

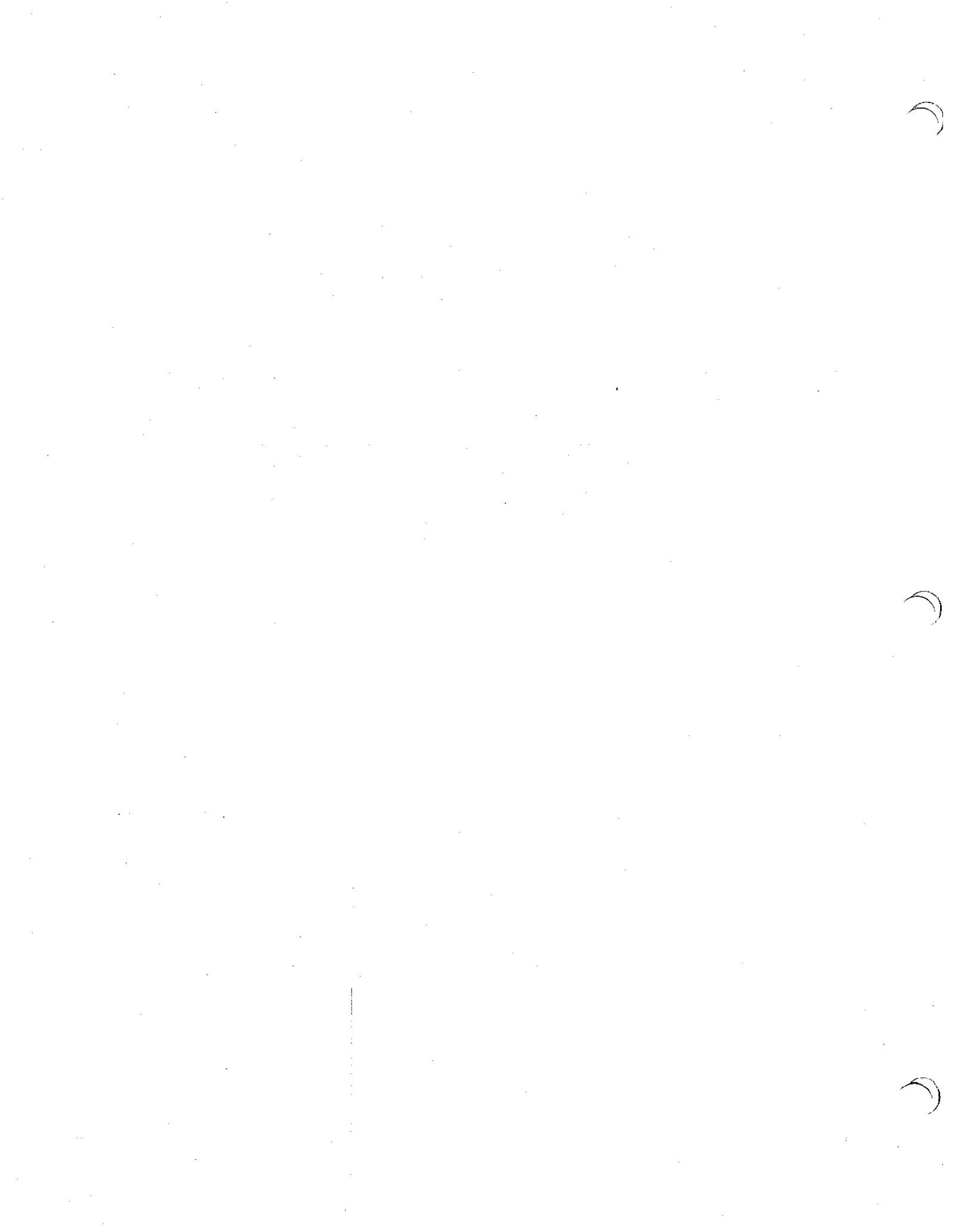
BRIDGER MOUNTAIN VILLAGE

PLANNED UNIT DEVELOPMENT

COMMUNITY WATER SYSTEM

NOVEMBER 2006

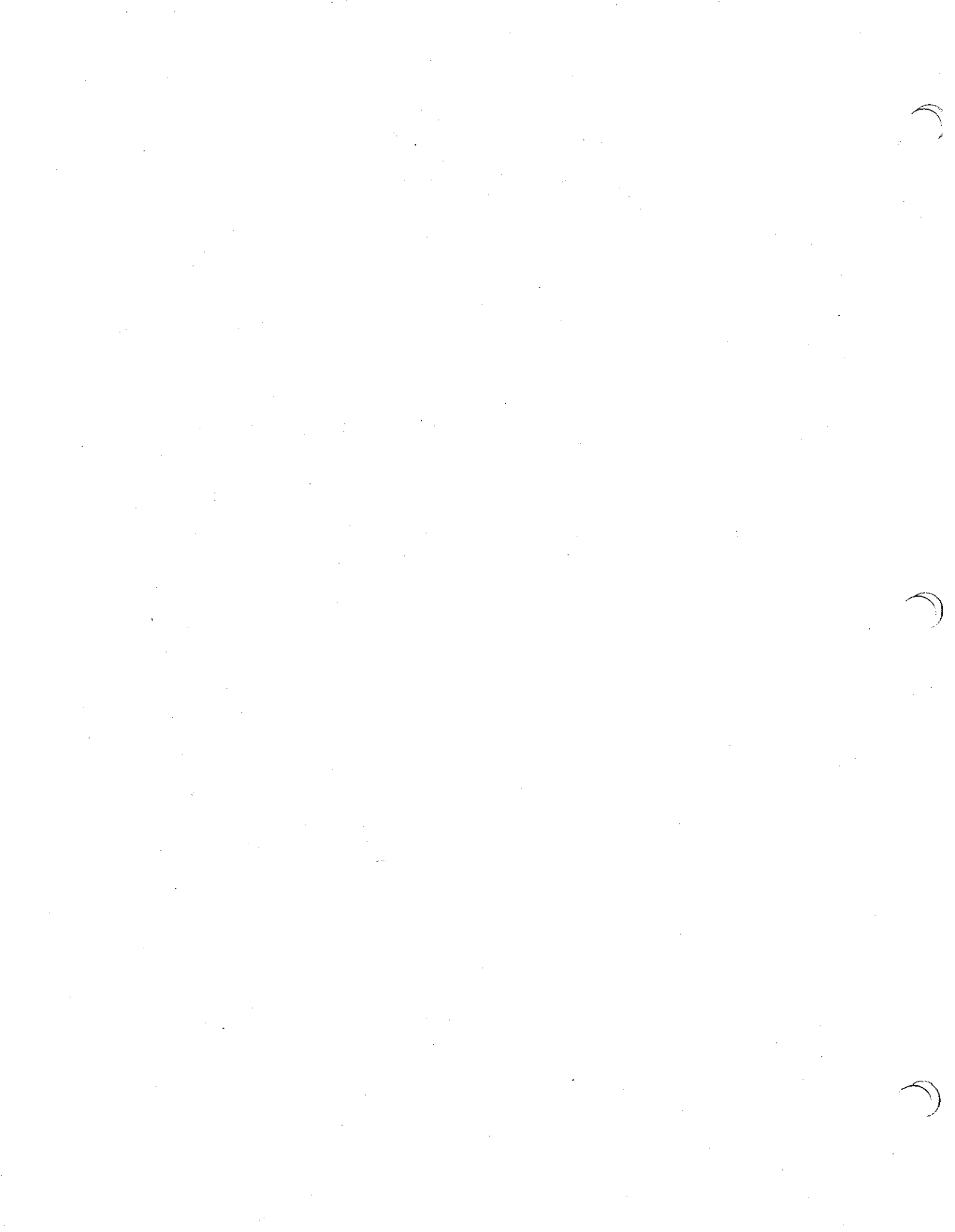
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COMMUNITY WATER SYSTEM

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EXECUTIVE SUMMARY

The proposed water supply system for the Bridger Mountain Village project is an expansion of the existing Bridger Base Water System that supplies Ross Peak Ranch. The Bridger Base Water System consists of supply wells, supply and distribution piping, a storage reservoir and telemetry controls that operate and monitor the overall system. The proposed expansion of the water system will require additional water supply wells, distribution piping and in the later phases of the project additional water storage. It is the intent of the development to expand the water system in such a manner that all properties in the Base Area Zoning District will have access to the water system. All improvements to the water system require approval of the Montana Department of Environmental Quality. In addition a Beneficial Use Permit will need to be obtained from the Montana Department of Natural Resources and Conservation.

INTRODUCTION

A community water distribution system supplied by a series of community water wells is proposed for the Bridger Mountain Village project. The central water system is a critical ingredient necessary for base area clustered development. The Bridger Bowl Base Area Plan, encourages a central water system (page 7, Goal #3, Objective #2). The proposed expansion of the Bridger Base Water System will provide for a reliable domestic water system and fire protection system for the entire base area.

WATER DEMANDS

Water demands are estimated based on three components of water use. These include domestic/commercial needs, irrigation requirements and water needed for fire protection.

Average day water demands for the domestic and commercial needs are shown in the table below for 100% occupancy rates. It should be noted that in concert with

planning for the overall base area infrastructure needs that demands of all potential users are included in the table.

USERS	Domestic Water Use - Average Day					
	Building		Number	Gallons Per Day Per Unit	Gallons Per Day	Total
Bridger Canyon Partners, LLC	Units	Basis	Per Unit			GPD
A. Recreation Sites	75	Person	2.5	100	250	18,750
B. Overnight accommodations						
1. Trapper Cabins	128	Person	2.5	60	150	19,200
2. Chalets	80	Person	2.5	60	150	12,000
3. Condo in base area over commercial	80	Person	2.5	60	150	12,000
4. Main Lodge	100	Person	2.5	50	125	12,500
Hotel density bonus @	50	Person	2.5	50	125	6,250
Pool / Spa	1	Customer	100	10	1,000	1,000
Restaurant	1	Meal	300	3	900	900
Bar	1	Seat	50	3	150	150
C. H-1 Lodge	48	Person	2.5	50	125	6,000
D. Bed & Breakfast / Back country huts	<u>16</u> 505	Person	2	60	120	1,920
E. Commercial - Base Area						
1. Restaurants	500	Meal	2	3	6	3,000
2. Bars	1	Seat	300	3	900	900
3. Launderette	1	Machine	4	580	2,320	2,320
4. Shops	1	Net Sq. Ft.	32,000.0	0.2	6,400	6,400
5. Police & Fire O & M Administration	1	Employees	10	15	150	150
6. Nordic Center	1	Employees	10	10	100	100
7. Church	1	Seat	100	3	300	300
8. Ice skating area						0
9. Misc.	5	Each	1	200	200	1,000
F. Commercial - Convenience Store	1	Each	1	500	500	500

G. Base area employee housing (250 employees @ 10% = 25 x .5)	13	Person	2	100	200	2,600
H. Bridger Park 1. Recreational Site	30	Person	2.5	100	250	7,500
						115,440

Domestic Water Use - Average Day

Fringe areas	Units	Basis	Number Per Unit	Gallons		Total GPD
				Per Day Per Unit	Gallons Per Day	
A. Lachenmaier						
1. Recreation sites	13	Person	2.5	100	250	3,250
2. Overnight accommodations	37	Person	2.5	60	150	5,550
B. Hepburn						
1. Recreation sites	2	Person	2.5	100	250	500
2. Overnight accommodations	5	Person	2.5	60	150	750
C. Bridger Bowl						
1. Overnight accommodations	39	Person	2.5	60	150	5,850
D. Employee Housing (250 employees @ 10% = 25 x .5)	13	Person	2	100	200	2,600
E. Bridger Pines						
1. Recreation Sites	30	Person	2.5	100	250	7,500
2. Condominium Recreation Sites	28	Person	2.5	100	250	7,000
Potential Additional Users	7	Person	2.5	100	250	1,750
						34,750
TOTAL AVERAGE DAILY WATER DEMAND						150,190

The average daily water demand for the entire base area zoning district and the Ross Peak subdivision is 150,190 gallons per day. This value is conservative as it is based on full occupancy of all of the units. Based on literature sources the maximum to average day ratio is 2.5. Thus the maximum day demand for domestic and commercial use is estimated to be 375,500 gallons per day.

150,190
 47,950

 197,640

Irrigation water needs for the project will be minimal. Strict limits will be placed on the irrigable landscape areas for the project. These include a maximum of 2,500 square feet of irrigated landscape area for the recreation sites, and one acre of irrigated area associated with the overnight accommodations and one acre of irrigated area for the commercial component of the project. The built out water system will accommodate the Ross Peak subdivision in addition to all areas within the base area zoning district.

The following summarizes the irrigation needs for the water system:

Ross Peak Lots 5,000 square feet of irrigated area for 30 lots (150,000 sf)

90 Recreation Sites – 2,500 square feet of irrigated each (225,000 sf)

Overnight Accommodations – 1 acre – 43,560 square feet

Commercial Area – 1 acre – 43,560 square feet

Bridger Pines Recreation Sites (30) - 2,500 square feet each (75,000 sf)

Bridger Pines Condominium Sites – 0.5 acre total – 21,780 square feet

7 Potential Additional Users – 2,500 square feet each (17,500 sf)

The irrigation needs for the project area are minimal. On an annual basis the project area receives an abundance of precipitation. It is anticipated that the irrigation season will be limited to a 10 week period including July, August and the first half of September. An irrigation requirement of 1 inch per week is adequate for area. The irrigation water requirement for an average day is computed as follows:

Average Irrigation Day = 1" x (150,000 sf + 225,000 sf + 43,560 sf + 43,560 sf + 75,000 + 21,780 + 17,500) x 1 ft/12 inch x 7.48 gallon / cubic foot / 7 days per week = 47,450 gallons per day.

The maximum day water use for irrigation is estimated to be twice the average day. Thus the maximum day demand for irrigation is estimated to be 94,900 gallons per day.

Water needs for fire protection are based on the requirements listed in the Uniform Fire Code. The requirements vary based on construction type, structure size and other fire protection components. For the initial phases of the development a 2 hour fire flow of 1,500 gallons per minute is adequate. This equates to 180,000 gallons

of water reservoir storage. Water needed for fire protection does not impact average day or maximum day demand values.

Total water demands for the water system at build out are therefore 197,640 gallons per day on an average day basis and 470,380 gallons per day on a maximum day basis. It is important to note that these values are during the irrigation season and represent a conservative approach to forecasting water demands. It is likely that during the summer the project will not be at full occupancy and therefore both average and maximum summer demands will be much less than what is listed, however it is important to design the facilities to allow for full occupancy during the irrigation season. Considering that the shoulder seasons in the spring and fall do not provide the same recreational opportunities as the winter and summer seasons the annual average water use is anticipated to be much less than the value noted above. On an annual average basis with full occupancy and at full build out the estimated demand is 110 gallons per minute.

WATER SUPPLY

Water will be supplied to the project through a series of water supply wells. The existing Bridger Base Water System for Ross Peak is served by two wells. Additional wells will be required to serve the entire base area zoning district. A detailed drilling and testing program is currently underway on the project site to determine the total number of wells that will be required.

Public water supply wells are permitted through two State of Montana agencies including the Department of Environmental Quality and the Department of Natural Resources and Conservation. Approvals have been obtained through the Department of Environmental Quality to drill the public water supply wells. Additional applications will need to be submitted for approval to both agencies. In accordance with the agencies requirements adequate well capacity is required to serve maximum day demands with the largest well out of service. Instantaneous water demands and fire

protection demands are provided through storage in a water reservoir.

A telemetry control system will operate and monitor the overall community water system. Each well will discharge to an underground concrete storage reservoir commonly called a "clear well". The clear well is located centrally in the lower base area. The clear well provides the means to chlorinate the well water supply or provide for other water treatment needs as may be required in the future. A triplex booster pump station at the clear well pumps the collected water to an on-ground steel water storage reservoir for release into the community water distribution network. As with all components of the water system, the approvals needed for the expansion of the water system will require that the system be evaluated and upgraded as needed to provide for the additional capacity and upgraded as needed to come into compliance with newly implemented regulations.

WATER DISTRIBUTION SYSTEM

The community water distribution system is a gravity operated network consisting of the storage reservoir and underground water mains located in existing and proposed rights of way. Easements for water mains located outside of existing or proposed right-of-ways will be granted and recorded in the platting stage. Water mains not within road rights-of-way will be laid in curvilinear routes to lessen visual impacts.

The distribution system is made up of approximately 39,000 lineal feet of 6-inch, 8-inch and 10-inch polyvinyl chloride (PVC) C-900 water main pipe. The well supply piping consists of approximately 13,000 lineal feet of 4-inch and 6-inch water main supply pipe. Other components of the distribution network include pressure reducing stations, fire protection hydrants, individual water service piping to property lines and miscellaneous appurtenances.

WATER STORAGE RESERVOIR

The water storage reservoir will have the capacity to store the average daily water demand, plus a reserve for fire protection demand requirements as required by Department of Environmental Quality regulations. The initial phases of the development will require 180,000 gallons of storage for fire protection. The existing reservoir provides for 350,000 gallons of storage. Thus with the storage for fire protection taken out of this volume there remains adequate capacity for 170,000 gallons per day of average day use. It is recommended that the requirements for water storage be evaluated on a phase by phase basis to assure that adequate capacity is available as needed. The water distribution network is a gravity operated system from the reservoir. A power outage will not affect the supply of water from the reservoir for domestic or fire fighting demands. Therefore, domestic and fire protection water needs will be available at all times.

The reservoir is located in the upper portion of the project area at an approximate elevation of 6,460 feet above sea level. At that elevation, the reservoir will provide a minimum of 35 pounds per square inch (psi) to all locations of the distribution system. The water system will be designed to maintain a minimum 20 psi in the distribution system during a fire flow condition.

FIRE PROTECTION REQUIREMENTS

Fire protection shall be provided for the Bridger Mountain Village project in the form of a fire reserve water supply at the community reservoir. The community water system shall be capable of delivering the required fire flow throughout the development at a residual pressure of not less than 20 pounds per square inch. The amount of water storage for fire protection is calculated by a 1,500 gpm flow for 2 hours or 180,000 gallons. Average day domestic and irrigation requirements are in addition to the fire reserve.

The proposed community water system design criteria is based upon automatic

fire suppression sprinklers being required in all multi-family and commercial structures within the development. Design criteria will meet or exceed Uniform Fire Code Standards.

Providing adequate storage, properly sized water mains and a sufficient number of fire hydrants to deliver water for fire protection, together with access approved for emergency vehicles, greenbelt firebreaks fire resistant construction materials, etc., will greatly reduce the danger of large fires or fire spread. An adequate supply of water for fire protection is the key element to controlling fires once they have begun.

SUMMARY

Generally, the community water system consists of several supply wells, supply and distribution piping, an underground clear well for water treatment and storage, a large above ground storage reservoir and a telemetry system to integrate, operate and monitor the overall system and provide fire protection for the Bridger Mountain Village project.