, significant highway frontage and buildable land both on the bench above the river (west of Highway 191) and on properties east of Highway 191. The area is pressured by growth from the Four Corners area to the north, and by significant high-speed traffic passing on to Big Sky. Commercial uses and mixed commercial/residential uses will be allowed, though specific design standards (described below in Policy 5.2) will be adopted to prevent standard strip commercial.

Southern Highway District. This classification includes land extending from Cottonwood Road south for one mile. This area plays a different role than the

Northern Highway District in that it does not have the immediate pressures of development from Four Corners. Traffic reaching this area is primarily through traffic to the south. Given the reality of highway frontage, this land use classification will allow some commercial development along the highway, though standards will be adopted requiring certain design elements to mitigate the safety issue raised by extended strip commercial.

Consideration should be given to future development as the Town Core grows. Continuity of flow for density of residential development away from the highway and to the south should consider view shed, open areas, connectivity with the Town Core, walking paths, access to the Gallatin River and recreational space along the Gallatin River.

Policy 5.2. Commercial Development Along Highway 191

Strip development consists of commercial uses that are one lot deep, have separate access to the highway (resulting in numerous places where vehicles attempt to enter the flow of traffic), and display numerous large signs. Strip development often has a continuous curb cut (allowing vehicles to enter or leave the road at numerous points and angles), little if any landscaping, and no provision for pedestrian or bicycle movement to the businesses or through the area. While several of these issues will be constrained by policies of the Montana Department of Transportation, this plan will supplement those policies further.

This plan recognizes the difference in the types of businesses locating in the downtown core versus on property along the highway. Given the reality of through traffic to the south, businesses along the highway will develop to serve that traffic. To ensure new development along Highway 191 meets the goal of discouraging strip commercial, the following actions will be taken:

5.2.1 **Commercial Nodes.** The Montana Department of Transportation (MDT) has limited the number of access points from adjacent properties onto Highway 191. As new development occurs along the Highway 191 corridor, commercial uses shall be clustered around existing MDT encroachments.

5.2.2 **Site Design.** The development standards and land use map will require the use of frontage roads connecting structures and properties, deep lots, landscaped buffers, and other site planning tactics along Highway 191 to ensure that strip development is discouraged. Additionally, the development standards will encourage parking lots and other impervious surfaces to be placed along the rear or side of structures.

5.2.3 **Connections.** New development along Highway 191 must have safe, functional access for vehicles, pedestrians, and cyclists through the site, as well as have safe, functional connections with adjoining developments.

5.2.4 **Landscaping.** The development standards will require landscaping for new commercial uses fronting Highway 191

Policy 5.3 Highway 191 Improvements

Improvements to state highways are implemented when a specific set of warrants are met. This policy calls for applications for high-traffic developments accessing Highway 191 to include a traffic impact study specifically analyzing impacts to the highway. The following improvements have been identified by the Gallatin Gateway community as potentially necessary as warrants are met:

5.3.1 **General Improvements.** The following improvement is located on Highway 191 but are not located within either the Highway 191 North or Highway 191 South subdistricts.

5.3.1.a Install a stoplight at the Mill Street/Highway 191 intersection, with a preemptive Traffic Device to allow the Gallatin Gateway Fire Department safer access to the highway.

5.3.2 **Northern Highway Subdistrict.** The following improvements are suggested for Cottonwood Road north to Axtell-Anceny Road section of Highway 191 as warrants are met:

5.3.2.a Consider extension the 50 mph speed zone north to Axtell-Anceney Road and south to Cottonwood Road.

5.3.2.b Install signage at both ends of the speed zone to indicate "congested area next 2 miles" or "dangerous intersection ahead".

5.3.2.c As warrants are met, consider installing turning lanes at the intersections of Highway 191 and Axtell-Anceny Road, Zachariah Lane, and Cottonwood Road.

5.3.1.d Continue evaluating the Mill Street/Highway 191/Rabel Lane intersection. To the west, Mill Street services the elementary school, the fire station, the Gallatin Gateway Community Center, and businesses and homes in town, as well as the Gallatin River and a network of rural roads. To the east, this intersection services the Post Office, various businesses, and residences. This intersection was recently given a Level of Service performance grade of C/C (a.m./p.m.). More growth is expected in the future in that area, and increased traffic could quickly diminish the LOS to a failing grade

5.3.2.e Continue to require traffic impact studies for all major development and install road improvements as determined by traffic studies.

5.3.3 **Southern Highway Subdistrict.** The following improvements to Highway 191 are suggested for Cottonwood Road south to the southern edge of the district:

5.3.3.a Eliminate the speed differential between cars and trucks on Highway 191, by posting a day speed of 65 mph and night speed of 60 mph.

5.3.3.b As warrants are met, consider installing turning lanes at the intersections of Highway 191 and Low Bench Road, Williams Road, and Gateway South Road.

District-Wide Policies

6

Several policies apply across the entire Gallatin Gateway Planning Jurisdiction. These policies are:

6.1 Fire and Emergency Services

6.2 Gallatin Gateway School

6.3 Pedestrian and Trail opportunities

6.4 Signs and Billboards

6.5 Greater Bozeman Area Transportation Plan

6.6 Night Sky

6.7 Connections

6.8 Recommended Speed Controls

6.9 Sexually-Oriented Businesses

Policy 6.1. Fire and Emergency Services

Ensure continued provision of adequate fire and emergency services.

6.1.1 **Planning for hydrant placement in the Town Core should include the Fire Department.**

If a Gallatin Gateway Sewer and/or Water District becomes a reality over the next few years, any discussion of hydrant placement throughout the Town Core should include the Gateway Rural Fire Department.

6.1.2 **Explore the possibility of addressing a reduced Fire Suppression Rating from ISO for portions of the fire district.**

With the addition of new apparatus over the past few years, the Fire Department should explore the possibility of addressing a lower ISO rating for portions of the fire district.

6.1.3 **Cooperate with the County Road Department and the County GIS Department to rename the southernmost portion of Portnell Road.**

There is currently some confusion for emergency services regarding the southernmost portion of Portnell Road. As houses are built on existing Certificates of Survey in this area, the potential for more confusion and conflicts increases. The Fire Department should cooperate with the County Road Department and the County GIS Department to rename the southern portion of the road.

6.1.4 **Consider provisions to add career staff as the need dictates.**

The number of calls the Fire Department is responding to is nearing an average of one per day. The current staff is all volunteer, but as the community grows and the volume of calls increase, the Fire Department should engage the community in discussions about adding career staff as the need dictates.

6.1.5 **If traffic lights are installed anywhere in the jurisdiction, pre-emptive traffic devices should be installed to allow emergency vehicles access.**

6.1.6 **The Zoning Regulation adopted to implement this plan should consider height requirements and building separation for new buildings that can adequately be served by the Fire Department (i.e., ladder height, etc.)**

6.1.7 **Any variances to road standards in new subdivisions should be routed to the Fire Department for comment.**

6.1.9 **Two bridges in the planning jurisdiction, the Axtell-Gateway bridge and the West Williams bridge, do not meet weight capacities for fire engines and water tender. New development using these bridges shall be required to participate in improvements to the bridges.**

6.1.9 **New commercial structures should contact the Fire Department for Knox boxes.**

Knox boxes allow fire department members to access buildings by a secure key system rather than creating damage to doors in order to allow access for fire suppression or investigation.

Policy 6.2. Gallatin Gateway School

The community and Gallatin County should actively explore options to help the Gallatin Gateway School expand as new growth occurs in the Downtown Core.

The Gallatin Gateway School is one of the foundations of Historic Gateway. The original school building was constructed in 1914 and has provided education for the community since its inception. Currently, grades K-8 attend the school.

School enrollment has increased consistently over the past 20 years, and recent discussions have raised the following issues:

- Current enrollment leaves very little room for expansion in the current school due to issues with space;
- Parts of the original building do not meet state building codes, making full utilization of the building difficult;
- The school is served by a well and septic system that is at capacity;
- Federal law requires a certain percentage of playground space per student. Any significant rise in enrollment will require an expansion in the amount of playground space for the school.
- There are almost 300 buildable lots in the Gateway School District that are currently empty. Even with no new subdivision, there is significant potential for growth in the area that will affect public facilities such as the school.

In light of these issues, the following policies are suggested:

6.2.1 Gallatin Gateway School District has prepared a school facilities inventory to prepare for new students. The School District should continue this work and develop a school facilities Master Plan, including infrastructure, utilities, and service requirements projections.

6.2.2 Gallatin Gateway School should work with the School Superintendent to ensure an annual discussion with the Board of County Commissioners regarding the status of the school and growth in the area.

6.2.C GG School District should request a voluntary school impact fee from new residential development. Additionally, major subdivisions shall provide a school mitigation plan to discuss impacts on the Gateway School and potential solutions.

6.2.D New development in the Gallatin Gateway area should confer with the Gallatin Gateway School District to discuss mitigation measures (see also Policy 7.4 for more discussion of infrastructure concurrency).

Policy 6.3 Pedestrian and Trail Opportunities

Explore opportunities to provide pedestrian and other trail opportunities within the core. Specifically:

6.3.1 **Explore opportunities to provide pedestrian trails along major Roads.**

Many of the secondary roads in Gallatin Gateway are used by residents for various recreational pursuits, such as walking, riding horses, bicycling, and cross-country skiing. Developments that add considerable traffic to the roads should mitigate their impact by providing for trails within or adjacent to the development so that residents can continue to enjoy these pursuits safely.

6.3.2 **Expand the pedestrian trail on the East side of Highway 191.**

The underpass provides a pedestrian connection to the historic downtown for properties on the east side of Highway 191. New development within the core and along Highway 191 should provide pedestrian connections where possible to the existing trail and underpass. This includes extending the trail both to the north and the south, but also investigating options for expanding pedestrian opportunities along Mill Street to the Gallatin River. Expansion of this trail should consider not only bicycle and pedestrian travel, but also equestrian travel.

6.3.C **Explore options for a pedestrian trail west of Highway 191.**

As property develops along the West side of 191, the feasibility of constructing a pedestrian trail along highway frontage should be considered on a case-by-case basis.

Policy 6.4 Signs and Billboards

One of the primary concerns for residents has been the proliferation of billboards in the Gateway vicinity. As of the drafting of the plan, 14 billboards were located between the mouth of the canyon and Zachariah Lane. The development standards will include a sign provision prohibiting new billboards, explore options for a sunset clause for existing billboards, and establish size and design criteria for signs along Highway 191.

Policy 6.5 Greater Bozeman Area Transportation Plan

The Greater Bozeman Area Transportation Plan has jurisdiction that includes the Gallatin Gateway Planning area. Many of the design standards and transportation guidelines are generally supportive of the vision described by this plan. This policy urges the Gallatin County Commission to adopt the Greater Bozeman Area Transportation Plan and implement those policies as development occurs. For more information on the Transportation Plan, please contact the Gallatin County Planning Department.

Policy 6.6 Night Sky

Protect the night sky by adopting lighting standards for commercial uses, billboards, and signs.

Much of the rural nature of the Gallatin Gateway area can be attributed to the visibility of the night sky, as consistently expressed by the community. To preserve and protect this element of the Gateway community, lighting standards for commercial uses, billboards, and signs will be drafted as part of the zoning regulations adopted to implement this plan. Additionally, any street lighting constructed in the planning jurisdiction shall comply with applicable lighting standards to protect the night sky.

Policy 6.7 Connections

Multiple points of access will be required to most developments. Additionally, safe, functional connections between neighborhoods, and within residential and commercial areas and public places, will be required.

6.7.1 Require Connectivity as a Condition of Development Approval.

Commercial and residential developments must have safe, functional access for vehicles, pedestrians, and cyclists through the site. They should also have safe, functional connections with adjoining developments.

Benefits of safe, functional connections between neighborhoods between neighborhoods via roads and sidewalks, paths, and trails include the following:

- Having multiple points of access to a neighborhood can be important during emergencies;
- Facilitating movement from one part of the community to another via local roads, sidewalks, paths, and trails can reduce congestion on arterial roads and major connectors. It also encourages walking and cycling;
- Connecting neighborhoods promotes a sense of community throughout town;
- Providing multiple connections, including sidewalks and paths, can facilitate safe movement of school children to either of the two schools in the community.

Policy 6.8 Recommended Speed Controls

The Gallatin County Road Department should consider extending the 25 mph speed zone on Mill Street to the west to the intersection with Cottontail Road, Axtell-Gateway Road, and Gateway South Road. Additionally, given the number of residences and the potential traffic from gravel pits, the County Road Department should examine the possibility of designating Gateway South Road as 35 mph.

Policy 6.9 Sexually-Oriented Businesses

A prevalent concern of area residents is the potential for undesirable commerce. Sexually-oriented businesses should be prohibited within the Gallatin Gateway planning jurisdiction.

Continuing the Conversation and Implementing the Plan

7

This chapter addresses the desire of many Gallatin Gateway residents to have increased say in the future of their community. It shall be the policy of the Gallatin Gateway community and Gallatin County to actively engage citizens in the long-range planning process. The Gallatin Gateway community's commitment to active citizen participation is affirmed by the extensive program of involvement used to develop this plan. The strategies for continuing implementation of this policy are:

7.1 Zoning District Formation

7.2 Sewer and Water District Formation

7.3 Development Review Board

7.4 Concurrency of Development and Infrastructure

7.5 A Return to the Vision and Guiding Principals

Policy 7.1 Zoning District Formation

The Gallatin Gateway community and Gallatin County will adopt a zoning district and regulation to implement the goals and policies of the community plan.

Many of the goals and policies of the Gallatin Gateway community plan call for specific development standards to be adopted. The community and Gallatin County will draft a zoning regulation specifically designed to implement the community plan. After adoption of the community plan, the County Commission will formally appoint a citizen board (comprising residents of the Gallatin Gateway jurisdiction) to work with planning staff to draft a zoning regulation.

Policy 7.2 Sewer and Water District Formation

The Gallatin Gateway community and Gallatin County will jointly explore options to form a water and sewer district.

As stated in Policy 3.3, community water and sewer infrastructure in the historic Town Core will implement several guiding principles of the plan. While sewer and water infrastructure can be provided in several ways, many residents have expressed interest in the options for increased local control offered by a public district. After adoption of the plan, residents of the community and Gallatin County commit to exploring options to provide community water and sewer, ideally in the form of a public district.

Policy 7.3 Development Review Board

Gallatin County will appoint a Development Review Board, comprised of Gallatin Gateway residents, for the Gallatin Gateway jurisdiction to ensure new development reflects the goals and policies of this plan.

New development within the Gallatin Gateway planning jurisdiction will continue to be reviewed by the Gallatin County Commission for compliance with the Gallatin Gateway Community Plan and any other applicable regulations, such as future zoning regulations and the Gallatin County Subdivision Regulations. To provide guidance to this process, the Commission will appoint a Development Review Board to review all developments for compliance with the adopted plan.

Policy 7.4 Concurrency of Development and Infrastructure

New development shall be required to include necessary infrastructure concurrent with the impacts and demands of new development

As discussed throughout this plan, mitigation of development's impact on existing infrastructure is an important goal of the Gallatin Gateway community. As development proceeds within the Gallatin Gateway planning jurisdiction, new development shall demonstrate that all infrastructure (public facilities and services) needed to accommodate the impact of new development shall be provided and available at the time those impacts occur.

New development shall be evaluated on the basis of its impact on roads, sewer/treatment facilities, water supply/distribution, schools, fire, and police protection. All projects will be submitted for review to the appropriate service provider or special district to confirm the projected impacts of the proposed development, the existing level of service, and the availability of service capacity.

Additionally, Gallatin County will consider adoption of impact fees in the Gateway area to mitigate impacts of new development on existing residents.

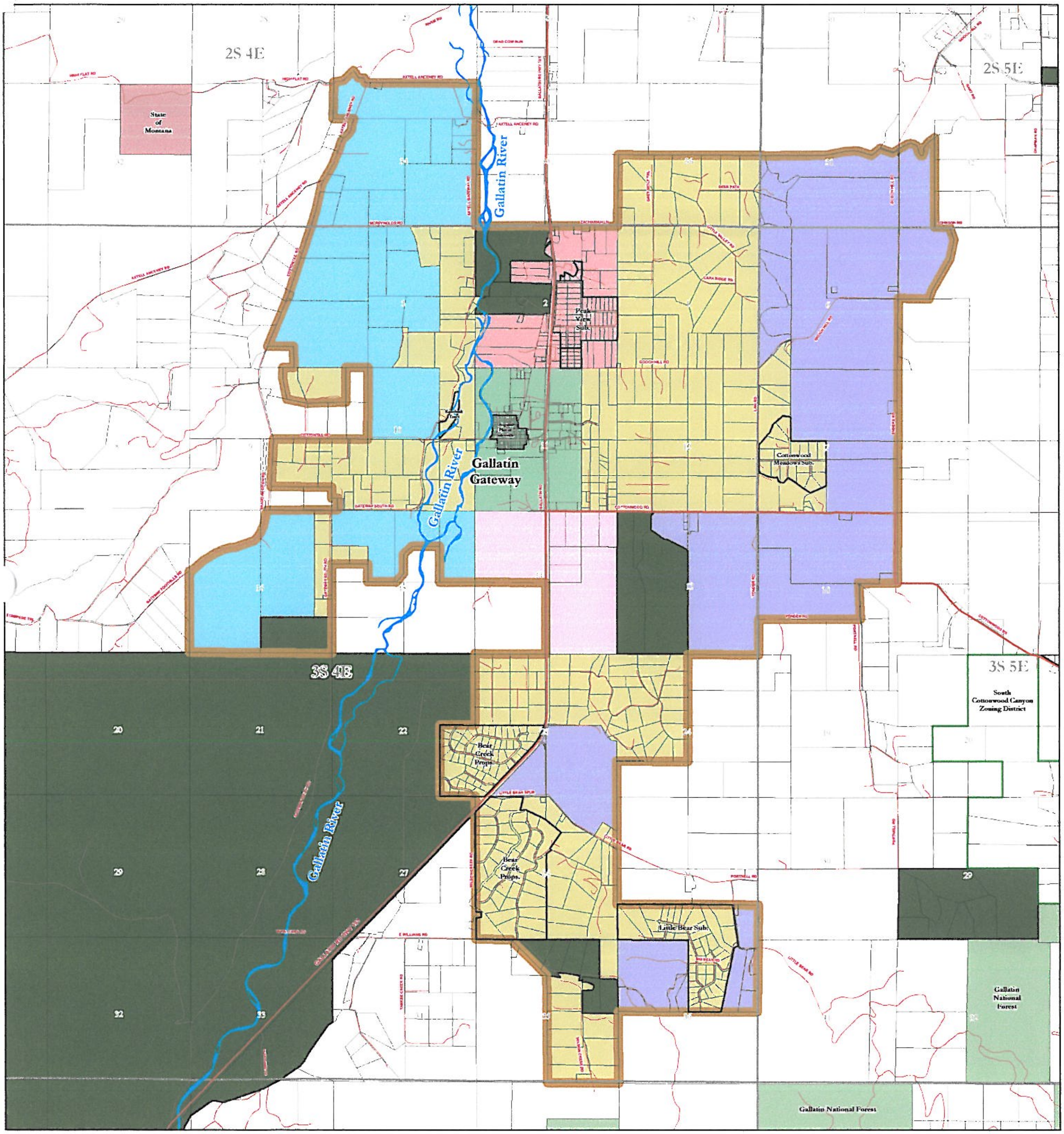
Policy 7.5 A Return to the Vision and Guiding Principles

This plan ends with a reminder that, while this is the first community plan for the Gallatin Gateway area, it was written on a foundation of Guiding Principals obtained through an inclusive process involving several hundred individuals. As the community continues to grow and change, decisions that affect the area should be weighed with those Guiding Principles and the planning policies in mind. Likewise, as the discussion about Gallatin Gateway continues and the plan evolves over time, that vision should continue to serve as the foundation for future community conversation.

01/27/2009

Gallatin Gateway Neighborhood Plan Area

Gallatin County, Montana



NOTE: This map is a visual representation only and does not represent a survey. No liability is assumed as to the accuracy of the data delineated hereon. For additional information, please refer to the Gallatin County Planning Department web site link from www.gallatin.mt.gov or call 582-3130.

- Parcels
- Gallatin Gateway Neighborhood Plan Area
- South Cottonwood Canyon Zoning District
- State Lands
- Federal Lands
- Conservation Easements

General Landuse

- Highway South
- Rural South
- Existing Development
- Rural East
- Rural West
- Highway North
- Core

0 0.5 1
Miles

MAP PREPARED BY
GALLATIN COUNTY, MT
GIS DEPARTMENT AND
PLANNING DEPARTMENT
02/22/2007; 01/27/2009
bw_20090127_gateway_landuse.mxd

Public Participation

MEMO

To: Gateway Community Planning Working Group
From: Warren Vaughan, Planning Department
Date: May 21, 2007
Re: Kickoff Meeting Data

Attached you will find all information gathered at the Kickoff Event from May 18. There is a lot of stuff, so I tried to go through and sort it into categories that made sense. There are some that could have made it into a number of categories; the point here is not complete and scientific accuracy but simply a way of organizing the info in a way that helps us make sense of it and make informed decisions on where to go next.

Please keep in mind the three questions we asked people:

1) What makes Gallatin Gateway a good place to live?
2) What would you like to change in the future for Gallatin Gateway?
3) If Gallatin Gateway is to be a successful community in 20 years, what would that success look like to you?

All three questions are included, as well as the numbers from the dot voting (concerns) exercise and the sign-in sheets (I couldn't read all the handwriting, so you'll have to help me fill some in).

I. VALUES

Categories
School
Values
Recreational access
Wildlife
Quality of life
Natural Resources
Sense of community
Agricultural lands and community
Open space
Rural lifestyle
Places

SCHOOL

- Gallatin Gateway school
- Small school
- Local school
- Good school
- Small school
- Small school
- Great school
- Good school
- Good school
- Small school
- School
- Wonderful school (know people who wouldn't of moved if not for the school)
- Good school
- Small school
- Great school
- Small school
- Rural school
- Great school
- Nice school

VALUES

- Family values
- That we still have some property rights
- The lack of regulations

- Respect for private property
- Lassez-Faire "social attitudes" ; Libertarian attitudes
- Lack of rental units and multi-family complexes
- Time left to implement positive change
- We are not Elk Grove
- Affordable housing

RECREATIONAL ACCESS

- River access
- Close to natural amenities, river mountains, etc. birds and deer and national forest
- Outdoor opportunities
- Access to natural resources
- Access to river
- Nearby hiking
- Proximity to lots of activities
- Good access to river and mountains
- Hunting and fishing
- Great fishing
- Easy access to good hiking trails, XC skiing, quiet roads to bike

WILDLIFE

- Wildlife
- Wildlife
- Wildlife
- Critters (except the gophers)
- Critters
- Wildlife (local elk herd)
- Wildlife
- Wildlife activity
- Wildlife
- Wildlife
- Wildlife
- Elk herds seen out of front windows

QUALITY OF LIFE

- Quiet and dark
- Quiet and dark
- Not very many restrictions or codes
- Location
- Quiet
- Quiet, rural setting

- You can still see the stars at night
- It use to be quiet; no more!
- Freedom to do what you want – within limits
- A quiet place to live
- Gateway is still county; however, its changing rapidly
- Small town community
- Non-urban
- No (little) traffic
- Perfect the way it is!!
- Less rules
- Home!
- Quick response in case of an emergency
- Close to work quiet
- Peace and quiet
- Beautiful surroundings
- Beautiful scenery
- Clean
- Quietness
- Quiet
- Sense of privacy
- Home It's a quiet place
- Quiet
- Mountain views
- Small Quiet Peace and quiet Good place to live: open space, not crowded
- Good place to live: Nice and quiet!
- Safe place to live
- Safe neighborhood
- Quiet- rural community
- The beauty of the mountains, etc,
- Can take long walks
- Can ride bicycle
- Beautiful location
- Beautiful landscape – mountains
- Most homes neat and clean
- As an artist, a good place to work!
- Proximity to Bozeman/Big Sky (ugh)
- Close enough to larger facilities (airport, hospital, college)

NATURAL RESOURCES

- Clean air

- Clean air
- River
- Clean air
- Clean water
- Clean air, water
- Good water resources
- Fresh air
- Clean water
- Clean water
- Clean water
- Clean water
- Clean water
- Good drinking water
- Clean air
- Good place to live: fresh air
- Good air
- River
- Canyon
- Night sky
- Clean
- Pristine Gallatin River
- Gallatin river
- River
- Natural resources

SENSE OF COMMUNITY

- Very diverse community in terms of people and lifestyles
- Community spirit, lots of volunteers
- Non uniform architecture
- I still feel close to the community, even though its been years since my kids got out of school
- People know how to do things and offer their help and lots of reciprocity
- Good neighbors
- Community involvement
- Sense of community and history
- The historical small community feel – not degraded or replaced or gentrified
- Good people who help each other
- Mix of long term and short term residents
- Good neighbors (friendly and helpful)
- Gateway still a diverse community

- Sense of cohesive community, but even this has changed a lot since 1981 when I moved here – the wave of growth is coming at us; that's the challenge
- Feeling of community
- Great people
- People with a lot of talent
- Most all are friendly people
- Used to have a lot of nice old folks; not so many anymore
- Community environment
- Community spirit
- Community involvement
- Emphasis on our own destiny of our own doing
- Lots of opinions
- Group meeting involving food
- Community events
- Good neighbors who are caring people
- Community is made up of Montana natives and old families Our good neighbors
- The people
- The people
- Friendly people
- Friendly community
- Community spirit
- Local
- Sense of community
- Support of one another
- Neighbors
- Stick togetherness
- Good people who live here
- Has a community atmosphere; true friends
- Neighborhood respect
- Good neighbors
- Good neighbors
- The people
- Nice neighbors, friendly
- Friendly people
- Our community center
- Sense of community
- Friendly people
- Diversity in community
- Sense of community
- Friendly neighborhood
- Real small town, not contrived subdivision

- A community of non-conformists
- Neighbors!
- Friends, family, security (can keep doors unlocked)
- Close, helpful neighbors
- My home - helpful people
- Generations of my family and great memories
- Great events at the community center

AGRICULTURAL LAND AND COMMUNITY

- Agricultural space
- Agricultural land
- Agriculture
- The ranch/agricultural community
- Agriculture
- Agriculture
- Agriculture
- Rural agricultural economy

OPEN SPACE

- Open spaces
- Open lands
- Large spaces
- Open space preserved
- Open space maintained
- Open spaces
- Open space
- Open space
- open space
- Open space – need binoculars to see what your neighbors are doing
- Open space
- Open space
- Open space
- Views
- Open space
- Open spaces
- Open space

RURAL LIFESTYLE

- Rural setting
- Rural
- Rural setting and atmosphere
- Rural values, honest, ethical
- Rural
- Its not Bozeman, Belgrade, or Big Sky
- Rural way of life
- Out of town living
- Still in the country
- Small town atmosphere
- No major subdivisions
- No major subdivisions
- Still in the country
- Rural environment
- Rural environment
- Rural character
- Small town away from traffic
- Smaller population
- Low density housing
- Rural atmosphere
- Small neighborhood
- Country atmosphere with easy access to Bozeman
- Rural atmosphere
- Small "ranchette" type homes available
- Rural
- Rural
- A rural community
- Small town
- Small town feel
- Was a small community
- Still rural; lets keep it that way
- Rural character
- Its still rural
- Rural area
- I like the rural feeling of the area
- Rural community
- Rural area
- Low density of population
- Small community
- Small community

- Lower density, elbow room
- Not a suburb of Bozeman
- Small community
- Great place for animals (riding horses, walking dogs, outdoor activities)
- Rural feeling
- Peaceful and rural environment
- Rural aesthetics
- No big boxes
- Rural atmosphere
- Rural
- The rural feel
- Diversity of land use

PLACES

- The town is historic, it's a real place, with school, commercial center, churches, local places to eat, etc.
- Restaurants
- Community center
- The community center
- Exxon
- Community center (community)
- Comfort lane is a very nice subdivision; 2-5 acres
- Community center
- Churches
- Restaurants
- Church
- Nice post office
- Great restaurant

II. CHANGES

Categories

- School
- Town Issues
- Sewer and Water
- Billboards
- Planning and Zoning
    - Planning issues
    - Zoning issues
    - New subdivision issues
- Transportation Issues
- Agriculture
- Water Resources
- Community Pride
- Parks and Trails
- Weed Control
- Property Rights
- Economy
- Emergency Services
- No Changes
- Miscellaneous

SCHOOL

- Own high school
- If school grows, need more classrooms and bigger playground
- Expansion of school (including property)
- High school
- 2nd high school
- Identify a location for another or larger school

TOWN ISSUES

- Main street
- More commercial use on main street
- A downtown
- Grocery store
- Grocery store
- Grocery store
- Keep the county out of the township's business
- Eventually, sidewalks in town
- Pave the road to the post office

- Study advantages/disadvantages of incorporation
- Fundamental different vision between the town of Gateway and the planning area as a whole
- Figure out what needs to be done to strengthen the small town center (infrastructure?)
- Town – streets, septic system, sidewalks
- Sidewalks and trees for town of gateway
- No gravel truck traffic through the town of gateway
- Incorporation
- Incorporate
- Central services for gateway village and the surrounding area
- Video store
- Grocery store and services; won't have to drive to Bozeman if self-contained
- Offices, stores – town center (post office)
- Gravel trucks (less) out of Gateway Main street!
- Get gravel trucks off main street

SEWER AND WATER

- Protect ground water – wastewater treatment
- Good wastewater system to handle the growth
- Water – management of resources; wastewater
- Sewer system
- Regulations to protect ground water and surface water/ wastewater treatment and few new wells
- Wastewater treatment plan
- Improve sewage treatment
- Sewage system
- Fix water/sewer issues in Gateway
- Gateway needs septic system
- Septic system for town of gateway
- Water system for Gateway
- Central septic in gateway proper
- Municipal water and sewer
- Wastewater plan
- Sewer and water
- Sewage system as a long-term project
- Sewer and water system

BILLBOARDS/SIGNAGE

- Less billboards
- No billboards
- Signage could be regulated
- No highway billboards!!
- No billboards

PLANNING AND ZONING

Planning issues

- Well planned, small subdivisions, with emphasis on keeping open space
- Community voice; what will happen here; like this growth plan
- Guidance for future development to prevent sprawl and high density
- Continuing self-assessment
- Identify important resources (wildlife, ag operations, fire protection, etc) then work to protect them
- Growth should minimize negative impacts on wildlife and water
- Gateway community okay's plans for development
- Town commercial growth, not strip malls
- Growth with a vision, not blind growth
- Diverse controlled growth (residential)
- Planned commercial growth (some)
- Planning to keep growth manageable and along existing roads
- Organize to resist development that threatens values
- Find voice to oppose those who try to exploit our community
- Good community plan
- Smaller plan area!
- A core community for additional housing and business district
- Accept change's arrival and manage it with positive incentives not negative enforcement
- Recognize this becoming a staging area for Big Sky; opposite of stable community
- Maintain rural character

Zoning issues

- Convert neighborhood plan into zoning district
- Set areas for certain type of building to guarantee small community
- Zoning
- Restrictions on type of businesses
- Use density zoning to keep wildlife, open spaces (agricultural, large private acreages, and recreational lands)
- Restrict noise-related businesses
- Adopt reasonable zoning to protect quality of life

- Develop commercial areas zoning
- Zoning that will allow us to keep things the same as we now enjoy
- No gravel pits in residential areas
- No gravel pits!!
- Zoning district
- Zoning district?
- Control the density of growth from Gateway
- Rules for commercial/industrial use
- Air and water pollution restrictions for new industry
- No gravel pits
- Restrict commercial mining (big sky's gravel)
- Restrict mining (eg, gravel), noise and other degradation

New Subdivision issues

- Decision on size of lots- community plan
- Lots not smaller than 1 acre
- 2-5 acre lots
- Control of proposed subdivisions
- No more subdividing; its encroached too far
- Rural density subdivision be no smaller than 20 acres
- Rural neighborhood – develop density (houses per acre)
- Remain rural 5 acre tracts
- Not become subdivided
- Low density housing
- Some covenants
- Agreement on density of new housing (low density)
- Allow smaller acreage sales
- No subdivisions; keep it small and homey
- Low density housing is the feeling of rural

TRANSPORTATION ISSUES/ROADS

- Speed zone from cottonwood to Zachariah
- Traffic regulated/better 191 intersection
- Impact of growth on 191, traffic, safety issues
- Lower speed limit on 191 to protect lives and light at 191 and cottonwood and 191 and Web road
- Better road and traffic system at major intersections (cottonwood and 191)
- Traffic mitigation (speed, turn lanes, signals)
- 191 needs to be safer = more patrols

- I hate stoplights, but if traffic increases along the highway, you may need one
- Traffic relief – four lane; turn lane, better speed control
- Signal at mill street and 191
- Perhaps: move access road to gateway (main street) over a block for school safety
- May be way in the future, but – feeder to streamline system
- Public transportation
- Safe walking all along 191
- Improvements of roads – safety, turning lanes off of us 191
- Traffic
- Traffic control at 191
- Reduced speed on 191
- Strict traffic control on 191 in conjunction with adjacent areas from mouth of canyon to four corners
- More left turn lanes on 191
- 191 needs to be four lane highway for safety purposes
- Traffic control
- Re-route 191

AGRICULTURE

- Offset tax burden on agricultural land
- Stop referring to agriculture as open space
- Retention of the agricultural phase of lives
- Dusty road, ranching/agriculture
- No change as far as keeping open space open, agriculture as it is
- Ag protection via conservation easement
- Less agricultural land taxes
- Agricultural control
- More land in conservation easements

WATER RESOURCES

- Protect ground water
- Protect water quality
- Water conservation
- Preserve groundwater quality
- Groundwater protection
- River corridor access and protection
- Protect resources: water, wildlife, air quality
- Water conservation

COMMUNITY PRIDE

- Rules of land - less junk on properties
- Buffalo station (besides the type of business, it's a mess!)
- Reduce low income, high crime, health problem areas (police, fire)
- We don't want to look like Elk Grove or Baxter Meadows
- Buffalo station gone
- Nothing (ha ha) buffalo station gone
- I'd like people to take more responsibility for their dogs and garbage
- Buffalo station
- Get rid of buffalo station
- No more yuppies buying up the "hill"
- Integrate new arrivals into old community values

PARKS AND TRAILS

- Extension of bike path
- Bike lane
- More community projects like a park
- Community park
- Park

WEED CONTROL

- Weed control
- Strong noxious weed abatement program
- re weed control
- Control knapweed, especially along the river

PROPERTY RIGHTS

- Buy your own open space
- Allow the people who have lived here all their lives the right to sell their property in less than 160 acres; 1 acre, 20 acres, etc.
- Respect private property signs and rights
- Respect existing property rights
- Get rid of Axtell-Anceny fishing access
- Don't allow zoning

ECONOMY

- We need jobs that support housing prices

- Develop variety of business

EMERGENCY SERVICES

- Untie hands of law enforcement with youth
- Professional fire department; our volunteer fire dept is great but insurance could be reduced if professional

NO CHANGES

- I hope it stays the same as much as possible
- Go back 30 years
- In order to allow Gallatin County to have great diversity (most people like that word) lets keep GG the same

MISCELLANEOUS

- Stable, profitable gateway inn
- Don't allow people to come in and change it to what they left behind; you're coming to the country to live in the country, not change it into another Aspen or Big Sky or whatever
- Control our taxes
- Have proper representation where necessary
- Natural gas lines to our road
- No one wants it to change, but change is coming. Now what?

III. MEASURES OF SUCCESS

Categories
Town
Sense of Community
Planning and Zoning
- Planning Issues
- Zoning Issues
- New Subdivision Issues

Agriculture
School
Weeds
Natural Resources
Transportation
Infrastructure
Wildlife
Natural Resources
Billboards
Night Sky
Parks and Trails
Economy
Values
Rural Lifestyle

TOWN

- Library
- Develop grocery
- Amenity center
- Medical facility
- Grocery store
- Recycle center
- Retirement home
- No street lights
- No paved streets
- No sidewalks
- Stacy's would have their own parking lot
- A small grocery store with fresh produce
- City growth; a) some shops, b) walkways, c) attractions
- Stacy's stays just the same!
- A community that has its own local government
- A thriving gateway proper with main street
- Quaint, tree lined streets and street lights

- Clean safe neighborhoods and streets
- Downtown shopping center
- Apartment rental for elderly
- Main street with grocery store, restaurants, coffee shops, etc.
- Central gateway community (residential and commercial) strengthened
- Strengthened sense of town – not solely bedroom community
- Gallatin Gateway will still be a small town in a rural setting, but with upgraded facilities: wastewater treatment, school expansion, more core businesses in town
- New community center
- New post office (bigger)
- Who knows, maybe a high school!
- Central K-12 school
- Thriving small business district (like 1930)
- "Mayberry"
- Still a small town
- Grocery store
- Strong small commercial district
- Gateway will have more small businesses
- Local town business, grocery, farmer's market
- Have a grocery store
- Add on to community center

SENSE OF COMMUNITY

- In 20 years if we have kept our English speaking environment
- Retain the small town feel – sense of community
- We have not become the service community for big sky upper class millionaires club
- Preserve community spirit
- Preserve the historical integrity of gateway
- We would still want to live here
- Continue to have a small town and rural feel
- Still has rural, small community atmosphere
- Continued sense of community closeness
- An identity as a great place to live and work; unique
- Continued diversity coexisting with unity
- Lots of community spirit
- Neighborliness
- Community center thriving
- Promotion of our unique history
- A community that respects individual rights

- It would look like a "middle class" community; that is, a lack of pretentiousness. How? Who knows!
- A larger community that retains current values
- Still a genuine community; viable school, active community center, some services (food market)
- Interacting and active community members (community identity)
- Still my home
- Gateway is still a distinct place in the valley – some farms, non elk Grove housing
- A community for all: elderly friendly, youth friendly, family friendly
- Preserve rural character
- Diversity

PLANNING AND ZONING

Planning Issues

- Not like four corners, Belgrade, Bozeman, elk grove, etc.
- High density growth within the core area of the community
- Slow, measured growth
- Remain an unincorporated area
- Unincorporated town, maybe with zoning
- A small community that's been kept under control
- Controlled growth, no large subdivisions
- Affordable living still available
- In 20 years the community would in all likelihood be incorporated but still have an agricultural environment
- Minimize the size of the neighborhood plan area to maximize the surrounding rural area
- We still have a crossroads small town and big rural spaces around it (no Elk Grove)
- Let's keep the density and growth in or adjacent to the town
- A great small town
- Try to plan now for future growth
- Well planned residential growth
- A nucleus of a town with a school, a few stores, post office, and a diversity of housing surrounded by rural, open, and agricultural spaces and no subdivisions
- Like a plan was developed and implemented 20 years before by the people who live here!
- The growth has happened in an orderly manner that ensures value and property values
- Mix: rural, agriculture, town
- a self contained community with access to Bozeman and big sky
- Still safe – walkable, bikeable

Zoning Issues

- Regulated development

New Subdivision Issues

- Subdivide in tracts 5 acres to keep rural atmosphere
- Some new homes replacing those that won't last 20 years
- 160 acre sales promotes dense subdivisions and 20 acres is a waste

AGRICULTURE

- More cows, less condos
- Still have agriculture and ranches
- Agricultural land will still be what it is today
- Agriculture still an important component
- Farming
- Happy ranchers and farmers supported by locals
- Working farms and ranches
- There would still be farms
- Still have agriculture

SCHOOL

- Larger school for influx
- Thriving elementary school
- School will be maintained
- High school
- Have a high school
- Move access to gateway over a block and add on to school
- Best school in county, including high school
- Gateway school would have appropriate space for children's varied needs
- High school and activity center for kids
- Good school
- Strong, well funded school
- New schools: grade school and high school
- A community school system K-12

WEEDS

- No weeds
- Eliminate weeds

- Free of noxious weeds (or at least under control)

NATURAL RESOURCES

- Pristine environment for future generations to enjoy
- Clean air, water
- Clean air and water
- Still have clean water
- Clean surface and groundwater
- Natural resources protected: water, wildlife, agriculture
- The Gallatin River will be preserved
- Clean healthy environment
- Preserve/improve quality of riparian environment; river access, weeds control education
- Clean water
- Gallatin river still a viable river for fishing and irrigation

TRANSPORTATION

- As long as it took to get the tunnel we may have a light by then
- Urban transit to Bozeman
- Turn lanes on 191 for homeowners on and off highway
- 191 access would be limited/regulated especially with respect to mill street and school
- Good (safe) (efficient) traffic controls
- Highway 191 will be safer for traffic, less junky
- Stop light at 191 and Mill
- 191 widen to 4-5 lanes
- Fewer dead deer along 191
- No gravel roads
- More public transportation and people using it

INFRASTRUCTURE

- Well supported services
- Central services for the whole community
- Central water and sewer, paving
- Extended sewer system
- Infrastructure and services
- Sufficient infrastructure to accommodate growth
- Well planned, non-invasive infrastructure for water and sewer, possibly incorporation

- Small town with infrastructure
- City water and sewer

WILDLIFE

- Still have healthy wildlife populations, including elk
- Abundant wildlife
- The wildlife corridors preserved

EMERGENCY SERVICES

- Fire department will be at least partially staffed
- New fire dept

BILLBOARDS

- No lighted billboards – should be in close proximity to what s advertised
- No billboards

NIGHT SKY

- Hope we can still enjoy the night sky
- Dark skies

PARKS AND TRAILS

- Park
- A gateway community park
- Small park in town with valued river frontage
- City/county park; a) picnics, b) baseball, etc
- One or two well maintained beautiful parks (small)

ECONOMY

- Businesses will be planned and supported to provide the amenities
- Local employment opportunities

VALUES

- We'd still be outraged if another Loseff came in with a massive subdivision plan
- Get rid of the greed and bring back the values
- If we're successful, we'll all still want to be here
- The bar will still be here and the river not run dry.

RURAL LIFESTYLE

- Rural feel
- Rural community with agriculture and open space
- Hope it would still be rural
- Still diverse, rural community
- Keeping it as it is as much as possible
- Small town feel
- Rural amenities intact
- Retain rural character

MISCELLANEOUS

- No fast food restaurants
- Buffalo station recycled into a school (has kitchen and stage!)
- Exxon has new siding and paint
- There are places I'll remember: some have changed not for the better; there will be both good and bad I cannot see the future

IV. DOT VOTING

NATURAL ENVIRONMENT

Groundwater: 54
River Resources: 17
Lighting/Night Sky: 27
Air Quality: 9
Wildfire Mitigation: 2
Wildlife Habitat: 24
Water Quality: 34
Weed Control: 23
Recreational Opportunities: 7

LOCAL SERVICES

Traffic: 28
Fire Protection: 20
Law Enforcement: 14
Schools: 29
Emergency Services: 6
Public Transportation: 3
Wastewater Treatment: 29

NEW DEVELOPMENT

Signage/Billboards: 24
Rural vs. Urban Community: 35
Property Rights Protection: 82
Housing Density: 57
Commercial Development: 8
Industrial Development: 14
Noise Pollution: 19

Agriculture: 47
Open Space: 46

Top Ten:
Property Rights Protection: 82
Housing Density: 57
Groundwater: 54
Agriculture: 47
Open Space: 46
Rural vs. Urban Community: 35
Water Quality: 34
Wastewater Treatment: 29
Schools: 29
Traffic: 28

SIGN-IN SHEET

1) Barbara Axtell 12850 River Road 59718 763-4289
2) Karen Dassonville 12460 Gooch Hill Rd 59730
3) William Volkerz 12299 Port Nell 763-4773
4) Dick Felter 355 Low Bench Rd 763-4169
5) Anita Felter
6) Curtis Dassonville 12460 Gooch Hill rd
7) Dick Shockley 627 Gateway S. Rd 763-4605
8) Katie Harvey 420 Little Bear 763-4240
9) Anne Meushall 11940 Gooch Hill Road 763-5317 ***
10) Mark Heyser 2487 Axtel Anceny 763-4597
11) Jill Allen 125 Dier Lane 763-5410
12) Andy Allen
13) Joe Axtell 12850 River rd 763-4289
14) Charles Ervin 12923 Axtel 763-4653
15) ??? 72652 Gallatin rd 763-4507
16) Karen Vinten 700 Little Bear rd 763-4550
17) Rick Hargrove 409 ??? Street 763-???
18) William Daniel 16949 Wilson Creek rd 763-4649
19) D McReynolds 1755 McReynolds road Bozeman 763-9083
20) ??? Goldsworthy 12465 Gooch Hill Road Gallatin gateway 763-4612
21) Ronda ??? 200 E. Williams road gallatin gateway 763-4168
22) Richard Moss 200 E. Williams Road gallatin gateway 763-4168
23) Duane Walker Box 17 Gallatin Gateway 763-4463
24) Carol Lee-Roark 1550 Cottontail/PO Box 90 763-4228
25) Margaret Ryder 14825 Sp?? Break Trail 763-5222
26) Rick Morse 12821 Axtell Anceny Rd 763-4746
27) Richard Vinton 700 Little Bear 59730
28) Kate Nisbet 17011 Cottonwood Rd 763-5578
29) Nikki Robbins 695 Low Bench Road 763-4869
30) Norma Daniel
31) Gary Matsuk 900 McReynolds Road 763-4022
32) Judy Hengel 331 Ruby Mtn Way 763-4871
33) Kindra Francis 170 Bushnell Road 763-4691
34) Ramona Baden PO Box 247 763-4666
35) Larry Wilcox Box 454 763-4789
36) John Baden 763-4666
37) Russ Thayer 763-4512
38) Dian Volkers 763-4773
39) Dean Hartman 763-4575
40) Shirley Hartman 763-4575
41) Tom Johnson 285-3569
42) Ralph McPayne 300 Webb Street 763-4586
43) Donna Shockley 627 Gateway South road
44) Jim ??? 1245 Glacier Mtn Lane 763-4175

45) Amy ??? O Box 715 E. Williams rod 763-4420
46) Ann Prescott PO Box 653 763-4829
47) Sally Barnes 75 Williams road east 763-4099
48) Terry Thayer 14205 Portnell 763-4512
49) Scott Harvey 420 Little Bear 763-4240
50) Ardean Johnson 285-3569
51) Ron Jarrett 2633 Gateway South road 763-4305
52) Bernice Payne 300 Webb 763-4586
53) Pete Stein 216 Mill street 763-4728
54) Morgan McReynolds 1755 McReynolds road 580-3256
55) Mick Seeburg 1400 Axtell Anceney 763-4598
56) Kathryn seeburg
57) Sjobhan Peters 763-4929
58) Gerald Ryder 14825 Spanish bks trail 763-5222
59) Karla Mertens 12831 Axtell Gateway road 59718 763-4746
60) Patty Boyd 12670 Portnell 763-4847
61) Rick Hargrove PO Box 397 763-4248
62) Maxine Daniel 16949 Wilson Creek 763-4649
63) Jerry Kawasak Gateway 763-4432
64) Tom Knapp
65) Glenda Knapp 17033 Cottonwood road 763-4794
66) Debi Dassonville 12460 Gooch Hill Road 556-8258
67) Ellie ??? 12425 Glacier Mountain lane 763-4175
68) Joe davis 55 Axtell Anceny road 763-4464
69) John >>> 13730 Portnell road 763-5215

Gallatin Gateway Sewer District Informational Meeting – May 29, 2008

Agenda

Open, Introductions and Format for the Meeting	Matt Donnelly	7:00
Gateway Community Plan Briefing (if needed)	Dick Shockley	7:10
Gallatin County Perspective	Warren Vaughn	7:20
Definition of a Sewer District and practical implications	Matt Donnelly	7:30
Technology options	Dave Aune	7:45
Questions and Answers	All	8:15
Show of hands to the questions: "Do you want to move forward with a petition to form a sewer district?" "Is the proposed boundary OK?"	All	9:00
Adjourn[1]		9:15

[1] After the formal meeting Q&A can continue for as long as participants can stay

M

Timeline (Estimated)

What needs to happen	When (Best Guess)	Who is involved	Notes
Decide whether to move forward and, if yes, decide on initial boundaries	June 2008	Community	This meeting and more if needed. The point is to make sure everyone has all of the information.
Submit petition to County Commissioners	July 2008	Community	Need to hire surveyor for the legal description of the boundary. Matt Donnelly has offered to shepherd the petition.
Public Hearings	October 2008	County	Probably two hearings will be held. The County Commissioners will hear arguments for and against a district.
Election (vote on whether to form the district)	December 2008	County	The County Clerk and Recorder administers the election. Residents and property owners within the boundary get to vote.
Election (vote on the initial Board of Directors)	December 2008	County	Elect five Directors. They must either be residents or property owners within the boundary.
Preliminary Engineering Study	March 2009	Board of Directors	The Board hires and engineering firm to do this. Cost is around $30,000.
Decide on the best system for our needs	July 2009	Board of Directors	The engineer recommends solutions based on the number of hookups expected.
Apply for grants	May 2010	Board of Directors	The State of Montana only accepts grant applications once every two years. So we need to wait until 2010.
Hold a Bond Election	May 2010	Board of Directors asks the County for a vote, then the County administers it	A bond election, if passed, will fund a portion of the sewer system. The more grants we get, the less money we will need from bonds. Bonds would result in higher property taxes.
Begin construction	November 2010	Contractor and Engineer	
Ongoing decisions	May 2011 and beyond	Board of Directors	Ongoing decisions are, for example: Should we expand our boundaries? What fees should we charge?

Proposed Initial Boundary

This is for discussion purposes. Please offer your input by phone or email to

Matt Donnelly; 763-4258; m.k.donnelly@ieee.org

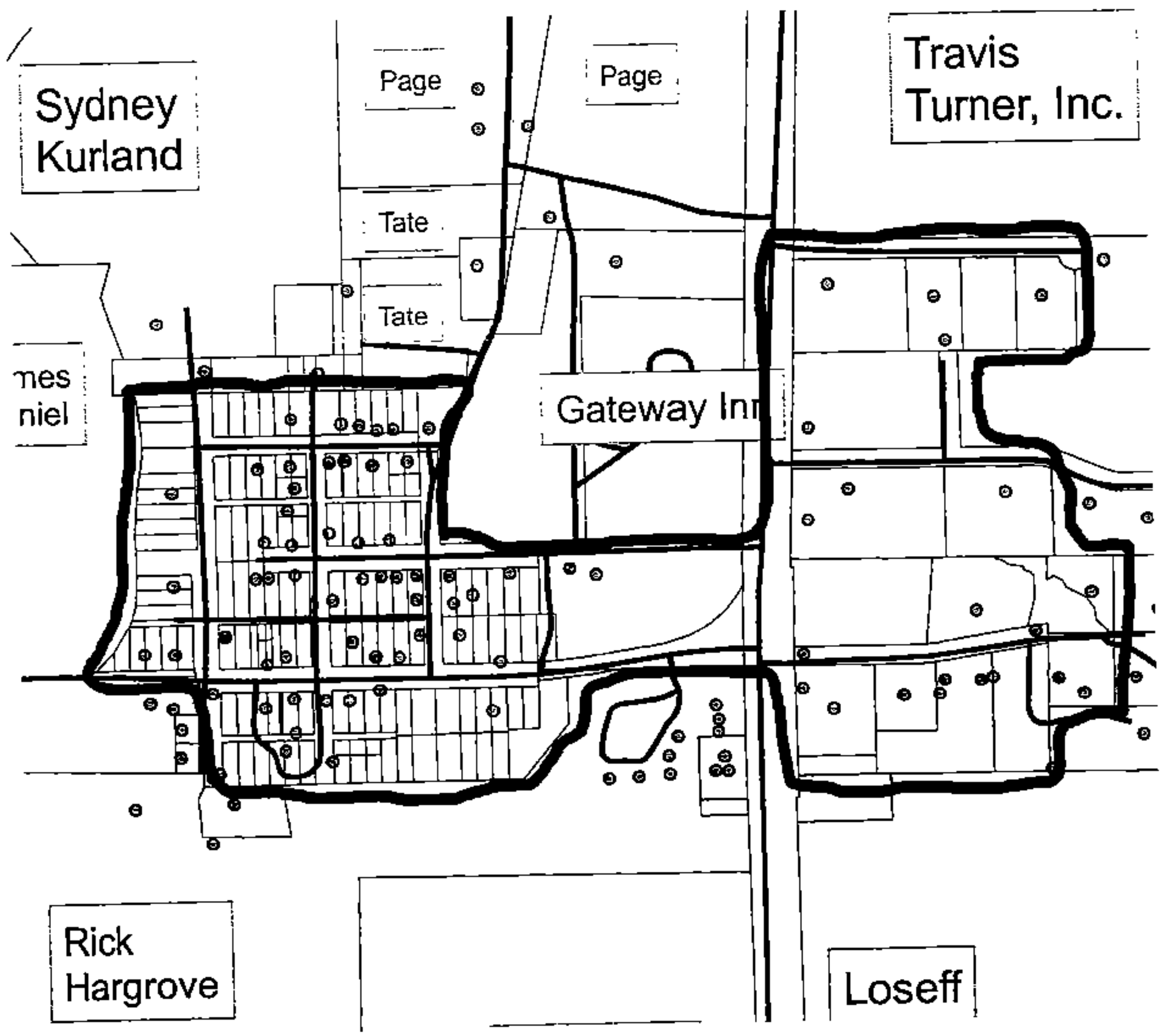
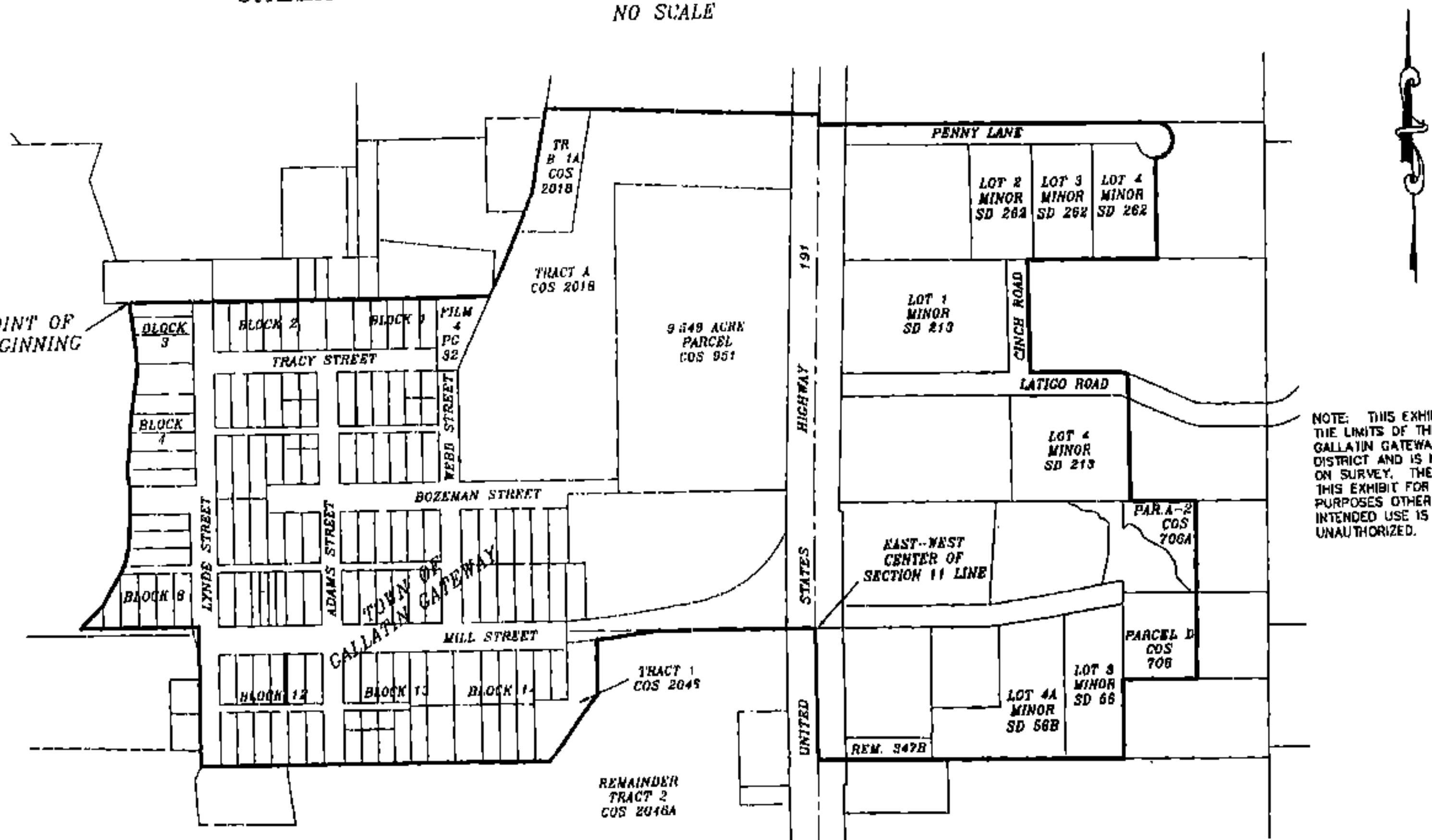


EXHIBIT B

LIMITS OF THE PROPOSED SEWER DISTRICT
GALLATIN GATEWAY, GALLATIN COUNTY, MONTANA

NO SCALE



NOTE: THIS EXHIBIT DEPICTS THE LIMITS OF THE PROPOSED GALLATIN GATEWAY SEWER DISTRICT AND IS NOT BASED ON SURVEY. THE USE OF THIS EXHIBIT FOR ANY PURPOSES OTHER THAN ITS INTENDED USE IS UNAUTHORIZED.

MORRISON MAIERLE, INC.

PROJECT NAME
GALLATIN GATEWAY, MONTANA

PROPOSED GALLATIN GATEWAY SEWER DISTRICT

EXHIBIT B

To: Gallatin Gateway Planning Group
From: Warren Vaughan, County Planning
Date: November 24, 2007
RE: Comments from the October 17, 2007 meeting

Attached are the average scores of comments from the October 17, 2007 meeting. In general, there appears to be agreement for the guiding principles of the plan. The lowest score is for the statement on a "Healthy and Vibrant Downtown", which I would interpret as being general nervousness about the original Gateway Village project.

Guiding Principles for the Gallatin Gateway Community Plan

All statements were rated on a 1-5 scale, with 5 showing the highest level of agreement and 1 showing the lowest. If you haven't done so yet, you can take the survey at www.gatewaycommunityplan.com.

Rural Lifestyle. Repeatedly, residents have stressed that Gallatin Gateway is a unique place. The quality of life, the night sky, access to recreational areas, and the sense of community and neighborliness of people were continually mentioned as a principle value. Residents stressed that new development, whether residential, commercial, or industrial, should be appropriate to the area and its neighbors.

Average Score: 4.47

Compatibility between existing residential and new commercial. Many residents expressed concern with the compatibility (or incompatibility) of residential, commercial, and industrial use. Generally, residents feel that Gallatin Gateway should primarily be residential, with appropriate, small-scale, and compatible commercial allowed only in the downtown core, including the area between Gooch Hill Road and Cottonwood Road.

Average Score: 4.01

Property Rights and Property Values Protection. Basic property rights protection is always in the background (if not the forefront) of every discussion regarding planning. Discussion showed that property rights is a two-sided coin: the right to use property goes hand in hand with responsibility to your neighbors and your community.

Average Score: 4.37

A Healthy, Vibrant Downtown. Many residents expressed a desire for a safe, walkable, and vibrant town center with adequate services for residents, including appropriate commercial development, a functioning school, central water and sewer, and parks and trails.

Average Score: 3.8

Protected Natural Resources. Elements such as clean water, clean air, wildlife, and the surrounding open space and agricultural lands are crucial to maintaining the quality of life of the community.

Average Score: 4.5

Sufficient Infrastructure, Including Central Sewer and Water for Downtown Gallatin Gateway. As Gateway grows, sufficient infrastructure should be in place, including central sewer and water, a strong, well-funded school, and a fire department which can provide efficient and safe services

A dominant issue has been the need for central sewer and water for downtown Gateway and the protection of groundwater in the area. Two primary cautions have emerged regarding central water and sewer: the presence of infrastructure could potentially lead to greater density than was desired, and the fear that a heavy financial burden could be imposed on residents who may not have an immediate need.

Average Score: 4.39

Control of Signage and Billboards. All participation efforts showed that control of signage and billboards, primarily along Highway 191, was a priority.

Average Score: 4.05

Better Traffic Safety and Transportation. Good, safe, and efficient traffic safety on Highway 191 is critical to the quality of life of the area, as is traffic and pedestrian safety on Mill Street in Downtown Gateway. Additionally, many residents expressed a desire to see paths and trails incorporated into the area.

Average Score: 4.58

Protected Open Spaces and Agricultural Landscapes. Open spaces and healthy agricultural landscapes are critical to maintaining the rural nature of the area.

Average Score: 4.2

Implementation and Results. Many residents expressed a desire to have a successful and meaningful planning process and to see results, resulting in a thoughtful community plan ensuring the appropriateness of new development in the area. In addition, residents have expressed a willingness to explore zoning, central water and sewer, and other tools implement the plan.

Average Score: 4.25

MEMO

To: Gateway Community Plan Working Group
From: Warren Vaughan, Planning Department
Date: July 11, 2007
Re: Preliminary Survey Results

Following are some numbers from the survey:

Total surveys as of 7/8/07: 108

Question #1: Do you support the development… of a neighborhood plan?

Yes: 101
No: 2
Blank: 4
Torn: 1

Question #2: Is it important to retain…small town identity?

Yes: 93
No: 6
Neutral: 7
Blank: 2

Question #3:

Planned: 96
Unplanned: 0
Other: 9
Blank: 3

Question #4: Land Use Designations

Unfortunately, EVERYONE seems to have answered this question differently. We need to think about a good way to quantify these answers.

Growth Factors. There is more than one way to count these numbers. Both ways end up with very similar results. I've included both results here:

TOTAL number of votes (regardless of ranking):

ground water	63
housing density	61
open space	57
water quality	47
rural vs. urban community	45
property rights protection	43
wildlife habitat	43
traffic/public safety	41
schools	38
ag operations	37
lighting/night sky	35
wastewater treatment	32
noise pollution	30
air quality	29
fire protection	27
emergency services	26
weed cntrol	26
signage/billboards	25
river resources	25
law enforcement	23
commercial development	21
recreational opportunity	20
industrial development	18
wildfire mitigation	11
public transit	6

Top vote-getting issues for each ranking:

#1 Issue: Housing Density
#2 Issue: Water Quality and Groundwater (tie)
#3 Issue: Water Quality
#4 Issue: Groundwater
#5 Issue: Open Space
#6 Issue: Open Space
#7 Issue: Groundwater
#8 Issue: Housing Density
#9 Issue: Noise Pollution
#10 Issue: Law Enforcement

DOWNTOWN GALLATIN GATEWAY COMMUNITY PLANNING MEETING

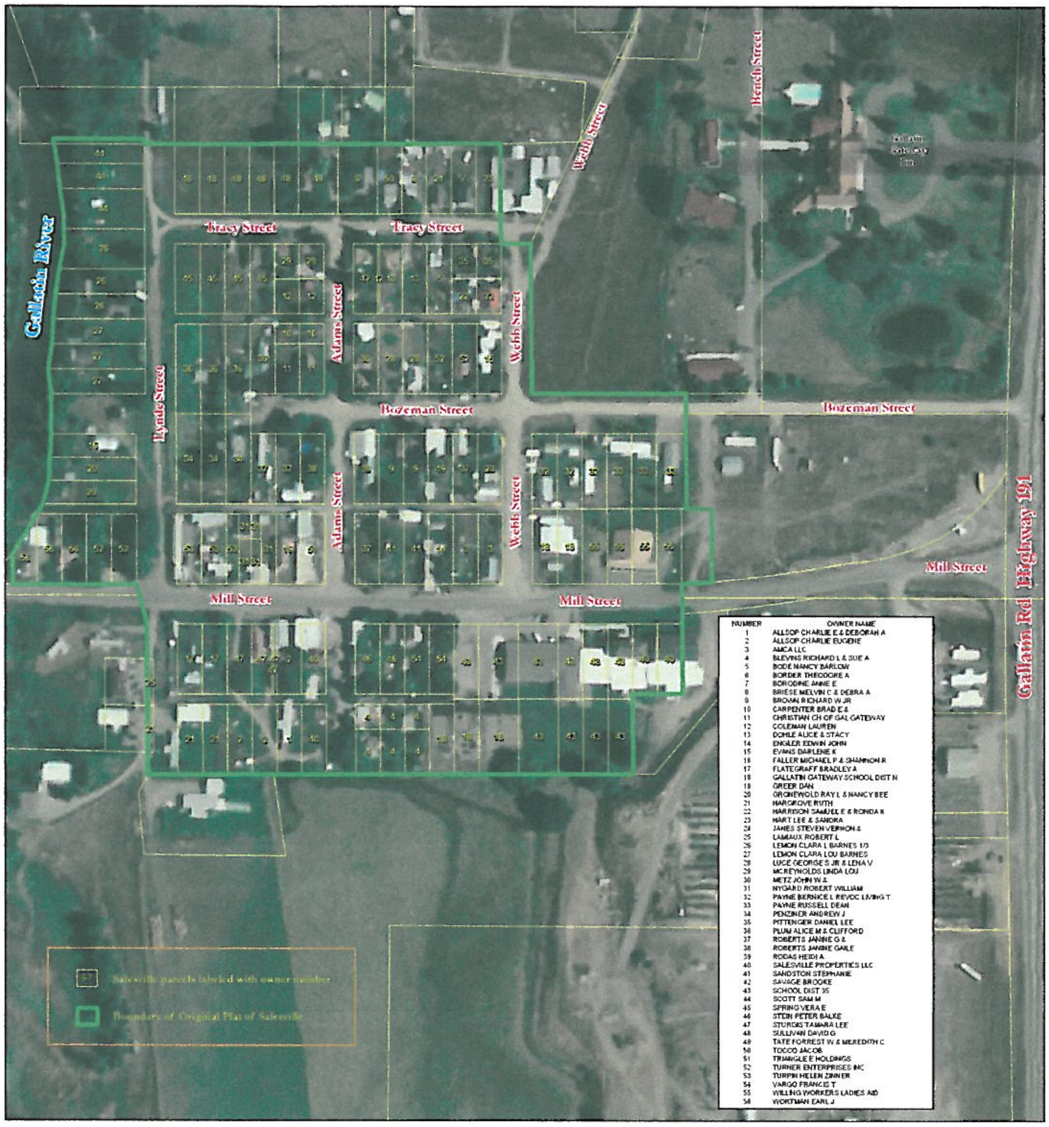
AUGUST 15, 2007

RESULTS AND NEXT STEPS

Original Plat of Salesville - Current Property Owners

DRAFT

Gallatin Gateway, Montana



NUMBER	OWNER NAME
1	ALLSOP CHARLIE E & DEBORAH A
2	ALLSOP CHARLIE EUGENE
3	AMCA LLC
4	BLEVINS RICHARD L & SUE A
5	BODE NANCY BARLOW
6	BORDER THEODORE A
7	BORODINE ANNE E
8	BRIESE MELVIN C & DEBRA A
9	BROWN RICHARD W JR
10	CARPENTER BRAD E &
11	CHRISTIAN CH OF GAL GATEWAY
12	COLEMAN LAUREN
13	DOHLE ALICE & STACY
14	ENGLER EDWIN JOHN
15	EVANS DARLENE K
16	FALLER MICHAEL P & SHANNON R
17	FLATEGRAFF BRADLEY A
18	GALLATIN GATEWAY SCHOOL DIST N
19	GREER DAN
20	GRONEWOLD RAY L & NANCY BEE
21	HARGROVE RUTH
22	HARRISON SAMUEL E & RONDA K
23	HART LEE & SANDRA
24	JANES STEVEN VERNON &
25	LAMAUX ROBERT L
26	LEMON CLARA L BARNES 1/3
27	LEMON CLARA LOU BARNES
28	LUCE GEORGE S JR & LENA V
29	MCREYNOLDS LINDA LOU
30	METZ JOHN W &
31	NYGARD ROBERT WILLIAM
32	PAYNE BERNICE L REVOC LIVING T
33	PAYNE RUSSELL DEAN
34	PENZINER ANDREW J
35	PITTENGER DANIEL LEE
36	PLUM ALICE M & CLIFFORD
37	ROBERTS JANINE G &
38	ROBERTS JANINE GAILE
39	RODAS HEIDI A
40	SALESVILLE PROPERTIES LLC
41	SANDSTON STEPHANIE
42	SAVAGE BROOKE
43	SCHOOL DIST 35
44	SCOTT SAM M
45	SPRING VERA E
46	STEIN PETER BALKE
47	STURGIS TAMARA LEE
48	SULLIVAN DAVID G
49	TATE FORREST W & MEREDITH C
50	TOCCO JACOB
51	TRIANGLE E HOLDINGS
52	TURNER ENTERPRISES INC
53	TURPIN HELEN ZINNER
54	VARGO FRANCIS T
55	WILLING WORKERS LADIES AID
56	WORTMAN EARL J

NOTE: This map is a visual representation only and does not represent a survey. No liability is assumed as to the accuracy of the data delineated hereon. Aerial photo image from 2005 National Agriculture Imagery Program of the USDA Farm Service Agency.

Ownership information from the Montana Department of Revenue Computer Assisted Mass Appraisal (CAMA) database.

Gallatin County and the Gallatin Gateway Neighborhood Plan Area

N

0 125 250

Feet

MAP PREPARED BY
GALLATIN COUNTY, MT
GIS DEPARTMENT AND
PLANNING DEPARTMENT

The Gallatin Gateway Community Planning Group thanks everyone who helped make the event a success, and everyone who took the time to participate. For future announcements, visit www.Gatewaycommunityplan.com. Please stay involved!

Contents

BACKGROUND

This report describes the Downtown Gallatin Gateway Community Planning Meeting held on August 15, 2007 and provides a summary of results. It also discusses the steps the residents of the Gallatin Gateway Community and Gallatin County should take to continue its planning process.

The Gallatin Gateway Community Planning Group (Planning Group) has been meeting bi-monthly since February 2007. The Planning Group had its inception in a series of meetings hosted by a potential developer in December of 2006 and January of 2007, at which a group of citizens volunteered to serve on a committee addressing planning and growth issues in the Gallatin Gateway area in response to several recent changes. Briefly, those issues are as follows: the potential development of a high-density residential and commercial neighborhood on the 60 acres between the Buffalo Station and the Exxon Station; the construction of a new billboard at the intersection of Gooch Hill Road and Highway 191, increasing traffic issues on Highway 191 through Gateway, the opening of a gravel pit on Gateway South Road, and the potential expansion of a second existing gravel pit west of the original town site of Gallatin Gateway and the river.

To date, the Planning Group, in cooperation with the Gallatin County Planning Department, has held two separate efforts to engage public opinion on growth issues in the area: the first was a survey mailed to 647 landowners in the Gallatin Gateway area; the second was a public kickoff meeting held on May 18, 2007, with 69 residents in attendance.

Both of those efforts have resulted in significant participation. As the results were tallied, however, members of the Planning Group realized that most of the participation was from the outlying Gateway area. To address this, the Planning Group held a second community planning meeting on August 15 targeted at the residents of the downtown Gallatin Gateway area to directly ask them about their needs and concerns. This report summarizes that meeting.

PROCESS

The Downtown Gallatin Gateway Community Planning Meeting was held on August 15, 2007, from 7:00 – 9:00 PM. A total of 40 residents attended (Appendix B lists all participants). Immediately after entering, all participants were asked to address 25 issues listed on the wall of the meeting room. Each participant was given five dots and asked to vote, one dot per issue, on the top five issues with which they were concerned. Results from the dot voting are as follows (the number indicates the number of votes received):

Top Five Issues/Concerns:

Traffic/Public Safety 19
Groundwater 18
Wastewater Treatment 18
Open Space 16
Signage/Billboards 13

Other issues/concerns:

Water Quality 11
Housing Density 11
Property Rights Protection 10
Commercial Development 10
Schools 9
Lighting/Night Sky 9
Rural vs. Urban Community 8
Fire Protection 7
Emergency Services 7
Industrial Development 6
Noise Pollution 6
Wildlife Habitat 6
Agricultural Operations 6
Law Enforcement 5
Wildfire Mitigation 2
Weed Control 2
River Resources 1
Air Quality 1
Recreational Opportunity 1
Public Transportation 0

After the entry exercise, participants sat at 5 different tables, with approximately 8 people per table. Dick Shockley, co-chair of the Planning Group, welcomed everyone to the event. After explaining the brief history of the planning process and the reason for the meeting, Dick asked each group to respond to two questions:

1) What do you want Gallatin Gateway to be in the future?
2) What should this planning process focus on?

The process for both questions was the same: participants first responded to the question individually by writing their responses. After approximately 5 minutes of working individually, participants shared all responses with their table. A facilitator from the Planning Group was present at each table to help sort answers into categories and to help discussion. After approximately 10 minutes of discussion among table members, each table shared their results with the larger group.

After both questions were answered, the group moved on to the second discussion activity of the evening. Each individual was asked to respond to a series of goal statements and strategies to reach those goals, presented as a matrix. Responses are presented in Appendix A.

Note: The workshop produced a significant number of responses to the questions asked. To save space, these responses have not been reproduced here; to see the complete report, see the Planning Group's webpage at www.gatewaycommunityplan.com.

SUMMARY

The responses to the both the small group questions exercise and the goals matrix reveal broad support for the larger goals presented for downtown Gallatin Gateway, with some differences in perception of how to attain those goals. Many of the responses request more information, suggest amendments, and provide cautions. Results from the meeting provide policy direction and point to a next step in the Gallatin Gateway planning process. Overall, the following themes emerged:

Sewer and Water. One of the most discussed issues of the night was the possibility of forming a water and sewer district. While several participants cautioned that central water and sewer could potentially lead to greater density than was desired by the community, everyone agreed that the community should investigate this issue further.

Compatibility between existing residential and new commercial. Many responses dealt with the compatibility (or incompatibility) of residential and commercial use. Generally, most participants felt that the downtown Gallatin Gateway area should primarily be residential, with appropriate, small-scale commercial allowed only if it was compatible with existing uses in the area. Many residents spoke of their concerns about the expansion of the gravel pit west of town. Other residents expressed concern that increased commercial use would lead to greater traffic and safety problems.

Rural Character. Much of the discussion centered on the rural character of the area. Many residents expressed a desire to preserve open space in the Gateway area by directing moderate growth into the downtown core and the area around the existing Exxon Station rather than spread along the highway or throughout rural Gateway. Other residents voiced a desire to control the proliferation of signs and billboards in the area. Many residents expressed a general concern that increased development would erode the things they currently value about downtown Gallatin Gateway.

Next Steps

The Planning Group will begin following up on the workshop by distributing this summary to everyone who participated. The Planning Group will then consider the results of the workshop and begin consolidating responses into policy statements. Those policies will state larger goals and objectives of the Gallatin Gateway community and begin to identify implementation actions for the community and the County to take.

It is important for residents of the Gallatin Gateway community to understand that implementation of a community plan will require two actions:

1) *Investments.* One of the most important issues identified by participants was formation of a water and sewer district. Exploring this possibility will require a significant investment in both the time and the energy of Gallatin Gateway residents.
2) *Regulations.* Many residents discussed concerns such as high-density development, inappropriate commercial development, increased industrial uses in the area, and signs/billboards. Addressing these concerns will require serious discussion of zoning regulations.

Staying Involved

The Planning Group meets every first and third Wednesday of the month from 7:00 pm to 9:00 pm at the Gallatin Gateway Community Center. Over the next several months, the Planning Group will continue to host community-wide meetings to address issues and concerns expressed by the community and to discuss implementation strategies. The next meeting will be held October 17 to discuss conclusions and recommendations for the Community Plan.

You can monitor the group's activities at www.Gatewaycommunityplan.com. The Planning Group is committed to ensuring all landowners are involved and actively steering the community planning process. For questions, contact co-chairs Dick Shockley at 763-4605 or Christie Francis at 763-4691.

APPENDIX A: RESULTS OF THE GOALS MATRIX EXERCISE

Downtown Gallatin Gateway Should Continue to Be…	**Yes**	**No**	**Blank/Alternative**
…the center of the surrounding Gallatin Gateway area;	40	0	1
…a rural alternative to Bozeman, Belgrade, and Four Corners;	26	9	6
…a mix of residential and commercial development;	19	14	6
…a community center with small-scale commercial development providing restaurants or basic services for visitors.	29	6	5

Should the Downtown Gallatin Gateway Community…	**Yes**	**No**	**Blank/Alternative**
…investigate and collect more information on the possibility of forming a public water and sewer district?	40	0	0
…explore opportunities to help the school expand?	30	7	3
…explore opportunities to provide paved streets, sidewalks, and street lighting?	15	21	4
…designate areas for future growth in the downtown Gateway vicinity?	24	12	4
…identify specific areas for park space dedication?	27	11	2

New Development in the Downtown Gallatin Gateway Area Should…	**Yes**	**No**	**Blank/Alternative**
…extend the existing street pattern and connect with the center of town where feasible;	23	12	5
…provide sidewalks and paved streets within its borders;	15	17	8
…take place in, or adjacent to, a core consisting of downtown Gateway and the existing Exxon Station rather than in a continuous strip along Highway 191;	27	7	6
…continue the pattern of streets and alleys similar to the original townsite.	28	5	6

OTHER RESPONSES TO THE GOALS MATRIX:

Downtown Gallatin Gateway should continue to be…

…the center of the surrounding Gallatin Gateway area.

- Not necessarily
- Keep services (school and fire)
- Yes, with proper controls
- Also at gas station

…a rural alternative to Bozeman, Belgrade, and Four Corners.

- Do not understand the question – "rural alternative"?
- Good idea but it ain't gonna happen.
- Services – viable commercial core at smaller scale
- I don't understand what this means. Isn't that what it will be regardless?
- Maintain small with open space
- Rural is wrong – small ????, well-planned town
- Not clear on meaning

…a mix of residential and commercial development.

- Very little commercial, very little development.
- More residential, small commercial
- "small town" commercial
- emphasis should be on "small scale"
- No large housing projects
- Small, limited commercial meeting needs of community (small scale)
- 95% residential, small commercial
- commercial small businesses – retail and professional
- only if small commercial development in town proper
- small commercial
- of light commercial
- a grocery store of the quality of Town and Country foods
- but public controlled

…a community center with small-scale commercial development providing restaurants or basic services for visitors.

- More commercial development creates traffic and parking problems.
- A *residential* community center.
- On Highway 191 yes, in town no!
- Consider exploitation of tourism.
- Just close, not inside

- Where?
- Small, locally-owned shops
- Caution! Residents first, not chain, not big sky drive-thrus
- Similar in scale to current town; <u>local</u> businesses
- No gas station, already have two restaurants
- Just outside, not inside

Should the downtown Gallatin Gateway community…

…investigate and collect more information on the possibility of forming a public water and sewer district?

- Not for development, but for current residents.
- Public health, rural
- Absolutely, but with limited capacity to discourage over-growth

…explore opportunities to help the school expand?

- Use what they have more effectively.
- Developers need to address this
- If needed.
- As needed.
- If needed
- If that's what's needed. The area will grow regardless.
- High school to keep kids in community
- Expand while staying in present locale

…explore opportunities to provide paved streets, sidewalks, and street lighting?

- No lighting like South 19th Street.
- No to all three
- That will come with development
- Perhaps lighting, but not necessarily paved streets and sidewalks
- Prefer trails
- No street lighting
- Safe sidewalks for Mill street out to South Gateway – YES
- Sidewalks - yes
- No street lights, but sidewalks and landscaping
- Perhaps not lighting
- Mill street only
- Maybe – this is a lower priority for me
- Too much too soon (we don't need bike paths when the roads are safe)
- NO NO NO NO
- Just sidewalks – no street lighting, no paved streets, public controlled

...designate areas for future growth in the downtown Gateway vicinity?

- Limit future growth
- Through zoning process
- Where?
- I.e., be in charge of where growth happens
- And eliminate junk heaps through zoning without being overly restrictive
- Very limited growth
- Keep it small and adjacent to existing town
- Plan ahead

...identify specific areas for park space dedication?

- There are already 2 community parks in town which are not being kept up very well, why add more? Take care of what we have.
- Attach to school.
- Where?
- By/along the river
- In surrounding, existing open space
- Consider existing spaces, underutilized and hardly cared for
- The gravel pit as a water park
- Associate with the community center

New development in the downtown Gallatin Gateway area should...

...extend the existing street pattern and connect with the center of town where feasible.

- Limit development
- Utilize current structure
- With industrial traffic
- Where feasible

...provide sidewalks and paved streets within its borders?

- Gravel roads keep traffic slower.
- Community benefit rather than commercial/owner benefit. Employ ancient European model that the privilege of commerce is gained by big business benefiting the community by providing and supporting the services to the residents.
- Without major impact to what is already there.
- Prefer trails
- Paved streets means faster traffic
- With landscaping/beautification/clean
- Pedestrian paths

- Or a bike path/foot route. This could take the place of lining the streets with sidewalks
- Sidewalk/path along Mill street but not paving inner Salesville
- ?Maintenance?
- rural paths, not paved

...take place in, or adjacent to, a core consisting of downtown Gateway and the existing Exxon station rather than in a continuous strip along Highway 191.

- Prefer development on 191
- Preserve open space
- Definitely
- Down to post office

...continue the pattern of streets and alleys similar to the original townsite.

- Without changing existing Gateway drastically.
- Needs updating
- Lots are too small
- Where feasible

What other strategies do you suggest?

- Limit future residential, as well as commercial development, to keep small-scale rural community. Do not allow Gateway to become another Four Corners.
- All of the above keep the same issues of traffic and parking associated with commercial development.
- User-friendly community
- Grocery store on highway
- REAL traffic control
- No industrial business, especially gravel pits!
- Zoning and TDR's should be tools to generally develop Gallatin Gateway to an attractive residential/commercial town that is surrounded by agricultural land and open space. Gotta be market based.
- Pursue water and sewer.
- Pursue zoning
- If people have complaints, tell them to pony up and pay for a solution
- Water and sewer
- Reduce speed on 191
- Stoplight on Mill and 191
- Connect the non-motorized path along Highway 191 that goes through the tunnel with a similar path in town that extends to the river
- Alternate commercial trucking route that bypasses Mill Street and Salesville plat area

- Do not allow extension of gravel pit until there is a better plan. The impact on quality of life through river access, evening/morning walks, bicycling, etc. is HUGE. Commercial rights do not exceed citizen rights. We don't want a memorial walkway.
- Maintain significant open space around town proper
- Maintain/develop corridor along river with no development
- Maintain large rural gap between other communities – not be continuous with Bozeman, Belgrade, 4 Corners
- No new buildings taller than the school
- Bring in speakers who have been through the process , this stage of growing pains and successes. Let them share their experience, and maybe we can learn from them.
- Zoning (citizen based), not County dictated or developer's vision
- Need a park
- Water and sewer
- Paved roads
- No gravel trucks
- Connect Gateway to the river and mountains with continuation of pedestrian/bicycle trail (this would work both ways, it would better connect people in the outlying area with Gateway).
- A town for the people, run and decided about by the people of Gateway!!

APPENDIX B: SMALL GROUP RESPONSES TO THE GROUP QUESTIONS:

Question #1: What do you want Downtown Gallatin Gateway to be in the future?

Note: All responses have been sorted according to category and are recorded as they were written. The responses generally fell into eight categories:

Sewer/Water
Planning, Zoning, and General Growth Issues
Traffic/Pedestrian Safety and Road Issues
The School
Billboards and Signs
Gravel Pits
Community Pride
Small Town/Rural Feel/Community

Sewer/water

- Central water/septic
- Fix water/sewer issues
- Water and sewer
- Water and sewer
- Clean, safe drinking water
- Wastewater
- Adequate sewage treatment
- Water/sewer district before Bozeman gerrymanders
- Water and sewer
- Water safety
- Sewer/water
- Sewer/water
- Small town with sewer and water addressed
- Central septic
- Protect river quality
- There is a definite need for central sewer
- Central water/sewer
- Central sewer
- Central sewer
- Wastewater treatment
- Protect river quality

Planning and Zoning

Planning Issues

- Don't want: rapid growth that chokes out the agriculture, outgrows the streets, and overwhelms emergency services
- Enforced property rights (usage)
- Smart growth, not like 4 Corners
- No development along river corridor
- Only small commercial uses, similar to current
- Open to growing needs
- Maintain and strengthen downtown as center of community for the area
- Extend a <u>small</u> residential grid with entry-level homes
- Mix of commercial/residential
- Want: low-density residential with destination commercial (artists studios, walkable shops, etc) and covenants
- City park
- Trail system
- Reasonable fire and emergency medical services
- I would like to see Gateway keep its community core (school, community center, fire dept), but grow organically, with business and homes (small, local businesses, growth patterns similar to present)
- City park

Zoning Issues

- Not a lot of regulations
- Zoning to provide enforceable community-approved rules
- Zoning
- Zoning: yes
- Architectural review of development
- Building height limitations
- No more commercial development, but emphasis on residential
- Keep Gateway residential
- Limit housing density
- No large-scale commercial
- Limit light pollution
- Keep future development small-scale, consistent with current buildings, etc…
- No apartments/townhouses
- Housing and small retail businesses
- Less development, no large housing development

General Downtown Gateway Growth Issues

- Want: room for small business that hires from community that has wages equivalent to Bozeman and will not grow to Walmart
- No houses which take up most of the lot or block the view

- Viable commercial core
- Main street presence
- Small businesses
- Want: affordable place to live
- More community functions
- Keep small village feeling
- Grocery store
- Grocery store
- Recycle
- A few local businesses in downtown core (grocery, daycare, family restaurant)
- Grocery store
- Restaurants/cafes
- Locally-owned grocery/café
- Businesses, shops
- Small office/business, retail
- Local ownership (no chain stores, restaurants)
- Safer river conditions or public park area for teenagers, children, and adults
- Vibrant small town (like it was…)
- Grocery store
- Recycling
- Re: downtown – a nice grocery store, quiet streets with no ATV's
- Want: more law enforcement – frequent patrols by Sheriff – keep it quiet and friendly, like now
- I'd like to see Gateway have a park, more grocery choices (a grocery store?)
- I want a small to medium independent grocery store
- No big power transfer or transformer stations
- Don't want streetlights, big signs, busy retailers
- Local ownership (no chain store/restaurant, etc)
- Similar style to old buildings
- Continue progress
- Leave things as they are; all's okay

Traffic/Pedestrian Safety and Road Issues

- Safer 191 intersection
- Road improvements –sidewalks (kids) and drainage
- Gateway connected to the Gallatin River and National Forest (Little Bear) with pedestrian/bike paths
- Sidewalks or continue path through town
- Continuation of path from the tunnel under Highway 191 all the way through town to the first bridge, with NO motorized use
- Limit traffic – keep area safe for children (and adults)
- Safer 191 intersection

- Highway 191 is the elephant next: fix traffic/safety issues; no more blight in the form of huge billboards, junkyards, buffalo stations, etc.
- Safe pedestrian river crossing and access
- Slower downtown traffic, including across bridges
- Safe, uncongested highway access
- Quiet streets
- Sidewalks
- Pedestrian friendly
- Less traffic
- Pave post office road!
- Traffic light at Mill Street and 191
- Pedestrian safe
- Slow traffic down/stop signs
- Reroute truck traffic
- Traffic and speed changed to facilitate nice, quiet neighborhoods and pedestrian traffic
- Pedestrian friendly
- Eliminate industrial traffic
- Stop signs
- Pedestrian friendly!!
- Eliminate industrial traffic
- Paved roads
- Speed limit signs
- No major industrial haul routes through town
- Safe pedestrian access on main road, bridges
- No semi's and large trucks (cement trucks)
- Sidewalks
- Sidewalks
- Pedestrian friendly
- Pedestrian friendly
- Limit truck traffic in front of school, community center

School

- Larger area for school when it needs to expand (larger playground)
- Improved school with ample playground
- Gateway school – give it all the support it needs, solve the wastewater issue or it won't be able to expand if necessary
- Viable future plans for school
- Healthy School
- Improved school with ample playground
- Access to good education

Billboards and Signs

- Limit signage
- No billboards, big ugly signs
- Limited billboards
- No billboards
- Less billboards
- No billboards on 191 and Gateway
- Reduce billboard

Gravel Pits

- No gravel pits
- Less gravel trucks
- No gravel trucks or similar industrial vehicles
- A through-way fo trucking gravel or any other commodities
- Fewer gravel trucks (none?)

Community Pride

- Enforced "junk" regulations (vehicles, trash)
- Cleaned up
- Some paint
- Clean!
- Old Gateway motel cleaned up
- Re: downtown – no junkers (cars) or environs
- Cleaner lots
- Weed control

Small Town/Rural Feel/Community

- I want to keep the rural look and feel – no sidewalks, no up-to-date pseudo western look; rather see the money spent on larger issues, those that keep the health and high-quality of living
- Quiet residential community
- Close-knit neighborhood
- Know neighbors
- Depend on neighbors
- Maintain small community – no sprawl!
- The draw of Gateway is the small town feel; don't want pre-planned, organized look like other towns
- Rural community
- Small population

- Don't want: gated community
- Community feeling
- Kid/pedestrian friendly
- Family friendly
- Ideal for me: remain a quiet and sleepy town; I like hearing the birds
- Friendly/beautiful/clear
- Don't want to cater to big Sky/Bozeman attitudes
- Booked community center
- Stay agricultural
- Family/community events (parade, festival)
- Do want: wildlife habitat near town..sandhill cranes, Canada geese, deer, etc.
- Some open spaces
- Open space/agricultural land
- Want: open space, small town living, a place where you don't have to lock your dogs
- Don't want: to look like Bozeman
- Don't want: large commercial businesses that don't support Gateway residents and businesses

Question #2: What are the Most Important Issues and Concerns We Should Address In This Planning Process?

Note: All responses have been sorted according to category and are recorded as they were written. The responses generally fell into ten categories:

Water and Sewer
Planning and Zoning
Traffic and Road Issues
The School
Parks and Trails
River Issues
Billboards
Emergency Services
Open Space Issues
Other

Water and Sewer

- Water/Sewer treatment
- Water issues, sewage (community??)
- Water and sewer
- Sewer and water district – School, Stacy's, Gateway Inn
- Central Water and Sewer

- Septic/central water
- Sewer system
- Water/sewer district
- Central water and sewer
- Water and sewer central but not obligatory; learn how to make it affordable
- Water and sewer issues
- Water/Sewer
- Water/sewer
- Water/sewer district
- Water/sewer district
- Water and sewer system for Gateway and the school if feasible
- Sewer system limited to Salesville plat plus 25%
- Water: please pursue means for conserving and preserving clean water quality. This may involve sewer/water service to the community
- Pursue water/sewer district
- Sewers are a double-edged sword: my fear is it would encourage more development, so I would want to see sewers along with zoning parameters

Planning and Zoning

- Zoning
- Reasonably-parametered zoning
- Require river setbacks
- Eliminate gravel pits and/or regulate travel rates
- Maintain development in town proper; no sprawl
- Limit commercial development size
- In order to control unwanted development, mining, billboards, strip clubs, we need zoning (unfortunately)
- No zoning
- Don't be too restrictive or controlling with any zoning
- Potential commercial needs most control
- Limit commercial: where? How much?
- Zoning
- Residential limits
- Citizen-based zoning
- Gravel pit limits
- Zoning: how can we implement our choices? If through zoning, please pursue
- Existing Gateway – if new standards are implemented, will what exists be "grandfathered" or must changes be made to meet standards? Who will pay for changes if they must be paid?
- Zoning for: residential, light commercial, no heavy industrial
- Neighborhood plan/control space; commercial lots
- Eliminate gravel pit, concrete plants, asphalt plants
- Not 4 Corners

- Controlled Development
- Controlled development
- Some lighting on the streets of Gateway (not overpowering, but not dark)
- An agreed community decision for the people of Gateway and not big money corporations
- Small commercial businesses to be supportive of community, i.e., bookshop, coffee shop, art enclave

Traffic and Road Issues

- Weight limit on Mill Street
- Restrict speed on 191 (Gooch Hill and Cottonwood)
- Traffic light at Mill and 191
- Safe traffic
- Stop light at Mill and 191
- Little or no commercial development on Mill Street between 191 and second bridge (traffic issue)
- Traffic control – speed and volume
- Slow down traffic
- Eliminate industrial traffic
- Road safety
- Light at Highway
- Water and sewer
- Traffic safety and control (includes pedestrial)
- Traffic control
- Traffic
- Alternate trucking route that bypasses any downtown Gateway streets
- Mandatory 45 mph from Cottonwood Creek to buffalo station
- Fix drainage or rebuild road on Mill Street

The School

- School doesn't have enough room
- School expansion; if possible, stay where it is
- Kids

Parks and Trails

- Pedestrian/bicycle paths extend to other side of second bridge
- Encourage, possibly support public spaces – small park area or support for community center projects
- Bike paths (research available grants)
- Park/open space for community
- Community park

- Pedestrian walkway between 191 and Gateway South road
- Get money to help buy gravel pit and convert to water park for community and county

River Issues

- River quality
- River safety/quality

Billboards

- No more billboards on highway 191 within 5 miles north and south of Mill street
- Limitation of # and size of billboards

Emergency Services

- Emergency services (fire, law, floodplain) to accommodate growth
- Emergency services, i.e., police

Open Space Issues

- Not to push out our slowly depleting wildlife habitat
- Open space in rural surround with access from town (paths, trails)
- Retain open space

Other

- Don't make Gateway like where you came from
- As the need arises, they are usually filled. Most wants are already here, just not to the extent that some people expect; no city to provide
- I hope we are not a covert impact study
- No singling out properties that bother you because of how they look
- The main issues facing Gateway can and should be addressed without telling the property owners what they can't do, like what color their house is or how many cars in driveway
- Something to keep kids in Gateway instead of going to Bozeman

APPENDIX C: PARTICIPANTS

1) Pete Stein
2) David Steinmuller
3) Michael Lebwohl
4) Janine Roberts
5) Charlie White
6) Rick Hargrove
7) Ruth Hargrove
8) Terry Threlked
9) Ric Blevins
10) Francis Vargo
11) Gary Kachadurian
12) Margaret Kachadurian
13) Earl Wortman
14) Bradley Flategraff
15) Toni Donnelly
16) Brian Persha
17) Tim Roark
18) Katy Nygard
19) Frank Silva
20) Brook Savage
21) Kris Ellingsen
22) Nikki Robbins
23) Stephanie Sandston
24) Kim Parsch
25) Amy Davis
26) Alex Fox
27) Lauren Coleman
28) Steve Janes
29) Gina Taylor
30) Duane and Lynn Walker
31) Charlie Allsop
32) Debbie Allsop
33) Monica Pokorny
34) Kyran Kunkel
35) Dan Pittenger
36) Bjorn Flategraff
37) Angie Flategraff
38) Don Hargrove
39) Rich Brown
40) EJ Engler

Newspaper Articles

County to appoint Gateway zoning board

By Chronicle Staff

The Gallatin County Commission Tuesday is expected to create the Gallatin Gateway Zoning Task Force, a citizen board that will work with county planning staff to draft zoning regulations for that area.

The Gallatin Gateway Neighborhood Plan, approved by the commission Jan. 27, defines several different land uses within its jurisdiction: a "town core," or primary growth area; a central business district; rural Gallatin Gateway; and the U.S. Highway 191 corridor, which runs north to south through the planning area.

Once the zoning regulations are written, the task force will present them to the commission for final approval.

In other business Tuesday, commissioners are scheduled to:

* Conduct a bid opening for pharmacy services at the Gallatin Rest Home.
* Hold a public hearing and decide on a speed limit change for the Bear Creek Properties subdivision.
* Hold a public hearing and decide on closing the Logan Cemetery to future burials without written approval and establishing visiting hours.
* Hold two public hearings and decide on using Open Space Bond Fund money to buy conservation easements on the Half Circle Ranch and the Buck/Butterfield property.
* Hold a public hearing and decide on a common boundary-realignment exemption for Pierce.
* Hold a public hearing and decide on requests for one-year extensions of preliminary plat approval for the Greenig and Riverwood Manor subdivisions.
* Hold a public hearing and decide on final plat approval for Patterson Park subdivision.

Also this week, the commission will also meet at 12:30 p.m. Wednesday for a public hearing and decision on the final adoption of the North Gallatin Canyon Zoning District map, which prohibits billboards in a portion of the canyon.

The proposed ordinance is available from the planning department or online at www.gallatin.mt.gov.

And there will be a Treatment Court graduation and the annual Friends of Treatment Court gift-giving celebration on Friday, Dec. 18.

The commission meets at 9 a.m. in the Gallatin County Courthouse community room. The meetings are televised on community cable television and audio streamed on the county's Web site, www.gallatin.mt.gov.

Gallatin Gateway: will party for sewer

By AMANDA RICKER Chronicle Staff Writer

Gallatin Gateway's Birthday Bash is back.

It's been a few years since Gallatin Gateway has held the town celebration, but the 126th birthday party this Saturday will feature a parade, street dance and family activities.

"Because our community hasn't had a big party in three or four years, and because we have some new community needs, we decided to resurrect the Gateway Birthday Bash and we're going to try to make it an annual event once again," said Jill Allen, an organizer of the event.

Organizers have set a goal of raising $15,000 from the event to help pay for the design of a central sewer system and to support local charitable organizations.

Gallatin Gateway residents' septic systems have been operating at maximum capacity.

"We need to do the sewer so that (residents) can keep drinking their well water," said Merle Adams, president of the Gallatin Gateway Water and Sewer District.

Gallatin Gateway residents voted to create the sewer district in January. Many residents have both septic systems and wells on their property that are too close together, risking contamination, Adams said.

The bash begins at 2 p.m. with a parade down Mill Street, from Lynde Street to Bench Street.

"There's horse drawn carriages, the kids will be decorating their bikes and pets," said organizer Debbie Allsop. "The fire trucks will of course be in it, several businesses have floats and the churches have floats. There will be a little bit of everything in the parade."

Activities, including carnival games for kids and logging competitions for adults, will be from 3 to 7 p.m.

Live music begins at 5 p.m. at the Gallatin Gateway Inn. Nite Ride, a country band, plays from 5 to 6:30 p.m. Diamond Rock & Soul plays from 7 to 8:30 p.m. and Two Story Ranch plays from 9:30 to 11 p.m.

A 5-kilometer run will start at 6:30 p.m., with registration beginning at 5 p.m. A silent auction will be from 5 to 9 p.m. and raffle drawing at 9 p.m.

Money to help pay for the sewer system and other local organizations will be raised by selling buttons, T-shirts, food and through the silent auction. People attending the bash are being asked to buy a $3 button.

The first Gateway Birthday Bash was held in 1995, in observance of the 100-year anniversary of the town's establishment, Allen said.

But the party died off after the last Gateway bash was held five years ago, Allsop said.

Gallatin Gateway was originally platted in 1883. Bozeman, by comparison, was platted in 1864.

Gallatin Gateway was originally called Salesville. The name was changed when the Milwaukee Road railroad built the Gallatin Gateway Inn, to serve as a passenger terminal and gateway to Yellowstone National Park, in the 1920s.

Amanda Ricker can be reached at aricker@dailychronicle.com or 582-2628.

2009-07-17

Gateway to get funds for study

By Michael Tucker, staff writer

After some uncertainty due to budgetary struggles, the Gallatin Gateway Water and Sewer District will receive seed money to start an engineering study for its sewer system, the Gallatin County Planning Board decided Tuesday.

On Tuesday, the board voted 9-1 to hand out $15,000 to the district to fund a preliminary engineering study to determine best-case scenarios for the fledging water and sewer district, county planner Sean O'Callaghen said. The money will be matched by a state grant from the Montana Treasure State Endowment Program.

The request had been called into question by some board members largely because of budgetary issues, White said. Overall, the board's budget was increased, but discretionary funding was reduced to funnel additional money to the planning department.

The board uses discretionary funds on various planning efforts around the county, including a $45,000 valley-wide wastewater study.

But the Gateway district needed the money to both match a state grant and to get the project into the hopper for additional funding during the next legislative session, district manager Matt Donnelly has said.

With that in mind and an assurance from county officials that the board can fund all of various projects in the works, the measure passed, White said.

'If we put it off and the guys don't have money and put off the study, they could miss that window of opportunity for the 2011 Legislature and that would put the project out for two (more) years,' he said. 'It's a critical area. It's designated as a growth node in the growth policy.'

Board member Byron Anderson cast the lone dissenting vote, according to draft minutes. Anderson said he had concerns that too much money was being diverted to the planning department and until that issue is resolved, the board shouldn't earmark money for other programs.

Water, sewer district before county

By Chronicle Staff

The Gallatin County Commission is expected Tuesday to vote on organization of new public water and sewer district to serve residents and businesses in the Gallatin Gateway area.

The meeting begins at 9 a.m. in the community room of the Gallatin County Courthouse on West Main Street.

Gallatin County offices are closed on Monday in observance of Presidents Day.

Other items the commissioners are scheduled to consider Tuesday morning are:

? Whether to direct county staff to develop an impact fee ordinance to assess and collect a school impact fee for the Monforton School District as per a request from the district;

? Appointing a county representative to the Human Resources and Development Council's Streamline Advisory Board;

? A request from Kachadurian to exempt common boundary relocation from subdivision review;

? And a decision on amendments to approval conditions for the East Gallatin Commercial Center subdivision, including eliminating and altering required improvements to the Airport and Frontage roads intersection.

The commissioners have two other special meetings planned for the week ahead.

The first, on Wednesday, involves the presentation of results from a request for proposals for materials, testing and inspection services for the new county jail, followed by a public hearing and decision on a contract for those services at 4:30 p.m. in the conference room at the courthouse.

The second is in West Yellowstone on Thursday, and involves a decision on annexing property into the Hebgen Basin Fire District. That meeting will be held at 1:30 p.m. in the Canyon/Dunraven Room of the West Yellowstone Holiday Inn.

For more information, call 582.3027 or visit www.gallatin.mt.gov.

The courthouse is at 311 W. Main Street.

City Commission meets on Tuesday evening

The Bozeman City Commission will meet Tuesday evening, rather than Monday, due to the Presidents Day holiday today.

The commission is scheduled to consider:

? General fund projects and equipment within the Capital Improvements Program for fiscal years 2010 to 2014.

? An appeal of city staff's denial of J&D Family Limited Partnership and 360 Ranch Corporation's property-realignment request at Cottonwood Road and West Babcock Street.

? Modifications to the Cottonwood Silos plan.

* Authorizing the city manager to sign a forestry-services agreement with Peck Forestry for a forest-management plan on the city's timbered lands in the Sourdough Creek Drainage.

? A contract for civil site inspection and survey services for construction activities related to the renovation of Story Mansion in an amount not to exceed $5,750. The cost would be paid for out of the contingency fund for mansion renovations.

The commission meets 6 p.m. at City Hall, 121 N. Rouse Ave.

County intends to OK Gallatin Gateway plan

By JESSICA MAYRER Chronicle Staff Writer

County Commissioners tweaked Gallatin Gateway's new blueprint for growth Tuesday, trying to find common ground among residents, before agreeing tentatively to adopt the community plan.

"It's messy, there are always people who don't like it," said Commissioner Bill Murdock of planning efforts.

Several folks came forward to say the document could infringe upon private property rights. But others said the plan, painstakingly produced through 18 months of meetings and community input, will help ensure predictability in an area that has seen oodles of growing pains.

Citing property rights concerns, several Gallatin Gateway residents, many on the periphery, opted out of the planning area. But there are neighbors voicing opposition who live in the middle of the planning area who will likely be rolled in.

"There is no consensus among the large landowners," said Gateway resident Clifford Nixon, who owns 320 acres of agricultural land.

Others, like Rocky Goertz, said guidelines and specifics remain blurry.

"What does it mean if you're rural residential?" he asked commissioners.

But as folks expressed desire to opt out, Murdock cautioned patchy planning could cause more problems.

"I don't want to see any Swiss cheese; I don't think that's healthy," he said.

And many neighbors in the small agricultural community came forward to support the document as inclusive and reassuring with its predictability.

"Growth is good, and it certainly isn't stopping growth," Gateway resident Anne Prescott said.

Planners are now ironing out rough spots, but it looks as if final commission approval will come in March, said County Planning Director Greg Sullivan.

From there, it will go through another round of public meetings before it becomes a zoning regulation, Sullivan said.

But as the county eyes broader zoning regulations, which, some say are more restrictive, those opting out of Gateway's planning district could get swept up in the broader growth plan.

Planners have touted the Gateway effort as proof communities may chart their own future, rather than being told by officials how they should grow. And so, folks are watching and learning from what comes out of Gateway's effort.

"This is a humungous part of implementing the county growth policy," Sullivan said.

As it stands, the blueprint recommends:

* Four-units-per-acre in the town core, and one unit per 10 acres, with developments clustered, in the outlying rural area.
* Property owners would not be allowed to build within 300 feet of the Gallatin River or 150 feet of other waterways, as existing subdivision regulations dictate.
* All existing businesses downtown will be grandfathered in. New growth will be encouraged in the town core.
* Heavy industrial uses and gravel pits will not be allowed in the town core. Gravel pits in rural Gateway must get a conditional use permit before mining. The plan recommends limiting sign size and restricting billboards to those already in place.
* The plan suggests the county commission create a design review board to oversee new development.

All of the commissioners voiced support for the plan, with Chairman Steve White voicing concern about who should be included in the planning area.

"I'm generally supportive of this. My dilemma is the boundaries," he said.

But Commissioners Joe Skinner and Murdock said all interests will never be satisfied, and they've made every effort to accommodate neighbor concerns.

"Consensus is something that no one likes but everyone can live with," said Gateway resident Carol Lee Roark, quoting from Margaret Thatcher.

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2009-01-20

Gateway passes sewer district

By Michael Tucker, staff writer

Gallatin Gateway residents last week passed a resolution forming a water and sewer district along with a board of directors to oversee the body, organizer Matt Donnelly said.

Gallatin Gateway has been part of a neighborhood planning process since November 2006 and covers 16,530 acres, county planner Warren Vaughan said. The plan affects 600 landowners and is divided into three parts — rural landowners, the business corridor along Highway 191 and Gateway proper.

The sewer district overlays Gateway proper and stretches across Highway 191 to include a handful of lots, according to planning documents. The idea to form the district was hatched from several neighborhood planning meetings.

Businesses and homes in the area currently use individual wells and septic systems and some of those systems are struggling, county planning director Greg Sullivan said. Approving a district not only affects physical troubles but also addresses long-range planning as well.

By providing the blueprint for central sewer and water, Gateway residents can have a say in how the community will grow, Sullivan said.

"This is essential to ensure Gateway and the whole neighborhood planning area remains vital," he said. "It's just a real fundamental aspect to the whole thing. It has a positive affect on everything — land value, economic opportunity — everything."

But not everyone agreed with the idea, Donnelly said in an e-mail.

"There were obviously some 'no' votes," he wrote. "People, myself included, are worried about the cost of the system and about the possibilities of changing the character of the town."

During planning meetings held in 2007, engineers discussed several ways to fund new infrastructure, including grants, according to planning documents.

The district board will hold their first meeting Feb. 23 and residents are encouraged to attend, Donnelly said.

"The more you say, the better ability the board will have to try to come up with solutions that work for the greatest number of people," he wrote.

Gallatin Gateway residents approve sewer district

By JESSICA MAYRER Chronicle Staff Writer

Gallatin Gateway residents voted to create a new sewer district this week, taking them one step closer to building the infrastructure required to better accommodate growth.

"It's a big piece of the growth plan for this area," said Gallatin Gateway Planning Group co-chair Dick Shockley.

Septic systems in Gallatin Gateway have been operating at maximum capacity. And as the area continues to grow, new infrastructure is desperately needed, said Matt Donnelly, a Gallatin Gateway resident who spearheaded efforts to make the sewer district a reality.

Now, with creation of the district, Gallatin Gateway will be able to start raising funds for a central sewer system, said county planner Warren Vaughan.

"I think it's a great thing for this community," Vaughan said.

And in a related decision this week, the County Planning Board approved Gallatin Gateway's blueprint for development. The community plan is a result of a long-term grassroots effort, and will go before the public and the Gallatin County Commission Jan. 27 at 9 a.m.

The plan, which emphasizes limiting growth to the town core, is an example of how neighborhoods may design their own blueprints for growth and opt out of a countywide zoning ordinance that could, pending public comment and commissioner approval, come online in the next several months.

The sewer district "goes hand-in hand with the plan," Shockley said. "Without the sewer, the plan wouldn't work. And without the plan, the sewer wouldn't work."

Now that the sewer district has been approved by voters, the newly elected sewer board now can begin raising funds to make the sewer a reality, Vaughan said.

"This was their critical first step," he said.

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Rural growth plan subject of debate

By JESSICA MAYRER Chronicle Staff Writer

Gallatin County planners are sifting through a stack of proposed regulations that could, pending the Gallatin County Commission's approval, limit development in the county's rural unzoned areas to one home per 160 acres.

The new blueprint, which includes a handful of exceptions, is intended to help guide growth in one of the fastest-growing counties in the state, planners say. They argue that without such a comprehensive approach, rural landowners will remain subject to unpredictable, often undesirable and unfettered sprawl in the Gallatin Valley.

Yet not everyone has the same vision.

A group of about 150 rural landowners recently submitted a petition asking commissioners to halt the plan.

"We're tired of being told how to live," Richard Morgan, who met with commissioners to voice his opposition, said this week. "The county has control over that already, without zoning."

There are about 1,000 square miles of unzoned land in the county. The petition represents about 400 square miles of county land.

A subcommittee of the Gallatin County Planning Board is working through some of the plan's kinks. The goal is to sketch out a fair zoning policy, balancing private property rights with smart growth, said County Planning Director Greg Sullivan.

"We would like this to reflect a shared community vision," he said.

But the rural opposition could halt the process. Although the existing petition is not a legal document, if commissioners do eventually approve the plan, a similar petition signed by a majority of rural agriculture or forestry producers within 30 days could stall the zoning ordinance for one year, Commission Chairman Steve White said.

"They can override the commission," White said.

And he worries that, in the long run, the existing zoning effort could be a waste of county resources.

Commissioner Joe Skinner said he thinks the plan is a good deal, and he will support it unless someone points out a fatal flaw. Because commissioners are increasingly skeptical about developments, nixing projects that look like sprawl, the rural plan actually gives landowners more room to grow.

"We're turning down more and more subdivisions," Skinner said. "They get more development potential with our plan."

It also spells out standards for any future projects, which should save landowners and developers money, worry and frustration.

In the meantime, county administrators on both sides of the issue encourage communities to create their own individualized blueprints for growth, as residents of Four Corners and Gallatin Gateway are doing, Skinner said. .

"I want communities to forge their own destinies," Skinner said.

But there are other options, too, White said, like incentive-based planning. Building roads and water lines is one way to localize future development without forcing people to stomach more regulations, he said.

"And then, also, we have subdivision regulations," he said. "The tools that we already have, I think, are important things."

White said he also worries that more regulations would require more planning staff. And as the economy continues to cool, it might not be the best time to grow county government.

"Are we going to be able to manage that with the staff we have?" he asked.

But planners say the new document is a necessary piece of the county's future, if infrastructure needs and growth are to be navigated smartly.

"We're trying to turn this into a flexible document that can learn and live over time," Sullivan said.

The discussion continues Tuesday at 3:30 p.m. in the Gallatin County Courthouse as the subcommittee continues hashing out details. The meeting is open to the public.

"We all want people to know what's going on," Skinner said.

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Gallatin County plans for growth

By JESSICA MAYRER Chronicle staff writer

How does Gallatin County accommodate breakneck growth, while retaining the farmland, open space and quality of life that lure people from all over, causing the growth to begin with?

That's the question county decision makers are trying to answer as they roll out a new zoning plan, which, at this stage, aims to limit development in agricultural areas.

Nearly 20,000 people have migrated to the Gallatin Valley since 2000. If that continues, in the next 20 years the valley will need 25,000 new homes to accommodate all the new residents, said County Planning Director Greg Sullivan.

And all those houses have to go somewhere.

The rural zoning proposal rolled out this week by Gallatin County planners, if approved by the County Commission, will restrict new development in unzoned rural areas outside of neighborhood planning districts to one home per 160 acres. A slew of exceptions and incentives, however, will give developers some wiggle room.

The plan has yet to go before the commission, and before it grows teeth, the public will be invited to comment at hearings in coming months.

"We sure welcome any questions or comments from the public," Planning Board Chairman Kerry White said.

There's little doubt planners will get an earful. The "Z" word inevitably raises hackles.

But without a comprehensive blueprint for growth, zoning advocates say, local residents risk erosion of the county's allure.

Willy-nilly development strains resources, Sullivan said. And the current patchwork of regulated and unregulated land leads to unpredictable and, at times, undesirable land use, Sullivan said.

A rural land plan is included in the larger Countywide Growth Policy adopted by commissioners in 2003, which stated their commitment to curbing sprawl.

Despite that commitment, a 2005 survey found that the majority of county residents felt the commission was not adequately managing growth.

And so, prompted by community dissatisfaction, county officials began to take a more proactive approach to planning.

Exceptions to the one-home-per-160-acre limit include:

+ landowners who agree to build homes close together would be allowed four homes per 160 acres;

+ family transfers, in which a relative receives a small piece of a larger property, will be exempt from the one-per-160 limit;

+ and agricultural producers would be free to build additional residences to accommodate farm and ranch hands.

Another option for rural landowners would be to sell their development rights to developers building in designated growth areas like Belgrade and Bozeman's periphery. Selling development rights means those rural landowners agree not to build for 40 years. Ultimately, the arrangement provides cash incentives to keep agricultural land open, Sullivan said.

As it stands, no density restrictions would apply to commercial development, although businesses would have to apply for conditional-use permits if they add more than 500 trips per day to a public road system, or build new structures within 5 feet of a waterway. Sand and gravel operations, too, would have to apply for a conditional-use permit.

There's substantial flexibility, planners say, and county administrators encourage communities to create their own blueprints for growth, such as folks in Four Corners and Gallatin Gateway are doing, said county planner Warren Vaughan.

If communities decide that's what's best for them, the county will help, providing resources and know how, Vaughan said.

"Anybody and everybody can do their own plan," Vaughan said.
The draft plan is available online at http://www.gallatin.mt.gov/Public_Documents/index
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Gallatin Gateway plans for growth

By JESSICA MAYRER Chronicle staff writer

In an attempt to tackle issues facing communities across the West, such as how to build and pay for schools, water and sewer infrastructure and how densely new developments should grow, Gallatin Gateway this week rolled out a plan that could shape its future.

Some say the Gallatin Gateway Community Plan provides an essential blueprint to guide growth. But others say if it's approved as it stands, it will infringe on property rights.

Neighbors who gathered Wednesday night to hash out their community's future debated a range of issues, including the plan's proposed zoning regulations, which, as it stands, would limit development to one home per 10 acres.

For many, the catch came from "clustering," or the plan's mandate to keep new construction limited to certain areas. For instance, a developer carving 10 properties from 100 acres would have to leave 65 of those acres as open space.

That didn't sit well with some.

"That land is now worth only the parcel that can be developed," said Wendy Hiebert, who, because of the zoning regulations, is opting out of the plan.

Folks, like Hiebert, who don't want to be included in the Gallatin document, may submit a written request, said county planner, Warren Vaughan. And, a few folks attending the Wednesday night community meeting said that's exactly what they intend to do.

But, others said the document is essential if locals are to have any say in how the area grows.

"We're trying to find some general rules for people to plan by," said Christie Francis, co-chair of the Gallatin Gateway Planning Committee, which steered the document's creation.

And as questions about where gravel mine operations should be allowed and how many billboards should be erected come to the fore, it's important area folks pipe up, said planning committee co-chair, Dick Shockley.

Because of infrastructure costs and the toll sprawling developments take on community resources, clustering homes just makes sense, Shockley said. "It's costing this county way too much to take care of sprawl."

At the opposite end of the spectrum, Lain Kay said there's no way the average family can afford to buy a 10-acre property, the minimum-sized parcel proposed by the plan.

"We're going to have the have's and the have not's," Kay said. "I just don't see how anyone can live here."

But planners don't dictate market forces, Shockley said. And the proposed zoning regulations that grew out of several meetings with large land owners are an attempt to satisfy folks who desire rural lifestyle and the needs of property owners.

Overall, the plan is relatively benign, Shockley said.

"I was shocked, my phone's not been ringing much," he said.

In addition to the tricky zoning issue, the plan tackles gravel pits, calling for standards to lessen impact on local residents and barring them from the town core. And it recommends limiting the size of future billboards, while disallowing new ones in the town center.

"It's a real delicate balance between private property rights and the future of our community," Shockley said.

A slew of stuff is in the works in conjunction with the plan, including the creation of a sewer and water district. Residents will have a chance to vote on that in January.

"That's a pretty huge part of getting the Gateway Plan implemented," Vaughan said.

And as enrollment rises at Gallatin Gateway School, they'll need to expand, too, said school-board member, Nikki Robbins.

While the discussion was, at times, heated, it's necessary, Vaughan said.

"We need to talk about how we're going to handle those big, basic things," he said.

The Gallatin Gateway Planning Committee will take suggestions generated from Wednesday's meeting and attempt to incorporate them into the final draft, Vaughan said.

"This is definitely not the end of the line," he said. "This is words on a page."

From there, the plan will go before county commissioners, who, after public discussion, will have the final say.

"There have been some contentious issues," Shockley said. "But, in my perception, they're healthy issues."

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Commission OKs Gateway sewer and water district vote

By JESSICA MAYRER Chronicle Staff Writer

Gallatin County Commissioners gave their approval Tuesday to a Jan. 13 vote on a proposed water-and-sewer district for Gallatin Gateway's town core.

During a regularly scheduled Tuesday meeting, commissioners, planners and locals unanimously voiced support for the district, which, if approved by voters, could alleviate some of the area's growing pains.

Septic systems in Gallatin Gateway have been operating at maximum capacity. And as the area continues to grow, new infrastructure is desperately needed, said Matt Donnelly, a Gallatin Gateway resident.

"We can't grow without public sewers," Donnelly said. "There's a recognized need for public water and sewer in Gallatin Gateway."

Pending voter approval, the sewer district, which locals and county officials have been planning for nearly two years, will again come before county commissioners and the public before money can be levied to build infrastructure.

"The big hurdle is money," Commissioner Steve White said. But if the sewer district makes it through voter approval, Gallatin Gateway will have access to additional funding through matching grant programs.

There's little doubt the community needs the new infrastructure, White said. But, "it's going to be a challenge to make this thing fly."

Commission Chairman Bill Murdoch said creating the new district is going to be tricky, but the commission would step up to help Gallatin Gateway secure grants and revenue.

"We're going to have to help you. We know that. So we'll work with you," Murdoch said.

Also on the January ballot, Gallatin Gateway residents also will have the opportunity to elect a sewer and water board to oversee the new district, said Charlotte Mills, Gallatin County Clerk and recorder.

Applications for those board positions are available through the clerk and recorders office and are due by Oct. 30.

Commission budget session Wednesday

By Chronicle Staff

The Gallatin County Commission will hold a budget work session at 1:30 p.m. on Wednesday, as long as the final taxable values have arrived from the Montana Department of Revenue.

Also this week, on Tuesday, commissioners are scheduled to meet at 9 a.m. to discuss water and sewer districts in Four Corners and Gallatin Gateway, among other things.

The agenda for that Tuesday meeting includes:

* A public hearing and decision on establishment of a Gallatin County Gravel Pit Interim Zoning Task Force;
* Consideration of a resolution to amend the county's subdivision regulations on water-conveyance facilities, such as ditches and canals;
* A public hearing and consideration of the Four Corners County Water and Sewer District tax levy request;
* A public hearing and decision on a resolution setting boundaries and calling for an election for the creation of the Gallatin Gateway Water and Sewer District;
* A public hearing and decision on RealCorn Associates' request on behalf of Verizon Wireless for preliminary approval of a telecommunications tower on a 2,996-square-foot leased property in Gallatin Gateway;
* A public hearing on a resolution for the Morningstar Montessori Revenue Bond, and calling for a Sept. 23 public hearing on the matter;
* A public hearing and decision on a request for preliminary approval extension of phase 2 of the Spain Bridge Meadows subdivision;
* A public hearing and decision on a request for preliminary approval, with three design standards waivers, of phase 7 of the Spanish Peaks Resort's subdivision.
* An appointment to the West Yellowstone TV District board.

Both meetings are scheduled for the community room in the Gallatin County Courthouse on West Main Street.

For more information, call 582-3027.

2009-07-10

Funds for Gateway Water District uncertain

By Michael Tucker, staff writer

Funding for the fledgling Gallatin Gateway Water and Sewer District is being called into question due to Gallatin County budgetary issues, which could knock the district out of the state funding cycle, both county and district officials said.

In May, the Gallatin County Planning Board voted 7-3 to dole out $15,000 to the district to fund a preliminary engineering study to look into nuts-and-bolts issues facing the new district. The money was needed to match a $15,000 grant from the Montana Treasure State Endowment Program, district manager Matt Donnelly said.

If the money isn't awarded to Gateway, the district runs the risk of missing a May 2010 deadline to submit funding requests to the state for the next legislative session, Donnelly said. A thorough study is needed to boost the project's ranking against similar requests from around the state.

At a district board meeting Monday, the group chose a firm to conduct the study, but because the funding is in question, the board is unable to sign a contract for the engineering work, Donnelly said.

'We have a concern that we will not make the May deadline to complete this (study),' he said. 'If we don't make the May deadline, we essentially get delayed for two years.'

But funding from the county was tied to an agreement that the Gallatin County Commission would increase the board's budget by that same amount, planning board president Kerry White said. The money in question comes from the board's discretionary funds that go toward a host of services and studies related to planning.

Commissioners did increase the overall budget for the planning board, but at the same time reduced some of the discretionary funds, County Administrator Earl Mathers said. Some of the board's money is funneled toward the planning department to shore up the planning board's work.

Even so, Mathers said, funding should be available to cover all of the planning board's projects, including the Gateway study. The county is facing bleak budgetary times due to a slowdown in growth and revenue is down across the entire spectrum, he said.

'I believe there is adequate funding for the planning board to accomplish the major activities they are interesting in performing,' he said. 'However, I would certainly concede they have less discretionary budget than they have in previous years and it's going to be tight. But it's going to be tight with all boards and departments that operate under the auspices of county government.'

The rub lies with an over-arching wastewater study that will examine a host of issues around the county, White said. The board has earmarked $45,000 to look into infrastructure needs and the best way to address them.

Originally, the Gateway area was included in the plan, but once the Gateway district was formed in

January, the board removed the hamlet from the study, White said. A subcommittee has been examining wastewater issues for more than a year and has put the project out to bid.

The board also doles out money to other planning projects, including a trail interconnect study, a review of the 2003 Growth Policy and three neighborhood planning efforts, White said.

With a limited amount in the pot, White said the Gateway request coupled with the wastewater study would eat into the available money.

'We could probably accomplish those two things (water-related studies), but we will probably sacrifice those other three,' he said.

The commission, though, is dedicated to helping out Gateway residents, County Commissioner Bill Murdock and Joe Skinner said. The water and sewer district was formed primarily because of the Gallatin Gateway neighborhood plan currently in the works.

According to the plan, the hamlet is suffering from overworked septic systems in the area. If future growth is going to be steered around the core of community, then a working community water and sewer district will be needed to accommodate more people.

And since the neighborhood planning process is a key component in the county's effort to control growth, the district's funding request should be granted, Murdock said.

'It's ideal for the planning board to do this,' he said. 'It's right down the alley of neighborhood planning, creating infrastructure and is consistent with the growth policy. I'm totally committed to helping (Gateway) with their study. It's exactly what that money is for.'

The issue will go before the planning board July 14 at 7 p.m. in the Community Room at the County Courthouse in Bozeman.

2008-06-27

Gateway residents file petition for sewer district

By Michael Tucker, staff writer

Gallatin Gateway residents took the plunge this week and submitted a petition to Gallatin County to form a sewer district, petition signature-gatherer Matt Donnelly said.

The Gallatin Gateway area has been part of a neighborhood planning process since November 2006, and covers about 17,000 acres, county planner Warren Vaughan said.

The plan is divided into three parts — rural landowners, the business corridor along Highway 191 and Gateway proper.

The sewer district would overlay Gateway proper, the Gallatin Gateway Inn and a handful of businesses across from the hamlet's entrance on Mill Street, Donnelly said, adding that the boundary is far from set in stone.

"There are pros and cons as to how you describe the boundary," he said. "But most of the advice coming in said start small."

The idea to form a sewer district grew from numerous planning meetings held over the years, Donnelly said. Currently, Gateway residents rely on individual wells and septic systems. And some of those systems are at the brink of failure.

"There are varying levels of 'failed,'" he said. "There has been systems that have been examined by the county where they said, 'You need corrective actions immediately.' But no one has moved off their property or has been condemned or anything like that."

Sewer districts fall under the purview of the Gallatin County Commission, said Tim Rourke, an environmental specialist with the Gallatin City-County Health Department. Districts are formed via resident petition, and the issue moves to the public hearing arena before commissioners take a vote.

If commissioners give the project the thumbs up, the issue moves on to a vote of the people. But that isn't likely to happen until after the November general election, Vaughan said.

If approved by voters, the project will takes years to come to fruition, Donnelly said.

"It will be about four years from now from where ever we start," he said.

If everything goes smoothly, the estimated timeline for construction would be the spring of 2012, according to planning documents. Sewage treatment plants are typically paid for through a mix of state grants and loans, along with bond issues.

2008-06-03

Gateway neighborhood plan to be unveiled

By Michael Tucker, staff writer

After nearly two years of preliminaries, proponents of a Gallatin Gateway Neighborhood Plan are entering into the nitty-gritty stage of writing a plan, Gallatin County Planner Warren Vaughan said.

The process started November 2006 and covers about 17,000 acres, Vaughan said. The plan is divided into three parts — rural landowners, the business corridor along Highway 191 and Gateway proper.

Community members held three large events where residents outlined general ideas and "laid the foundation for the process," Vaughan said.

"We're at a point now where there is a lot of discussion going on," he said.

The group will hold a meeting Wednesday to unveil a rough draft.

"We're rolling it all out for everyone to look at," he said.

Among the big ticket items are central sewer and water for the core community, "to protect the area's water quality," according to the planning document. Currently, all of Gateway is serviced by individual wells and septic systems.

Also, the plan calls for adopting standards for gravel pits in the area, the document states.

Drafters of the plan want to require gravel pit operators to obtain conditional use permits to "address off-site mitigation."

The rough draft discourages strip development along Highway 191, the plan states. Drafters are calling for commercial nodes along the state roadway to cluster businesses together, both to capitalize on existing highway access points and reducing sprawl. They also are requesting commercial development standards, including landscaping and site design.

The neighborhood planning process is part of the Gallatin County Growth Policy, which encourages residents in specific areas to draft and adopt zoning regulations that will directly affect each community, county officials have said.

Gateway planning document to be presented Wednesday

By JODI HAUSEN Chronicle Staff Writer

When a local developer wanted to turn 54 acres on state Highway 191 outside Gallatin Gateway into a 400-unit subdivision, it raised concerns. The tiny community south of Bozeman lacks a water or sewer district and at least two septic systems, including the school's, are already taxed to their limits.

"It's a major infrastructure problem," the developer, David Loseff, said last week. The community is comprised of "tight, little lots" all on individual septic systems, he said.

Gallatin County planners also felt that people in the community would want to provide input on a project of this size, planner Warren Vaughan said. For this reason, he said, they encouraged Loseff to initiate a neighborhood planning process.

The work began in late 2006 and resulted in a rough draft of the Gallatin Gateway Community Plan that will be presented to residents at 7 p.m. Wednesday at the Gallatin Gateway Community Center. The hope is for the document to become a guide for county commissioners in future planning decisions for the area.

"With that in mind, we sponsored and arranged the first six initial meetings," Loseff said. Loseff also hired a planner to facilitate the meetings, and in an effort to allay suspicions that the planner was acting solely on his behalf, Loseff did not attend those meetings.

"I was in a damned if I do and damned if I don't situation," Loseff said.

Eventually, the neighborhood group told Loseff they didn't need the facilitator.

"We don't need a developer to pay for this; we'll do it ourselves," Dick Shockley, co-chairman of the neighborhood planning committee said last week. But, he said of Loseff: "Much to his credit, he initiated the process."

The group sent surveys to about 650 landowners in Gallatin Gateway and received responses from more than 250, Vaughan said. Many people also attended and contributed to the meetings.

"We've had a really awesome grassroots democratic process," Vaughan said. "Not everyone's been happy with it, but we've made an unprecedented effort to listen to everybody and incorporate their thoughts and ideas."

Christie Francis, the committee's co-chairman said, "It's really cool to see people working together like this. It's what makes Gallatin Gateway unique. They're colorful people and they're not lacking an opinion. All those diverse people came together to solve our water issues and planning issues."

Most controversial in the process has been defining property rights.

"Large landowners are concerned with zoning because they feel like the people on the small lots are telling them what to do," County Commissioner Joe Skinner said. "And they are." People living on smaller lots want ranchers with large lots to continue ranching to retain open space but that isn't always feasible for them. "Small landowners want to see open space but they don't really care about agriculture," he said.

Skinner said zoning can concentrate development near services, which automatically conserves farmland, wildlife habitat and open space. "I'm not anti-zoning anymore. I think reasonable zoning is going to be good for the county."

Francis said finding common ground for the plan was difficult.

"But I think we've done a fantastic job," she said. "Everybody has their own idea about what property rights are or what they represent and so finding ways for people to come together, everybody has to give a little."

Shockley said it was the toughest process he's been involved in.

"The difficulty has been coming up with a solution that is acceptable to everybody and represents the community's vision and values as a whole," Shockley said.

In addition to a future planning document, the group's efforts spawned an endeavor to create a water and sewer district for the area. Heading up that group is Matt Donnelly, an electrical engineer and husband of Toni Donnelly, owner of Stacy's Bar.

The bar and restaurant's septic system has failed and needs to be pumped out weekly to avoid adverse environmental impacts. Additionally, the septic system at the community's school is operating beyond its limit, though it has yet to fail. So Donnelly and another group are investigating means to acquire and maintain a central sewer system for Gallatin Gateway.

"It's a huge issue and it's an important issue," Donnelly said. "Our community can't survive without a central sewer system. It's the right thing to do from the county planning perspective and from an environmental perspective."

Donnelly praised Francis and Shockley for their commitment to a difficult process.

"I really applaud Dick and Christie," he said. "(They) got everyone talking about the problems and then it was easy for me to step in now that I know there's not going to be so much agony over the process. They've taken most of the bullets."

Shockley, in turn, praised Vaughan.

"He's been a godsend," Shockley said. "I can't over-emphasize what a value he's been to the process and the county commissioners with their support."

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Survey reportedly casts doubt on regional sewer district

By WALT WILLIAMS, Chronicle Staff Writer

Building a single sewer system servicing the area between Bozeman, Belgrade and Four Corners, where much of the county's growth will occur in the next few years, is not feasible according to a recently released survey of developer, planners and engineers.

Conducted by David Aune of Great West Engineering of Helena, the survey supports the conclusion of a study he previously completed on the practicality of a regional sewer system servicing the triangle of developable land outlined by the three communities.

However, only nine people responded to the survey, which was mailed to 24 people. Aune wrote that he sent the survey forms in March and still had not received returns from everyone who promised to fill them out, but "enough time has elapsed that I need to close the survey effort."

The Gallatin County Planning Board commissioned both the survey and the study. While the survey didn't find much in the way of consensus among those who did replay, the results did support the idea that separate, centralized sewer systems for each of the three communities would be more feasible than a regional system.

Planning board members will continue to look at the issue.

"We're not to the point of making any decision regarding any kind of system," planning board member C.B. Dormire said.

The survey results were presented Thursday to the Gallatin County Commission. No action was taken.

The county has been looking at the feasibility of a regional wastewater system since 2004, when Clinton Cain of Bozeman suggested that a single sewer system could service the valley from Gallatin Gateway to Belgrade, where a large sewer plant would be located.

Gallatin County agreed to spend up to $11,000 to study the issue, but Bozeman and Belgrade, each having its own sewer systems, didn't participate.

Great West Engineering concluded that such a system wouldn't be feasible when it studied the issue a couple years ago because of the rights of way needed to cross private land and the cost of building the system. The company's recent survey found that sentiment was common among people it contacted.

Among the questions in the survey, respondents were asked if they agree that a large wastewater system servicing the area was unfeasible, or if Belgrade should consider expanding its sewer system to cover outlying areas.

Water availability and sewer capacity has been an issue in the triangle. On Tuesday, county commissioners sent the developers of the proposed Wild Horse subdivision outside Belgrade back to the drawing board, saying the project's proposal to install 26 individual wells and sewer systems failed to fit the county's growth policy.

Aune didn't rule out the possibility of maybe three sewer systems servicing most of the area around Bozeman, Belgrade and Four Corners, which is already happening to an extent. Both cities have their own systems and can hook up new subdivisions annexed into the communities, while many of the subdivisions around Four Corners will be served by the Four Corners Water and Sewer District.

Gallatin Gateway planning effort under way

By WALT WILLIAMS Chronicle Staff Writer

More homes or more farmland?

That's a question many Gallatin Gateway residents are pondering as they begin to lay the foundation for future development.

For the past few months, several people in the unincorporated community have been working to draft a Gallatin Gateway Neighborhood Plan.

Gallatin Gateway has the basic infrastructure of a town, and it will grow to a degree, Gallatin County Planner Warren Vaughan said. The plan will state what limits residents there want on growth and what policies and strategies could be used to help.

Neighborhood plans are not regulatory documents, so they can't be used by Gallatin County officials to make decisions. But they can be used as possible springboards to create policy, such as citizen-initiated zoning.

Four Corners already has a neighborhood plan in place and Gallatin County commissioners envision such documents serving as cornerstones in their efforts to guide growth countywide.

Gallatin Gateway's effort is only in its beginning stages.

"Our goal is, at this point in time, to get as much possible feedback from our community as we can," said Christie Francis, chair of the Gallatin Gateway Neighborhood Planning Committee.

The group is a 16-member volunteer board that meets the first and third Wednesdays of every month at the Community Center.

It has met informally since January, but one of its first official actions has been to send out a community survey to gather people's thoughts about how they would like to see Gallatin Gateway grow.

The survey asks what level of housing density they would like to see, and to rank the importance of farmland, open space, commercial or industrial development.

Residents are also asked to rank their level of concern on issues ranging from wildlife habitat to private property rights.

Board members also are looking at traffic, educational and public safety needs. One of the board members, for example, is a representative from the local fire department.

Ultimately, Gallatin Gateway's plan could resemble other neighborhood plans, or it may look nothing like them.

The plan for Four Corners, for example, lists four pages of suggestions, from avoiding strip commercial development along back roads to encouraging lighting that protects the night sky.

Planning committee co-chair Dick Shockley said the Four Corners plan may be too specific to that community to help.

"Unfortunately, it is not a good model for us because it doesn't have the specificity we think is needed" for Gallatin Gateway, he said.

But, he added, there could be other plans that other communities across the nation have drafted that may help out.

"Our intention is not to reinvent the wheel because there are lots of good models," he said.

The group's next meeting will be at 7 p.m. Wednesday at the community center.

More information about the effort, including an online survey, is available on the Web at www.gatewaycommunityplan.com

March 12, 2010

Gallatin Gateway
Water/Sewer District

I have property at the end of Lynde Street, I'm all for a water/a sewer system being put in Gallatin, especially a sewer system since Flood Plain + water table is so high.

I can not make meetings as I work in Dupuyer + Heart Butte + do support that the Board do whatever is Necessary to get a Water, Sewer District in place, and let's get this Project going, the sooner the Better

Sam Scott
owner → 203 Lynde Street

P.O. Bx 132
Dupuyer, MT
59432

472-3292

Rocky Mountain

Northern Rocky Mountain
Resource Conservation & Development Area, Inc.

502 South 19th Avenue, Suite 105, Bozeman, MT 59718
phone: (406) 582-5700, fax: (406) 582-5855
email: info@nrmrcd.org, web: www.nrmrcd.org

March 31, 2010

Jim Edgecomb, Program Manager
Treasure State Endowment Program
Montana Department of Commerce
P.O. Box 200523
Helena, Montana 59620-0523

Subject: Gallatin Gateway Wastewater System Improvements Project

Dear Mr Edgecomb:

On behalf the Northern Rocky Mountain Resource Conservation and Development Area (RC&D), I would like to express our organization's enthusiastic support for the Gallatin Gateway Water and Sewer District and its effort to fund the construction of a new centralized wastewater treatment facility for their community. It is a goal of our organization to assist communities with projects that enhance their infrastructure and community facilities and the project proposed by the District will achieve that goal for the residents of Gallatin Gateway.

Much of Gallatin Gateway was constructed before the establishment of Health Department regulations in the mid-1960s. Consequently, many of the individual septic systems in the community do not comply with current regulations and the majority of these systems are cesspools or septic tank/drainfields that either have failed, or have a high potential of failing in the near future. The soils in the project area are primarily coarse-grained sands and gravels, therefore when a system fails there is an increasingly high probability that water supply wells and groundwater will be contaminated. This situation creates a public health hazard for the community and justifies support for the proposed project.

In addition to the challenge of resolving a public health hazard, Gallatin County will not permit septic systems for new homes or businesses unless the proposed septic system meets current regulations and because of the conditions that exist in the area, the County's decision has effectively brought new construction to a standstill.

The District is requesting a $750,000 TSEP grant to fund, in part, the construction of a $4.3 million wastewater collection, treatment and disposal system. The new system will treat 50,000 gallons per day and will replace 80 individual septic systems and it will allow for the reasonable growth of Gallatin Gateway. For these reasons, we encourage you and your staff to do all that you can to give the District's request for $750,000 in Treasure State Endowment Program funding the highest possible ranking

Sincerely,

Travis Wright
Northern Rocky Mountain RC&D Acting Chairman

Cc: Matt Donnelly, Gallatin Gateway Water and Sewer District

Appendix V

Original Plat of Salesville (Gallatin Gateway)

SALESVILLE SUB C-25

SALESVILLE C-25

SALESVILLE
GALLATIN COUNTY
MONTANA

[illegible] Montana }
[illegible] Gallatin } ss

July 20th 1883

John I Tomlinson being duly sworn deposeth and saith I [illegible] Engineer have examined and surveyed the described premises being [illegible] of Salesville The Block Marked B and Numbered 1 to 14 each inclusive, [illegible] in each Block are sixty feet by one hundred and forty feet [illegible] not odd ones which are as Represented, Stones are located as shown [illegible] are some of them sixty feet wide, others Eighty feet wide as shown on the [illegible] all alleys are twenty feet wide, All of which has been laid out according to the acknowledged plat by the owner thereof.

John I Tomlinson Surveyor.

[illegible] and subscribed to before me & signed the date above mentioned

Frederick Cann
Justice of the Peace

Territory of Montana }
County of Gallatin } ss

Be it Remembered that I Margaret E. Tomlinson proprietor of the above described premises in said County and Territory do hereby [illegible] and certify that the foregoing plat is a true plat for all purposes of Record and Sale

In witness whereof I have hereunto set my hand and seal this 20th day of July A.D. 1883

Margaret E Tomlinson (Seal)

Territory of Montana }
County of Gallatin } ss

Be it Known that on this tenth day of July A.D. 1883 personally appeared before me a Justice of the peace in and for said County Margaret E. Tomlinson signer and sealer of the foregoing plat and acknowledged the execution of the same to be her free act and deed for the purpose therein expressed.

Witness my hand and seal this 10th day of July A.D. 1883.

Frederick Cann
Justice of the Peace,

[illegible] Record July [illegible] A.D. 1883 at 4.30 o'clock P.M. and Recorded in Book of Plats [illegible] of Gallatin County Montana Territory

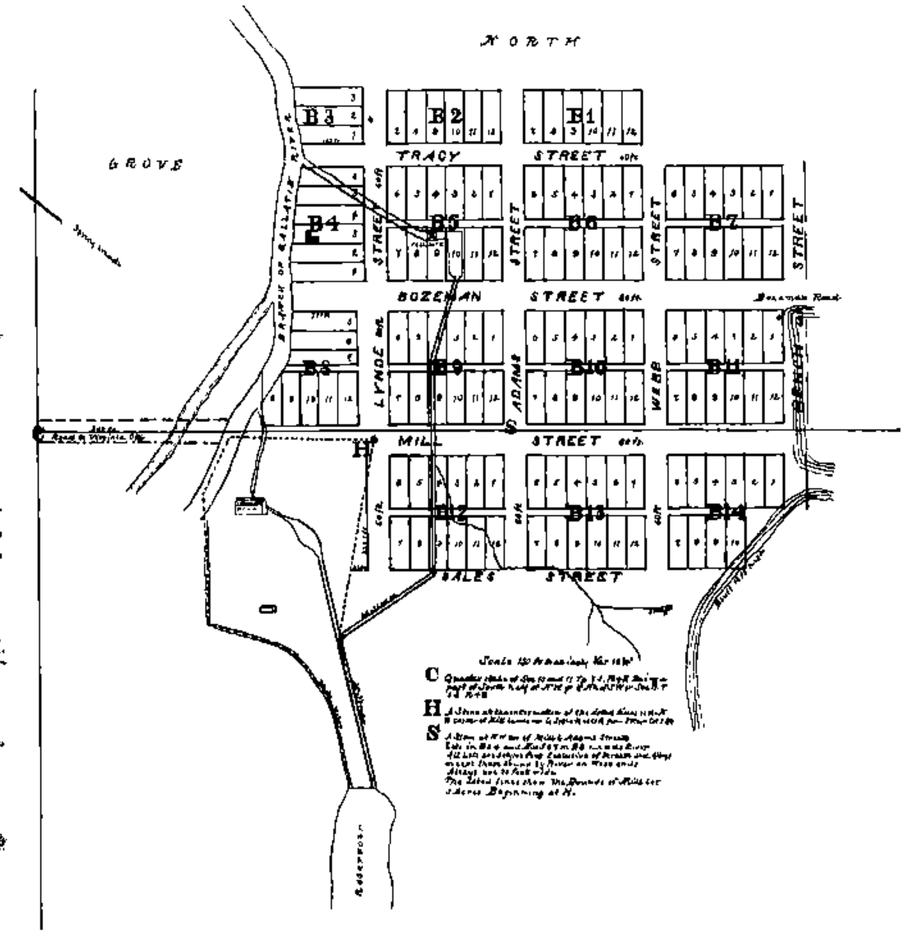
M. M. Black
County Recorder

By F. [illegible]
Deputy

[illegible] Montana }
[illegible] } ss

I, Jas. M. Brennan County Clerk in and for said County [illegible] certify that the foregoing is a full true and correct copy of the orig[illegible] Salesville Gallatin Co. M.T. now on file and of record in my office [illegible] my hand and the seal of said County this [illegible] day of September A.D. 1883

Jas. M. Brennan
County Clerk



Appendix W

GWIC Well Information

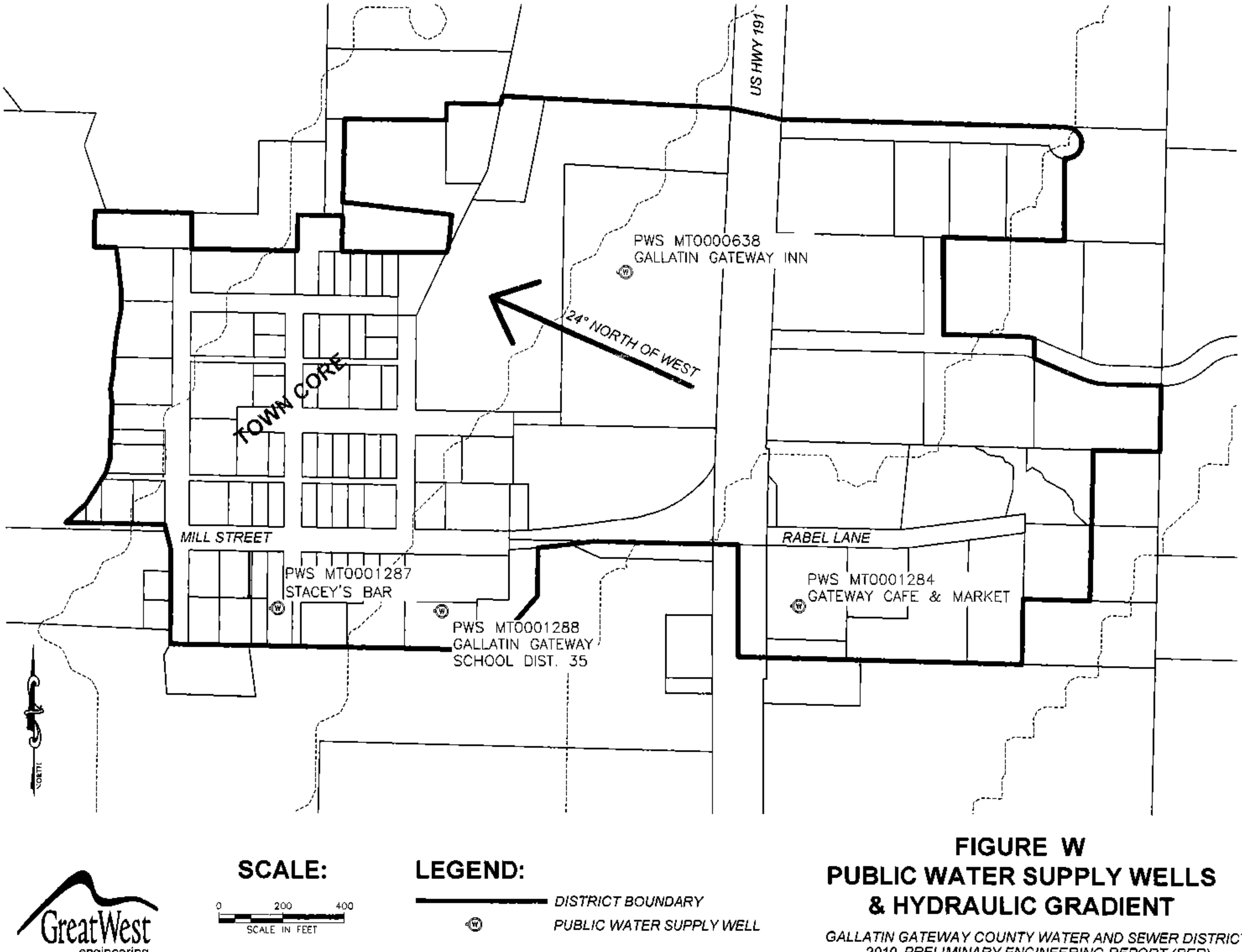


FIGURE W
PUBLIC WATER SUPPLY WELLS & HYDRAULIC GRADIENT

GALLATIN GATEWAY COUNTY WATER AND SEWER DISTRICT
2010 PRELIMINARY ENGINEERING REPORT (PER)

Gwic Id	PDF	DNRC WR	Site Name	Twn	Rng	Sec	Q Sec	Ver?	Type	Td	Swl	Pwl	Rwl	Yield	Test	Date	Use
98987			NICHOLS JOHN	03S	04E	11	DADA	No	WELL	50	20	20		10	PUMP	6/9/1976	DOMESTIC
99093		16710	NIXON ED	03S	04E	11		No	WELL	47	16	21		35	AIR	11/8/1977	DOMESTIC
99094			AMBERSON BELLE	03S	04E	11		No	WELL	40				6	OTHER	1/1/1927	DOMESTIC
99095			CONNOLLY R P	03S	04E	11		No	WELL	40	14	15		30	BAILER	8/24/1962	DOMESTIC
99096			HERMANSON GENE	03S	04E	11		No	WELL	41	3	8		45	BAILER	7/23/1971	DOMESTIC
99097		C00027830	PLUM CLIFFORD R & ALICE	03S	04E	11		No	WELL	40	9	18		30	OTHER	11/11/1946	DOMESTIC
99098			WORTMAN ELSON E & CLARA V	03S	04E	11		No	WELL	33	6			13	OTHER	8/1/1951	DOMESTIC
99099			BLANCHARD MAE	03S	04E	11		No	WELL	41	26	35			OTHER	12/14/1961	DOMESTIC
99100			BLANCHARD LUMBER CO	03S	04E	11		No	WELL	35		21			OTHER	9/1/1941	DOMESTIC
99101			KUCHLING EMIL	03S	04E	11		No	WELL	40	20			1	OTHER	1/1/1958	DOMESTIC
99102			WOOD JOSEPH W & VERBA BULAH	03S	04E	11		No	WELL	42	10			30	OTHER	9/1/1952	DOMESTIC
99103			WORTMAN ELSON E & CLARA V	03S	04E	11		No	WELL	29	7	9		30	BAILER	4/21/1962	DOMESTIC
99104			CARPENTER BERNADINE C	03S	04E	11		No	WELL	30				8	OTHER	10/1/1939	DOMESTIC
99105		9232	ALVERSON J J	03S	04E	11		No	WELL	46.3	12	25		50	PUMP	3/6/1974	DOMESTIC
99106			WEATHERLY JOHN R & KATHRYN M	03S	04E	11		No	WELL	42	10			45	OTHER	6/1/1912	DOMESTIC
99107			MCCOY WILLIAM F & MABEL	03S	04E	11		No	WELL	33	11	15		30	BAILER	10/11/1961	DOMESTIC
99108			GREER DAN	03S	04E	11		No	WELL	36	9	20		30	PUMP	5/21/1982	
99109			KRATTCER LOWELL	03S	04E	11		No	WELL	25	6	12		21	BAILER	6/26/1964	DOMESTIC
99110			MULLIGAN RUBY & CLYDE	03S	04E	11		No	WELL	59	2	24		25	BAILER	3/30/1962	DOMESTIC
99111			SALIDAY C R	03S	04E	11	A	No	WELL	62	7	26		75	BAILER	6/20/1980	
99112		16455	HOUGARD ERIC	03S	04E	11	AA	No	WELL	52	19	34		35	AIR	11/10/1977	DOMESTIC
99113		6793	LIGHT CECIL	03S	04E	11	AAA	No	WELL	56	11	35		50	PUMP	6/22/1976	DOMESTIC
99114			POTTS HERBERT A	03S	04E	11	AAB	No	WELL	125	35	45		500	PUMP	4/10/1980	IRRIGATION
99115		7654	THOMPSON RUSS	03S	04E	11	AC	No	WELL	60	26	31		60	BAILER	5/23/1975	DOMESTIC
99116			TIMBER WORKS INC	03S	04E	11	AC	No	WELL	60	30			50	AIR	3/29/1990	INDUSTRIAL
99117		6093	LUCE GEORGE S & LENA W	03S	04E	11	B	No	WELL	35	18	22		36	PUMP	4/16/1976	DOMESTIC
99118			PINKERTON G F	03S	04E	11	B	No	WELL	37	13	18		50	PUMP	7/16/1963	DOMESTIC
99119			ROBERTS FRED C	03S	04E	11	B	No	WELL	41	[illegible]			1	OTHER	1/1/1942	DOMESTIC
99120			TUDOR ROSS A & AGNES	03S	04E	11	B	No	WELL	33	23			50	OTHER	1/1/1911	DOMESTIC
99121			ROBERTS R G	03S	04E	11	B	No	WELL	41				1	OTHER	1/1/1947	DOMESTIC
99122			MULLIGAN RUBY M	03S	04E	11	B	No	WELL	33	13	14		21	PUMP	5/28/1965	DOMESTIC
99123		11157	SIGA LUMBER	03S	04E	11	BA	No	WELL	37.8	9	12		20	BAILER	10/2/1976	INDUSTRIAL
99124			DYKSTRA PAM	03S	04E	11	BA	No	WELL	40	13	30		30	PUMP	10/11/1984	DOMESTIC
99125			MARYOTT F L	03S	04E	11	BC	No	WELL	10	2			30	OTHER	12/31/1993	DOMESTIC
99126			THOMAS ARCHIE J	03S	04E	11	BC	No	WELL	30	16			5	PUMP	1/1/1929	DOMESTIC
99127		63714	KURLAND SYDNEY	03S	04E	11	BCA	No	WELL	36	5	15		30	PUMP	9/29/1986	DOMESTIC
99128			DANIELS JIM	03S	04E	11	BCC	No	WELL	30.3	4	14		30	PUMP	8/30/1973	DOMESTIC
99129			RCT REALTY	03S	04E	11	BD	No	WELL	80	10			80	AIR	4/12/1988	DOMESTIC
99130			GALLATIN GATEWAY INN	03S	04E	11	BDBA	No	WELL	68	23	27		470	PUMP	6/6/1987	FIRE PROTE
99131			HARGROVE ALLEN	03S	04E	11	BDB	No	WELL	39	10	30		26	BAILER	7/26/1982	DOMESTIC
99132		63820	BARNES ROSE	03S	04E	11	BDB	No	WELL	40	18	33		40	PUMP	3/11/1987	DOMESTIC
99133			HINZ GORDON	03S	04E	11	BDC	No	WELL	36	14	20		20	PUMP	6/13/1982	DOMESTIC
99134			IRVINE COMPANY	03S	04E	11	C	No	WELL	60	25			100	OTHER	1/1/1900	DOMESTIC
99135			HARGROVE JAY	03S	04E	11	C	No	WELL	60	42	50		60	BAILER	8/1/1984	DOMESTIC
99136			GUHUN ELIZABETH	03S	04E	11	C	No	WELL	43	8	6		40	BAILER	9/22/1983	DOMESTIC

99137		HARGROVE WESLEY & EDITH	03S	04E	11	CB	No	WELL	99	9	39	25	PUMP	10/31/1966	DOMESTIC
99138	49715	BAKER ROBERT J & EDITH E	03S	04E	11	CBA	No	WELL	33	9	9.5	60	PUMP	2/21/1963	DOMESTIC
99139	73750	TURNER ENTERPRISES	03S	04E	11	CBB	No	WELL	40	8	15	60	AIR	3/20/1990	DOMESTIC
99140	8747	TOPEL HUBERT	03S	04E	11	D	No	WELL	65	37	49	14	PUMP	6/5/1976	DOMESTIC
99141		PHILLIPS KURT & NINA	03S	04E	11	D	No	WELL	72	48	53	20	AIR	10/11/1984	DOMESTIC
99142		TOPEL CLIFFORD & FREDA	03S	04E	11	D	No	WELL	61	26	32	20	PUMP	6/14/1983	DOMESTIC
99143		HARGROVE WESLEY & EDITH	03S	04E	11	D	No	WELL	45	48			OTHER	6/1/1967	DOMESTIC
99144		MCMANUS DOUG	03S	04E	11	DA	No	WELL	50	21	22	10	PUMP	6/9/1976	DOMESTIC
99145		MELSON EVERETT	03S	04E	11	DA	No	WELL	70	60	65	15	AIR	4/1/1980	DOMESTIC
99146		DELOCK LEROY	03S	04E	11	DA	No	WELL	40	10	40	25	AIR	9/3/1980	
99147		RABEL JOHN & LINDA	03S	04E	11	DA	No	WELL	65	28		30	BAILER	6/6/1983	DOMESTIC
99148	60721	RABEL JOHN	03S	04E	11	DB	No	WELL	56	39	53	35	AIR	9/9/1965	DOMESTIC
99149		RABEL JOHN	03S	04E	11	DB	No	WELL	78	46		25	AIR	4/21/1968	DOMESTIC
99150		HARTMAN DEAN	03S	04E	11	DBA	No	WELL	66	38	40	40	BAILER	1/20/1979	DOMESTIC
99151	13988	SNELL RAYMOND	03S	04E	11	DBB	No	WELL	68	45	48	20	BAILER	4/12/1977	DOMESTIC
99152		HEAP JOE	03S	04E	11	DC	No	WELL	63	20	60	15	AIR	5/23/1979	DOMESTIC
99153		GLACIER MOUNTAIN CHEESE	03S	04E	11	DC	No	WELL	73	31	66	55	BAILER	12/12/1984	INDUSTRIAL
99154		SNELL RAYMOND & SHERYL	03S	04E	11	DD	No	WELL	67	25		30	PUMP	6/6/1982	IRRIGATION
99155		ROONEY WAYNE	03S	04E	11	DD	No	WELL	60	37		25	AIR	6/6/1990	DOMESTIC
99156	73109	HOUSTON RICHARD	03S	04E	11	DDD	No	WELL	80	40	65	30	AIR	6/21/1989	DOMESTIC
1E+05		SIGA LUMBER	03S	04E	11	BA	No	WELL	48	18	19	30	BAILER	12/28/1976	DOMESTIC
1E+05		BIG TIMBER WORKS	03S	04E	11	A	No	WELL	70	31		50	AIR	9/20/1990	
1E+05		SHEPPARD KEN	03S	04E	11		No	WELL	60	30	58	30	AIR	9/6/1991	DOMESTIC
1E+05	87215	BORDER TED & BETH	03S	04E	11	BCD	No	WELL	80	15	17	100	AIR	4/28/1993	DOMESTIC
1E+05		MT DEPT OF HWYS * DHES CHEESE	03S	04E	11	CC	No	BOREHOLE	50	36.6			OTHER	12/20/1993	GEOTECH
1E+05		MT DEPT OF HWYS * DHES CHEESE	03S	04E	11	CC	No	BOREHOLE	50	38			OTHER	1/4/1994	GEOTECH
1E+05	85056	LARSON DELBERT	03S	04E	11	DAC	No	WELL	60	28	45	20	AIR	8/26/1993	DOMESTIC
1E+05	99405	CLINE PAUL	03S	04E	11	BDB	No	WELL	77	16	30	50	AIR	9/12/1994	DOMESTIC
1E+05		RABEL GEORGE	03S	04E	11	ABB	No	WELL	60	18	25	50	AIR	1/6/1993	DOMESTIC
1E+05	85392	GATEWAY SCHOOL MUSEUM	03S	04E	11	ABB	No	WELL	60	37	55	20	AIR	6/22/1994	DOMESTIC
1E+05	85500	HANCOX DAVE	03S	04E	11	BCD	No	WELL	55	15	50	30	AIR	9/12/1994	DOMESTIC
1E+05		TATE FROSTY	03S	04E	11	B	No	WELL	60	15	56	55	AIR	6/26/1994	DOMESTIC
1E+05	103219	HARGROVE WESLEY	03S	04E	11	CCC	No	WELL	40	10	20	100	AIR	6/3/1994	DOMESTIC
2E+05	C095518-00	GALLATIN GATEWAY SCHOOL	03S	04E	11	CABA	Yes	WELL	60	6.58	9.2	37	PUMP	8/26/1995	PUBLIC WAT
2E+05	97995	HARGROVE RICHARD	03S	04E	11	CAA	No	WELL	60	30	53	50	AIR	8/16/1995	DOMESTIC
2E+05	96664	BISON GROUP INC	03S	04E	11	DBB	No	WELL	80	41	55	40	AIR	9/5/1995	DOMESTIC
2E+05	99397	HARGROVE MARIAN & JAY	03S	04E	11	CDD	No	WELL	80	30	75	30	AIR	7/16/1996	DOMESTIC
2E+05	99407	PAYNE RALPH & BERNICE	03S	04E	11	BDC	No	WELL	40	14	35	25	AIR	7/18/1996	DOMESTIC
2E+05		GALLATIN GATEWAY POST OFFICE *	03S	04E	11	BDCC	No	WELL	18	7.72			OTHER	5/29/1997	MONITORING
2E+05		GALLATIN GATEWAY POST OFFICE *	03S	04E	11	BDCC	No	WELL	17	8.78			OTHER	5/29/1997	
2E+05		GALLATIN GATEWAY POST OFFICE *	03S	04E	11	BDCC	No	WELL	17	8.91			OTHER	5/29/1997	
2E+05		MAWHINNEY DOUG	03S	04E	11	BD	No	WELL	49	12	33	45	AIR	7/28/1997	DOMESTIC
2E+05	101956	NYGARD ROBERT W	03S	04E	11	BCD	No	WELL	40	6		75	AIR	6/2/1997	DOMESTIC
2E+05		DESHEY E G	03S	04E	11		No	WELL	31				OTHER	10/23/1935	COMMERCIA
2E+05		DESHEY E G	03S	04E	11		No	WELL	30.5				OTHER	10/15/1938	COMMERCIA
2E+05		FEDERAL PUBLIC HOUSING	03S	04E	11		No	WELL	53				OTHER	12/15/1944	DOMESTIC
2E+05	I103243-00	WILLING WORKERS LADIES ACD INC	03S	04E	11	BDC	No	WELL	60	14	54	25	AIR	4/10/1998	DOMESTIC

2E+06	C106100-00	PINKERTON ERNIE	03S	04E	11	BBA	No	WELL	60	23	30		55 AIR	9/14/1996	DOMESTIC
2E+05		GALLATIN GATEWAY COMMUNTITY	03S	04E	11	BD	No	WELL							
2E+06	C112576-00	BLEVINS RICK	03S	04E	11	CAB	No	WELL	60	4	55		50 AIR	6/12/1998	DOMESTIC
2E+05	C30043653	ALLSOP BILL	03S	04E	11	CB	No	WELL	60	4	55		60 AIR	10/16/1996	DOMESTIC
2E+05	C106216-00	HARTMAN DEAN	03S	04E	11	DBA	No	WELL	60	25	55		40 AIR	7/1/1998	DOMESTIC
2E+05	C107579-00	GRIFFITH LESTER	03S	04E	11	AB	No	WELL	60	30		30	35 AIR	5/24/1999	
2E+05		GRIFFITH LESTER B & CHER	03S	04E	11	AC	No	WELL	60	31	55	31	50 AIR	3/18/1999	
2E+05		MCMANIS KURT	03S	04E	11	DB	No	WELL	60	10	-	10	75 AIR	11/4/1998	
2E+05	C112429-00	TURNER ENTERPRISES	03S	04E	11	BC	No	WELL	40	5		5	35 AIR	2/14/2000	DOMESTIC
2E+05		SULLIVAN DAVID	03S	04E	11	CCA	No	WELL	60	15			120 AIR	5/19/2000	DOMESTIC
2E+05	C115470-00	GRIFFITH LESTER & CHEYRL	03S	04E	11	ACD	No	WELL	55	29		29	30 AIR	12/29/2000	DOMESTIC
2E+05	C30024205	BUFFALO STATION/ LARRY BERG	03S	04E	11	DCCC	No	WELL	113	42.7	51	42.7	210 PUMP	1/15/2001	PUBLIC WAT
2E+06		GALLATIN GATEWAY RFD	03S	04E	11	BDC	No	WELL	[illegible]	33.5	33.5	15.5	1000 PUMP	[illegible]	OTHER
2E+05		POTTS HERBERT A * WELL 1	03S	04E	11	AAAC	No	WELL	65	26	30	26	90 PUMP	4/12/2002	IRRIGATION
2E+06		POTTS HERBERT A *WELL 2	03S	04E	11	AA	No	WELL	[illegible]	20	[illegible]	20	40 PUMP	[illegible]	DOMESTIC
2E+05		POTTS HERBERT A *WELL 3	03S	04E	11	AAB	No	WELL	60	23		23	25 AIR	2/15/1976	DOMESTIC
2E+06	C30004600	POTTS HERBERT AND EVELYN *WELL	03S	04E	11	AAC	No	WELL	[illegible]	19		18	60 AIR	[illegible]	DOMESTIC
2E+05		J AND K PROPERTIES	03S	04E	11	ACAA	No	WELL	61	35		35	50 AIR	8/26/2003	DOMESTIC
2E+05		MEDICE HAT INC. EDWIN ENGLER	03S	04E	11	BDCC	No	WELL	50	13.33		13.33	60 AIR	7/17/2003	DOMESTIC
2E+05		MDOT*PEDESTRIAN TUNNEL-	03S	04E	11	BDD	No	BOREHOLE	26.6				OTHER	4/15/2003	GEOTECH
2E+06		MCMANUS RAT	03S	04E	11	CB	No	WELL	[illegible]	38		20	20 AIR	[illegible]	DOMESTIC
2E+05		CHRISTY JOHN	03S	04E	11	ACCA	No	WELL	59.25	27		27	60 AIR	5/11/2004	DOMESTIC
2E+06		HARGROVE RICHARD	03S	04E	11	BD	No	WELL	[illegible]	40		40	[illegible] AIR	[illegible]	DOMESTIC
2E+05		HARGROVE WESLEY	03S	04E	11	BD	No	WELL	60	34		34	60 AIR	4/5/2004	DOMESTIC
2E+05		RENNEBERG HARDWARE	03S	04E	11	B	No	WELL	80	26		26	75 AIR	5/17/2004	DOMESTIC
2E+05		HARGROVE RICHARD	03S	04E	11	CA	No	WELL	78	30		30	75 AIR	7/19/2005	DOMESTIC
2E+06		BLEVINS, RICK	03S	04E	11	CB	No	WELL	41	[illegible]			OTHER	[illegible]	DOMESTIC
2E+05	C30020133	WHORRALL, PATRICK	03S	04E	11	DDD	No	WELL	80	50		50	30 AIR	11/6/2005	DOMESTIC
2E+05		MCGILL, JASON	03S	04E	11	ADBC	No	WELL	65	19		19	65 AIR	6/29/2006	DOMESTIC
2E+05		R & R WELL * HARGROVE RICHARD	03S	04E	11	C	No	WELL	56.5	8		8	75 AIR	6/21/2006	UNKNOWN
2E+05		GATEWAY VILLAGE, LLC	03S	04E	11	DACD	No	WELL	360	44		44	75 AIR	9/27/2006	IRRIGATION
2E+05		GATEWAY VILLAGE, LLC	03S	04E	11	DABD	No	WELL	56	39		39	10 AIR	9/27/2006	OTHER
2E+05		GATEWAY VILLAGE, LLC	03S	04E	11	BCCD	No	WELL	[illegible]	37.5		37.5	[illegible] AIR	9/27/2006	IRRIGATION
2E+05		GATEWAY VILLAGE, LLC	03S	04E	11	BBCD	No	WELL	90	42		42	60 AIR	9/27/2006	IRRIGATION
2E+06	C30025534	RUBLEIN ERIC	03S	04E	11	DAAB	No	WELL	[illegible]	38		38	40 AIR	[illegible]	DOMESTIC
2E+05		PRICE MICKY	03S	04E	11	DCD	No	WELL	100	56		56	18 AIR	11/7/2006	DOMESTIC
2E+06		ZINNER HELEN	03S	04E	11	CB	No	WELL	[illegible]	12		12	[illegible]	[illegible]	DOMESTIC
2E+05		ANDRES KEVIN	03S	04E	11	DD	No	WELL	83	45		45	30 AIR	5/14/2007	DOMESTIC
2E+06		CAMPBELL DREW	03S	04E	11	DDA	No	WELL	[illegible]	34		34	[illegible]	[illegible]	DOMESTIC
2E+05	C30042013	KAWASAKI JERRY & JODEE	03S	04E	11	DACC	No	WELL	60	36.5		36.5	15 AIR	4/3/2008	DOMESTIC
2E+06	C30043870	RABBI ADAM D	03S	04E	11	B	No	WELL	60	20		20	60 AIR	[illegible]	DOMESTIC

Average SWL for Lynde Street collection and lift station construction 7.3

Average SWL for Bench along east side of Highway 191 - Potential disposal area 33.1

Average SWL for Bench from Nicklin Report 43.1

Public Water Supply System

Montana Department of Environmental Quality
Data Source: Public Water Supply Section

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PWSID: MT0001287 **Name: STACEYS OLD FAITHFUL BAR**

City: GALLATIN GATEWAY **County:** GALLATIN **Tot Pop:** 200

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 06/13/2007 **Activity Status:** A

Type	Conns	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
CM	2	1/1-12/31	06/13/2007	200	T

Nitrate Results

FROM 01/01/2000 TO 03/30/2010

Fac ID: WL002 **Fac Name:** WELL 1 **Avl:** P **Status:** A **Src:** GW
Smp Pt ID: EP502 **Status:** A **Description:** EP FOR WELL 1 **Src Typ** RW

Analyte/CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	11/24/2009	43	BAL2009003313	1	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/16/2008	43	BAL200802527	0.04	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/16/2008	43	BAL20080252702	0.988	MG/L
IOC	1038	NITRATE-NITRITE	RT	05/27/2008	08	B08052584-001A	1.67	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/22/2007	08	B07011385-001A	1.05	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/21/2005	21	200512021723	1.05	MG/L
IOC	1038	NITRATE-NITRITE	RT	11/25/2003	21	5699P-N502	0.73	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/20/2002	21	02125843P-N502	0.86	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/10/2001	21	01094299PN502	0.83	MG/L

Montana Department of
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Data Source: Public Water Supply Section

Public Water Supply System

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PWSID: MT0001288 Name: GALLATIN GATEWAY SCHOOL DIST 35

City: GALLATIN GATEWAY **County:** GALLATIN **Tot Pop:** 192

Pri Src: GW **Class:** NTNC **Last Snty Srv Dt:** 11/16/2009 **Activity Status:** A

Type	Conn's	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
IN	1	9/1-6/30	11/16/2009	192	NT

Nitrate Results

FROM 01/01/2000 TO 03/30/2010

Fac ID: TP001 **Fac Name:** TREATMENT PLANT **Avl:** P **Status:** A **Src:** GW
Smp Pt ID: EP503 **Status:** A **Description:** EP FOR TP WELL **Src Typ** FN

Analyte CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	03/30/2009	08	B09040093-001A	2.01	MG/L
IOC	1038	NITRATE-NITRITE	RT	03/25/2008	08	B08031855-001A	1.76	MG/L
IOC	1038	NITRATE-NITRITE	RT	03/19/2007	08	B07031602-001A	1.34	MG/L

Fac ID: WL003 **Fac Name:** WELL 2 1995 **Avl:** P **Status:** A **Src:** GW
Smp Pt ID: EP503 **Status:** I **Description:** INACT EP FOR WELL 2 **Src Typ** FN

Analyte CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	03/08/2006	08	B06030669-001C	1.92	MG/L
IOC	1038	NITRATE-NITRITE	RT	04/11/2005	08	B05041090-001A	2.80	MG/L
IOC	1038	NITRATE-NITRITE	RT	06/05/2004	08	B04060716-007A	1.98	MG/L
IOC	1038	NITRATE-NITRITE	RT	02/09/2004	08	B04020610-001-I503	1.73	MG/L
IOC	1038	NITRATE-NITRITE	RT	08/07/2003	08	B03080469-001-N503	1.3	MG/L
IOC	1038	NITRATE-NITRITE	RT	06/14/2002	30	0502W00878-N503	1.24	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/14/2001	14	P011079N	1.32	MG/L

Montana Department of
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Data Source: Public Water Supply Section

Public Water Supply System

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PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET

City: GALLATIN GATEWAY **County:** GALLATIN **Tot Pop:** 203

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 02/07/2007 **Activity Status:** A

Type	Conns	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
CM	2	1/1-12/31	08/25/2000	3	R
		1/1-12/31	01/01/1997	200	T

Nitrate Results

FROM 01/01/2000 TO 03/30/2010

Fac ID: WL002 **Fac Name:** WELL 1 **Avl:** P **Status:** A **Src:** GW

Smp Pt ID: EP502 **Status:** A **Description:** EP FOR WELL 1 **Src Typ** FN

Analyte CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	01/19/2010	01	C1001-0162	2.22	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/14/2009	01	C0901-0150	2.31	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/07/2008	01	C0801-0047	2.25	MG/L
IOC	1038	NITRATE-NITRITE	RT	02/13/2007	01	C0702-0506	1.81	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/29/2007	01	C0701-0372	1.74	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/30/2005	21	200601014210	1.56	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/10/2003	21	5908P-N502	1.51	MG/L
IOC	1038	NITRATE-NITRITE	RT	11/26/2002	21	5516P-N502	1.2	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/10/2001	21	01094288PN502	2.17	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/13/2000	08	00-60767-1N	1.30	MG/L

Montana Department of
ENVIRONMENTAL QUALITY
Data Source: Public Water Supply Section

Public Water Supply System

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PWSID: MT0000638 **Name: GALLATIN GATEWAY INN**

City: GALLATIN GATEWAY **County:** GALLATIN **Tot Pop:** 62

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 05/10/2007 **Activity Status:** A

Type	Conn's	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
CM	4	1/1-12/31	05/11/2007	2	R
RS	1	1/1-12/31	05/11/2007	12	NT
		1/1-12/31	05/11/2007	48	T

Nitrate Results

FROM 01/01/2000 TO 03/30/2010

Fac ID: TP001 **Fac Name:** TREATMENT PLANT FOR WELL 1 **Avl:** P **Status:** A **Src:** GW

Smp Pt ID: EP502 **Status:** A **Description:** EP FOR WELL 1 TP **Src Typ** FN

Analyte/CAS No	Code	Analyte Name	Type	Collection D	Lab	Sample Number	Result	
IOC	1038	NITRATE-NITRITE	RT	08/03/2009	43	BAL2009001997	2.64	MG/L
IOC	1038	NITRATE-NITRITE	RT	06/04/2008	43	BAL200801274-02	1.87	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/31/2007	09	0702002-001	1.62	MG/L
IOC	1038	NITRATE-NITRITE	RT	12/19/2005	21	200512021716	1.51	MG/L
IOC	1038	NITRATE-NITRITE	RT	01/31/2005	21	200502002302	1.66	MG/L
IOC	1038	NITRATE-NITRITE	RT	11/04/2003	21	5439P-N502	1.88	MG/L
IOC	1038	NITRATE-NITRITE	RT	11/27/2002	21	5546P-N502	2.35	MG/L
IOC	1038	NITRATE-NITRITE	RT	09/10/2001	21	01094298PN502	0.14	MG/L
IOC	1038	NITRATE-NITRITE	RT	10/26/2000	MIG	00105542P-I502	2.66	MG/L

Montana Department of
ENVIRONMENTAL QUALITY
Data Source: Public Water Supply Section

Public Water Supply System

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PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET

City: GALLATIN GATEWAY **County:** GALLATIN **Tot Pop:** 203

Pri Src: GW **Class:** NC **Last Snty Srv Dt:** 02/07/2007 **Activity Status:** A

Type	Conn's	In Srvc Dts	Eff Begin Dt	Avg Daily Cnt	Type
CM	2	1/1-12/31	08/25/2000	3	R
		1/1-12/31	01/01/1997	200	T

Bacti Results **FROM 01/01/2000 TO 03/30/2010**

Collection D	Lab Number	Type	Orig Lab #	Code		TCR	Presence	Fec EC	Result
03/17/2010	W1003-0963	RT		3100	COLIFORM (TCR)	A	-		
03/17/2010	W1003-0963	RT		3014	E. COLI	A			-
02/08/2010	W1002-0513	RT		3100	COLIFORM (TCR)	A	-		
02/08/2010	W1002-0513	RT		3014	E. COLI	A			-
01/19/2010	W1001-0261	RT		3100	COLIFORM (TCR)	A	-		
01/19/2010	W1001-0261	RT		3014	E. COLI	A			-
12/14/2009	W0912-5170	RT		3100	COLIFORM (TCR)	A	-		
12/14/2009	W0912-5170	RT		3014	E. COLI	A			-
11/10/2009	W0911-4726	RT		3100	COLIFORM (TCR)	A	-		
11/10/2009	W0911-4726	RT		3014	E. COLI	A			-
10/20/2009	W0910-4370	RT		3014	E. COLI	A			-
10/20/2009	W0910-4370	RT		3100	COLIFORM (TCR)	A	-		
9/08/2009	W0909-3688	RT		3100	COLIFORM (TCR)	A	-		
09/08/2009	W0909-3688	RT		3014	E. COLI	A			-
08/10/2009	W0908-3255	RT		3014	E. COLI	A			-
08/10/2009	W0908-3255	RT		3100	COLIFORM (TCR)	A	-		
07/07/2009	W0907-2672	RT		3014	E. COLI	A			-
07/07/2009	W0907-2672	RT		3100	COLIFORM (TCR)	A	-		
06/15/2009	W0906-2384	RT		3014	E. COLI	A			-
06/15/2009	W0906-2384	RT		3100	COLIFORM (TCR)	A	-		
05/06/2009	W0905-1765	RT		3014	E. COLI	A			-
05/06/2009	W0905-1765	RT		3100	COLIFORM (TCR)	A	-		
04/13/2009	W0904-1387	RT		3100	COLIFORM (TCR)	A	-		
04/13/2009	W0904-1387	RT		3014	E. COLI	A			-
03/09/2009	W0903-0962	RT		3100	COLIFORM (TCR)	A	-		
02/23/2009	W0902-0753	RT		3100	COLIFORM (TCR)	A	-		
01/14/2009	W0901-0231	RT		3100	COLIFORM (TCR)	A	-		
12/10/2008	W0812-5126	RT		3100	COLIFORM (TCR)	A	-		
11/17/2008	W0811-4714	RT		3100	COLIFORM (TCR)	A	-		
10/14/2008	W0810-4272	RT		3100	COLIFORM (TCR)	A	-		
09/23/2008	W0809-3890	RT		3100	COLIFORM (TCR)	A	-		
08/12/2008	W0808-3289	RT		3100	COLIFORM (TCR)	A	-		
07/09/2008	W0807-2636	RT		3100	COLIFORM (TCR)	A	-		
06/18/2008	W0806-2310	RT		3100	COLIFORM (TCR)	A	-		

(continued)

PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET

Collection D	Lab Number	Type	Orig Lab #	Code		TCR Presence	Fec EC Result
05/14/2008	W0805-1833	RT		3100	COLIFORM (TCR)	A	-
04/09/2008	W0804-1374	RT		3100	COLIFORM (TCR)	A	-
03/24/2008	W0803-1071	RT		3100	COLIFORM (TCR)	A	-
02/19/2008	W0802-0664	RT		3100	COLIFORM (TCR)	A	-
01/07/2008	W0801-0091	RT		3100	COLIFORM (TCR)	A	-
12/11/2007	W0712-5161	RT		3100	COLIFORM (TCR)	A	-
11/27/2007	W0711-4954	RT		3100	COLIFORM (TCR)	A	-
10/24/2007	W0710-4505	RT		3100	COLIFORM (TCR)	A	-
09/24/2007	W0709-4023	RT		3100	COLIFORM (TCR)	A	-
08/14/2007	W0708-3394	RT		3100	COLIFORM (TCR)	A	-
07/23/2007	W0707-3016	RT		3100	COLIFORM (TCR)	A	-
06/25/2007	W0706-2539	RT		3100	COLIFORM (TCR)	A	-
05/09/2007	W0705-1852	RT		3100	COLIFORM (TCR)	A	-
04/17/2007	W0704-1512	RT		3100	COLIFORM (TCR)	A	-
03/14/2007	W0703-1046	RT		3100	COLIFORM (TCR)	A	-
02/13/2007	W0702-0635	RT		3100	COLIFORM (TCR)	A	-
01/29/2007	W0701-0399	RT		3100	COLIFORM (TCR)	A	-
11/21/2006	06114035P	RT		3100	COLIFORM (TCR)	A	-
0/23/2006	06103736P	RT		3100	COLIFORM (TCR)	A	-
09/22/2006	06093363P	RT		3100	COLIFORM (TCR)	A	-
08/21/2006	06082792P	RT		3100	COLIFORM (TCR)	A	-
07/10/2006	06072205P	RT		3100	COLIFORM (TCR)	A	-
06/12/2006	06061857P	RT		3100	COLIFORM (TCR)	A	-
05/17/2006	06051510P	RT		3100	COLIFORM (TCR)	A	-
04/19/2006	06041135P	RT		3100	COLIFORM (TCR)	A	-
03/15/2006	06030741P	RT		3100	COLIFORM (TCR)	A	-
02/13/2006	06020423P	RT		3100	COLIFORM (TCR)	A	-
01/09/2006	06010070P	RT		3100	COLIFORM (TCR)	A	-
12/12/2005	05124689P	RT		3100	COLIFORM (TCR)	A	-
11/14/2005	05114414P	RT		3100	COLIFORM (TCR)	A	-
10/27/2005	05104200P	RT		3100	COLIFORM (TCR)	A	-
09/26/2005	05093757P	RT		3100	COLIFORM (TCR)	A	-
08/17/2005	05083179P	RT		3100	COLIFORM (TCR)	A	-
07/26/2005	05072795P	RT		3100	COLIFORM (TCR)	A	-
07/18/2005	05072663P	RT		3100	COLIFORM (TCR)	A	-
06/20/2005	05062199P	RT		3100	COLIFORM (TCR)	A	-
05/16/2005	05051629P	RT		3100	COLIFORM (TCR)	A	-
04/25/2005	05041274P	RT		3100	COLIFORM (TCR)	A	-
03/07/2005	05030693P	RT		3100	COLIFORM (TCR)	A	-
02/07/2005	05020365P	RT		3100	COLIFORM (TCR)	A	-

PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET (continued)

Collection D	Lab Number	Type	Orig Lab =	Code		TCR	Presence	Fec.EC Result
01/10/2005	05010076P	RT		3100	COLIFORM (TCR)	A	-	
11/15/2004	04114678P	RT		3100	COLIFORM (TCR)	A	-	
10/20/2004	04104355P	RT		3100	COLIFORM (TCR)	A	-	
09/22/2004	4093937	RT		3100	COLIFORM (TCR)	A	-	
09/22/2004	4093938	RT		3100	COLIFORM (TCR)	A	-	
09/22/2004	4093939	RT		3100	COLIFORM (TCR)	A	-	
09/22/2004	4093940	RT		3100	COLIFORM (TCR)	A	-	
09/22/2004	4093941	RT		3100	COLIFORM (TCR)	A	-	
08/11/2004	04083266P	RP	04083229F	3100	COLIFORM (TCR)	A	-	
08/11/2004	04083267P	RP	04083229F	3100	COLIFORM (TCR)	A	-	
08/11/2004	04083268P	RP	04083229F	3100	COLIFORM (TCR)	A	-	
08/11/2004	04083269P	RP	04083229F	3100	COLIFORM (TCR)	A	-	
08/09/2004	04083229P	RT		3100	COLIFORM (TCR)	P	+	
08/09/2004	04083229P	RT		3014	E. COLI	A		-
07/12/2004	04072740P	RT		3100	COLIFORM (TCR)	A	-	
06/07/2004	04062143P	RT		3100	COLIFORM (TCR)	A	-	
05/10/2004	04051712P	RT		3100	COLIFORM (TCR)	A	-	
04/07/2004	04041258P	RT		3100	COLIFORM (TCR)	A	-	
03/22/2004	04030982P	RT		3100	COLIFORM (TCR)	A	-	
02/23/2004	04020606P	RT		3100	COLIFORM (TCR)	A	-	
01/26/2004	04010286P	RT		3100	COLIFORM (TCR)	A	-	
12/10/2003	03125907P	RT		3100	COLIFORM (TCR)	A	-	
10/28/2003	03105302P	RT		3100	COLIFORM (TCR)	A	-	
09/29/2003	03094820P	RT		3100	COLIFORM (TCR)	A	-	
08/25/2003	03083995P	RT		3100	COLIFORM (TCR)	A	-	
07/30/2003	03073437P	RT		3100	COLIFORM (TCR)	A	-	
06/30/2003	03062834P	RT		3100	COLIFORM (TCR)	A	-	
05/13/2003	03051890P	RT		3100	COLIFORM (TCR)	A	-	
04/29/2003	03041654P	RT		3100	COLIFORM (TCR)	A	-	
03/26/2003	03031131P	RT		3100	COLIFORM (TCR)	A	-	
02/24/2003	03020701P	RT		3100	COLIFORM (TCR)	A	-	
01/28/2003	03010351P	RT		3100	COLIFORM (TCR)	A	-	
12/19/2002	02125823P	RT		3100	COLIFORM (TCR)	A	-	
11/26/2002	02115516P	RT		3100	COLIFORM (TCR)	A	-	
10/22/2002	02104871P	RT		3100	COLIFORM (TCR)	A	-	
09/24/2002	02094336P	RT		3100	COLIFORM (TCR)	A	-	
09/24/2002	02094337P	RT		3100	COLIFORM (TCR)	A	-	
09/24/2002	02094338P	RT		3100	COLIFORM (TCR)	A	-	
09/24/2002	02094339P	RT		3100	COLIFORM (TCR)	A	-	
09/24/2002	02094340P	RT		3100	COLIFORM (TCR)	A	-	

PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET (continued)

Collection D	Lab Number	Type	Orig Lab #	Code		TCR	Presence	Fec.EC Result
08/05/2002	02083294P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083294P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083295P	RT		3100	COLIFORM (TCR)	A	-	
08/05/2002	02083296P	RT		3014	E. COLI	A		-
08/05/2002	02083296P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083297P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083297P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083298P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083298P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072883	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072883	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072884P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072884P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072885P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072885P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072886P	RT		3014	E. COLI	A		-
07/17/2002	02072886P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072886P	RT		3100	COLIFORM (TCR)	P	+	
7/17/2002	02072886P	RT		3100	COLIFORM (TCR)	P	+	
7/17/2002	02072909P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072909P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072909P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072909P	RT		3014	E. COLI	A		-
06/17/2002	02062308P	RP	02062215F	3013	FECAL COLIFORM	A		-
06/17/2002	02062308P	RP	02062215F	3100	COLIFORM (TCR)	P	+	
06/17/2002	02062309P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/17/2002	02062310P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/17/2002	02062311P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/12/2002	02062215P	RT		3100	COLIFORM (TCR)	P	+	
~~06/12/2002~~	~~02062215P~~	RT		3013	FECAL COLIFORM	P		+
04/16/2002	02041271P	RT		3100	COLIFORM (TCR)	A	-	
03/23/2002	02030904P	RT		3100	COLIFORM (TCR)	A	-	
02/26/2002	02020646P	RT		3100	COLIFORM (TCR)	A	-	
01/28/2002	02010252P	RT		3100	COLIFORM (TCR)	A	-	
12/12/2001	01125885P	RT		3100	COLIFORM (TCR)	A	-	
11/29/2001	01115673P	RT		3100	COLIFORM (TCR)	A	-	
10/27/2001	01105154P	RT		3100	COLIFORM (TCR)	A	-	
09/10/2001	01094288P	RT		3100	COLIFORM (TCR)	A	-	
08/28/2001	01083906P	RT		3100	COLIFORM (TCR)	A	-	
07/17/2001	01073045P	RT		3100	COLIFORM (TCR)	A	-	

PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET (continued)

Collection D	Lab Number	Type	Org Lab #	Code		TCR Presence	Fec/EC Result
06/19/2001	01062450P	RT		3100	COLIFORM (TCR)	A	-
05/29/2001	01052007P	RT		3100	COLIFORM (TCR)	A	-
04/11/2001	01041218P	RT		3100	COLIFORM (TCR)	A	-
03/08/2001	01030789P	RT		3100	COLIFORM (TCR)	A	-
02/15/2001	01020571P	RT		3100	COLIFORM (TCR)	A	-
01/26/2001	01010310P	RT		3100	COLIFORM (TCR)	A	-
12/27/2000	00126361P	RT		3100	COLIFORM (TCR)	A	-
11/29/2000	00116090P	RT		3100	COLIFORM (TCR)	A	-
10/26/2000	00105546P	RT		3100	COLIFORM (TCR)	A	-
08/21/2000	00084183P	RT		3100	COLIFORM (TCR)	A	-
07/13/2000	00073476P	RT		3100	COLIFORM (TCR)	A	-
06/29/2000	00063183P	RT		3100	COLIFORM (TCR)	A	-
05/30/2000	00052649P	RT		3100	COLIFORM (TCR)	A	-
04/25/2000	00042032P	RT		3100	COLIFORM (TCR)	A	-
03/20/2000	31371	RT		3100	COLIFORM (TCR)	A	-
02/29/2000	20940P	RT		3100	COLIFORM (TCR)	A	-
01/11/2000	10121P	RT		3100	COLIFORM (TCR)	A	-

Online Query Report Abbreviations

System Information

Type R (RS) - residential	**Type CM** - commercial	**In Srcv Dts-** schedule applicable dates
Eff Begin DT – date population changes were made	**Avg Daily Cnt** – total population	**Conn's** – number of service connections
NT- population type non transient	**R** – population type residential	**T** – population type transient
W – population type wholesale		

Facility and Entry Point Information

GW – ground water	**SW** – surface water	**GU** – GWUDISW ground water under influence service water
WL – well	**IN** – intake	**SP** – spring
ST – storage facility	**RS** – reservoir	**CW** – clear well
CH – common header	**PC** –pressure control	**PF** – pump facility
EP – entry point	**DS** – distribution	**SP001** – sample point for distribution
TP – treatment	**TP Units** – treatment process unit code	**DBP** – disinfection byproducts
TTHM – total trihalomethanes	**HAA5** – 5 haloacetic acids	**TOC** – total organic carbon
DBPMAX – disinfection byproducts at maximum residence time	**TOCRAW** – total organic carbon at raw water source	**TOCFIN** – total organic carbon at finished water
DBPAVG – disinfection byproducts at average residence time		

Sample Schedules/Monitoring Requirements

QT - quarterly	**Y** - yearly	**MN** - monthly
CDS – compliance decision support		
TCR – total coliform rule	**RT** - Routine	**TR5** – temporary routine follow-ups (5 samples)
ARSE – arsenic	**NITR** – nitrate + nitrite	
INO1 – P2 P5 inorganics	**P2** – phase 2 inorganics, barium, cadmium, chromium, fluoride, mercury, selenium	**P5** – phase 5 inorganics, antimony, beryllium, nickel, thallium
INO2 – P5 inorganics	**INO3** – waiver P2-P5	**INO4** – waiver P2
SOC1 – synthetic organic chemicals (3 methods)	**SOC2** – method 515 only	**SOC3** – method 531 only
SOC4 – method 525 only	**VOC1** – volatile organic chemicals	
GRAL – gross alpha	**COMB** – radium 226+228 combined	**URAN** - Uranium
ASBE – asbestos	**PBCU** – lead and copper	**PBCQ** – lead and copper water quality parameters
CDBP-compliance disinfection by products		

CHEMICAL RESULTS

Fac ID – Facility point identification	**SMP Pt ID** – Sample point identification

VIOLATIONS & ENFORCEMENTS

SIE-a state public notice was requested from the system	**SIA**- a violation letter was issued by the state	**SOX**- the state has indicated that the status of violation has been returned to compliance
SIF-state public notice has been received	**REF**- PWS has referred the violation to Enforcement	**SFO**- state administrative order issued with penalty
SFL- state administrative order issued without penalty		

MONTANA WELL LOG REPORT

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Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:28:42 PM)

Site Name: MCMANUS PAT
GWIC Id: 208661

Section 1: Well Owner

Owner Name
MCMANUS PAT
Mailing Address
12160 GLACIER MTN WAY

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼ SW¼

County **Geocode**
GALLATIN

Latitude	Longitude	Geomethod	Datum
45.589005	111.203737	TRS-SEC	NAD83

Altitude **Method** **Datum** **Date**

Addition **Block** **Lot**

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Friday, January 23, 2004

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	117	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	77	6	0.250		WELDED	STEEL
57	117	4.5		160.00	WELDED	PVC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
77	117	4.5	3	1/8 IN	DRILLED HOLES

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 117
Static Water Level: 38
Water Temperature:

Air Test *

20 gpm with drill stem set at 112 feet for 1 hours.
Time of recovery 1 hours.
Recovery water level 20 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	4	TOPSOIL
4	70	GRAVEL
70	117	HARD PAN CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 1/23/2004

MONTANA WELL LOG REPORT

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Other Options

Plot this site on a topographic map

Site Name: KAWASAKI JERRY & JODEE
GWIC Id: 242401
DNRC Water Right: C30042013

Section 1: Well Owner

Owner Name
KAWASAKI, JERRY & JODEE
Mailing Address
12201 GLACIER MTN. WAY

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Well Address
12201 GLACIER MTN. WAY

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SW¼ SW¼ NE¼ SE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.588	111.1903	NAV-GPS	NAD27

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)
IRRIGATION (2)
STOCKWATER (3)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Thursday, April 03, 2008

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	55.3	6	0.25		WELDED	A53B STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	B	Y

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 36.5
Water Temperature:

Air Test *

15 gpm with drill stem set at 55 feet for _ hours.
Time of recovery 0.25 hours.
Recovery water level 36.5 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	8	SAND TO MEDIUM COBBLES, MIXED SILTS
8	50	SAND & GRAVEL, DIRTY
50	60	SAND TO LARGE COBBLES, DIRTY, WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: DAVE POTTS
Company: POTTS DRILLING INC.
License No: WWC-512
Date Completed: 4/3/2008

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map

Site Name: RABEL ADAM D
GWIC Id: 246425
DNRC Water Right: C30043870

Section 1: Well Owner

Owner Name
RABEL, ADAM D
Mailing Address
BOX 663

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Well Address
76597 GALLATIN RD

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.594401	111.20112	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
	1	1C

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Friday, September 27, 2002

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	58	6.6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58	60	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 20
Water Temperature:

Air Test *

50 gpm with drill stem set at 40 feet for 1 hours.
Time of recovery 0.5 hours.
Recovery water level 20 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	60	GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: BILL MAXWELL
Company: DIAMOND M DRILLING- INC.
License No: WWC-597
Date Completed: 9/27/2002

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:43:47 PM)

Site Name: LARSON DELBERT
GWIC Id: 140237
DNRC Water Right: 85056

Section 1: Well Owner

Owner Name
LARSON DELBERT
Mailing Address
PO BOX 273

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SW¼ NE¼ SE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.588106	111.189344	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method:

Section 5: Well Completion Date
Date well completed: Thursday, August 26, 1993

Section 6: Well Construction Details
Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	58	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58	58	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 28
Water Temperature:

Air Test *

20 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 45 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
HAGGERTY FILE NO: 93144

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	40	GRAVEL
40	45	CLAY
45	60	GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 8/26/1993

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:15:56 PM)

Site Name: CLINE PAUL
GWIC Id: 145471
DNRC Water Right: 99405

Section 1: Well Owner

Owner Name
CLINE PAUL
Mailing Address
PO BOX 25

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼ SE¼ NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.593501	111.199811	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
SALESVILLE	1	10

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Monday, September 12, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	77	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	77	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
77	77	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 77
Static Water Level: 16
Water Temperature:

Air Test *

50 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 30 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
HAGGERTY FILE NO: 94133

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	77	GRAVEL WITH A FEW THIN CLAY LAYERS INTERMIXED

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 9/12/1994

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 5:49:23 PM)

Site Name: RABEL GEORGE
GWIC Id: 147970

Section 1: Well Owner

Owner Name
RABEL GEORGE
Mailing Address
PO 212

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼ NW¼ NE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.597099	111.194578	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Wednesday, January 06, 1993

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2.2	58.8	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58.8	58.8	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 18
Water Temperature:

Air Test *

50 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 25 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	20	SANDS TO COBBLES
20	26	DIRTY SANDS & GRAVELS
26	38	CLEAN SANDS & GRAVELS
38	53	DIRTY SANDS & GRAVELS SOME CLAYS
53	60	CLEAN LOOSE SANDS & GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-512
Date Completed: 1/6/1993

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 5:49:02 PM)

Site Name: GATEWAY SCHOOL MUSEUM
GWIC Id: 147972
DNRC Water Right: 95392

Section 1: Well Owner

Owner Name
C/O BRENNNER ERMA
Mailing Address
2400 LITTLE BEAR RD

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼ NW¼ NE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.597099	111.194578	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
COS 347		2A

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Wednesday, June 22, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	0

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	60	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
60	60	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 37
Water Temperature:

Air Test *

20 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 55 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

HAGGERTY FILE NO: 94074

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	60	GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 6/22/1994

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:10:15 PM)

Site Name: HANCOX DAVE
GWIC Id: 147974
DNRC Water Right: 95500

Section 1: Well Owner

Owner Name
HANCOX DAVE
Mailing Address
108 WHEELER MTN WAY

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SE¼ SW¼ NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.591703	111.202428	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
SALESVILLE	10	6

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Monday, September 12, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	55	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	55	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
55	55	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 55
Static Water Level: 15
Water Temperature:

Air Test *

30 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 50 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
HAGGERTY FILE NO: 94134

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	55	GRAVEL

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 9/12/1994

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:03:25 PM)

Site Name: TATE FROSTY
GWIC Id: 147975

Section 1: Well Owner

Owner Name
TATE FROSTY
Mailing Address
PO BOX 203

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.594401	111.20112	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
SALESVILLE	10	3

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Monday, August 29, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	60	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
60	60	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 15
Water Temperature:

Air Test *

55 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 55 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

HAGGERTY FILE NO: 94122

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	60	SAND & GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 8/29/1994

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:31:00 PM)

Site Name: HARGROVE WESLEY
GWIC Id: 147978
DNRC Water Right: 103219

Section 1: Well Owner

Owner Name
HARGROVE WESLEY
Mailing Address
PO BOX 295

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SW¼ SW¼ SW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.584508	111.205045	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Friday, June 03, 1994

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	40	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2.2	38.2	6	.250		WELDED	STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 40
Static Water Level: 10
Water Temperature:

Air Test *

100 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 20 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	GRAVELLY TOPSOIL
1	16	DRY LOOSE SANDS TO COBBLES
16	28	DIRTY WET SANDS TO COBBLES
28	35	STRATIFIED CLEAN & DIRTY SAND AND GRAVELS
35	40	CLEAN LOOSE SANDS & GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-512
Date Completed: 6/3/1994

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View water quality for this site
View scanned well log (1/30/2008 6:25:29 PM)

Site Name: GALLATIN GATEWAY SCHOOL DISTRICT #35
GWIC Id: 153163
DNRC Water Right: C095516-00

Section 1: Well Owner

Owner Name
GALLATIN GATEWAY SCHOOL
Mailing Address
PO BOX 265

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NE¼ NW¼ NE¼ SW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.5911	111.1994	MAP	NAD27

Altitude	Method	Datum	Date
4940	MAP	NAD83	10/21/2008

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Friday, August 25, 1995

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	72	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
70	80	6			.025 SLOT SCRN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	25	CEMENT	

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 8.58
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
37 gpm pump rate with _ feet of drawdown after 8 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 9.2 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
120SNGR - SAND AND GRAVEL (TERTIARY)

From	To	Description
0	3	TOPSOIL & CLAY
3	6	CLAY-FINE SAND-MED GRAVEL-GRAVEL
6	15	CLAY-FINE SAND-MED GRAVEL-GRAVEL
15	43	FINE SAND-MED GRAVEL-GRAVEL
43	80	FINE SAND-MED GRAVEL-GRAVEL-QUARTZ

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: RED TIGER DRILLING
License No: WWC-386
Date Completed: 8/25/1995

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:24:27 PM)

Site Name: HARGROVE RICHARD
GWIC Id: 153632
DNRC Water Right: 97995

Section 1: Well Owner

Owner Name
HARGROVE RICHARD
Mailing Address
PO BOX 397

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NE¼ NE¼ SW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.589904	111.197195	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Wednesday, August 16, 1995

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	58.5	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58.5	58.5	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 60
Static Water Level: 30
Water Temperature:

Air Test *

50 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 53 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	18	GRAVEL & SAND
18	21	BROWN CLAY
21	60	GRAVEL & SAND

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: VAN DYKEN DRILLING INC
License No: WWC-380
Date Completed: 8/16/1995

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:49:09 PM)

Site Name: BISON GROUP INC
GWIC Id: 153859
DNRC Water Right: 96664

Section 1: Well Owner

Owner Name
BISON GROUP INC
Mailing Address
PO BOX 678

City	State	Zip Code
FALOAM SPRINGS	AR	72761

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼ NW¼ SE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.589904	111.194578	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
MINOR SUB #56		5

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Tuesday, September 05, 1995

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	78.6	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
78.6	78.6	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 41
Water Temperature:

Air Test *

40 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 55 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	36	SANDS TO COBBLES
36	41	CLAYBOUND SANDS & PEBBLES
41	58	DIRTY TIGHT SAND & GRAVELS
58	73	MODERATELY TIGHT SAND & GRAVEL
73	80	LOOSE CLEAN SAND & GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-512
Date Completed: 9/5/1995

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:31:37 PM)

Site Name: HARGROVE MARIAN & JAY
GWIC Id: 159695
DNRC Water Right: 99397

Section 1: Well Owner

Owner Name
HARGROVE MARIAN & JAY
Mailing Address
PO BOX 127

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SE¼ SE¼ SW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.584508	111.197195	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Tuesday, July 16, 1996

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	80	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
80	80	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 30
Water Temperature:

Air Test *

30 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 75 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
HAGGERTY FILE NO: 96103

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	80	GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 7/16/1996

Groundwater Information Center
Montana Bureau of Mines and Geology
Montana Tech of The University of Montana
1300 West Park Street - Natural Resources Building Room 329
Butte Montana 59701-8997

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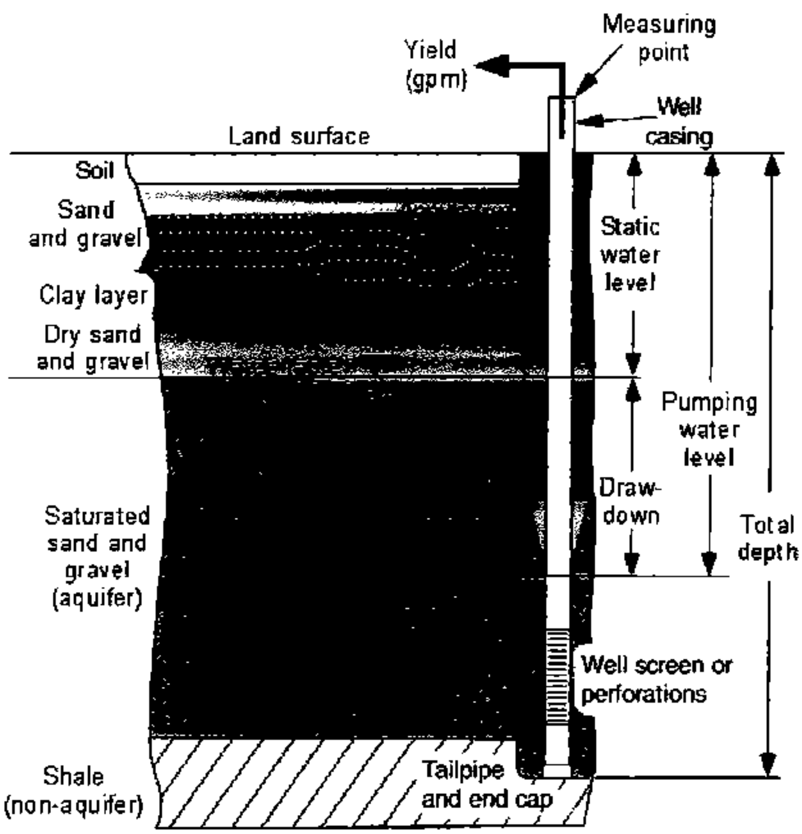
Typical water well construction and terms

Montana Ground-Water Information Center



The drawing illustrates some of the terms related to the construction and performance of a typical non-artesian water well. Although there can be many variations in the details, all wells should contain the features shown and can be described using these terms. Artesian wells differ in that they are constructed so that pressure in the aquifer can be controlled. Under artesian conditions the water table would be above the top of the aquifer, and possibly above land surface.

The left side of the drawing shows the geologic setting for this well. The borehole penetrated soil, a near-surface sand and gravel that is separated from the aquifer by a clay layer, and a second sand and gravel. The lower part of the second sand and gravel is saturated and is an aquifer. Below the aquifer the borehole hit shale which is not an aquifer. The water-well driller describes and records the geologic units at the time a well is drilled. Geologic conditions into which wells are constructed vary widely and although those depicted in the drawing are common, they do not represent all conditions encountered by all wells.

Annular seal: The annular seal is the material between the borehole wall and the casing, usually placed near the land surface and is designed to keep surface water and other potential contamination out of the well. Materials commonly used include bentonite (a sticky clay), and neat cement grout (cement and water with no sand).

Aquifer: An aquifer is a geologic unit (sand and gravel, sandstone, limestone, or other rock) that will yield usable amounts of water to a well or spring.

Borehole: the hole drilled to construct a well. Most boreholes for domestic wells in Montana are only slightly larger than the well casing.

Casing: Steel or plastic pipe placed in the borehole to keep it from collapsing. The casing is sealed to the borehole wall near the land surface with the annular seal.

Drawdown: The drawdown in a well is the difference between the pumping water level and the static (non-pumping) water level. Drawdown begins when the pump is turned on and increases until the well reaches "*steady state*" sometime later. Therefore, drawdown measurements are usually reported along with the amount of time that has elapsed since pumping began. For example, "*The drawdown was 10 feet, 1 hour after pumping began.*"

Drawdown cone: The depression in the water table near the well that is caused by pumping is called the "*drawdown cone*" or sometimes the "*cone of depression*". When the well is pumping, water levels are drawn down most near the well and the amount of drawdown decreases as the distance from the well increases. At some distance from the well at any given time there is a point at which the pumping does not change the water table and the drawdown is zero.

Measuring point: Water levels in wells are usually reported as depths below land surface, although the measuring point can be any convenient fixed place near the top of the well. In this drawing the measuring point is the top of the casing. The altitude of the measuring point is commonly recorded so that static water levels can also be reported as altitudes.

Pumping water level: The pumping water level is the distance from the land surface (or measuring point) to the water in the well while it is pumping. The time that the pumping water level was measured is usually recorded also. For example, "*The pumping water level was 85 feet below land surface, 1 hour after pumping began.*"

Screen or perforations: All wells are open to the aquifer so that water can enter the well. Well completions vary from "*open hole*" in consolidated rock that does not need a casing, to "*open bottom*" where the only way for the water to enter the well is through the end of the casing. However, many wells have some sort of well screen installed or perforations cut into the casing through which water can enter. The openings must be correctly sized so that water will enter, but sand and other aquifer materials do not.

Static water level: The static water level is the distance from the land surface (or the measuring point) to the water in the well under non-pumping (static) conditions. Static water levels can be influenced by climatic conditions and pumping of nearby wells and are often measured repeatedly to gain information about how aquifers react to climatic change and development.

Tailpipe and end cap: Wells that are completed with well screens may have a tailpipe installed below the screen. The tailpipe provides a place where sand that may enter the well through the screen can settle away from the pump. The end cap forces all water to enter the well through the well screen. Most wells that are completed with perforations will not have a tailpipe.

Water table: The top of the saturated part of a water-table (also known as an unconfined) aquifer. Below the water table, pore spaces (or fractures) in the geologic media are filled with water. Above the water table, the pore spaces are filled with air. An upside-down triangle is often used by hydrologists to indicate the water table.

Total depth: The total depth of the well is the distance from land surface to the bottom.

Yield: The amount of water measured in gallons per minute a well will produce when pumped.

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:18:41 PM)

Site Name: PAYNE RALPH & BERNICE
GWIC Id: 160024
DNRC Water Right: 99407

Section 1: Well Owner

Owner Name
PAYNE RALPH AND BERNICE
Mailing Address
PO BOX 264

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SW¼ SE¼ NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.591703	111.199811	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Tuesday, July 16, 1996

Section 6: Well Construction Details
Borehole dimensions

From	To	Diameter
0	40	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	40	6	.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
40	40	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	

Section 7: Well Test Data

Total Depth: 40
Static Water Level: 14
Water Temperature:

Air Test *

25 gpm with drill stem set at _ feet for 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 35 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
HAGGERTY FILE NO: 96102

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	40	GRAVEL

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HAGGERTY DRILLING
License No: WWC-353
Date Completed: 7/16/1996

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:57:51 PM)

Site Name: WHORRALL, PATRICK
GWIC Id: 223273
DNRC Water Right: C30020133

Section 1: Well Owner

Owner Name
WHORRALL, PATRICK
Mailing Address
POBOX 487

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SE¼ SE¼ SE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.584508	111.186727	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot
HOLLAND SUBDIVISION 374	1	1

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Tuesday, November 08, 2005

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
2	80	6	0.250		WELDED	A53B STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 50
Water Temperature:

Air Test *

30 gpm with drill stem set at 70 feet for 1 hours.
Time of recovery 0.5 hours.
Recovery water level 50 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	5	TOPSOIL
5	25	CLAYBOUND GRAVELS
25	55	CLAY
55	57	GRAVEL
57	68	CLAY
68	80	GRAVEL

Driller Certification
All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: DIAMOND M DRILLING INC
License No: WWC-597
Date Completed: 11/8/2005

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:13:50 PM)

Site Name: HARGROVE RICHARD
GWIC Id: 212842

Section 1: Well Owner

Owner Name
HARGROVE RICHARD
Mailing Address
PO BOX 397

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SE¼ NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.592602	111.198503	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Monday, April 05, 2004

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	78.5	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
78.5	80	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 40
Water Temperature:

Air Test *

48 gpm with drill stem set at 75 feet for 1 hours.
Time of recovery _ hours.
Recovery water level 40 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOP SOIL
2	80	SAND AND GRAVEL WITH THIN LAYERS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: VAN DYKEN DRILLING INC
License No: WWC-380
Date Completed: 4/5/2004

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:14:21 PM)

Site Name: HARGROVE WESLEY
GWIC Id: 212843

Section 1: Well Owner

Owner Name
HARGROVE WESLEY
Mailing Address
75773 GALLATIN ROAD

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	SE¼ NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.592602	111.198503	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Monday, April 05, 2004

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	78.5	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
78.5	80	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 34
Water Temperature:

Air Test *

60 gpm with drill stem set at 75 feet for 1 hours.
Time of recovery _ hours.
Recovery water level 34 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOP SOIL AND ROCK
2	80	SAND AND GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: VAN DYKEN DRILLING INC
License No: WWC-0
Date Completed: 4/5/2004

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:01:51 PM)

Site Name: RENNEBERG HARDWARE
GWIC Id: 213597

Section 1: Well Owner

Owner Name
RENNEBERG HARDWARE
Mailing Address
12 PENNY LANE

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.5941	111.1956	NAV-GPS	WGS84

Altitude	Method	Datum	Date

Addition	Block	Lot
GALLATIN BUSINESS		

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Monday, May 17, 2004

Section 6: Well Construction Details
Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-18	77	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
77	80	6			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 80
Static Water Level: 26
Water Temperature:

Air Test *

75 gpm with drill stem set at 74 feet for 1 hours.
Time of recovery _ hours.
Recovery water level 26 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log
Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL & ROCK
1	25	SAND & GRAVEL
25	32	CLAY & GRAVEL
32	80	SAND & GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: VAN DYKEN DRILLING INC
License No: WWC-380
Date Completed: 5/17/2004

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 6:23:47 PM)

Site Name: HARGROVE RICHARD
GWIC Id: 221228

Section 1: Well Owner

Owner Name
HARGROVE RICHARD
Mailing Address
100 HARGROVE LOOP

City	State	Zip Code
GALLATIN GATEWAY	MT	59730

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NE¼ SW¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.5899	111.201	SUR-GPS	WGS84

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Tuesday, July 19, 2005

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	80	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	78	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
78	80	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 78
Static Water Level: 30
Water Temperature:

Air Test *

75 gpm with drill stem set at 75 feet for 1 hours.
Time of recovery _ hours.
Recovery water level 30 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	15	FILL DIRT
15	80	SAND AND GRAVEL A LITTLE CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: VAN DYKEN DRILLING INC
License No: WWC-380
Date Completed: 7/19/2005

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (1/30/2008 5:59:06 PM)

Site Name: CHRISTY JOHN
GWIC Id: 211854

Section 1: Well Owner

Owner Name
CHRISTY JOHN
Mailing Address
LATIGE RD.

City	State	Zip Code
BIG SKY	MT	59716

Section 2: Location

Township	Range	Section	Quarter Sections
03S	04E	11	NE¼ SW¼ SW¼ NE¼

County	Geocode
GALLATIN	

Latitude	Longitude	Geomethod	Datum
45.5929	111.1934	NAV-GPS	NAD27

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water
DOMESTIC (1)

Section 4: Type of Work
Drilling Method: ROTARY

Section 5: Well Completion Date
Date well completed: Tuesday, May 11, 2004

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	60	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	59.3	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
59.3	60	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 59.25
Static Water Level: 27
Water Temperature:

Air Test *

60 gpm with drill stem set at 55 feet for 1 hours.
Time of recovery 0.25 hours.
Recovery water level 27 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	18	SAND AND GRAVEL MEDIUM COBBLES
18	22	SANDY CLAY
22	32	DIRTY SAND AND GRAVEL WITH OCCASIONAL CLAY LENSES
32	32	CLEAN SAND AND GRAVEL

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-512
Date Completed: 5/11/2004

Appendix X

Montana Natural Resources and Information System (NRIS) Search

Animal Species of Concern

Species List Last Updated **02/01/2010**

MONTANA Natural Heritage Program

A program of the University of Montana and Natural Resource Information Systems, Montana State Library

5 Species of Concern
1 Potential Species of Concern
Filtered by the following criteria:
Township = 3 S Range = 4 E

Species of Concern

5 Species
Filtered by the following criteria:
Township = 3 S Range = 4 E

MAMMALS (MAMMALIA)

3 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 3 S RANGE = 4 E

SCIENTIFIC NAME / COMMON NAME	FAMILY (SCIENTIFIC) / FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT
Gulo gulo Wolverine	**Mustelidae** Weasels	G4	S3		SENSITIVE	SENSITIVE	2	0%	37%	Conifer forest
		Species verified in these Counties: Beaverhead, Broadwater, Carbon, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland								
Lynx canadensis Canada Lynx	**Felidae** Cats	G5	S3	LT	THREATENED	SPECIAL STATUS	1	1%	40%	Subalpine conifer forest
		Species verified in these Counties: Beaverhead, Broadwater, Carbon, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland								
Ursus arctos Grizzly Bear	**Ursidae** Bears	G4	S2S3	LT,XN	THREATENED	SENSITIVE	1	1%	22%	Conifer forest
		Species verified in these Counties: Beaverhead, Carbon, Flathead, Gallatin, Glacier, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Stillwater, Sweet Grass, Teton								

BIRDS (AVES)

1 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 3 S RANGE = 4 E

SCIENTIFIC NAME / COMMON NAME	FAMILY (SCIENTIFIC) / FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT
Ardea herodias Great Blue Heron	**Ardeidae** Herons	G5	S3				3	3%	100%	Riparian forest
		Species verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McCone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone								

FISH (ACTINOPTERYGII)

1 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 3 S RANGE = 4 E

SCIENTIFIC NAME / COMMON NAME	FAMILY (SCIENTIFIC) / FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT

Oncorhynchus clarkii lewisi Westslope Cutthroat Trout	**Salmonidae** Trout	G4T3	S2		SENSITIVE	SENSITIVE	1		34%	Mountain streams, rivers, lakes
		Species verified in these Counties: Beaverhead, Broadwater, Cascade, Chouteau, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton								

Potential Species of Concern

1 Species
Filtered by the following criteria:
Township = 3 S Range = 4 E

MAMMALS (MAMMALIA)

1 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 3 S RANGE = 4 E

SCIENTIFIC NAME COMMON NAME	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT
Spermophilus armatus Uinta Ground Squirrel	**Sciuridae** Squirrels	G5	S3S4				2	14%	8%	Open grassy edges
		Species verified in these Counties: Beaverhead, Carbon, Gallatin, Jefferson, Madison, Park								

Plant Species of Concern

Filtered by the following criteria:
Township = 3 S Range = 4 E

Species List Last Updated **03/18/2010**

MONTANA
Natural Heritage
Program

**A program of the University of Montana
and Natural Resource Information Systems,
Montana State Library**

Species of Concern
0 Species
Filtered by the following criteria:
Township = 3 S Range = 4 E

Appendix Y

Public Meeting –
Gallatin Gateway Wastewater PER

GALLATIN GATEWAY COUNTY WATER & SEWER DISTRICT

March 6, 2010

From the Board of Directors of the Gallatin Gateway Water & Sewer District

Informational Meeting March 22, 7PM, Community Center

Dear Gallatin Gateway Community Member,

You are invited to attend an informational meeting of the Board of Directors of the Gallatin Gateway Water & Sewer District on March 22 at 7PM in the Gateway Community Center, 145 Mill St. Gallatin Gateway, MT. The Board of Directors, with assistance from engineers representing Great West Engineering, will describe a proposed plan of action for providing a public sewer infrastructure for the District along with associated costs. A map of the District will be posted at the Post Office and Community Center, or you can view a map at http://www.gatewaywsd.com/docs/boundaries.pdf.

Obtaining state and federal grants for the proposed project is a priority for the Board of Directors. Every dollar of grant money that the Board is able to secure reduces the financial burden on the community. The purpose of this meeting is to inform the public about the proposed project and to generate support for the grant application process. The process is very lengthy—we are still at least two years away from beginning construction if all goes well. You will not be asked to approve the project at this point. You are only being asked whether you are supportive and would like the Board to proceed with grant applications.

The Gallatin Gateway County Water & Sewer District was formed in February 2009 to address the difficult wastewater issues facing our community. The Board of Directors meets on the first Monday of every month at 6:30PM in the boardroom of the Gateway Fire Station. All meetings of the Board are open to the public.

Please come to this meeting. You will learn:

- What kind of sewage treatment plant is proposed and where it might be located;
- Where the sewer lines might be run and what impact it might have on the community;
- What is the total project cost and how much might be offset by grants;
- What the monthly rates and charges might be for users connected to the system;
- Some of the experiences other communities have had.

You will also have the opportunity to meet the Board of Directors and the staff member for the District and to provide valuable input that could help the Board make the best choices for our community. We hope to see you there.

Gallatin Gateway Water & Sewer District
PO Box 383, Gallatin Gateway, MT 59730
www.gatewaywsd.com

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING

Date:	**March 22, 2010**
Time:	**7:00PM**
Place:	**Gallatin Gateway Community Center** **145 Mill St., Gallatin Gateway, MT**
For:	**Special Meeting of the Board of Directors** **and Public Information Session**

Please come to this special meeting for information on a proposed technical and financial solution for providing a public wastewater system to the community of Gallatin Gateway.

<u>AGENDA</u>

I. Call To Order

II. Discussion and Forum on a Proposed Technology and Financing Solution for a Proposed Public Wastewater System

III. Public Participation on Non-Agenda Items[1]

IV. Adjourn

---

1 The opportunity for members of the public to comment on District matters which are not on the agenda. Time limits may be imposed at the discretion of the President.

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING
Date: March 22, 2010
Time: 6:30PM
Place: Gallatin Gateway Community Center
For: Special Meeting of the Board of Directors

SIGN-IN SHEET

Name	Address	Phone or Email
DAVID LOSOFF	201 S. Grand Ave Bozeman MT 59715	DPL16 @hotmail
BRAD FLATEGRAFF	P.O. Box 476 Gallatin Gateway 59730	
Marle Adams	Box 368 GG	
Jone Donnelly	Box 35 GG -	
LEAH OLSON	767 MCREYNOLDS RD 59718	
RYAN RITTAL	PO.BOX 10098 BZMN 59719	
Judy Hengel	331 Ruby Mt Way - G.G.	
Sandy Kust	PO Box 22 Ballentine MT 59006	671-4293
Kevin Lousteunan	710 E Fridley Bozeman 59715	
M-H Higgins	1627 W Main STE 299 Bozeman 59715	
Dick + Donna Shockley	627 Gateway S. RD GGtwy 59730	
PETE STEIN	216 MILL ST. G Gtwy 59730	
Duane L WALKER	76250 Gall Rd GG 59730	
Jess McCall	104 adams GG	
Rich Fillbach	41 Mafenna, Boz	539-5347
Lee & Sandy	73800 Gal. Rd.	763-4279
Mary Ellen + George Stewart	P.O. Box 25 GG	763-4162

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING
Date: March 22, 2010
Time: 6:30PM
Place: Gallatin Gateway Community Center
For: Special Meeting of the Board of Directors

SIGN-IN SHEET

Name	Address	Phone or Email
Susan Swimley	1807 W. Dickerson	6-5344
Ruth Hargrove		ruhargrove@gmail.com
Chris J. Francis	P.O. Box 15 Gallatin Gateway, MT 59730	406. 581. 0437
Brooke Savage	P.O. Box 672 Gateway, MT. 59730	763-4471
Frank Silva	" "	763-4471
Gwen Allen	305 Bozeman St	220-1802
Rich Brown	212 Bozeman	Richardthrasher@Gmail.com

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING
Date: March 22, 2010
Time: 6:30PM
Place: Gallatin Gateway Community Center
For: Special Meeting of the Board of Directors

SIGN-IN SHEET

Name	Address	Phone or Email
Brian Persha	P.O. Box 646 G.G.	763-4485
ERIC AMEND	Box 322	763-4146
Bob Nygard	305 Mill St	763 4000
Terry Threlkeld	12140 GOOCH HILL	763-4185
Rick Hargrove	409 Lynde STR GG	763-4748

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING
Date: March 22, 2010
Time: 6:30PM
Place: Gallatin Gateway Community Center
For: Special Meeting of the Board of Directors

SIGN-IN SHEET

Name	Address	Phone or Email
Brianne Rogers	355 Concord Bozeman	586-6104 brianne_rogers@baucus.senate.gov
Christie	170 Bushnell Rd / P.O. Box 5	763-4691
Jill Allan	638 Lower Tom Burke	jjmt@imt.net
Ann Prescott	22 Rabel Lane	jkpdeeppowder@msn.com

Gallatin Gateway County Water & Sewer District

PUBLIC MEETING

Date:	**March 22, 2010**
Time:	**6:30PM**
Place:	**Gallatin Gateway Community Center**
For:	**Special Meeting of the Board of Directors**

SIGN-IN SHEET

Name	Address	Phone or Email
Don Hargrave	37 Bj Chief Trail	587-1323

SUPPORT FOR WASTEWATER PROJECT

The Gallatin Gateway County Water and Sewer District intends to complete the wastewater project that was recommended in the 2010 Wastewater System Preliminary Engineering Report (PER) prepared for the District by Great West Engineering. The estimated cost of the project is approximately $4.3 million. To finance the project, the District has submitted an appropriations request for $600,000 to Montana's Congressional Deletion and this spring will submit applications to the Montana Department of Commerce for a $750,000 grant from the Treasure State Endowment Program, to the Department of Natural Resources and Conservation for a $100,000 Renewable Resource Grant, and to USDA Rural Development for a $2.4 million grant/loan package. The residential sewer rate from this project is estimated to be as indicated on the following Table:

TABLE 10.1.2C
COSTS ESTIMATES WITH PROPOSED FUNDING STRATEGY USING PROPERTY ASSUMPTIONS

	SCENERIOS	
MONTHLY BILL	**OPTION #1**	**OPTION #2**
Vacant Lot in Salesville	$0	$0
Salesville Lot with House	$25.64	$25.64
Vacant 1-Acre Lot	$0	$0
1-Acre Lot with House	$25.64	$25.64
ANNUAL TAX (50% TAXABLE VALUE, 50% SQUARE-FEET)		
Vacant Lot in Salesville	$106	$324
Salesville Lot with House	$256	$781
Vacant 1-Acre Lot	$651	$1,983
1-Acre Lot with House	$789	$2,404
ANNUAL TAX (EQUAL ASSESSMENT OF LOTS)		
Vacant Lot in Salesville	$386	$1,175
Salesville Lot with House	$386	$1,175
Vacant 1-Acre Lot	$386	$1,175
1-Acre Lot with House	$386	$1,175

The project is generally summarized as follows:

The construction of a centralized wastewater collection, treatment and disposal system that will initially treat 30,000 gallons of sewage each day, replace over 80 individual septic systems, and allow for reasonable growth. The project's scope of work includes the installation of a gravity collection system consisting of approximately 10,500 lineal feet of 8-inch sewer main that would provide service to each home and business in the District. A centralized lift station would also be installed to pump wastewater through a 6-inch pressurized force main approximately 5,000 feet in length to a large centralized septic tank, followed by a level 2 recirculation system that would bring the District into compliance will all current public health regulations.

The project will take out of service 80 septic systems, many of which have failed or a have high potential of failing in the near future – threatening Gallatin Gateway's groundwater and water supply wells. Without the proposed project, the residents of Gallatin Gateway face a serious health risk.

By signing below, I am indicating that ***I support*** the wastewater project summarized on the previous page.

	Name	Address (or Business)	Phone (Optional)
1	Don Haynes	37 Big Ck Tr	5871373
2	Judy Hengel	331 Ruby Mt Way	763 4871
3	Russ Olson		
4	Kelly Dobbs	214 Tracy St	539-7385
5	Brian J. Persha	214 Mill / P.O. 646	763-4485
6	Chris J. Francis	P.O. Box 15 Gallatin Gateway, MT	763-4691
7	Frank SWA	214 Adams St.	763-4471
8	Dick Shockley	627 Gateway S. Rd	763-4605
9	Donna Shockley	"	"
10	Pete Stein	216 Mill St	763-4728
11	Ruth Hargrove	408 Lynde St	451-9324
12	Brooke Savage	214 Adams St	763-4471
13	Rob Nygaard	305 Mill St	763 4000
14	Duane L Walker	Box 1799	763-4463
15	[illegible]	309 Bozeman St	220-1802
16	Eric Amend	17 Rabel Ln	763-4146
17	John Dobson	309 Bozeman St	220-1802
18	Steve Strandberg	12 Rabel Lane	580-9100
19	Rick Hargrove	409 Lynde Str	763-4748
20	Ann E Prescott	22 Rabel lane	763-4829

Gallatin Gateway County Water & Sewer District

MINUTES OF THE

BOARD OF DIRECTORS

A special meeting of the Board of Directors of the Gallatin Gateway County Water & Sewer District was held in the Gallatin Gateway Community Center on March 22, 2010. Present at the meeting were board members Merle Adams, Ted Border, David Sullivan, Charlie White and Earl Wortman. Attorney Susan Swimley and Matt Donnelly were also present.

The meeting was called to order at 7:00 p.m. by President Adams. Mr. Rich Fillbach recorded the minutes of the meeting.

As the first order of business, President Adams announced that the purpose of the special meeting was to inform the public about the preferred alternative for a sewer collection and treatment system as outlined in the draft Preliminary Engineering Review (PER) developed by Great West Engineering. President Adams asked for public comment on items not on the agenda. Seeing none, President Adams proceeded to the agenda.

Approximately 44 members of the public were in attendance. Seated at the front of the room were five Board members, the General Manager, and Mr. Craig Pozega from Great West Engineering for a total of 51 in attendance. President Adams first made introductions of the Board. Mr. Donnelly then followed with a brief history of sewer issues in Gallatin Gateway. Mr. Pozega then followed with a summary presentation outlining the outcomes of the PER.

Following the engineer's presentation, President Adams opened the floor for discussion. Some of the questions posed were:

- How did the District count residences?
- Should renters be included on the income survey?
- What percentage of income surveys have been returned?
- Do non-residential entities need to fill out an income survey (ie. Willing Workers)?
- Why was the board in favor of the Level 2 system (AdvanTex)?
- What percentage of the alternative cost estimates is the collection system?
- What if some of the grants in the funding plan come through, but not all of them, then what?
- Where is the treatment and disposal site going to be located?
- Was land cost factored into the alternative cost estimates?

- During the course of the discussion, one resident testified that she had become sick and had required medical attention as a result of contaminants entering her drinking water supply from a neighbors failing septic system contaminating her well.

- Sandy Kust led a discussion regarding the income survey – who hasn't returned their survey?

Near the conclusion of the meeting, President Adams announced that there was a petition of support located at the sign-in table. Most of the attendees signed the petition of support on their way out of the meeting. The meeting adjourned at approximately 9:00 p.m.

Secretary

21	George Stewart	340 Bushnell	763-4162
22	Mary Ellen Stewart	P.O. Box 25 GG	763-4162
23	[illegible]	P.O. Box 653	763-4829
24	BRAD FLATEGRAFF	P.O. Box 476	
25	Toni Donnelly	Box 35 GG	763-4258
26	[illegible] J Wortman	Box 245 GG	763-4480
27	[illegible]	Box 368 GG	763-4818
28	[illegible]	Box 330 GG	763-4517
29	[illegible]	Box 357 GG	763 4157
30	[illegible]	Box 91 GG	763-4322
31	[illegible]	Box 284 GG	580-8970
32	MK Daly	Box 35 GG	763 4258
33			
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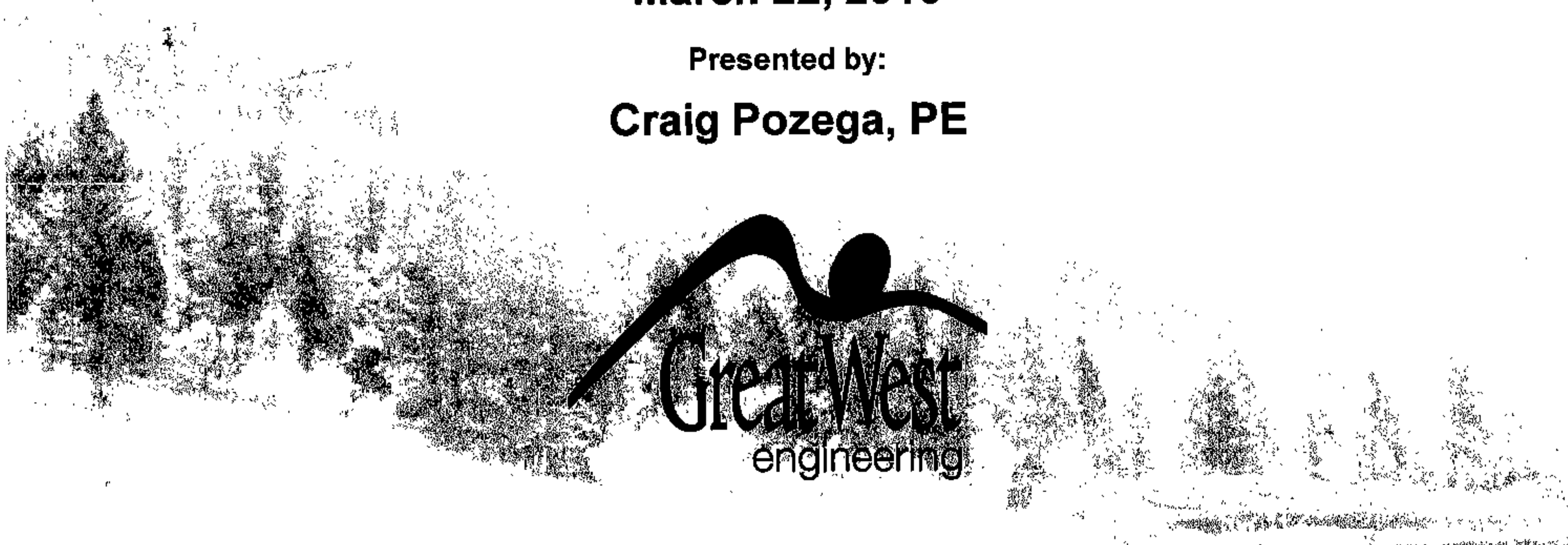
GALLATIN GATEWAY

Wastewater Treatment System
Preliminary Engineering

March 22, 2010

Presented by:

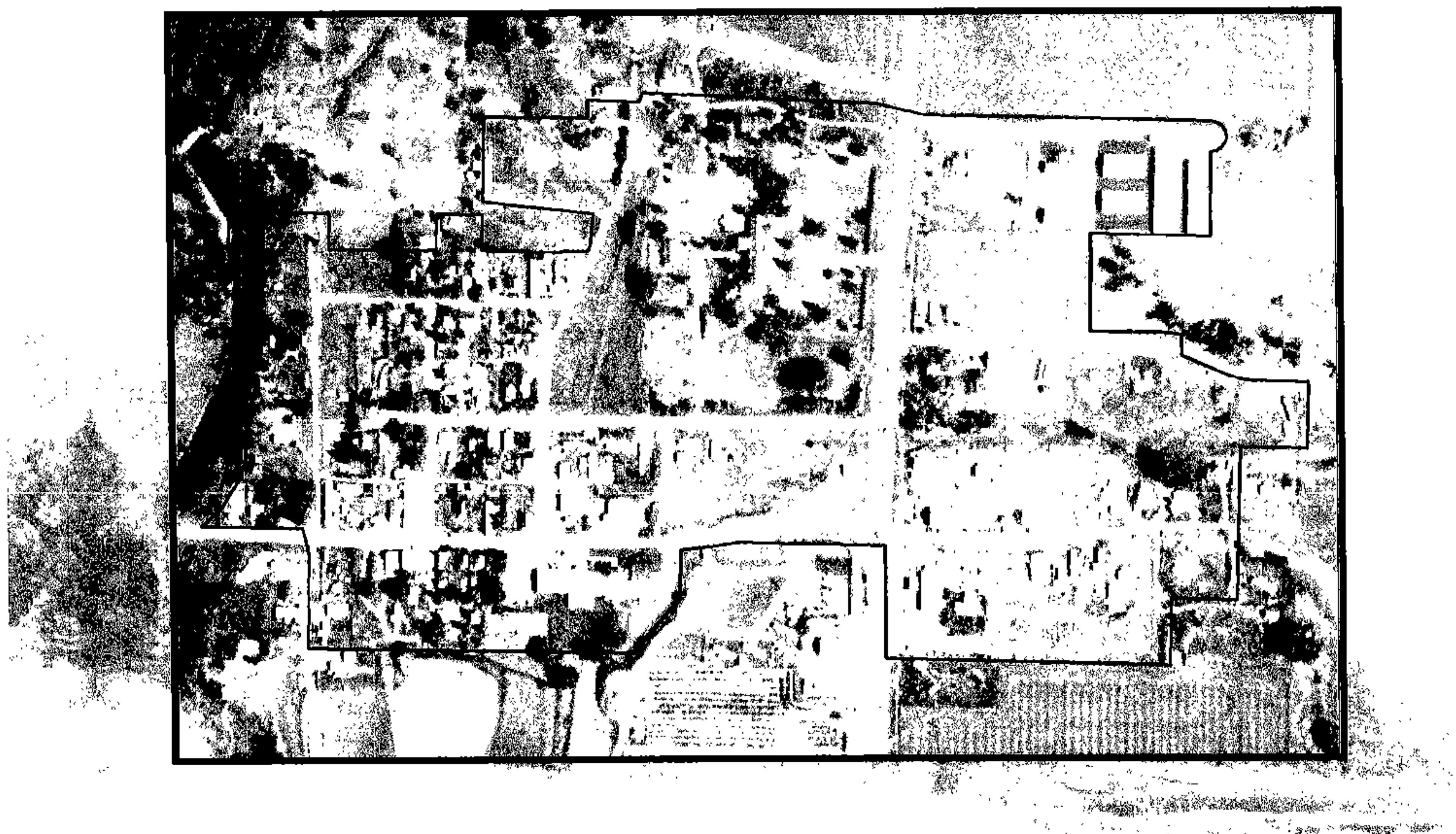
Craig Pozega, PE



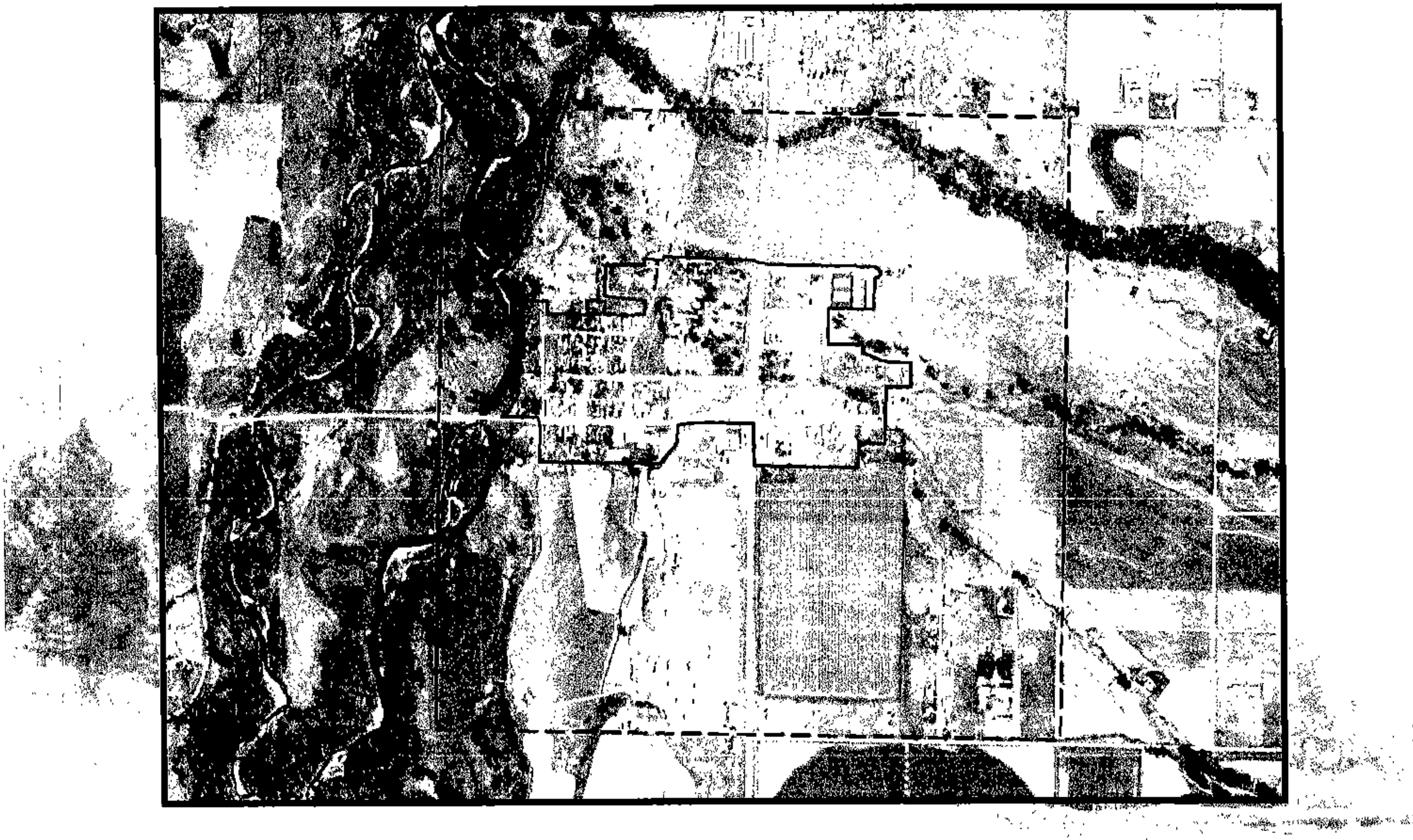
Preliminary Engineering Report

- Project Area
- Problem Definition
- Evaluation of Existing Conditions
- Need for the Project
- Design Requirements & Regulations
- Alternative Screening Process
- Selection of Preferred Alternative
- Project Funding Strategy
- Implementation Process and Schedule

Gallatin Gateway County Water & Sewer District



District Boundary & Planning Area



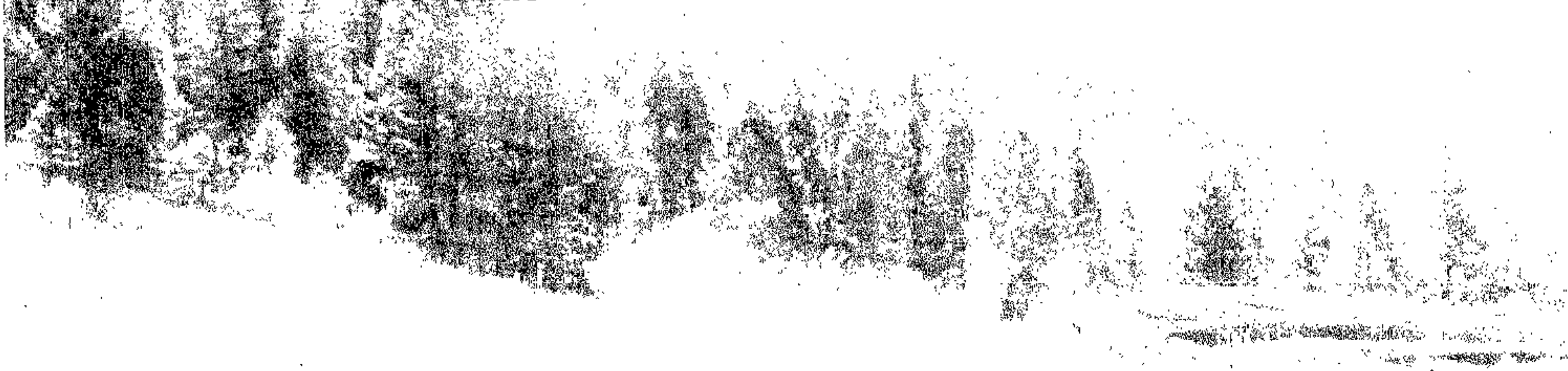
Problem Definition

<u>Public Health Risk:</u>
Groundwater contamination from individual septic systems that are out of compliance.

- **Health Regulations, 1966**
- **Failing Septic Systems**
- **Water Quality**
- **Well & Septic Separation**
- **Coarse Grain Soils**
- **New System Compliance**
- **Replacement Systems**
- **Variance Requests**
- **Town Growth Limitations**

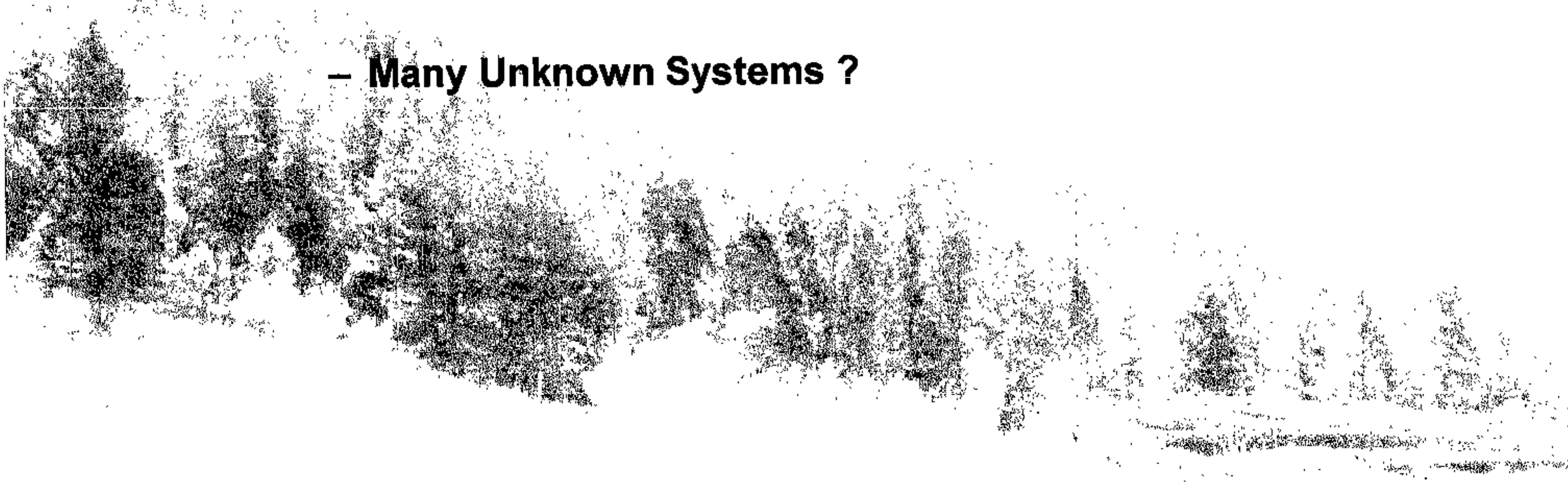
Evaluation of Existing Conditions

- Physical Characteristics
  - Topography
  - Agricultural Land
  - Soils
  - Water Features
- Environmental Resources Present
  - Water Resources
  - Floodplains
  - Wetlands



Evaluation of Existing Conditions

- **Existing Septic Systems**
  - **Over 80 systems in District**
  - **54 Permits on record**
  - **22 Variances**
  - **13 Obsolete Systems**
    - » Cesspools
    - » Metal Septic Tanks
  - **Many Unknown Systems ?**



Evaluation of Existing Conditions

- **Existing Wastewater Flows**

Existing / Design Flows and EDU's				
TYPE	**Existing Count**	**Existing EDU's**	**Existing Flow (gpd)**	**Design Flow (gpd)**
Residential	67	67	16,750	33,500
Non-Residential	6	15	3,750	7,500
Commercial	8	22	5,500	11,000
Total		**104**	**26,000**	52,000
Design			**30,000**	**50,000**

EDU = Equivalent Dwelling Unit

gpd = Gallons Per Day (wastewater)

Need for the Project

- Public Health and Safety
- Growth of Community

Population Data			
YEAR	Gateway Population (District)	County Population	Montana Population
1980	-	42,865	786,690
1990	-	50,463	799,065
2000	183	68,358	903,283
2010	168*	95,166	981,778
2020	234	-	-
2030	336**	-	-

Design Requirements and Regulations

- Montana Department of Environmental Quality
  - DEQ 2 Design Standards for Wastewater Facilities
  - DEQ 4 Standards for Subsurface Wastewater System
- Public Systems
  - 15 or more services serving 25 or more persons
- US Clean Water Act
- Montana Water Quality Act
- MT Wastewater Treatment Revolving Fund Act
- Public Water Supply Act
- Public Health Law

Alternative Screening Process

- **Collection Systems Alternatives**
  - **Gravity Collection System**
    - » Street Layout Option
    - » Alley Layout Option
    - » Hybrid System
  - **Pressurized Collection System**
    - » STEP Systems
    - » Individual Grinder Pumps
- **Lift Station Alternatives**
    - » Single Centralized Lift Station
    - » Multiple Smaller Lift Stations
    - » Individual Grinder Pump Systems

Alternative Screening Process

Treatment Systems Alternatives

1. No Action Alternative
2. Connection to Utility Solutions Wastewater Facility
3. Total Retention Ponds (Evaporation)
4. Storage & Irrigation (Low Rate Land Application)
5. Naturally Aerated Facultative Lagoons
6. Mechanically Aerated Lagoons
7. Septic Tank and Pressure Dosed Drainfield
8. Septic Tank / Level 2 Treatment / Pressure Dosed Drainfield
9. Constructed Wetlands
10. Biological Nutrient Removal (BNR) (Mechanical Treatment Plant)

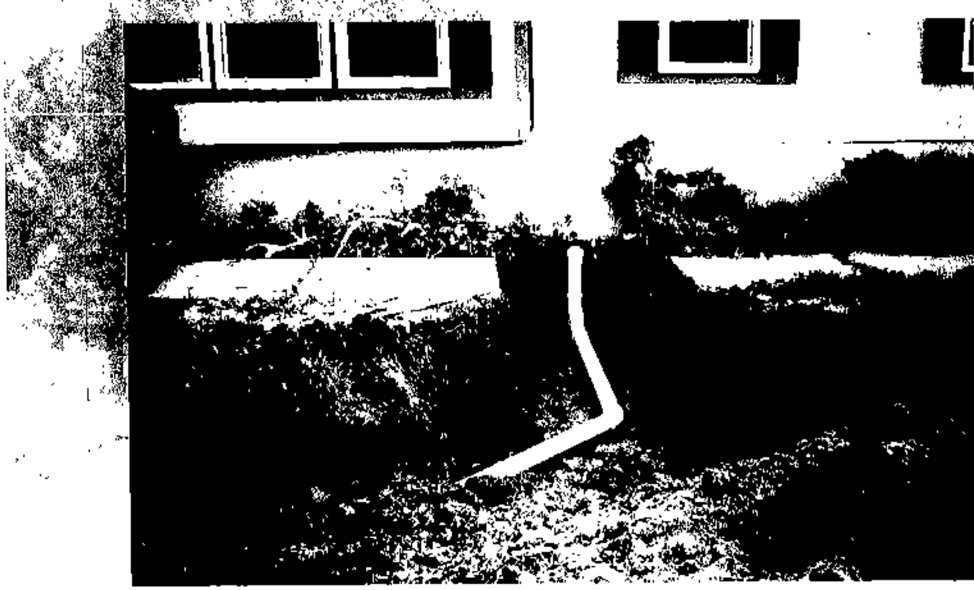
Alternative Analysis

- **<u>Alternatives that passed the initial screening:</u>**
  - **Gravity Collection System**
    - » Street Layout
    - » Alley Layout
  - **Single Centralized Lift Station**
    - » Packaged Submersible
    - » Wet Well/Dry Well
    - » Suction
  - **Treatment Alternatives**
    - » No Action
    - » Connection to Utility Solutions Wastewater Facility
    - » Storage and Irrigation
    - » Septic Tank / Level 2 Treatment / Drainfield
    - » Biological Nutrient Removal (BNR) Mechanical Plant

Collection System Installation

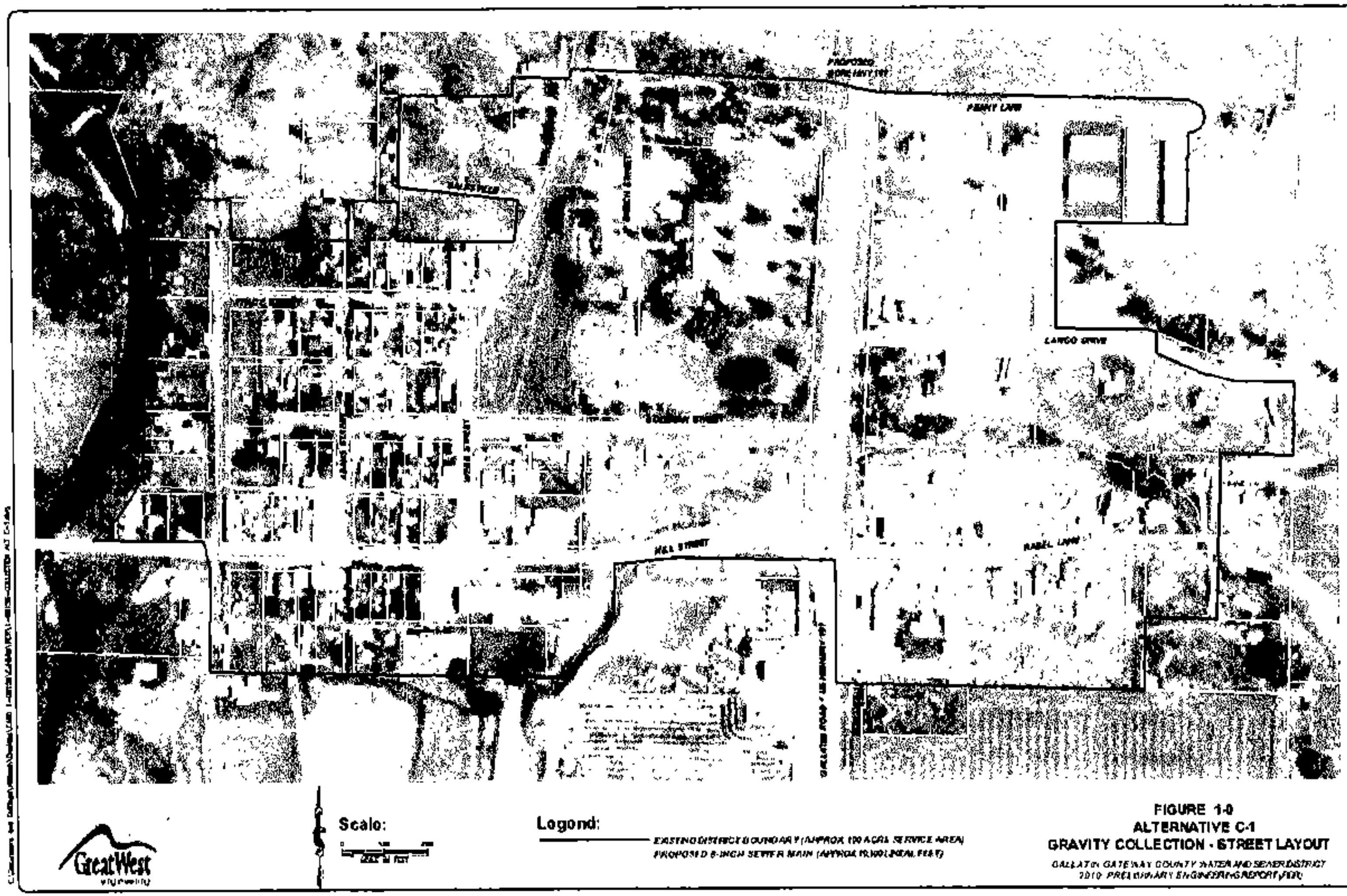
Project Features

- 8-inch gravity collection main
- 10,500-feet collection main
- Primarily alley way alignment pipe network
- 81-service connections
- Hwy 191 crossing(s)



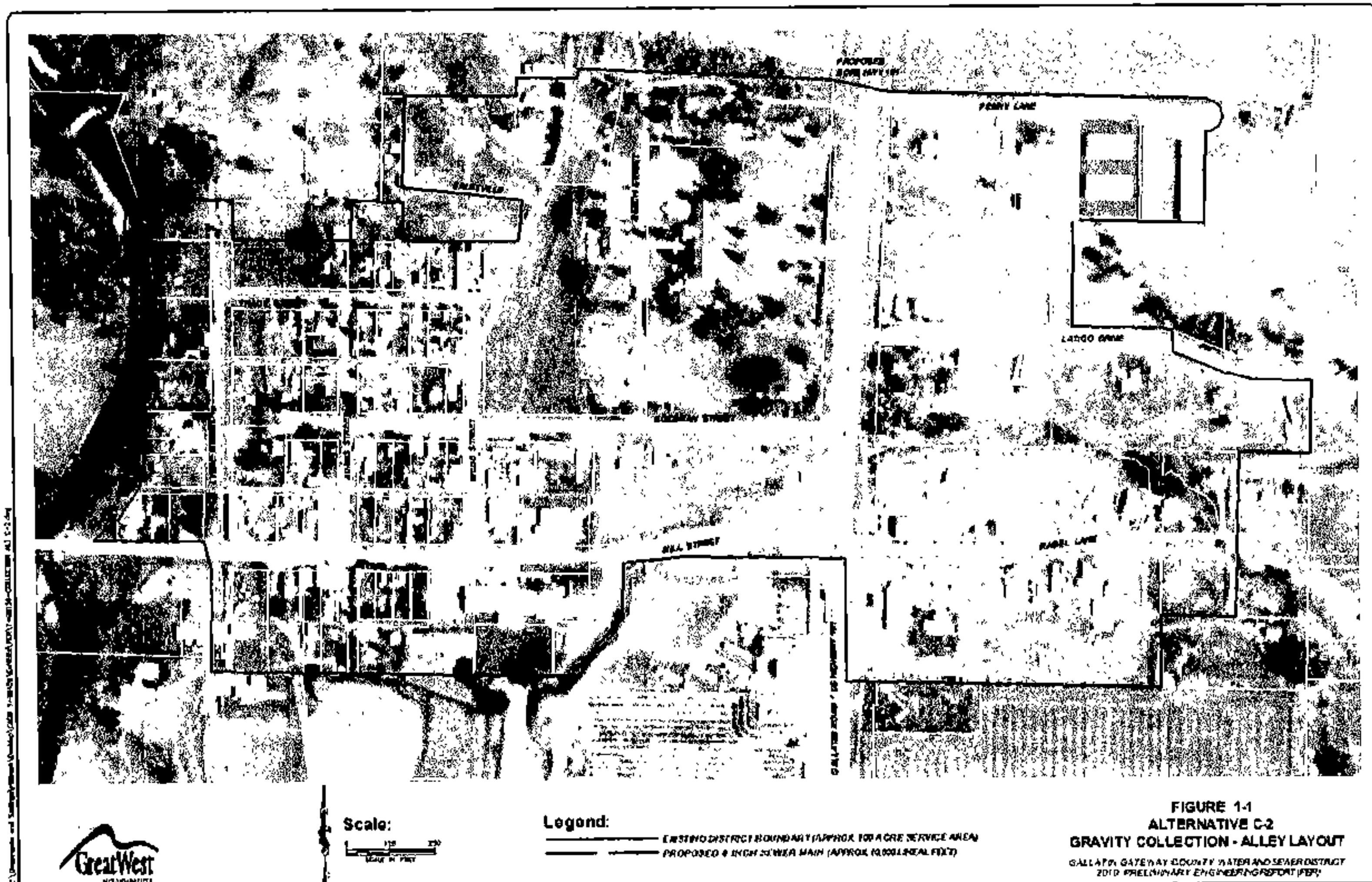
Collection System Installation

Street Layout



Collection System Installation

Alley Layout



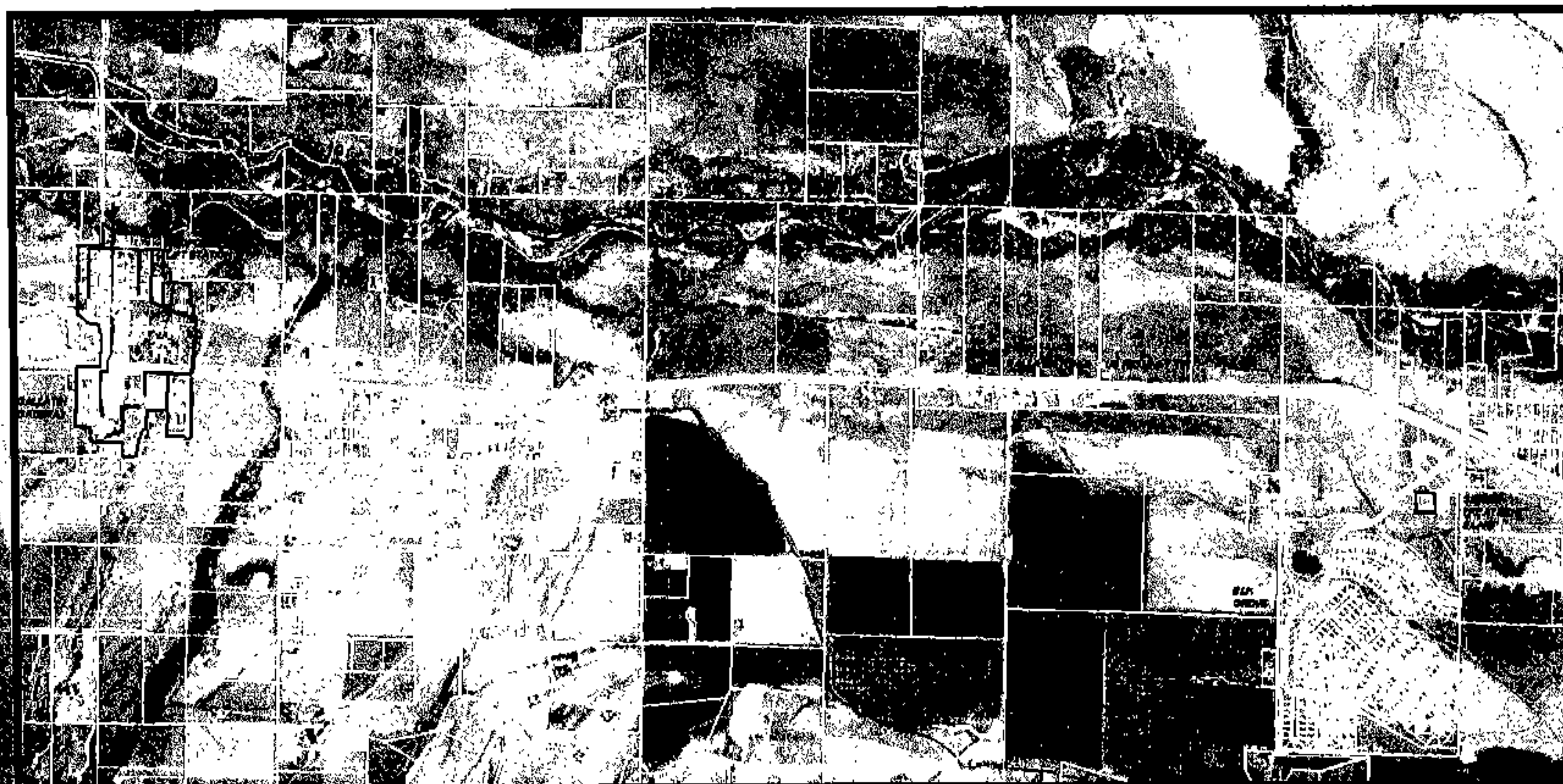
Single Centralized Lift Station

Project Features

- Packaged Submersible Lift Station
- Dual pump configuration (15 Hp)
- 200 gpm
- 100-feet TDH
- 3-Phase power supply
- Electronic Control System
- Back-up generator
- Located in Lynde Street right of way

Connection to Utility Solutions

WASTEWATER TREATMENT ALTERNATIVE

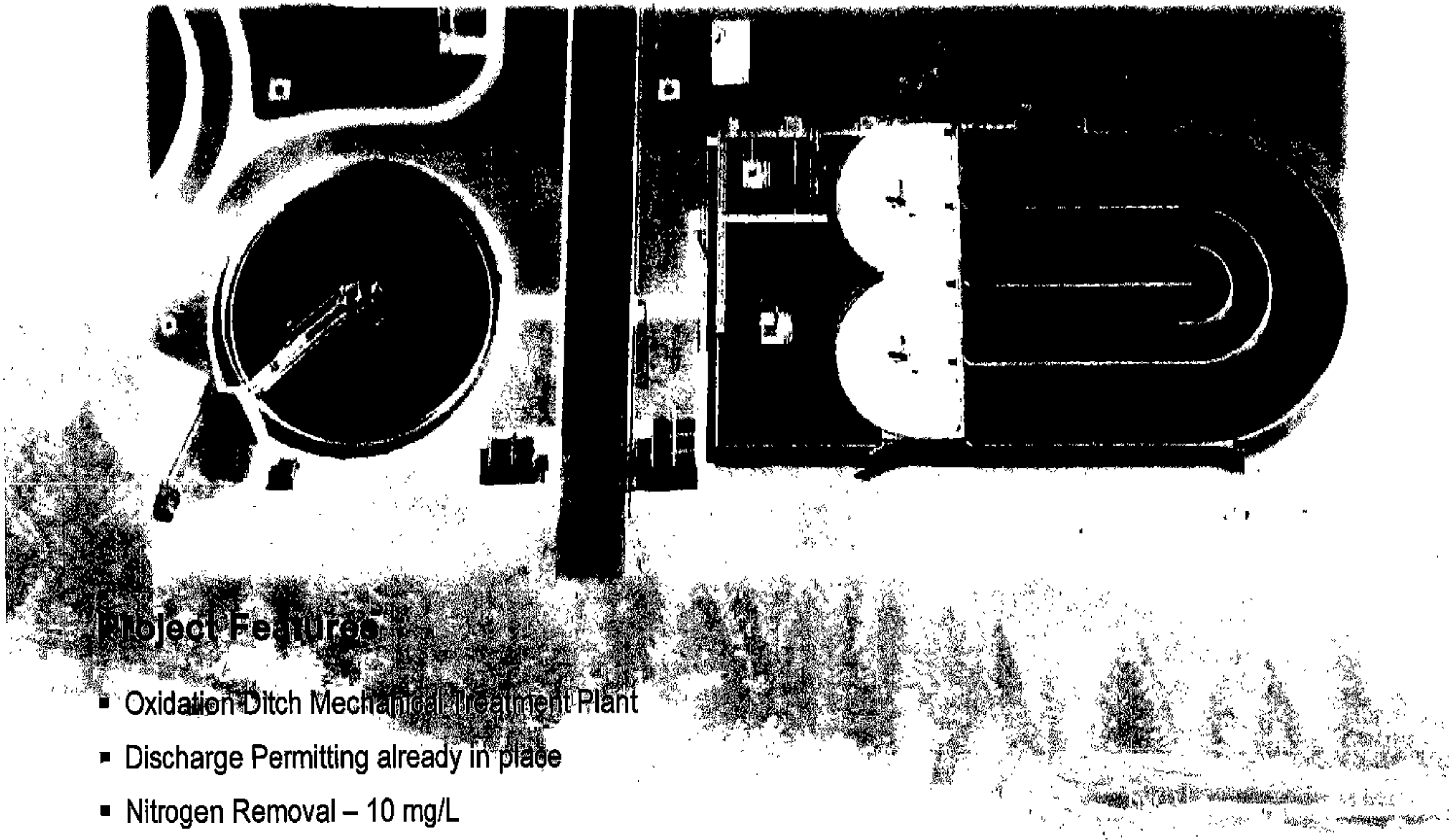


Project Features

- Approximately 23,700 lineal feet (4.5 miles) of 6-nch diameter force main
- Force main alignment in MDT US Hwy 191 right-of-way

Connection to Utility Solutions

WASTEWATER TREATMENT ALTERNATIVE



Project Features

- Oxidation Ditch Mechanical Treatment Plant
- Discharge Permitting already in place
- Nitrogen Removal – 10 mg/L

Storage and Irrigation

WASTEWATER TREATMENT ALTERNATIVE

Project Features

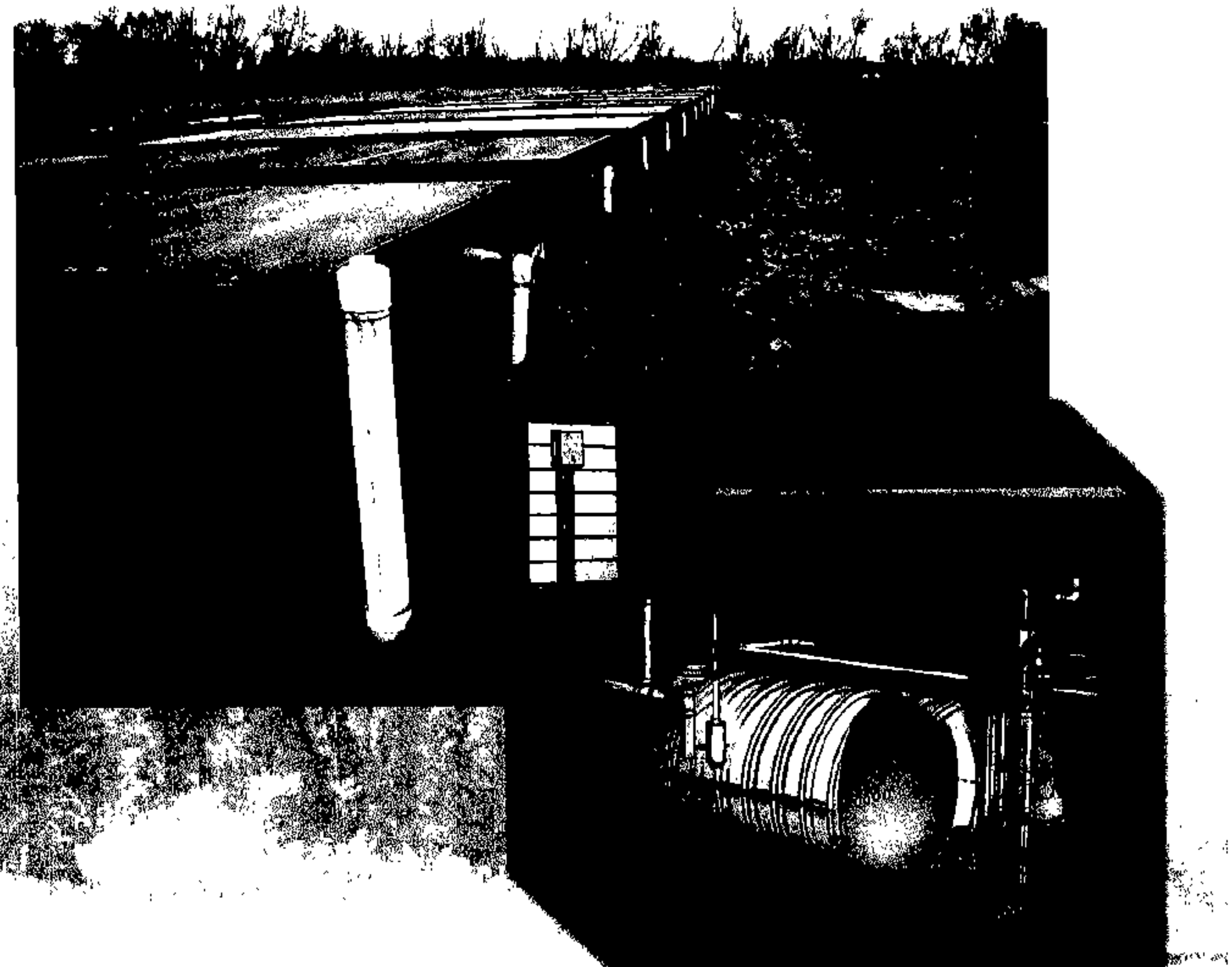
- 200-gpm lift station
- 0.5-acre primary pond (mechanically aerated)
- 5.1-acre storage pond
- 15 acres of irrigated cropland (alfalfa hay)
- No Discharge Permitting
- Secondary Treatment Standards
- UV Disinfection System

Septic Tank / Level 2 Treatment

WASTEWATER TREATMENT ALTERNATIVE

Project Features

- 150,000-gallon centralized septic tank
- 75,000-gallon recirculation tank
- 20-AdvanTex treatment filters (AX100 Pods)
- 10-acres of land for treatment and groundwater disposal area (drainfield)
- Groundwater Discharge Permit Required
- Secondary Treatment Standards

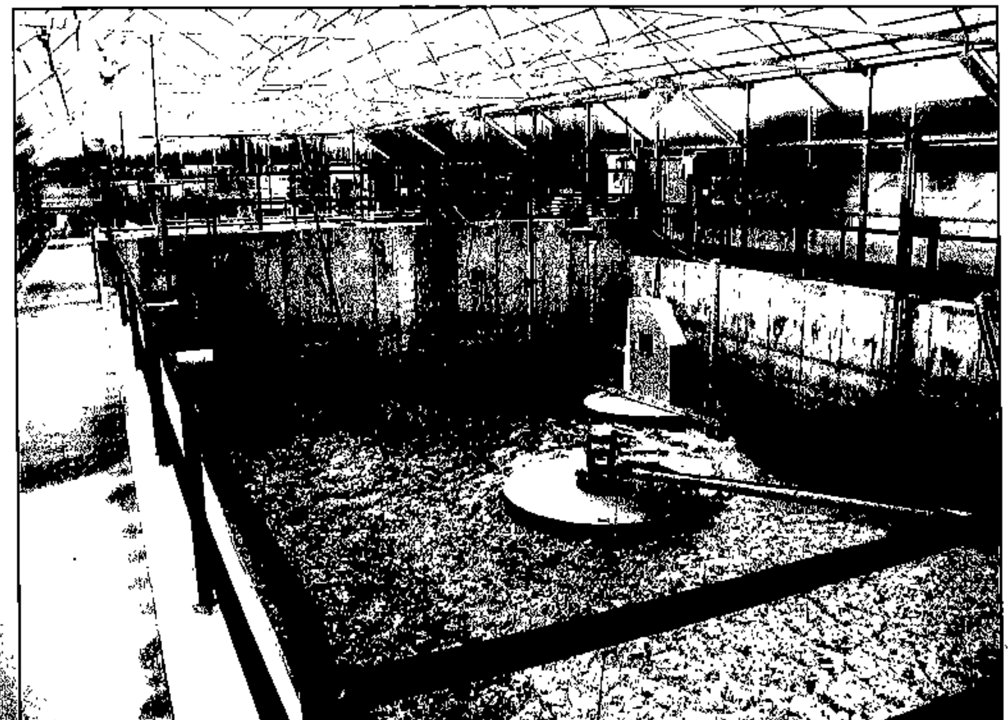


Biological Nutrient Removal (BNR)

WASTEWATER TREATMENT ALTERNATIVE

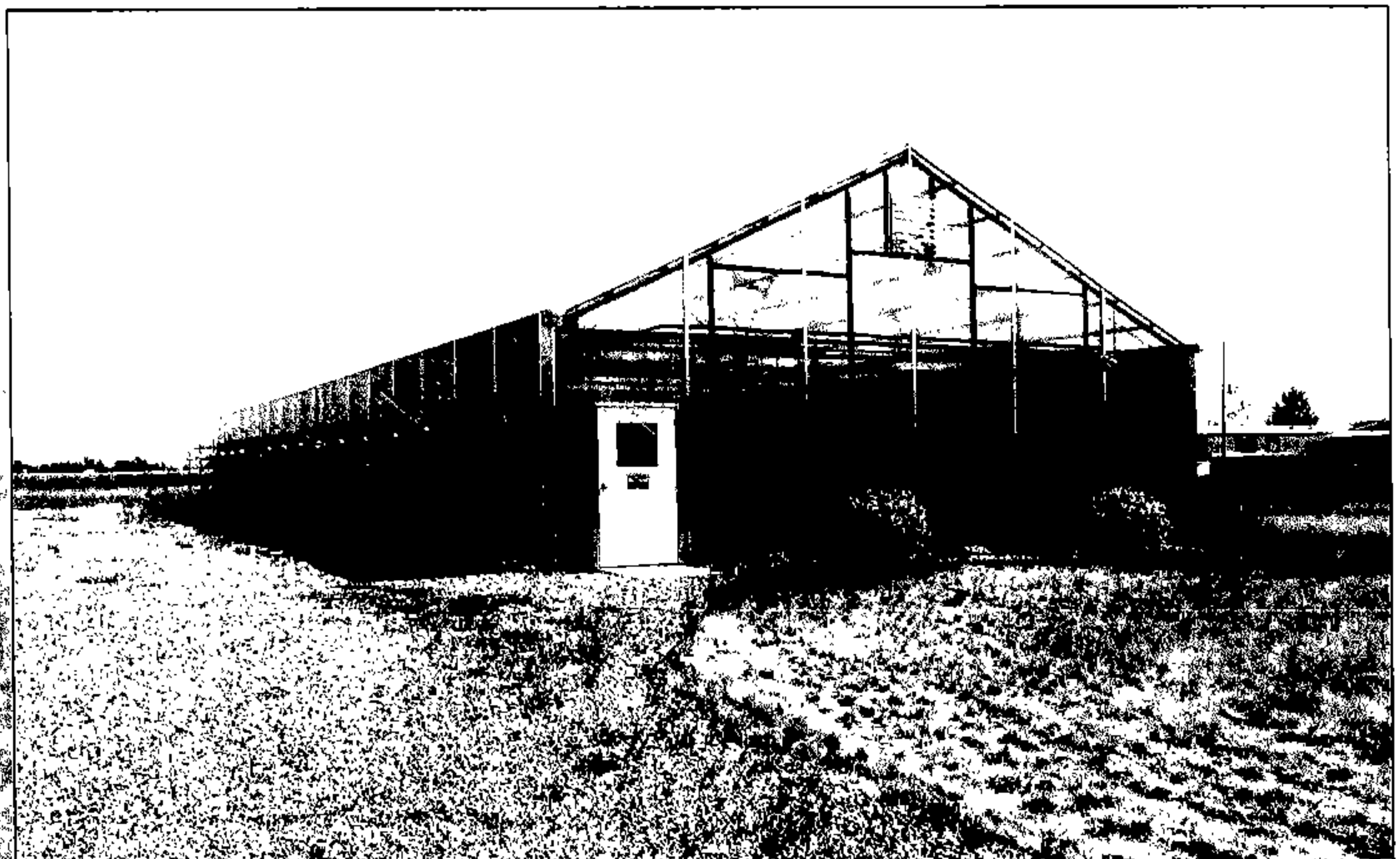
Project Features

- Mechanical Treatment Plant
- Sequencing Batch Reactor (SBR)
- RAE Water & Sewer District
- High level of treatment
- Groundwater discharge through infiltration galleries
- Plant operator
- Increased O&M
- Modest land requirement
- Highest Cost Alternative



Biological Nutrient Removal (BNR)

WASTEWATER TREATMENT ALTERNATIVE



RAE Water & Sewer District SBR Treatment Plant

Alternative Analysis

- Preliminary Design
- Operational Requirements
- Energy Requirements (Consumption)
- Regulatory Compliance and Permits
- Land Requirements
- Environmental Considerations
- Potential Construction Problems
- $ Cost Estimates $

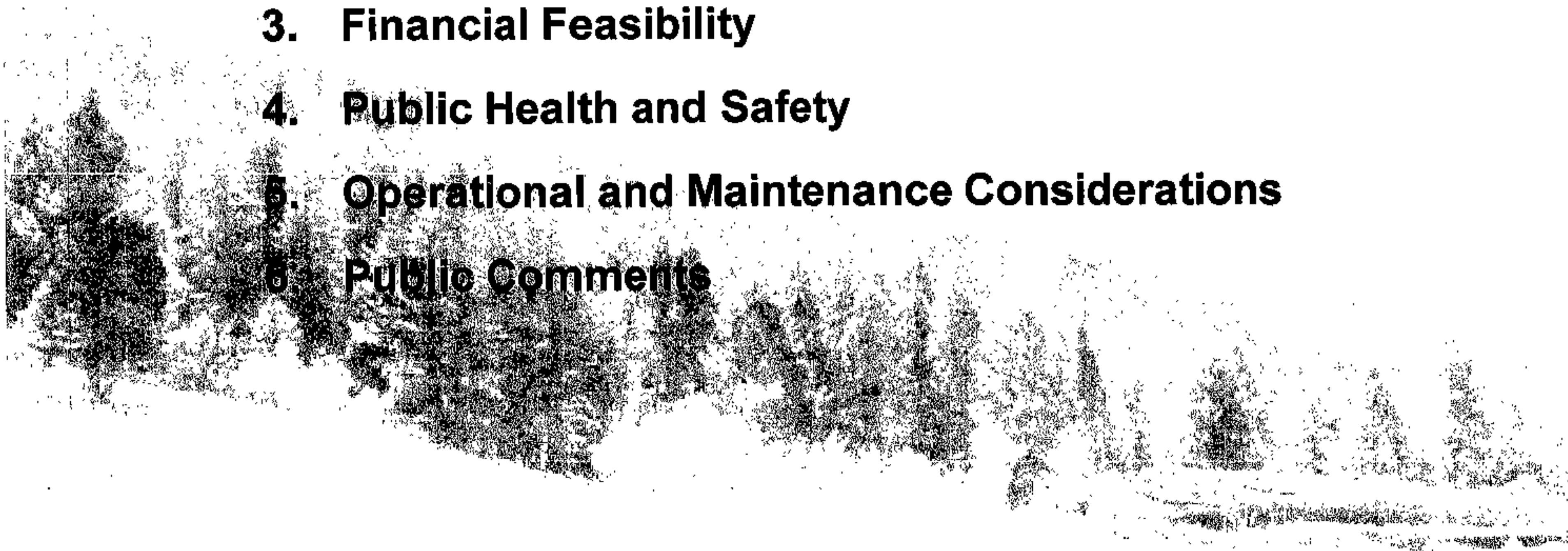
Cost Estimates

GALLATIN GATEWAY WASTEWATER TREATMENT PREFERRED ALTERNATIVES					
PRESENT WORTH ANALYSIS					
ITEM	**CONNECTION TO UTILITY SOLUTIONS**	**STORAGE AND IRRIGATION**	**SEPTIC TANK LEVEL 2 TREATMENT (50K gpd)**	**SEPTIC TANK LEVEL 2 TREATMENT (30K gpd)**	**BIOLGICAL NUTRIENT REMOVAL (BNR)**
Capital Costs	$4,201,000	$5,433,000	$4,908,000	$4,315,000	$5,574,000
Annual O&M Costs	$102,336	$41,500	$46,000	$32,000	$98,000
20-Year Salvage Value	$1,182,420	$1,333,410	$1,102,020	$1,012,740	$1,264,140
Present Worth of Salvage Value	$368,700	$415,800	$343,600	$315,800	$394,200
Present Worth of Annual O&M Cost	$1,534,874	$622,433	$689,925	$479,948	$1,469,841
Present Worth Cost[1]	**$5,367,174**	**$5,639,633**	**$5,254,325**	**$4,479,148**	**$6,649,641**

Selection of Preferred Alternative

6 Ranking Criteria:

1. Technical Feasibility
2. Environmental Impacts
3. Financial Feasibility
4. Public Health and Safety
5. Operational and Maintenance Considerations
6. Public Comments



Selection of Preferred Alternative

Example Decision Matrix (Draft)

Alternative	Technical Feasibility		Environmental Impacts		Life Cycle Cost		Public Health and Safety		Operation and Maintenance		Public Opinion		TOTAL
	Weight:	5	Weight:	3	Weight:	10	Weight:	7	Weight:	4	Weight:	5	
	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	
CS-1	5.0	25	5.0	15	4.5	45	5.0	35	4.0	16	3.0	15	**151**
CS-2	5.0	25	5.0	15	5.5	55	5.0	35	6.0	24	8.0	40	**194**
T-1	10.0	50	0.0	0	10.0	100	0.0	0	5.0	20	0.0	0	**170**
T-2	9.0	45	5.0	15	5.9	59	4.0	28	10.0	40	4.0	20	**207**
T-3	4.0	20	5.0	15	5.4	54	2.0	14	4.0	16	3.0	15	**134**
T-4	5.0	25	6.0	18	6.0	60	8.0	56	8.0	32	7.0	35	**226**
[illegible]	5.0	25	6.0	18	4.0	40	9.0	63	1.0	4	5.0	25	**175**
[illegible]	3.0	[illegible]	[illegible]	[illegible]	5.0	50	6.0	42	6.0	24	5.0	25	**165**
S-2	5.0	25	6.0	18	6.0	60	6.0	42	5.0	20	6.0	30	**195**
S-3	10.0	50	9.0	27	5.0	50	5.0	35	9.0	36	8.0	40	**238**

Selection of Preferred Alternative

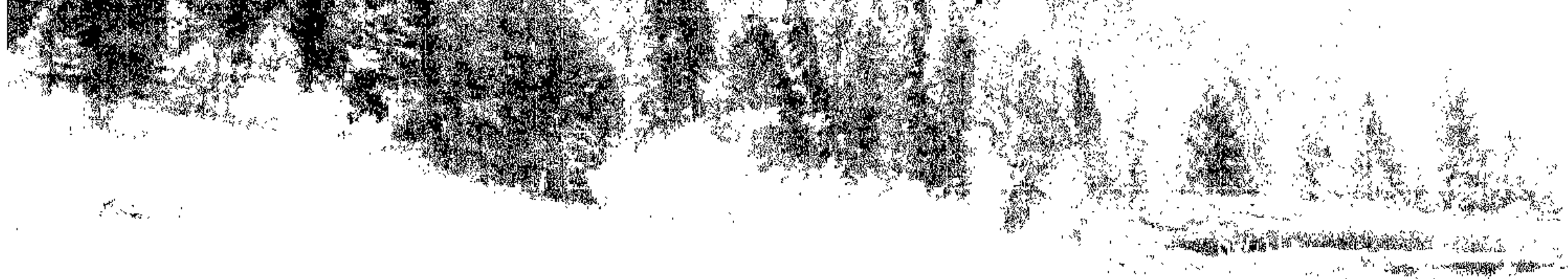
Preferred Alternative for Gallatin Gateway

- ✓ Collection System: Gravity Collection – Alley Layout
- ✓ Lift Station: Single Centralized Packaged Submersible
- ✓ Treatment System: Septic Tank / Level 2 / Drainfield
- ✓ Site Selection: Presumably East of Highway 191

- ➢ Estimated Cost of Preferred Alternative = <u>$4,315,000</u>
- ➢ Annual Estimated Cost for O&M = <u>$32,000</u>

Project Funding Strategy

- **Funding Sources**
  - TSEP – Treasure State Endowment Program
  - DNRC – Department Natural Resources & Conservation
  - CDBG – Community Development Block Grant
  - SRF – State Revolving Fund
  - RD – U.S. Department of Agriculture Rural Development
  - STAG – State & Tribal Assistance Grant
  - WRDA – Water Resource Development Act



Funding Agency Ranking Criteria

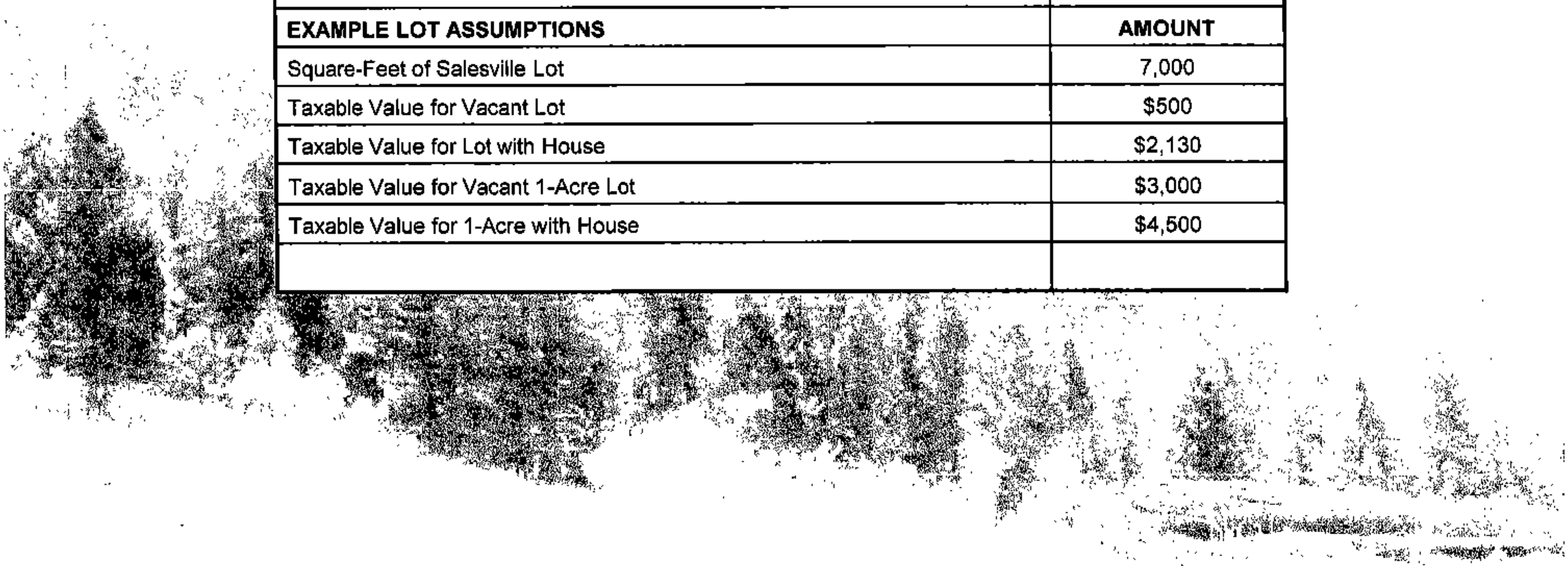
Criteria	TSEP	CDBG	DNRC
Need/problem	1,000 pts	125 pts	
Financial need	900 pts	150 pts	-100
Engineering report	800 pts	100 pts	+400
Planning and Management	700 pts	100+125 pts	-100
Other funding	600 pts		
Business/jobs/public	500 pts		+100
Community effort	400 pts	100 pts	
Low-income benefit		100 pts	
Environmental			-100
Natural resource			500 pts

Project Funding Strategy

FUNDING STRATEGY SUMMARY FOR PREFERRED ALTERNATIVE		
	SCENERIOS	
DESCRIPTION	**BETTER**	**WORSE**
TOTAL PROJECT COST	**$4,315,000**	**$4,315,000**
TSEP Grant	$750,000	$750,000
DNRC Grant	$100,000	$100,000
CDBG Grant	$450,000	$450,000
STAG/WRDA Grant	$600,000	$250,000
RD Grant	$1,086,750	$0
RD Loan (40 Years @ 3.73%)	$1,328,250	$0
SRF Loan (20 Years @ 3.00%)	$0	$2,765,000
Principal + Interest + Reserve on Loans (Annual)	$67,098	$204,437
Estimated O&M (Annual)	**$32,000**	**$32,000**
Effective Annual System Cost	**$99,098**	**$236,437**

Project Funding Strategy

ASSUMPTIONS FOR FUNDING STRATEGY ANALYSIS	
DISTRICT ASSUMPTIONS	**AMOUNT**
Number of Lots	174
Number of Initial EDU's	104
Total Taxable Value	$364,751
Total Square-Feet	3,896,679
EXAMPLE LOT ASSUMPTIONS	**AMOUNT**
Square-Feet of Salesville Lot	7,000
Taxable Value for Vacant Lot	$500
Taxable Value for Lot with House	$2,130
Taxable Value for Vacant 1-Acre Lot	$3,000
Taxable Value for 1-Acre with House	$4,500



Project Funding Strategy

COSTS ESTIMATES WITH PROPOSED FUNDING STRATEGY USING PROPERTY ASSUMPTIONS		
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1-Acre Lot with House	$386	$1,175

Income Survey

- **Required to determine RD and CDBG eligibility**
- **3rd Party Privacy**
- **Need completed income surveys to be valid**
  - » 67% returned for CDBG
  - » 87% returned for RD

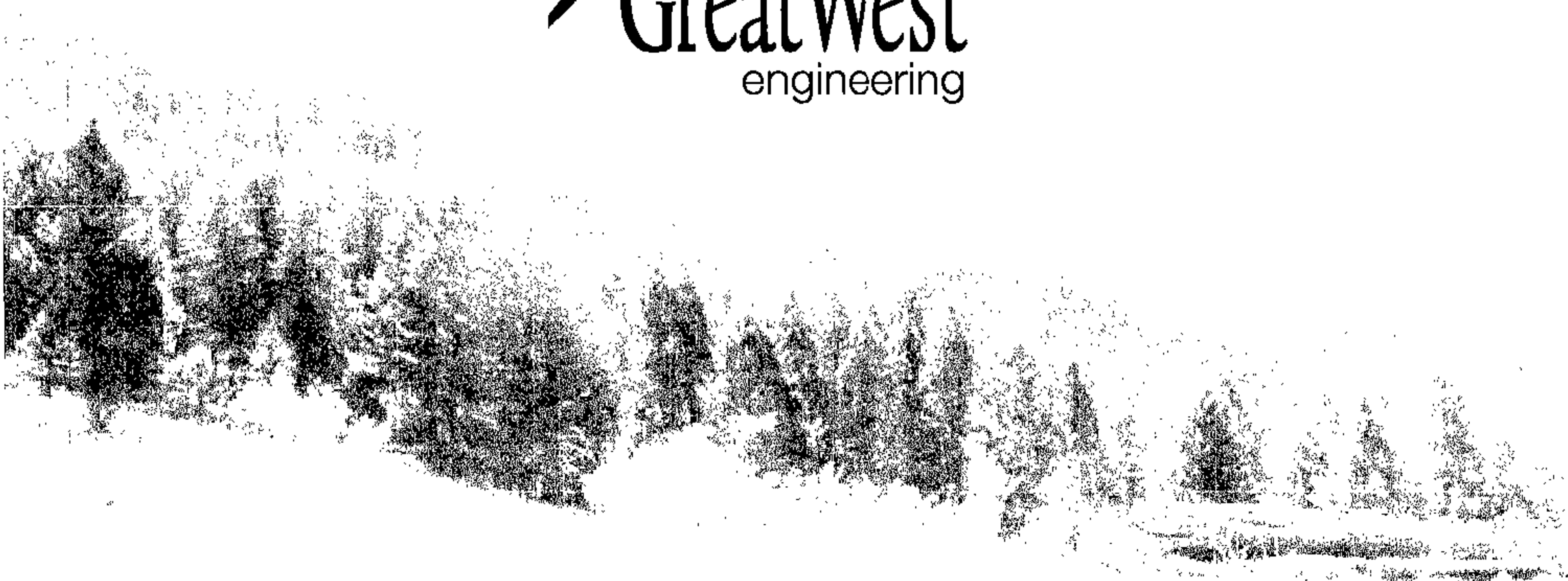
- **Due NOW!**

Implementation Process & Schedule

ACTION	DATE	FUNDING	NOTES
Submit STAG/WRDA grant applications	March, 2010	District	Completed
Complete Income Survey	March, 2010		Midwest Assistance
Submit TSEP application	April 16, 2010	District	GWE
Submit DNRC grant application	May, 2010	District	GWE
Select Bond Council, Hold Bond Election, Hire Engineer/Administrator	Sept, 2010	District	
Apply to RD for loan	Oct, 2010	District	
Results of TSEP and DNRC grant known	April or May, 2011		If insufficient funding, re-apply or phase project to meet available project funding
Submit CDBG Grant Application	May, 2011		
Begin Design Phase	May, 2011	TSEP	
Start-Up, FONSI Clearance	May, 2011	CDBG	All environmental research already complete
Submit Plans to DEQ	Dec, 2011		
DEQ approval	Feb, 2012		Allows 2 full months for review
Advertise and Bid Project	Feb – Mar, 2012	CDBG, TSEP	Allows Contractor 3 months to get crew and materials ready
Construction	Apr – Aug, 2012	CDBG, TSEP, DNRC, SRF	
Final Walk-Through	Aug, 2012		
Close-out	Oct, 2012		Conditional for TSEP and CDBG pending audits
Audit	Jan, 2013	TSEP, CDBG	Need special single act - audit due to high amount of state and federal funds
Audit and Final CDBG/TSEP Close-out	Jan, 2013		
11 month Walk-Through	Oct, 2013		

Questions?

GreatWest
engineering



GreatWest engineering

BOZEMAN

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BILLINGS

115 N. Broadway, Suite 500 • Billings, MT 59101

Phone 406.652.5000 • Fax 406.248.1363

www.greatwesteng.com

Appendix Z

Contaminated Well – Brooke Savage

LAB. NO. 0???25

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
Public Health Lab, W.F. Cogswell Building, Helena, Montana 59620
Phone: 444-2642

T 20380

SAMPLING PROCEDURE:

Received 8/16/94 *Reported* 8-19-94

1. Remove screen. Allow water to run 2-3 minutes. If you have a water softener use an outside tap.
2. Fill bottle to neck—without touching inside (this leaves ½ inch air space. Do not rinse out bottle.
3. Fill out sampling information below and return to lab within 48 hours.
4. Enclose $14.00 check or money order to cover cost. Results will not be sent until fee is paid.

DATE Collected 8/15/94 Time 7:45 A.M.

Owner of Water Source BROOKE SAVAGE

Location of Water Source 214 ADAMS GALLATIN (Nearest City)

County Gallatin

Type of Supply *(Circle One)* Cistern Well Spring River ______ Other (Please Specify)

Collector of Sample: BROOKE Phone No. 763-4842

Person to Receive Report *(Please Print)*:

NAME: BROOKE SAVAGE

Street or RFD: P.O. BOX 327

City: GALLATIN GTWY, MONT, MT Zip: 59730

ck # 744
paid

DO NOT WRITE BELOW THIS LINE

TOTAL COLIFORM

coliforms present

Multiple Tube *Membrane Filter*

FECAL COLIFORM

Multiple Tube *Membrane Filter*

☐ Satisfactory At This Time

☒ Contaminated

Water supply should be disinfected and retested before it is used as drinking water or for household purposes. Consult your county sanitarian for treatment procedures.

REMARKS:

Montana Department of
ENVIRONMENTAL QUALITY
Data Source: Public Water Supply Section

Public Water Supply System

Return to PWS Query

Return to PWS Reports

(continued)

PWSID: MT0001284 Name: GATEWAY CAFE AND MARKET

Collection D	Lab Number	Type	Orig Lab #	Code		TCR Presence		Fec/EC Result
08/05/2002	02083294P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083294P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083295P	RT		3100	COLIFORM (TCR)	A	-	
08/05/2002	02083296P	RT		3014	E. COLI	A		-
08/05/2002	02083296P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083297P	RT		3100	COLIFORM (TCR)	P	+	
08/05/2002	02083297P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083298P	RT		3013	FECAL COLIFORM	A		-
08/05/2002	02083298P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072883	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072883	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072884P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072884P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072885P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072885P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072886P	RT		3014	E. COLI	A		-
07/17/2002	02072886P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072886P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072886P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072909P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072909P	RT		3100	COLIFORM (TCR)	P	+	
07/17/2002	02072909P	RT		3013	FECAL COLIFORM	A		-
07/17/2002	02072909P	RT		3014	E. COLI	A		-
06/17/2002	02062308P	RP	02062215F	3013	FECAL COLIFORM	A		-
06/17/2002	02062308P	RP	02062215F	3100	COLIFORM (TCR)	P	+	
06/17/2002	02062309P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/17/2002	02062310P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/17/2002	02062311P	RP	02062215F	3100	COLIFORM (TCR)	A	-	
06/12/2002	02062215P	RT		3100	COLIFORM (TCR)	P	+	
06/12/2002	02062215P	RT		3013	FECAL COLIFORM	P		+
04/16/2002	02041271P	RT		3100	COLIFORM (TCR)	A	-	
03/23/2002	02030904P	RT		3100	COLIFORM (TCR)	A	-	
02/26/2002	02020646P	RT		3100	COLIFORM (TCR)	A	-	
01/28/2002	02010252P	RT		3100	COLIFORM (TCR)	A	-	
12/12/2001	01125885P	RT		3100	COLIFORM (TCR)	A	-	
11/29/2001	01115673P	RT		3100	COLIFORM (TCR)	A	-	
10/27/2001	01105154P	RT		3100	COLIFORM (TCR)	A	-	
09/10/2001	01094288P	RT		3100	COLIFORM (TCR)	A	-	
08/28/2001	01083906P	RT		3100	COLIFORM (TCR)	A	-	
07/17/2001	01073045P	RT		3100	COLIFORM (TCR)	A	-	