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Wastewater Collection and Treatment Feasibility Study For Placerville/Fall Creek Area in San Miguel County

Prepared For:
San Miguel County Environmental Health Department, Colorado
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Miramonte Building, Room 301
Telluride, CO 81435

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February, 2003

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WASTEWATER COLLECTION AND TREATMENT FEASIBILITY STUDY FOR PLACERVILLE/FALL CREEK AREA IN SAN MIGUEL COUNTY

P. O. Box 4130,Miramonte Building, Room 301, Telluride, CO 81435

I. INTRODUCTION

The Placerville/Fall Creek study area is located in Section 33, 34, 35 and unincorporated area 080166, Range 11 West, Township 43 and 44 North in San Miguel County, Colorado. The study area consists of Lower Placerville/San Miguel Canyon, Placerville and Fall Creek areas. The study area is approximately 3.2 miles long along the Highway 145 in the San Miguel River valley and bounded on both sides by BLM lands. Most of the study area is located on the north side of the San Miguel River. Shown on **Figure 1.1** is a vicinity map for the Placerville/Fall Creek study area, and shown on **Figure 1.2** is the study area map.

The study area is predominately a sparse residential community with limited commercial services. Existing residential units and commercial establishments in the study area use wells for potable water use and individual sewage disposal system (ISDS) for their sewage treatment and disposal at present. It is recognized that septic system failure can potentially occur as long as this area is served by ISDS. Due to limited available land in the study area, some of ISDS systems are located within the Right-of-Way (ROW) of the Highway 145 and they are not allowed to expand or be replaced within the ROW by the Colorado Department of Transportation (CDOT). It is reported that CDOT is planning a major highway project within the study area in the near future. Recent proposed development plans indicate potential growth in the area. To address the potential future growth, limited site conditions for use of ISDS and for the protection of water quality and public health, the County requested a feasibility study to evaluate and recommend the "best" alternatives for wastewater collection and treatment to serve the study area and identify potential funding sources to implement the project.

II. DESIGN FLOW AND ORGANIC LOADING ESTIMATES

1. Population Estimate

Based on the information provided by the San Miguel County Planning Department (see **Appendix A**), land uses in the study area include residential, commercial, parks and fire station. The majority of the area is zoned for residential use. Listed in **Table 2.1** is a summary of estimated number of commercial and residential lots and projected populations. Existing and future commercial establishments are and will be small shops and business with low to moderate water usage. It is not feasible due to site location and constraints to build larger restaurants or hotel type developments with high water usage. The Blue Jay PUD is in the process of constructing a small hotel and restaurant with on-site water and wastewater treatment systems. Commercial lots consist of a small percentage (18%) of the total lots in the study area and typically consist of small business and establishments. For this report it was assumed commercial was equivalent to residential in the population and flow projections. Population was projected

Figure 1.1 – Vicinity Map of the Placerville/Fall Creek Study Area

based on 2.3 people per household based on 2000 US census data (see **Appendix A**) for San Miguel County.

Table 2.1 – Summary of Estimated Lots and Populations

Uses	Place Description [4]	Number of Lots	Population (People)	Notes
Commercial	Placerville Commercial	50	115	50 platted town lots. Theoretically, one residential or commercial unit per lot for central sewer system. 50 units are the maximum for wastewater system planning. But due to site constraint and setback requirements, it was unlikely that 50 units would be developed.
	Corner of Hwy 145 & 62	5	12	2.74 acre parcel zoned for PC. Assuming 0.55 acre per unit.
	Truan PUD	5	11	An automotive repair service, a cabinet shop and 4 residential units.
	Down Valley Park	3.4[1]	8	Augmentation plan indicates 0.88 acre-foot water usage per year. This equates 3.4 residential equivalent units (EQR).
	Placerville Park/Fire Station	3.6[2] & [3]	8	200 users per day for the restroom in the park. This equates 3.6 EQR
	Total	**67**	**154**	Total 67 EQR Blue Jay PUD is not included since they have their own wastewater facility.
Residential	Fall Creek from Sawpit to Down Valley Park and west of the Park	234	538	185 parcels from Sawpit to Down Valley Park, 49 lots west of the Park including 12 lots west of river and 37 lots of east river.
	Placerville	39	90	39 units in Placerville, R/F Zone.
	Ellerdville/Lower Placerville/San Miguel Canyon	30	69	27 parcels in Ellerdville/Lower Placerville and 3 parcels in San Miguel canyon
	Total	**303**	697	Total 303 residential units. More than one unit may be allocated on some parcels.
Total Study Area		**370**	**851**	Total 370 residential equivalent units.

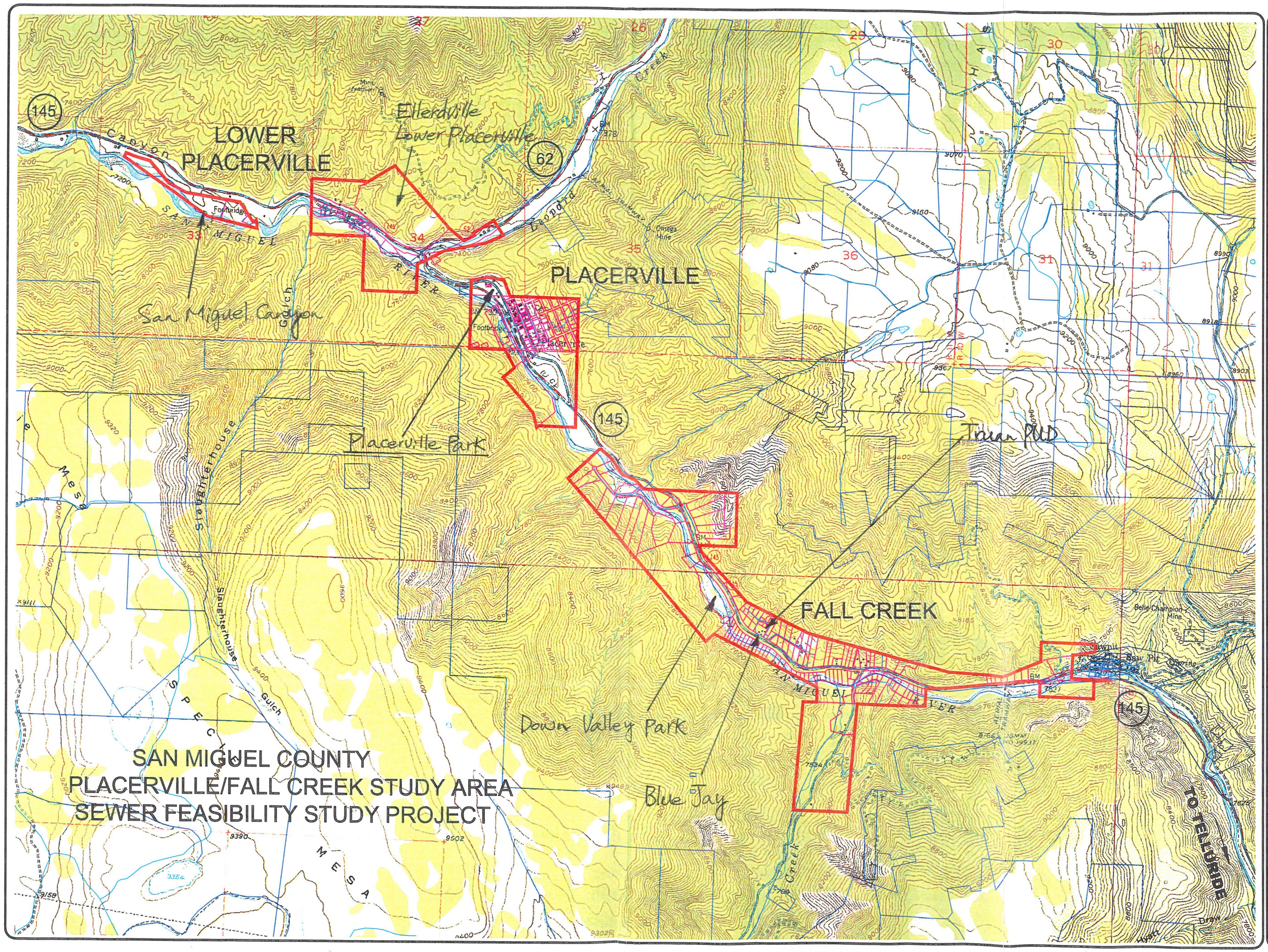
(1) Down Valley Park EQR Calculation
Annual water usage = 0.88 acre-foot water = 38,333 cubic feet = 206,729 gallons = 786 gallons/day
Each EQR = 2.3 people, 230 gallons/day
Down Valley Park EQR = 786/230 = 3.4

(2) Placerville Park EQR Calculation (fixtures in the restrooms will be toilets, sinks and urinals)
Daily users = 200 people.
Assuming each user use 3.0 gallons (toilet per flush 2.5 gallons, urinal per flush 1 gallon, sink per user 0.5 gallon).
Daily water usage = 200 x 3.0 = 600 gallons/day
Placerville Park EQR = 600/230 =2.6

(3) Placerville Fire Station = 1 EQR

(4) Locations of the places described are shown on **Figure 1.2**.

As shown on the **Figure 1.2**, the study area can be classified into Fall Creek, Placerville and San Miguel Canyon /Lower Placerville for a total of three (3) sub-areas. Fall Creek sub-area includes Fall Creek, Truan PUD and Down Valley Park, an area from Sawpit to the west of Down Valley Park. Placerville sub-area includes Placerville, Placerville Commercial, Placerville Park, Fire



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PROJECT
SAN MIGUEL COUNTY
PLACERVILLE / FALL CREEK
SEWER FEASIBILITY STUDY

TITLE OF DRAWING
PLACERVILLE/FALL CREEK STUDY AREA MAP

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1004-001

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FIGURE 1.2

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Station and the corner of Hwy 145 and 62. The San Miguel Canyon/Lower Placerville sub-area includes Ellerdville/Lower Placerville and the San Miguel Canyon. Using the projected population in **Table 2.1**, population for each of the sub-areas is summarized as follows:

a.	San Miguel Canyon/Lower Placerville:		=69 people
b.	Placerville:	115+12+8+90	=225 people
c.	Fall Creek:	11+8+538	=557 people
d.	**Total Study Area:**		**=851 people**

2. Average Daily Design Flow Estimate

There is no historic wastewater flow data for the study area. In the 1996 "Design Criteria Considered in the Review of Wastewater Treatment Facilities" manual, Colorado Department of Public Health and Environment (CDPHE) recommended the average daily per capita flow of sewage to be not less than 70 gallons nor greater than 100 gallons including normal infiltration. Since new wastewater collection facilities in the study area is anticipated, excessive infiltration and inflow (I/I) is unlikely. Using 100 gallons per day per capita flow loading, average daily flows were estimated as follows:

a.	San Miguel Canyon/Lower Placerville Design Flow = 69 x 100	= 6,900 gpd
b.	Placerville Design Flow = 225 x 100	= 22,500 gpd
c.	Fall Creek Deign Flow = 557 x 100	= 55,700 gpd
c.	**Total Study Area Design Flow = 851 x 100**	**= 85,100 gpd.**

3. Peak Hourly Design Flow Estimate

Peak hourly design flow is used to size hydraulic conveyance systems and lift stations. Peak hourly design flow is typically developed from peaking factor (PF) if no flow record is available. Peaking factor may be developed from flowrate records or based on empirical formula, published curves or data from similar communities. Sear Brown uses the following formula in the Ten States Standards (1990 edition) to determine peaking factors for municipalities:

$PF = (18+P^{0.5})/(4+P^{0.5})$, where P is population in thousands.

a. For San Miguel Canyon/Lower Placerville, P=0.069, then PF = 4.29, therefore,
Peak Hourly Design Flow = 4.29 x 6900 = 29,601 gpd, say 29,600 gpd.

b. For Placerville, P = 0.225, then PF = 4.13, therefore
Peak Hourly Design Flow = 4.13 x 22500 = 92,925 gpd, say 93,000 gpd.

c. For Fall Creek Area, P = 0.557, then PF = 3.95, therefore
Peak Hourly Design Flow = 3.95 x 55700 = 220,015 gpd, say 220,000 gpd.

d. For Whole Study Area, P = 0.851, then PF = 3.84, therefore
Peak Hourly Design Flow = 3.84 x 85100 = 326,784 gpd, say 327,000 gpd.

4. Design Organic Loading Estimate

In the 1994 "Guidelines on Individual Sewage Disposal Systems" edition, CDPHE recommends 0.2 lbs BOD_5 per person per day unit loading for residential areas. Therefore, design organic loadings were estimated as follows:

a. San Miguel Canyon/Lower Placerville, Design Organic Loading = 0.2 x 69 =14 lbs. BOD_5/day
b. Placerville, Design Organic Loading = 0.2 x 225 =45 lbs. BOD_5/day
c. Fall Creek, Design Organic Loading = 0.2 x 557 =111 lbs. BOD_5/day
d. Whole Study Area Design Organic Loading = 0.2 x 851 =170 lbs. BOD_5/day

5. Summary of the Projected Population, Flow and Organic Loadings

Listed below in **Table 2.2** are summary of the projected population, flow and organic loadings for Lower Placerville, Placerville, Fall Creek Area and the whole study area:

Table 2.2 – Summary of the Projected Population, Flow and Organic Loadings

Areas	Projected Population	Projected Average Daily Flow	Estimated Peak Factor	Projected Peak Hourly Flow	Projected Organic Loading
	(people)	(gpd)		(gpd)	(lbs. BOD_5/day)
San Miguel Canyon/Lower Placerville	69	6,900	4.29	29,600	14
Placerville	225	22,500	4.13	93,000	45
Fall Creek Area	557	55,700	3.95	220,000	111
Whole Study Area	**851**	**85,100**	**3.84**	**327,000**	**170**

III. WASTEWATER COLLECTION ALTERNATIVES EVALUATIONS

Three collection system alternatives were evaluated in this study. These three alternatives include conventional gravity sewer system, variable grade sewer system and pressure sewer system.

1. Conventional Gravity Sewer

Conventional gravity sewer collection system consists of 8" SDR-35 PVC pipes and 48" diameter manholes. Stub-outs are provided for each residential or commercial unit up to the property line for service line connection. Minimum grade for 8" sewer line is 0.5%. Minimum cover requirement for sewer is 5 feet, but preferably 8' for service lines to homes with basements. The use of conventional gravity sewer is widely accepted because of the performance

of the gravity sewer is well-established and documented with a well-developed body of knowledge available for design, construction, operation and maintenance.

Preliminary review of the study area's topography (USGS map) indicates that the conventional gravity sewer collection system is generally favorable for use in the majority of the area. However, because of several potential obstacles, such as high groundwater, rocky condition, and sparse developments, it may not be economically feasible and could limit the use of the conventional gravity sewer in the study area.

Conventional sewers are typically costly on a linear foot basis. Where housing is sparse, resulting in long reaches with many manholes between services, the cost of providing conventional sewers is often prohibitive. The existing development plan of the study area indicates Placerville and Fall Creek (at the confluence with San Miguel River) as two cluster areas. These two clusters appear to be favorable to be served by conventional sewer system based on the development density.

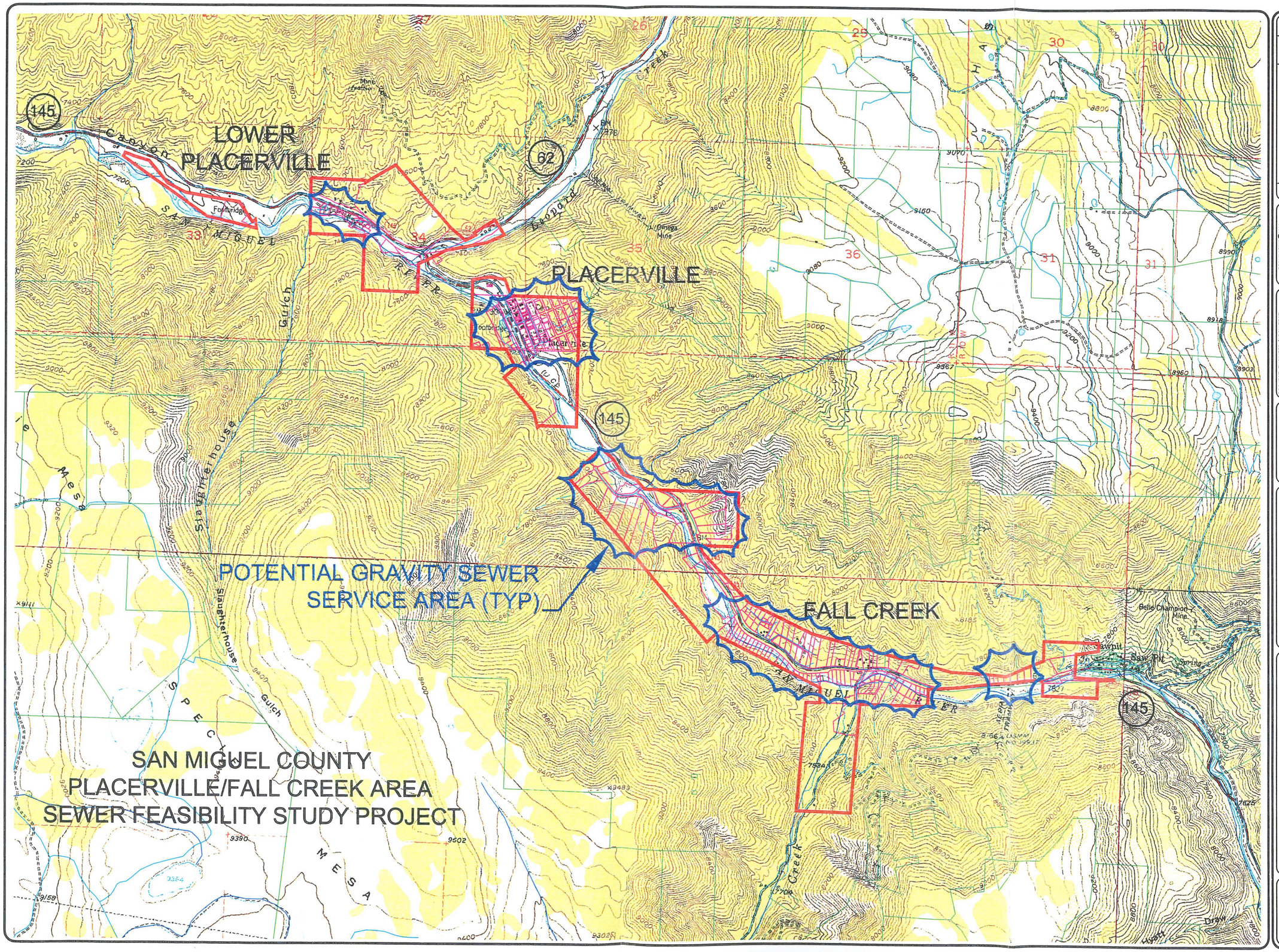
Based on site conditions, it is likely that rock excavation will be required for conventional sewer construction. In addition, winter condition requires deep excavation to provide enough cover for freeze protection. Rock excavation is very expensive, and may further limit wide use of conventional sewers in the study area.

The entire study area is adjacent to the San Miguel River. Areas of service near the river are subject to high groundwater conditions which make conventional sewer construction difficult and expensive.

Soils in the study area consist of Fivepine-Nortez-Rock outcrop complex, Haplaquolls and Specie gravelly loam. Specie gravelly loam is a deep, well drained and the dominate soil in the study area. The subsurface layer of this soil is very stony loam. Permeability of this soil is moderately rapid. The Fivepine-Nortez-Rock soil that is shallow to moderately deep and well drained, occupies a very small portion of the study area. Permeability of this soil is slow. The Haplaquolls soil is moderately deep, poorly drained and located on stream flood plains. Permeability of this soil is moderate. The Specie soil are well suited to residential development, while the Fivepine-Nortez-Rock and Haplaquolls soils are poorly suited to residential development. Included in **Appendix B** are soil condition details in the study area.

Existing utilities, such as gas line, telephone line, cable TV line and fiber optical communication line may be present in the study area. These existing utility lines could further increase the cost of the conventional sewer construction due to the need for relocation or protection.

In summary, topography in the study area generally favors conventional sewer systems. But sparse development, rocky conditions, high groundwater and existing utility lines will limit the use of the conventional sewer in selected areas. Shown on **Figure 3.1** are potential areas that could be served with conventional sewer.



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POTENTIAL AREAS FOR
CONVENTIONAL GRAVITY SEWER SERVICE

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FIGURE 3.1
SHEET 1 OF

2. Variable Grade Sewer

The basic concept of variable grade sewer (VGS) system is that if VGS with a net positive slopes from the inlet to outlet, wastewater put in the upper end or along the VGS will eventually exit from the outlet end. The VGS is laid at approximately the same depth below ground surfaces regardless of the grade. Minimum diameters of the VGS are typically 4 inch. The VGS is used in conjunction with septic tanks. The use of manhole with VGS is infrequent, usually only at the major junctions of main lines. Instead, appropriately spaced clean-outs are provided for cleaning when necessary. Air release risers may be required at or slightly downstream of extreme summits in the sewer profile. Lift stations are necessary where elevation differences do not permit gravity flow. Either septic tank effluent pumping (STEP) units or main line lift stations may be used. STEP units are small lift stations installed to pump septic tank effluent from one or small cluster of connections to the collector main. Because of the smaller diameters and flexible slopes and alignment, excavation depths and volumes are typically much smaller than with conventional sewers, sometimes requiring simply a trenching machine for excavation.

The USGS topography of the study area is not detailed enough to determine if VGS can be used. However, a site visit (driving through the study area) indicates that the VGS may have very limited use for this project. Steep grades and quick changes in grade within the study area would make a VGS layout difficult, possibly requiring several STEP or lift stations. In addition, the use of the existing home owner's septic tank (or replacement tank) is required for VGS. It should be mentioned that based on engineering experience, VGS may have practical application in small selected areas. However, without knowledge of more detail of topography and inventory of the existing homeowner septic tanks it would be difficult to recommend use of STEP and /or VGS systems. The costs for these systems may be prohibitive due to unknowns such as replacement of individual septic tanks.

3. Pressure Sewer

In pressure sewer systems, raw wastewater from individual residences or buildings is collected and discharged into a septic tank or a holding tank and then pumped to a pressure or gravity-flow collector sewer. The onlot discharge piping arrangement includes at least one check valve and one gate valve to permit isolation of each pressurization system from the main sewer. Pressure sewer systems generally use smaller pipe diameters than conventional sewers and are operated with pumping instead of gravity. Pressure sewers are independent of slope, and the systems have been developed and applied to reduce the high capital cost of sewer systems that have been designed in accordance with slope and velocity for conventional sewers. Pressure sewer systems involve a number of pressurizing inlet points and an outlet to a treatment facility or to a downstream gravity sewer, depending on the application. Automatic air relieve valves are required at, and slightly downstream of summits in the pressured sewer profiles.

Pressure sewers are cost-effective alternative systems when rock excavation, high groundwater or unfavorable slopes are encountered for conventional sewers or where homes are spaced distantly. Pressure sewers are usually less expensive to construct than conventional sewers in such conditions described above.

Pressure sewers have many advantages including: 1) there is little or no infiltration, resulting in reduction in pipe size and less flow for treatment; 2) low cost clean-outs and valve assemblies are used instead of costly manholes; 3) because pipe size and depth requirements are reduced, material and trenching costs are significantly lower; 4) there is no strict alignment and slope requirements, pipes can be laid in any locations and extensions can be made in street ROW at a relatively low cost without damage to existing structures or utilities; and 5) more flexibility is allowed in siting the treatment facility. The main disadvantage of the pressure sewer is often higher O&M costs due to the high number of pumps required for individual use.

Pressure sewer system seems to be a good alternative for some selected areas of the study area based on lower densities, topography and subsurface conditions (See **Figure 3.2**). For this study, pressure sewers without septic tanks (e.g. holding tanks with grinder pumps) will be further evaluated in this report.

4. Collection System Recommendations

In reviewing the study area site conditions, it is recommended that a combination of conventional gravity sewers and pressure sewers be used for wastewater collection. The conventional gravity sewers are recommended for higher density clusters such as Placerville and some Fall Creek areas. For sparse dwelling areas, pressure sewers are recommended (see **Figure 3.1** and **3.2**).

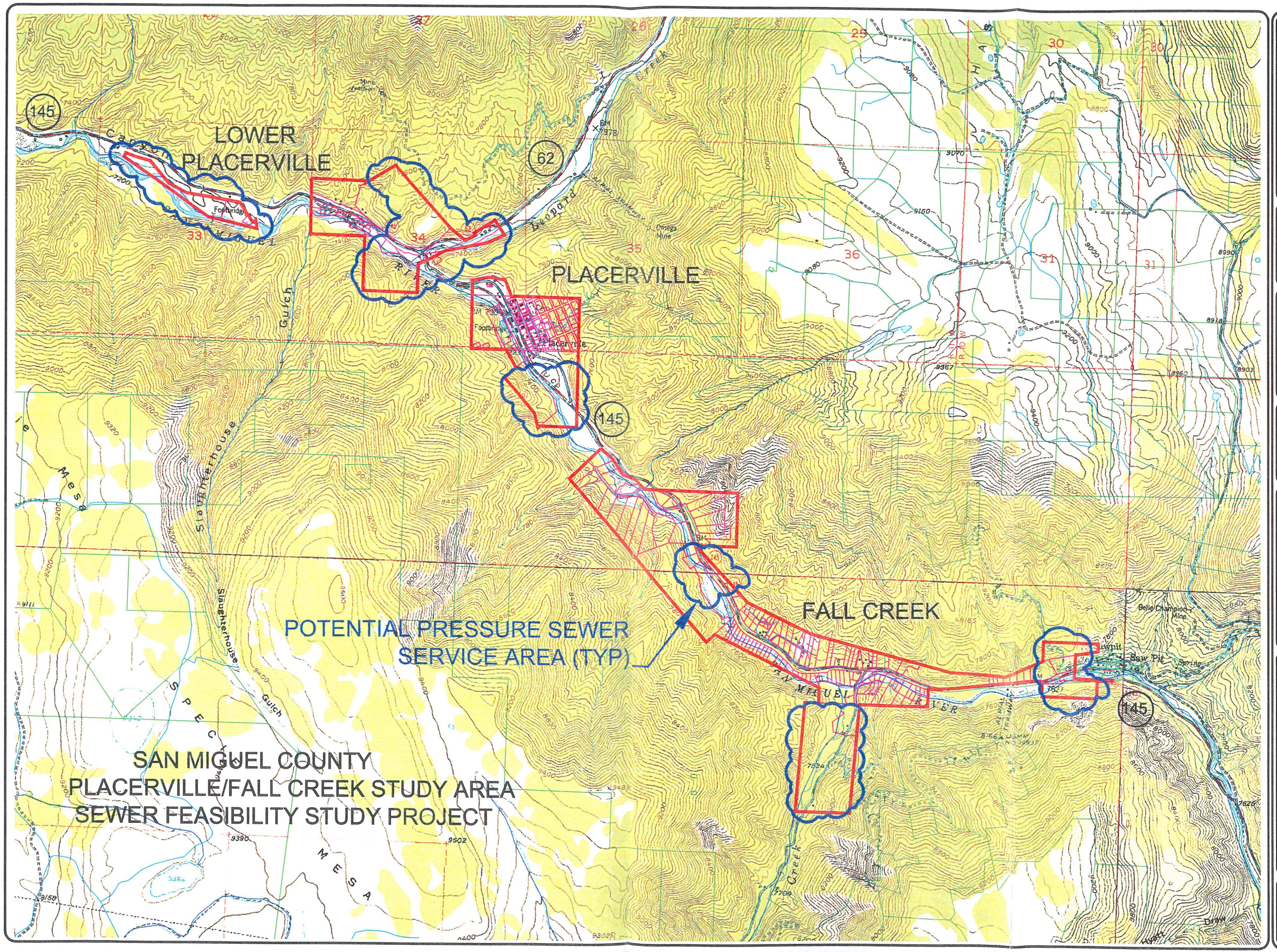
IV. WASTEWATER TREATMENT ALTERNATIVES AND EVALUATIONS

Two options were evaluated for treatment of collected wastewater within the study area. One option was to have one regional treatment facility to serve the entire study area, the other option was to have independent treatment facilities to serve the cluster areas. The treatment process alternatives that were evaluated included the Sequencing Batch Reactor (SBR) system and the Recirculating Granular Media Filter (RGMF) system. Opinion of probable project costs for each alternative was based on year 2002 dollar value.

1. Regional Facility Option

The regionalization option will be achieved through formation of a special Sanitation District for the study area. The new District will retain the control, management, operation and maintenance of the wastewater collection and treatment facilities. Two potential sites were identified as the possible regional facility site. Site #1 was identified to be near the north side of Placerville as shown on **Figure 4.1**. If the regional facility is located near Site #1, the San Miguel Canyon/Lower Placerville area will need to be served by a lift station.

Site #2 was identified to be near the confluence of Leopard Creek with the San Miguel River. If the regional treatment facility is located near Site #2, the San Miguel Canyon area will likely need to be served by a lift station. It should be noted that no reference was made to a specific site location for a treatment facility, only areas were mentioned based on advantageous site conditions and downstream areas to allow gravity flow.



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SEWER FEASIBILITY STUDY

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1004-001

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FIGURE 3.2

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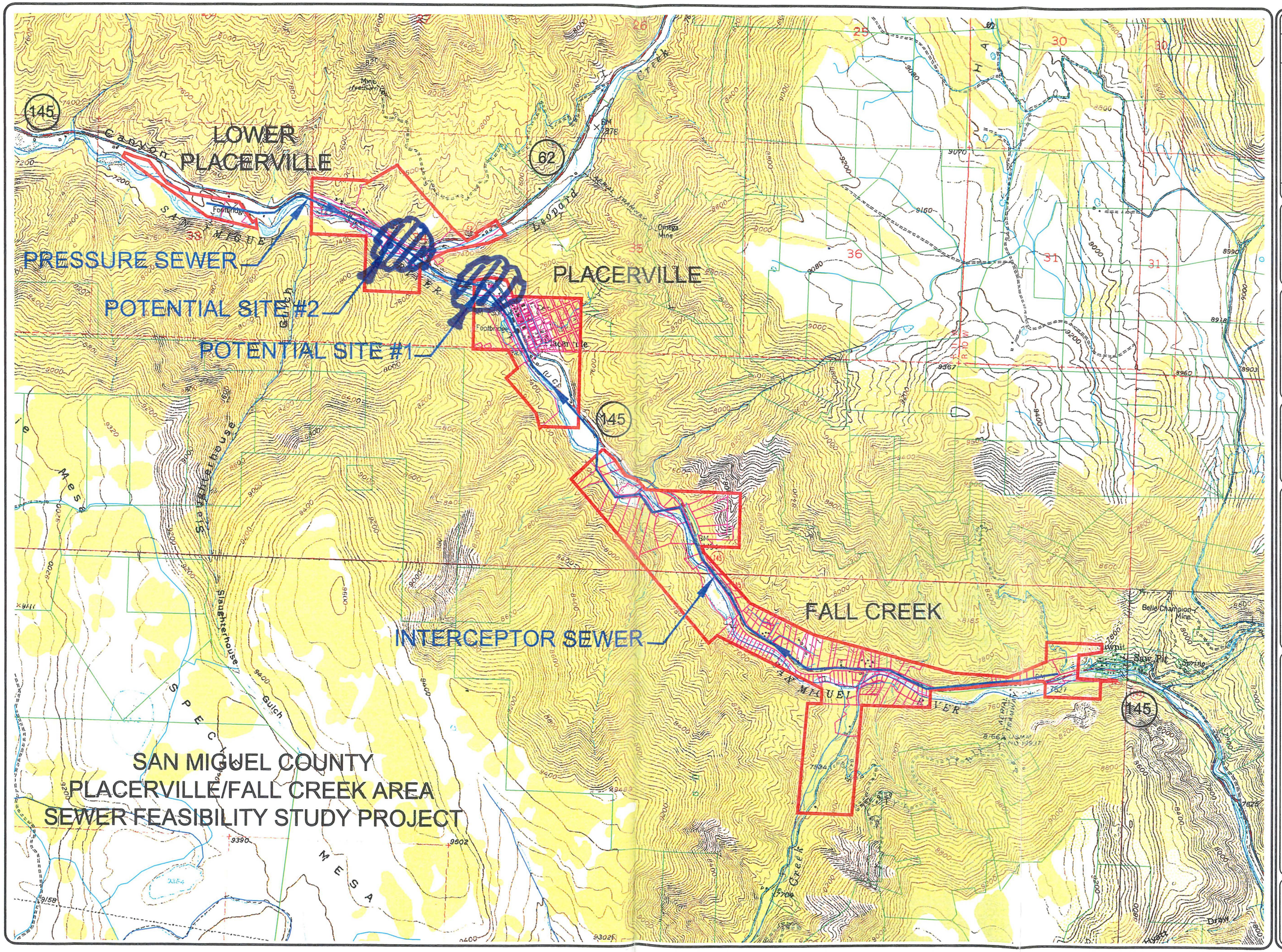

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PLACERVILLE / FALL CREEK
SEWER FEASIBILITY STUDY

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POTENTIAL REGIONAL WASTEWATER FACILITY
SITE #1 AND SITE #2 AND SEWER ALIGNMENT

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FIGURE 4.1

SHEET 1 OF

Both potential site areas must be considered for the 100–year floodplain of the San Miguel River (see **Appendix C** for floodplain map). Site #1 and Site #2 areas were evaluated for the regional facility site based solely on technical perspective and feasibility, other factors that may affect the site's feasibility were not considered at this time.

The study area (reference **Figure 1.2**) is generally sparsely occupied by the residential and commercial lots with two clusters. One cluster is Placerville as shown on **Figure 4.2**, the other cluster is in Fall Creek area at the confluence of the Fall Creek with the San Miguel River as shown on **Figure 4.3**. Advantages of the regional facility include:

a. Better resources for management, operation and maintenance of the facility.
b. Generally preferred by regulatory agency. The CDPHE encourages regionalization of wastewater treatment whenever feasible and economical.

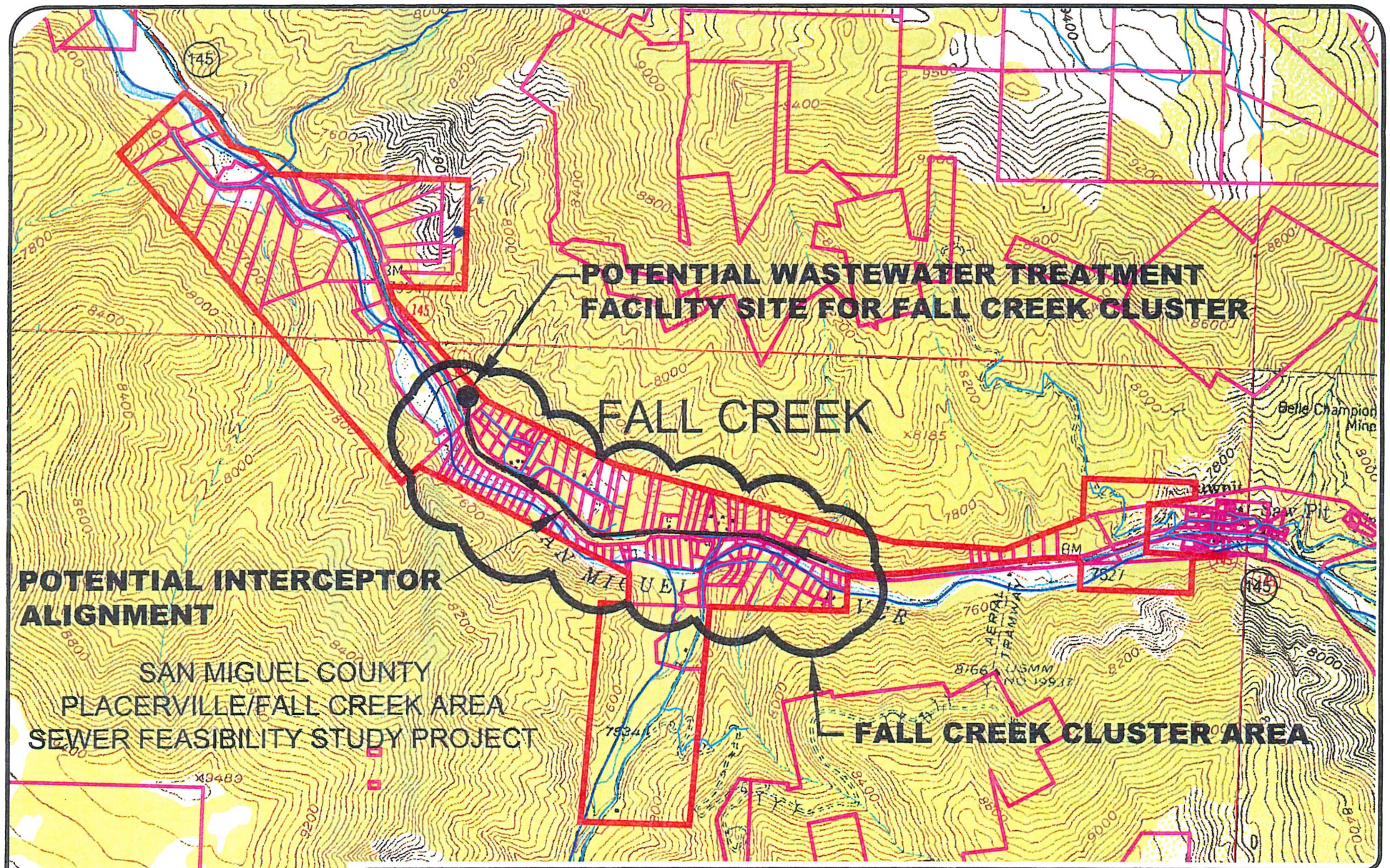
Disadvantages of the regional facility include:

a. Requirement of long interceptor sewer runs to serve the entire study area. High construction cost due to groundwater, rock excavation and limitations of construction area and other existing utilities for long sewer run installations.
b. Not cost effective to serve sparse dwelling areas.
c. May be difficult to implement politically because it involves several communities.
d. Requirement to obtain easement or approval for use of the CDOT ROW or other utility company's existing easements for sewer installation.

2. Cluster Facilities Option

As described previously in this report, the study area is sparsely populated. It is generally not cost effective to serve the sparsely developed area due to long reaches of sewer lines. Instead of providing a regional treatment facility for the entire study area, two independent treatment facilities can be provided to serve the Placerville and the Fall Creek clusters, respectively as shown on **Figure 4.2** and **Figure 4.3**. The treatment facility for the Placerville cluster would be located near the Site #1 area. The Fall Creek cluster comprises approximately 135 EQR units or 311 people including Down Valley Park and Truan PUD. It is unknown at present the availability of land for the treatment facility site for the Fall Creek cluster. Ideally the facility would be located just downstream of the Fall Creek cluster as shown on **Figure 4.3**. It appears likely that both clusters could be served economically by conventional gravity sewers. The main disadvantage of the Cluster Facilities Option is that some of existing units and possible future units outside the cluster areas will have to continue using the ISDS without centralized sewer. Advantages of the Cluster Facilities Option include:

a. It is cost effective and less expensive to construct due to higher density in the small cluster areas.
b. It may be easier to get consensus for implementation.
c. It can serve other less dense areas outside of the clusters if needed in the future with pressure sewers and/ or VGS.
d. It will provide centralized sewer service for the majority of existing developments within the study area with lower cost.



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PROJECT MANAGER
JOHN McGEE
DRAWN BY
Fred Kirschner
SCALE
1" = 500'
FIRST ISSUE DATE
AUGUST 2002

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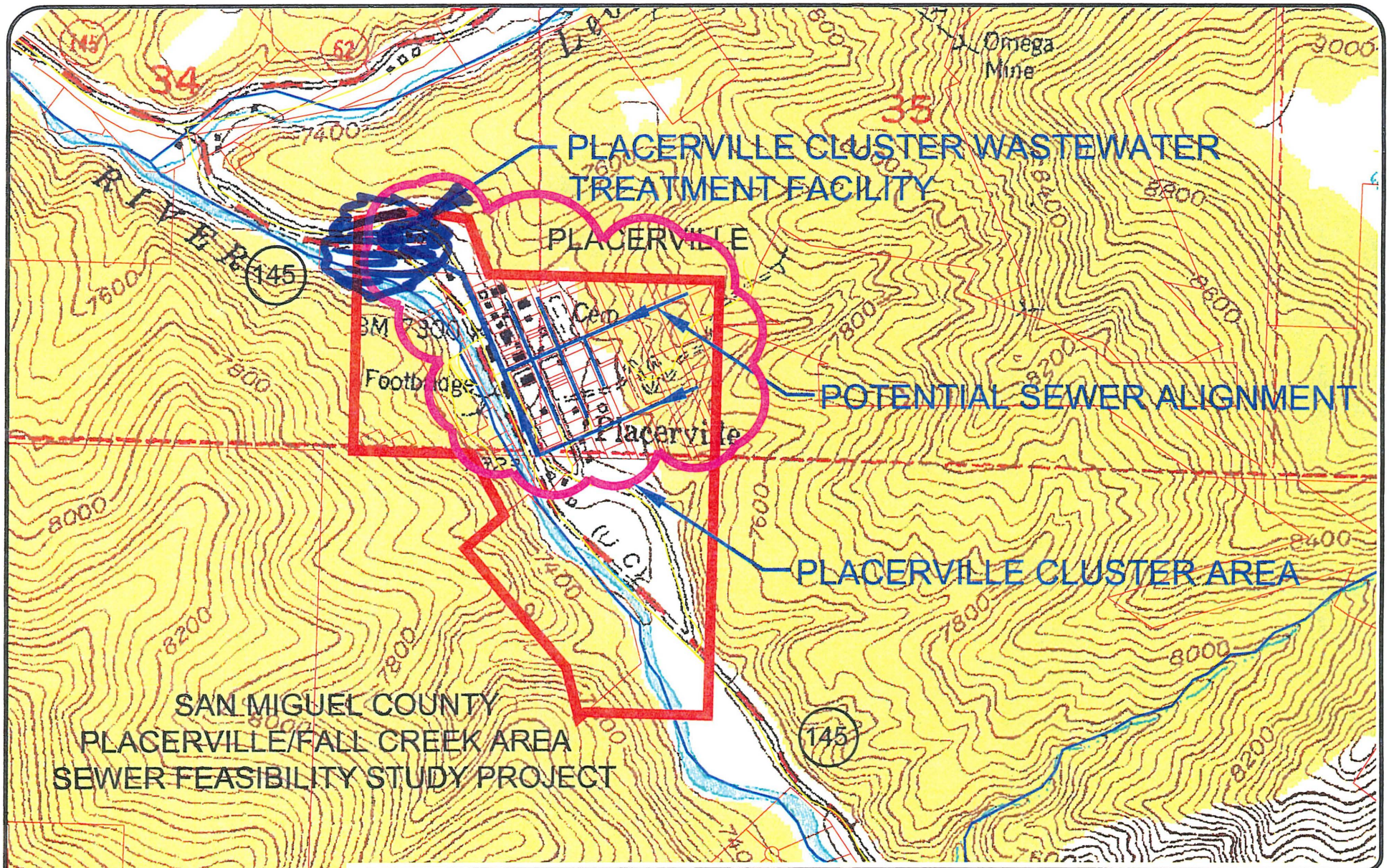
Fax:(970) 482-6368
www.searbrown.com

PROJECT
SAN MIGUEL COUNTY, PLACERVILLE/FALL CREEK AREA
SEWER FEASIBILITY STUDY

TITLE OF DRAWING
FALL CREEK CLUSTER
AND SEWER ALIGNMENT

PROJECT NO.
1004-001
DRAWING NO.
FIGURE 4.3
SHEET 1 OF



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PLACERVILLE CLUSTER
AND SEWER ALIGNMENT

PROJECT NO.
1004-001
DRAWING NO.
FIGURE 4.2
SHEET 1 OF

3. SBR Treatment Process Alternative

It is our understanding that effluent from wastewater treatment facility will be discharged to San Miguel River. The San Miguel River is in the Gunnison and Lower Dolores River Basins and is classified as Aquatic Life Cold 1, Recreation 1a, Water Supply and Agriculture. As such, stringent effluent limits will be required for the wastewater treatment system. The SBR and RGMF are two treatment systems that are capable of meeting high quality effluent requirements.

SBR is a proven technology and well suited for the wide flow variations that are associated with small communities. SBR is a packaged fill-and-draw activated sludge treatment process. The SBR system will consist of a duplex lift station, a mechanical bar screen, two trains of SBR units, an enclosure building, a sludge holding tank, and a disinfection system. The unit processes involved in the SBR and conventional activated sludge system are identical. Aeration and sedimentation/clarification are carried out in both systems. However, the one important difference is that in SBR operation the processes are carried out sequentially in the same tank.

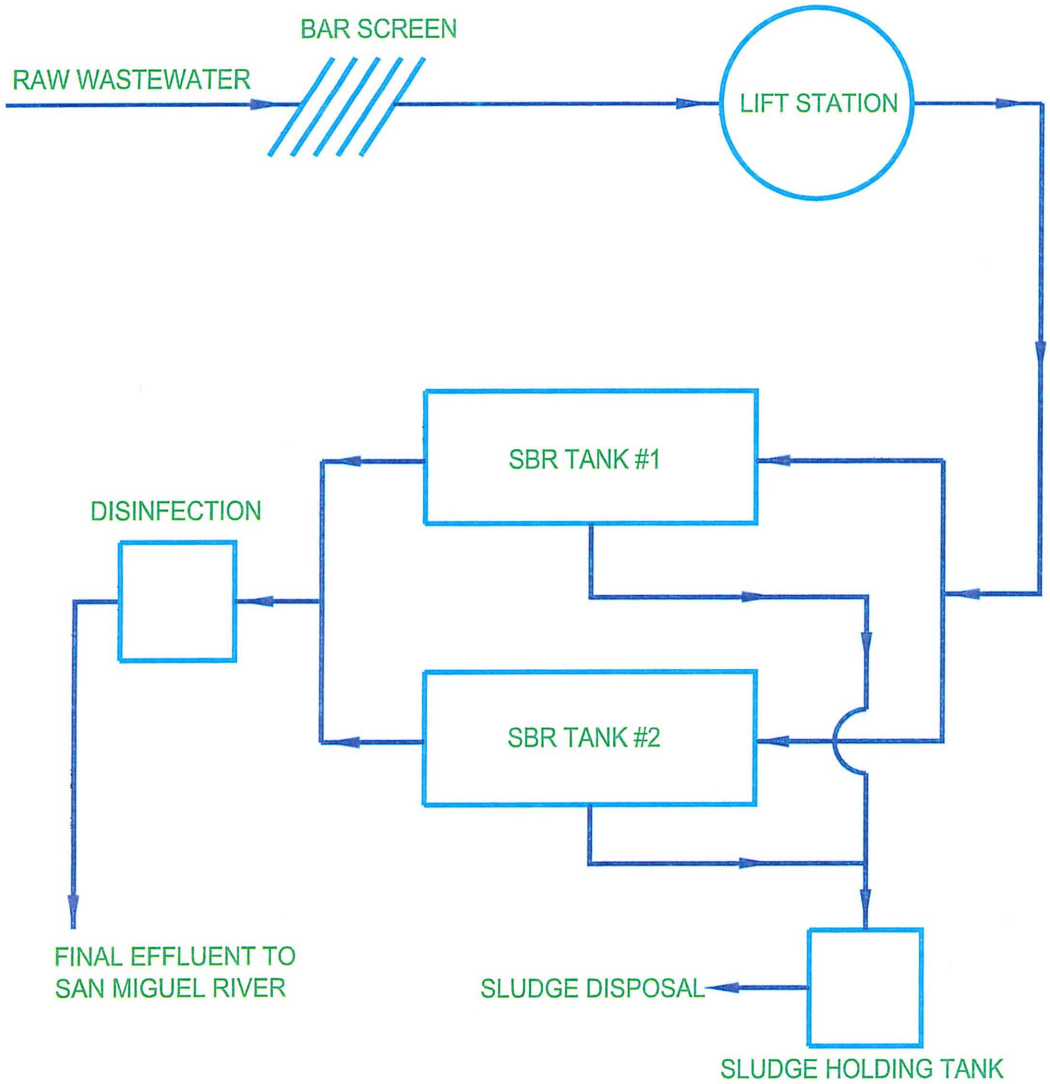
The SBR system has five steps that are carried out in sequence as follows: (i) fill, (ii) react (aeration), (iii) settle (sedimentation/clarification), (iv) draw (decant), and (v) idle. Each of the steps is illustrated by the schematic diagram shown on **Figure 4.4** and described in the following:

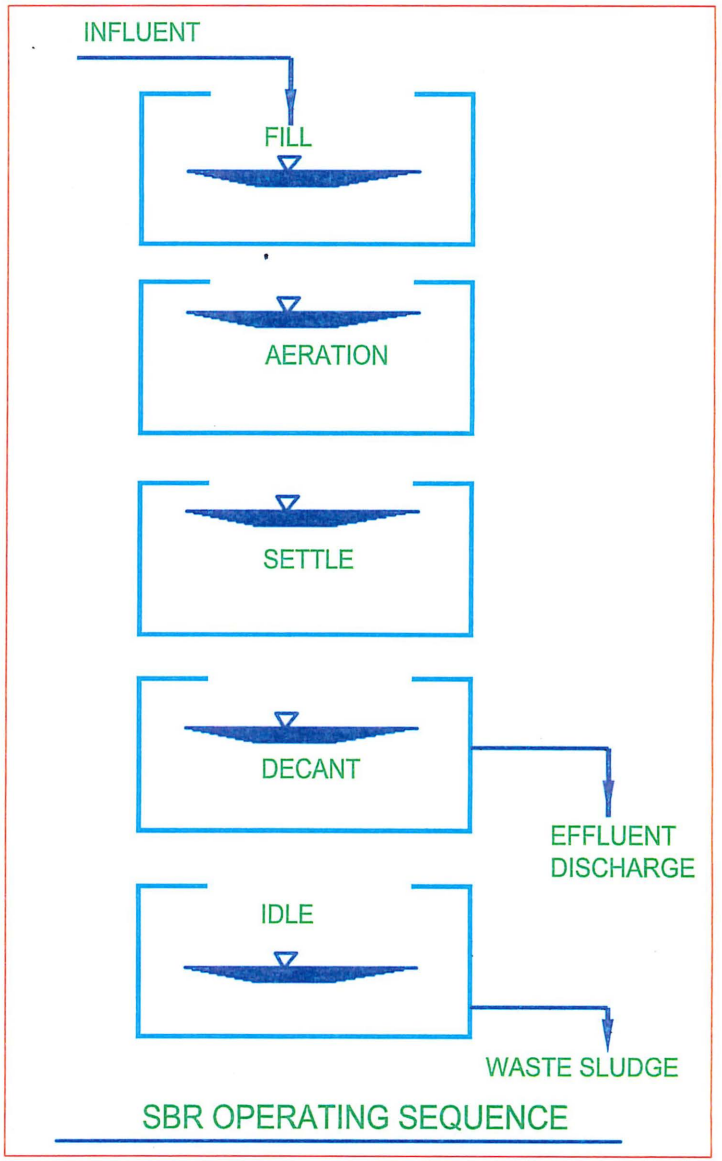
(i) Fill: The purpose of the fill operation is to add substrate (raw wastewater) to the reactor.
(ii) React: The purpose of react is to complete the reactions that were initiated during fill.
(iii) Settle: The purpose of settle is to allow solids separation to occur, providing a clarified supernatant to be discharged as effluent.
(iv) Draw: The purpose of draw is to remove clarified treated wastewater from the reactor. The most popular decant mechanism is floating or adjustable weirs.
(v) Idle: The purpose of idle in a multi-tank system is to provide time for one reactor to complete its fill cycle before switching to another unit.

A unique feature of the SBR process is that there is no need for a return activated sludge system. Sludge is typically wasted during the settle or idle phases. The wasted sludge will have to be disposed of in a legally acceptable manner. Typical sludge disposal practices include land application and landfill. SBR has many advantages including simplicity of operation, capability of accepting variable organic, hydraulic loadings, and high level nutrients removal, reliability for high quality effluent, significantly less land and less enclosure requirements than RGMF, automatic operation using PLC based controls for reduced operator attention and ease of expansion with modular tankage addition. Disadvantages of the SBR include requirements of skilled operators and higher O&M cost than RGMF. If properly designed, operated, maintained and enclosed, the SBR system will produce little odors. Size and performance of the SBR system will be very similar to the Illium Valley wastewater treatment facility.

4. RGMF Treatment Process Alternative

Recirculating Granular Media Filters are open sand filters designed to recirculate the filtrate for





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PROJECT
SAN MIGUEL COUNTY, PLACERVILLE/FALL CREEK AREA
SEWER FEASIBILITY STUDY

TITLE OF DRAWING
SBR SYSTEM SCHEMATIC FLOW DIAGRAM

PROJECT NO.
1004-001
DRAWING NO.
FIGURE 4.4
SHEET 1 OF

higher degree of treatment for discharge to surface water. The principal components of a RGMF include a pre-treatment unit (typically a septic tank or a sedimentation tank), a recirculation tank with recirculating pumps, free access sand filters with distribution and underdrain piping, and disinfection system. Shown on **Figure 4.5** is the schematic flow diagram of the RGMF system. **Appendix D** is reference literatures of the RGMF system. An enclosure building will be required for the system. As shown **Figure 4.5**, effluent leaves the pretreatment unit and enters a recirculation tank large enough to hold one-half to one day's flow. The pump located in the recirculation tank is used to dose mixture of the pretreated wastewater and returned filtrate from the recirculation tank to the sand filters. The pump is typically controlled by a timer. Treated effluent from the filter returns to the recirculation tank, and when the liquid level in the recirculation tank reaches the floating ball valve, effluent from the filter is discharged to the disinfection system for final effluent discharge.

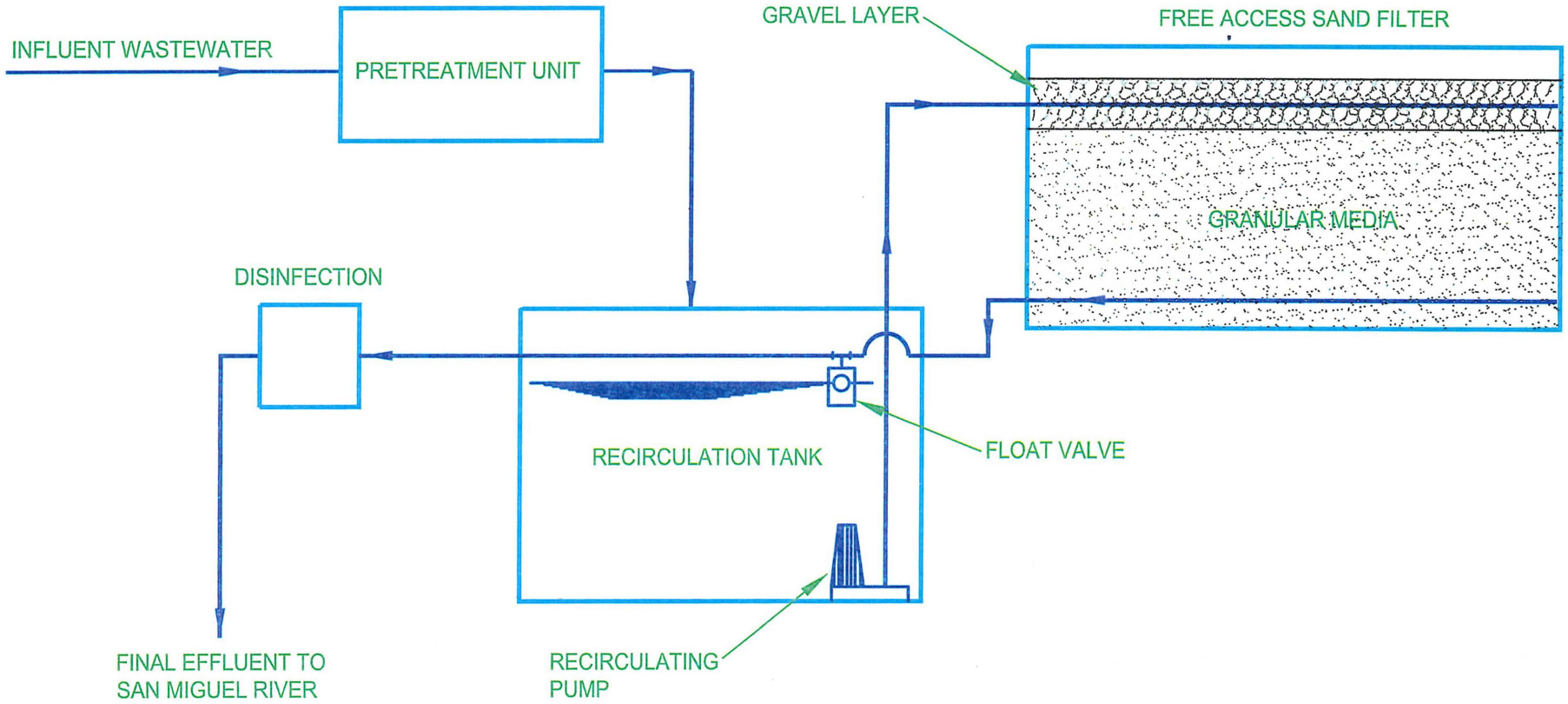
The mechanism of the RGMF treatment is a combination of biological, physical filtration and chemical adsorption. Sand is the commonly used for filter media, but anthracite, pea gravel, mineral tailings and bottom ash have also been used as the media. Effective size of the filter media ranges from 0.10 mm to 1.5 mm with uniformity coefficient less than 4.0. Media depths commonly used are 2 to 3 feet. Deeper beds tend to provide more complete treatment and more constant effluent quality.

RGMF is a proven method for providing advanced secondary treatment. It has been used for treatment of domestic wastewater since the late 1800s. RGMF is well suited to rural communities and small clusters of homes. Advantages of the RGMF include: 1) moderately inexpensive to construct; 2) low energy requirements; 3) ease of operation, thus requires minimum of operation skills; 4) stable operation and high effluent quality; 5) low O&M cost; and 6) easy to expand with modular design. Disadvantages of the RGMF include: 1) Requires more land area and much larger building enclosure than SBR; 2) performance varies with temperature, media used and loadings; and 3) filter media availability will have significant impact on the capital cost. If properly designed, operated, maintained and enclosed, the RGMF system would produce very little odors.

5. Summary of Facility Option and Treatment Alternative Evaluations

A. Facility Sites

Based on the evaluations of the Site #1 and Site #2 areas for a regional facility, site #1 area was recommended for the regional treatment facility, and the SBR was recommended as the treatment process for the regionalization option. Site #1 area was favored over Site #2 area in that it was more centrally located and feasible for a regional site. The SBR process was favored over the RGMF process due to system's ability to treat larger flows in a smaller footprint. Land area required for a SBR system was estimated at 6,000 square feet. The cost for serving the entire study area was estimated at **$4.77** million not including potential easement purchase cost. Estimated O&M cost was **$185,000** for the SBR system.



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PROJECT
SAN MIGUEL COUNTY, PLACERVILLE/FALL CREEK AREA
SEWER FEASIBILITY STUDY

TITLE OF DRAWING
RGMF SYSTEM SCHEMATIC FLOW DIAGRAM

PROJECT NO.
1004-001
DRAWING NO.
FIGURE 4.5
SHEET 1 OF

B. Cluster Options

Site #1 area was also recommended for the Placerville cluster facility, and RGMF was recommended as the treatment process. Land area required for a RGMF was estimated at 7,500 square feet. The cost for serving the Placerville cluster was estimated at **$1.59 million** not including potential easement purchase cost. Estimated O&M cost for the Placerville cluster RGMF was $**62,500** per year. Similarly, assuming the treatment facility for the Fall Creek cluster is located as shown on **Figure 4.3**, and RGMF was recommended as the treatment process. Land area required for this RGMF was estimated at 10,000 square feet. The cost for serving the Fall Creek cluster was estimated at **$1.5** million not including potential easement costs. Estimated O&M cost for the Fall Creek cluster was **$67000** per year. Because of the advantages listed above, Cluster Facilities Option is recommended for the study areas.

Because the 50 Placerville Commercial (PC) units are located in a very concentrated area, there exists a possibility that a small wastewater treatment facility may be constructed to serve the PC users only. Estimated cost for a RGMF system to the PC users was **$650,500**. Estimated O&M cost for the RGMF system was **$38,500** per year.

C. Treatment Alternatives

For evaluation purpose, the cost for a 22,500 gpd SBR system was estimated at approximately **$1.24** million including land cost to serve the Placerville area. Annual O & M cost for the treatment facility is estimated to be **$130,000** including labor, power, routine maintenance and sludge disposal. Similarly for evaluation purpose, the cost for a 22,500 gpd RGMF system was estimated at approximately **$780,000** to serve the Placerville area. Additional cost may be required for potential easement purchase for the facility. Annual O & M cost for the treatment facility is estimated to be **$62,500** including labor, power, routine maintenance and sludge disposal. Shown in **Table 4.1** is a summary of the cost for SBR and RMF systems.

Table 4.1 – Summary of the Estimated Costs for SBR and RMF Systems

	SBR System	**RGMF System**
System Cost	$1.24 million	$780,000
Annual O&M Cost	$130,000	$62,500

Note: For evaluation purpose the costs for both SBR and RGMF were estimated based on the Placerville flow 22,500 gpd. Additional cost for collection system and easement purchase were not included.

It can be seen from **Table 4.1** that RGMF system is less costly to construct and operate and maintain than the SBR system for 22,500 gpd flow. SBR is a mechanical system and is energy intensive compared to a RGMF system. The SBR system is an activated sludge process with PLC based operational control, and as such requires skilled operators compared to the RGMF system. Both systems require pretreatment. For SBR, typical pretreatment is fine bar screen

and/or grit chamber. A septic tank or a pretreatment tank is required for the RGMF system. Overall, the RGMF system is more suitable than the SBR system for the Cluster Facilities option based on demographics, site characteristics and operational constraints for the study area. However, the SBR system appears to be more suitable than the RGMF system for the Regional Facility Option based on higher flow requirement and site constraints. In addition, construction cost for the SBR is less sensitive to flow changes. The RGMF construction cost is very sensitive to flow changes because typical design loading for RGMF is 4 gpd/square feet, and a small change in flow will directly affect the RGMF size and land area requirement.

V. RECOMMENDATIONS

Based on USGS topography map of the study area, it is recommended that a combination of conventional gravity sewer and pressure sewer be used for the wastewater collection system for the study area. It is also recommended that two separate independent RGMF facilities be used to serve Placerville cluster and the Fall Creek cluster, respectively as shown on **Figure 4.2 and Figure 4.3**.

Technically, the entire study area is feasible for centralized sewer service. However, from the financial perspective, Cluster Facilities Option is recommended since it will require lower construction cost and lower annual O&M cost. The following is a summary of cost estimates:

Table 5.1 – Project Summary

Alternatives	Design Flows (gpd)	Project Cost	O&M Cost	Treatment System
Regional Facility	85,100	$4.77million	$185,000	SBR system
Placerville Cluster	22,500	$1.59 million	$62,500	RGMF system
Fall Creek Cluster	31,100	$1.50 million	$67,000	RGMF system
Placerville Commercial	11,500	$0.65 million	$38,500	RGMF system

Note: 1. The estimated costs include collection system cost and land cost, but easement purchase costs were not included.
2. Does not include homeowner individual costs for connecting to sewer main and abandonment of ISDS.

VI. POTENTIAL FUNDING SOURCES

There are various ways to fund the wastewater projects for small communities including grants, low interest loans, bonds, user fees and tap fees. Potential funding sources from the Federal and State governments include:

- State Revolving Fund (SRF) Loans: Under the Federal Water Quality Act of 1987, EPA provides each state with startup money to establish the SRF loan program. SRF loans are low interest, available to towns for constructing wastewater treatment facilities. Loan repayments go directly back into the program to be loaned to other communities.

- Community Development Block Grant (CDBG): CDBG is a state administered, federally-funded program. Grants are provided to "non-entitlement" municipalities and counties for public facilities which principally benefit low and moderate income persons. Districts and private entities are eligible sub-recipients of municipalities and counties.
- Economic Development Administration (EDA) Grants: EDA are federal grants providing help for distressed communities to attract new industry, encourage business expansion, diversify their economies.
- CDPHE Water Quality Control Division Sewage Treatment Construction Grants: This is a state grant available for small communities for sewage treatment processes. Appropriations are made by the State legislature from capital construction funds. Financial need is certified by the Division of Local Government.
- Energy & Mineral Impact Assistance Fund: This state fund is in the form of discretionary grants for basic infrastructure and community development. Low interest loans are available for water and wastewater projects only. By statute, municipalities, counties, special districts are eligible recipients of grants/loans. Priority consideration is given to those areas socially or economically impacted by the development, processing or conversion of fuels and minerals.
- USDA Rural Development (RD) Fund: The RD awards grants and loans to needy communities under 10,000 population for construction and replacement of water and wastewater facilities. Communities can receive a loan and grant combination, with percentages based on certain requirements, such as median incomes, health hazard elimination and annual debt service charges.
- Farmers Home Administration (FmHA) Loan/Grant: The FmHA provides loans and grants to rural communities for wastewater treatment facilities. These loans and grants can be used to build, repair, improve or change a facility according to the community needs.
- Water Pollution Control Revolving Fund (WPCRF): The WPCRF is a low-interest loan program for funding government agencies or special district whose projects will correct water quality problems.
- Hardship Grants Program for Rural Communities: This a limited federal grant that is available for small, disadvantaged, rural communities for planning, design and construction of publicly owned treatment facilities or alternative wastewater services.
- Private Activities Bonds (PAB): Tax exempt private activity bond allocations are available to municipalities and counties as issuing authorities. These entities can in turn issue bonds or other obligations to private entities with interest exempt from federal income taxation.

APPENDIX A

2000 Census Data

SAN MIGUEL COUNTY
PLANNING DEPARTMENT

P.O. BOX 548 333 W. COLORADO AVENUE, 3RD FLOOR TELLURIDE, COLORADO 81435
TELEPHONE (970) 728-3083 FAX (970) 728-3098 email: smcplanning@telluridecolorado.net

January 20, 2003

John Mc Gee
Sear Brown, Inc.
209 S. Meldrum
Fort Collins, CO 80521

Dear John:

I have attached copies of the zone districts for the following parcels. Each zone district has different uses allowed by right or by review. The uses or number of units can change by a review process. 15 of the parcels are in the Residential (R) Zone District and have a possibility of further subdivision with central water or sewer. The majority of the parcels are in the Forestry, Agriculture and Open (F) Zone District, which requires a 35-acre minimum lot size, and are substandard size parcels.

To calculate density the County uses the 2000 Census population numbers of 2.3 people per unit.

COMMERCIAL USES

Placerville Commercial (PC)

Placerville Residential zoning currently allows one unit per five platted town lots (18,750 sq. ft.) with or without a central sewer system. Both the Master Plan and Land Use Code would have to be amended to allow higher density.

USE 50 w/ Residential Loading 2.3 capita/ unit

Placerville Commercial zoning currently allows one residential unit or one commercial unit per 2 platted town lots (7,500 sq. ft.) and would allow one unit per platted town lot (3,750 sq. ft.) if a central sewer system were installed. There are 50 platted PC lots with 29 buildings, including residences. Current zoning would allow only 4 more units without demolition of existing buildings.

The corner of State Highways 145 and 62 has a 2.74-acre parcel zoned PC. There are no active uses on the parcel at this time. This parcel has the right to one residential unit or one commercial unit. A Planned Unit Development approval would be necessary to divide the parcel into lots for multiple uses.

Blue Jay PUD - Motel & Café

The 8,000 square foot Blue Jay is currently under construction. They 6,000 square foot 15-room motel and 2,000 square foot restaurant have their own wastewater treatment facility. The current system is designed for an average daily flow of 7,600 gpd peak flow and 5,070 gpd average flow. This facility may be tapped into/and or expanded for other residential units in the future with further County and State review, but may not have a large enough parcel to accommodate future expansion.

Truan PUD

The Truan PUD consists of an Automotive Repair Service, a large storage building and has zoning for 4 residential units. These are all on septic (or will be on septic).

Down Valley Park

The Down Valley Park is under construction and has approval for a septic system to service the park facilities. This has not yet been constructed.

Placerville Park/Placerville Fire Station

The Placerville Park currently uses out houses. There is a possibility the park will tie into the Fire Station septic system in the future.

RESIDENTAL USES

Fall Creek from Sawpit to Down Valley Park

185 Parcels

Placerville Residential/F Zone District from Down Valley Park to Western Placerville

12 lots west of river, 37 lots east of river.
Placerville Residential has approximately 39 units (25 exist, potential for approx. 14 more).

Ellerdville/Lower Placerville

27 parcels

San Miguel Canyon West of Lower Placerville

3 parcels

Please call the Planning Department if you have further questions.

Sincerely,

Karen Henderson

Karen Henderson, Associate Planner

[text/word/Placerville.wastewater.memo]

U.S. Census Bureau American FactFinder

DP-1. **Profile of General Demographic Characteristics: 2000**
Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data
Geographic Area: **San Miguel County, Colorado**

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Subject	Number	Percent
Total population	**6,594**	**100.0**
SEX AND AGE		
Male	3,607	54.7
Female	2,987	45.3
Under 5 years	299	4.5
5 to 9 years	339	5.1
10 to 14 years	311	4.7
15 to 19 years	333	5.1
20 to 24 years	534	8.1
25 to 34 years	1,557	23.6
35 to 44 years	1,296	19.7
45 to 54 years	1,183	17.9
55 to 59 years	352	5.3
60 to 64 years	168	2.5
65 to 74 years	154	2.3
75 to 84 years	49	0.7
85 years and over	19	0.3
Median age (years)	34.2	(X)
18 years and over	5,431	82.4
Male	3,032	46.0
Female	2,399	36.4
21 years and over	5,255	79.7
62 years and over	312	4.7
65 years and over	222	3.4
Male	129	2.0
Female	93	1.4
RACE		
One race	6,521	98.9
White	6,170	93.6
Black or African American	19	0.3
American Indian and Alaska Native	56	0.8
Asian	49	0.7
Asian Indian	25	0.4
Chinese	0	0.0
Filipino	7	0.1
Japanese	4	0.1
Korean	8	0.1
Vietnamese	1	0.0
Other Asian [1]	4	0.1
Native Hawaiian and Other Pacific Islander	5	0.1
Native Hawaiian	4	0.1
Guamanian or Chamorro	0	0.0
Samoan	0	0.0
Other Pacific Islander [2]	1	0.0
Some other race	222	3.4
Two or more races	73	1.1

Subject	Number	Percent
Race alone or in combination with one or more other races [3]		
White	6,239	94.6
Black or African American	26	0.4
American Indian and Alaska Native	82	1.2
Asian	67	1.0
Native Hawaiian and Other Pacific Islander	7	0.1
Some other race	247	3.7
HISPANIC OR LATINO AND RACE		
Total population	**6,594**	**100.0**
Hispanic or Latino (of any race)	439	6.7
Mexican	328	5.0
Puerto Rican	12	0.2
Cuban	15	0.2
Other Hispanic or Latino	84	1.3
Not Hispanic or Latino	6,155	93.3
White alone	5,959	90.4
RELATIONSHIP		
Total population	**6,594**	**100.0**
In households	6,577	99.7
Householder	3,015	45.7
Spouse	1,156	17.5
Child	1,243	18.9
Own child under 18 years	1,101	16.7
Other relatives	121	1.8
Under 18 years	33	0.5
Nonrelatives	1,042	15.8
Unmarried partner	273	4.1
In group quarters	17	0.3
Institutionalized population	17	0.3
Noninstitutionalized population	0	0.0
HOUSEHOLDS BY TYPE		
Total households	**3,015**	**100.0**
Family households (families)	1,424	47.2
With own children under 18 years	687	22.8
Married-couple family	1,156	38.3
With own children under 18 years	497	16.5
Female householder, no husband present	164	5.4
With own children under 18 years	131	4.3
Nonfamily households	1,591	52.8
Householder living alone	986	32.7
Householder 65 years and over	75	2.5
Households with individuals under 18 years	722	23.9
Households with individuals 65 years and over	180	6.0
Average household size	2.18	(X)
Average family size	2.77	(X)
HOUSING OCCUPANCY		
Total housing units	**5,197**	**100.0**
Occupied housing units	3,015	58.0
Vacant housing units	2,182	42.0
For seasonal, recreational, or occasional use	1,741	33.5
Homeowner vacancy rate (percent)	2.6	(X)
Rental vacancy rate (percent)	14.4	(X)
HOUSING TENURE		
Occupied housing units	**3,015**	**100.0**
Owner-occupied housing units	1,556	51.6

Subject	Number	Percent
Renter-occupied housing units	1,459	48.4
Average household size of owner-occupied unit	2.27	(X)
Average household size of renter-occupied unit	2.09	(X)

(X) Not applicable
[1] Other Asian alone, or two or more Asian categories.
[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.
[3] In combination with one or more other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, P3, P4, P8, P9, P12, P13, P17, P18, P19, P20, P23, P27, P28, P33, PCT5, PCT8, PCT11, PCT15, H1, H3, H4, H5, H11, and H12.

APPENDIX B

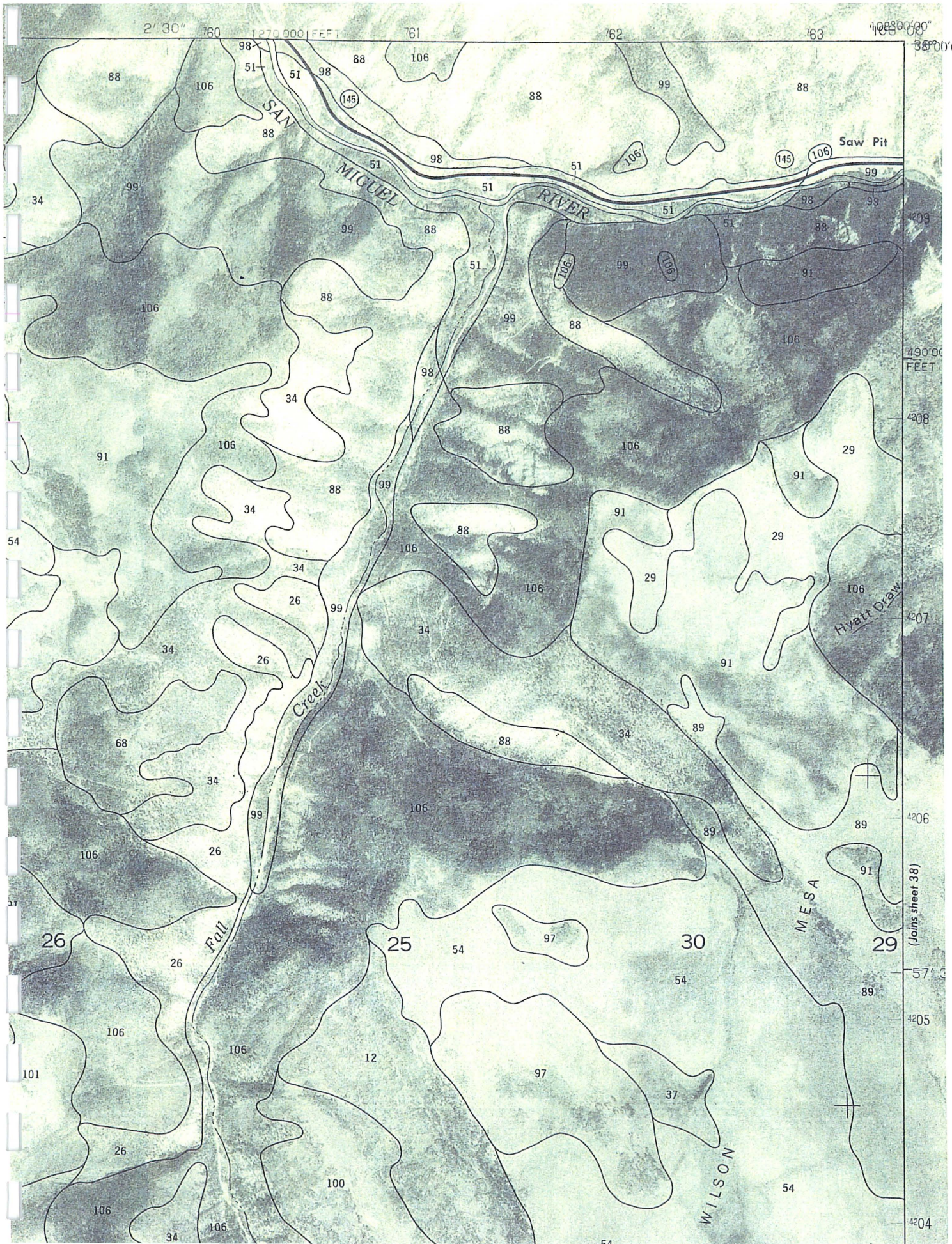
Soil Information

MIGUEL RIVER
CANYON
Leopard Creek
Leopard
Placerville
Slaughterhouse Gulch
(Joins sheet 37)
1 270 000 FEET
2' 30"
5'
N
1/2
1/4
0
1
2 MILES

SHEET NO. 37

SOIL SURVEY OF SAN MIGUEL AREA, COLORADO,

PARTS OF DOLORES, MONTROSE, AND SAN MIGUEL COUNTIES



41--Fivepine-Nortez-Rock outcrop complex, 12 to 30 percent slopes. This map unit is on mesa side slopes. The native vegetation is mainly grasses, shrubs, and ponderosa pine. Elevation is 7,400 to 8,500 feet. The average annual precipitation is 17 to 19 inches, the average annual air temperature is 41 to 43 degrees F, and the average frost-free period is 70 to 90 days.

This unit is 40 percent Fivepine loam, 30 percent Nortez loam, and 20 percent Rock outcrop. The Fivepine soil occurs under forested areas and the Nortez soil occurs under grasses and shrubs. (fig. 7) The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Acree soils and 5 percent soils that are similar to these Fivepine and Nortez soils but have less than 35 percent clay in the control section.

The Fivepine soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is reddish brown loam about 5 inches thick. The upper 4 inches of the subsoil is reddish brown clay loam. The lower 6 inches is reddish brown clay. Hard sandstone is at a depth of 15 inches. In some areas the surface layer is gravelly or cobbly loam.

Permeability of the Fivepine soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Nortez soil is moderately deep and well drained. It formed in alluvium derived dominantly from sandstone and shale. Typically, the surface layer is dark brown loam about 8 inches thick. The upper 10 inches of the subsoil is brown cobbly clay loam. The lower 6 inches is light brown clay loam. The substratum is pinkish white loam 8 inches thick. Hard sandstone bedrock is at a depth of 32 inches. In some areas the surface layer is gravelly, cobbly or stony loam.

Permeability of the Nortez soil is moderately slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

Rock outcrop consists of exposed bedrock. Areas are moderately steep to steep. They occur as 10 to 50 foot escarpments and as scattered outcrops 1 inch to 12 inches above ground level.

This unit is used for livestock grazing in summer and fall and for wildlife habitat.

This unit provides wildlife habitat for mule deer, elk, rabbits, hawks, and eagles.

The potential plant community on the Fivepine soil is mainly ponderosa pine, with an understory of Gambel oak, prairie junegrass, mountain muhly, and elk sedge. The average annual production of air-dry understory vegetation is about 1,200 pounds per acre.

If the condition of the understory deteriorates, cheatgrass, rabbitbrush and Canada thistle increases. Where the understory is in poor condition, these plants are dominant. Grazing should be managed so that the desirable balance of species is maintained in the plant community. The management practices suitable for use on this unit are proper grazing use and a planned grazing system.

The Fivepine soil is suited to the production of ponderosa pine. It can produce about 52 cubic feet of merchantable timber per acre per year from a fully stocked stand of trees. The site index for Fivepine averages 67. The main concerns in producing and harvesting timber are proper grazing management, shallow effective rooting depth, and equipment limitation. Brushy plants, such as Gambel oak, limit natural regeneration of ponderosa pine.

The potential plant community on the Nortez soil is mainly Gambel oak, elk sedge, nodding brome, and western snowberry. The average annual production of air-dry vegetation is about 900 pounds per acre.

If the condition of the range deteriorates, rabbitbrush, Canada thistle, and cheatgrass increase. Where the range is in poor condition, these plants are dominant. Grazing should be managed so that the desirable balance of species is maintained in the plant community.

If the range vegetation is seriously deteriorated, seeding is needed. For successful seeding, a seedbed should be prepared and the seeds drilled. The plants selected for seeding should meet the seasonal requirements of livestock or wildlife, or both.

The management practices suitable for use on this soil are a planned grazing system, proper woodland grazing, and woodland management. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

Following harvesting, if the site is not adequately prepared, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. The very low available water capacity generally influences seedling survival in areas where understory plants are numerous.

This unit is poorly suited to recreational development. It is limited mainly by slopes greater than 15 percent and depth to rock.

This unit is poorly suited to homesite development. The main limitations are depth to bedrock and slopes greater than 15 percent.

This map unit is in capability subclass VIIs, nonirrigated. The Fivepine soil is in Ponderosa Pine woodland site and the Nortez soil is in Pine Grassland #255 range site.

51--Haplaquolls, 0 to 3 percent slopes. These moderately deep and deep, poorly drained soils are on stream flood plains, minor intermittent streams, and sloughs. They formed in recent alluvium. The native vegetation is mainly sedges, cattails and rushes. Elevation is 6,800 to 8,200 feet. The average annual precipitation is 15 to 17 inches, the average annual air temperature is 41 to 45 degrees F, and the average frost-free period is 70 to 110 days.

No one profile typifies Haplaquolls, but one commonly observed the surface layer is grayish brown loam 21 inches thick. The upper part of the substratum is light gray cobbly sandy loam 9 inches thick. The lower part to a depth of 60 inches or more is pale brown very gravelly sandy clay loam. In some areas the surface layer is fine sandy loam.

Included in this unit are small areas of Callan soils, Gurley soils, and Mitch soils. Permeability of the Haplaquolls soil is moderate. Available water capacity is moderate. Effective rooting depth is 20 to 60 inches. Runoff is slow, and the hazard of water erosion is slight.

Haplaquolls soils have a water table at or near the surface throughout much of the year and are frequently flooded.

This unit is used for livestock grazing and wildlife habitat.

The potential plant community on this unit is mainly tufted hairgrass, Nebraska sedge, and slender wheatgrass. Grazing should be managed so that the desirable balance of species is maintained in the plant community. The management practices suitable for use on this unit are proper grazing use and a planned grazing system.

This unit provides wildlife habitat for waterfowl.

This unit is poorly suited to homesite development. The main limitations are high water table and frequent flooding.

This map unit is in capability subclass Vw, nonirrigated. No site assigned.

98--Specie gravelly loam, 5 to 15 percent slopes. This deep, well drained soil is on alluvial fans and terraces. The native vegetation is mainly ponderosa pine, oakbrush, grasses, and forbs. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 41 to 43 degrees F, and the average frost-free period is 70 to 90 days.

Typically, the surface is covered with a mat of pine needles and twigs 1 inch thick. The surface layer is dark reddish brown gravelly loam 3 inches thick. The subsurface layer is reddish brown very stony loam 13 inches thick. The underlying material to a depth of 60 or more inches is reddish brown extremely gravelly loam.

Included in this unit is about 10 percent soils similar to Sapeha soils but have less than 35 percent clay in the particle-size control section.

Permeability of this Specie soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for livestock grazing and wildlife.

The potential plant community on this unit is mainly western wheatgrass, Indian ricegrass, bottlebrush squirreltail, true mountainmahogany, and mountain big sagebrush. The average annual production of air-dry vegetation is about 900 pounds per acre.

If the condition of the range deteriorates, cheatgrass, cactus, Canada thistle increase. Where the range is in poor condition, these plants are dominant. Grazing should be managed so that the desirable balance of species is maintained in the plant community.

The management practices suitable for use on this unit are proper grazing use and a planned grazing system. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

This unit provides wildlife habitat for mule deer, elk, and raptors.

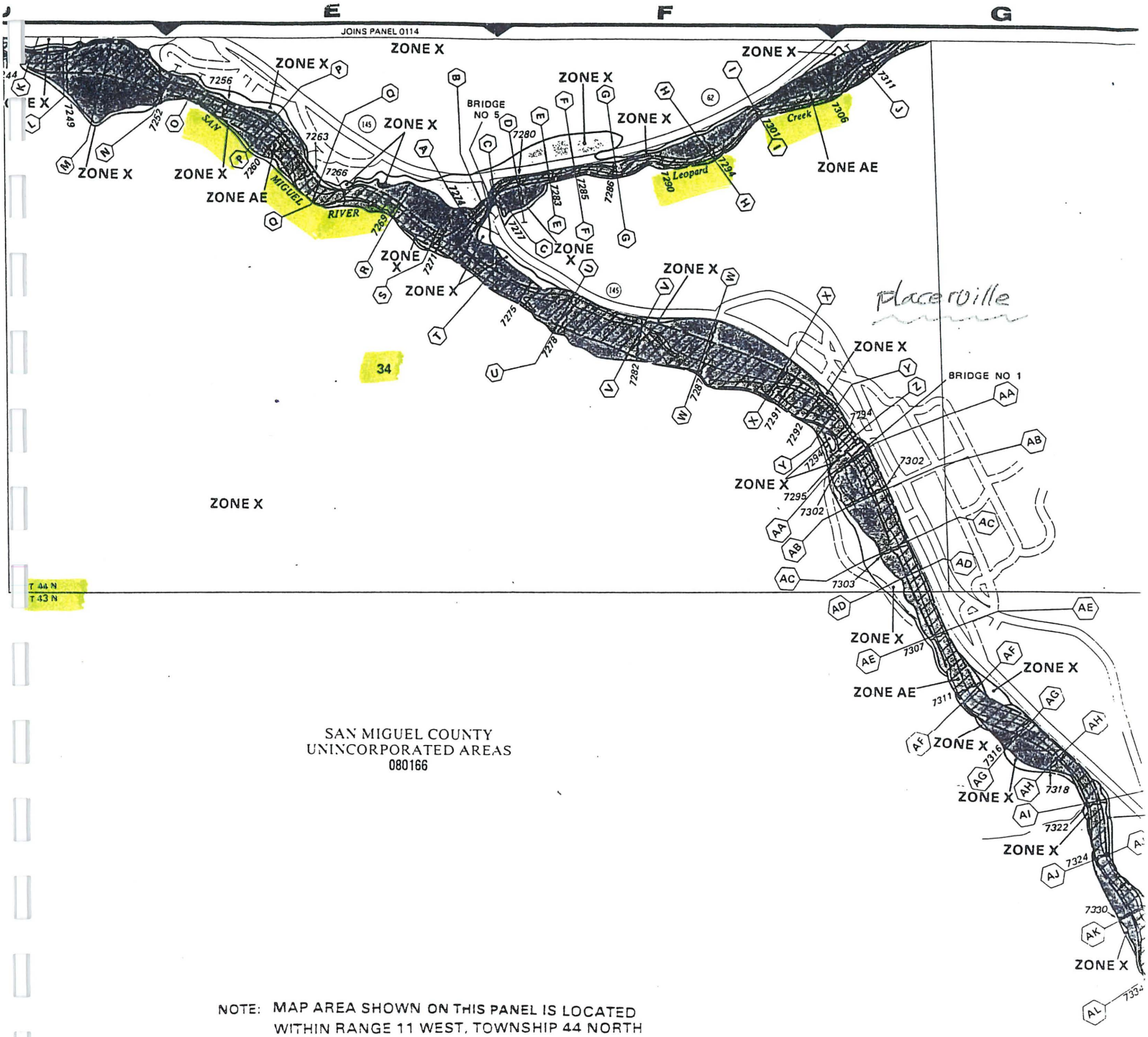
This unit is well suited to recreational development.

This unit is well suited to homesite development.

This map unit is in capability subclass VIe, nonirrigated. It is in the Loamy Slopes #303 range site.

APPENDIX C

Floodplain Map

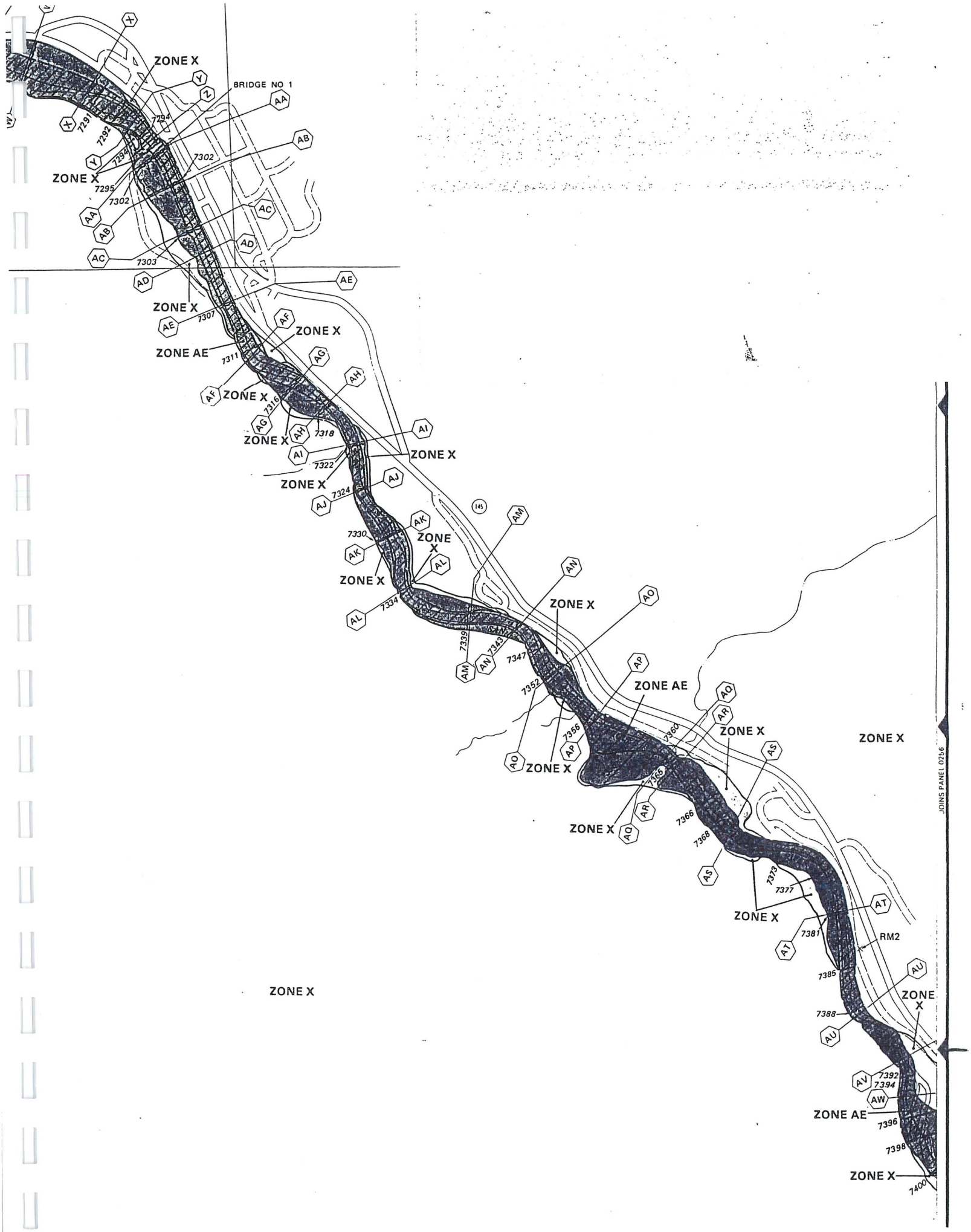


SAN MIGUEL COUNTY
UNINCORPORATED AREAS
080166

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 11 WEST, TOWNSHIP 44 NORTH

FEMA Flood Insurance Rate Map
Panel 252 of 400
Sept 30, 1988

ZONE X


ZONE X
BRIDGE NO 1
ZONE X
ZONE X
ZONE AE
ZONE X
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ZONE X
ZONE X
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ZONE X
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RM2
ZONE X
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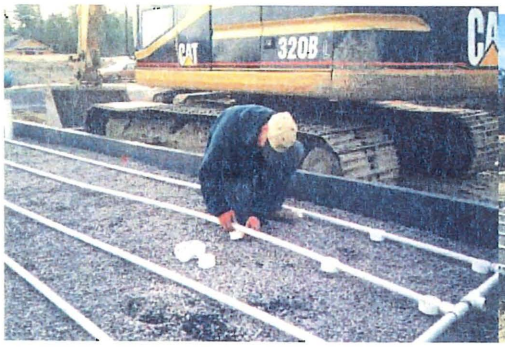
ZONE X
JOINS PANEL 0256

APPENDIX D

RGMF Reference Literatures

The Recirculating Sand Filter: (or multiple pass sand filter) is typically used in a commercial/communal applications (usually with larger flows) and has an exposed bed of gravel . The Ontario Building Code lists the recirculating sand filter as a tertiary treatment system and is suitable for use with conventional gravity drainfields or a Shallow Buried Trench type drainfield or other forms of final disposal. The recirculating sand filter is hydraulically loaded at 200 $l/m^2/d$.

Recirculating Sand Filters are an excellent method for bringing wastewater that varies in volume and strength up to tertiary treatment levels: BOD & TSS levels below 10 mg/L and total nitrogen reductions of 40-50%. Complete RSF kits from Sand Filtration Inc can handle every onsite treatment need, from a 3,785 liters per day installation to 3,785,412 liters per day effluent sewer system. Typically installed flush-to-ground, (exposed bed of gravel) they're the ideal solution for treating commercial waste from restaurants, schools, or RV parks. Sand Filtration Inc RSF's require little power to operate, and there's no need for a full-time operator. A Sand Filtration Inc. Recirculating Sand Filter makes sense when treatment quality is important and cost matters.



A finished Recirculating Sand Filter - Note river stone landscaping and exposed bed of gravel.

Construction:

The plywood frame to hold the liner in place is constructed first. A 50mm layer of fine sand is placed in the bottom of plywood frame. The 30mm PVC liner is installed then the 200 mm slotted underdrain and pump vaults (if applicable) along with a 200mm layer of large clear stone. A 600 mm layer of engineered gravel is placed in the Sand Filter. This layer is topped with a 50 mm layer of pea gravel on which a grid of effluent distribution laterals, with cold weather orifice shields, is placed then a final layer of pea gravel is applied over the distribution laterals. **Note:** The plywood frame is backfilled on the outside (which keeps the plywood frame rigid) at the same time the layers of gravel are applied.

Treatment Train:

In these on-sight sewage systems, there is a primary tank containing an effluent filter and a flow modulating orifice. Effluent from the relatively clear zone of the primary septic tank, between the scum and the sludge layer, enters the Biotube Effluent Filter through its inlet holes. Effluent then enters the space between the housing and Biotubes, utilizing the entire screen surface for filtering. Particles larger than 3 mm are detained in the interior spaces where continued decomposition of organic material occurs.Once the effluent has been screened through the Biotubes, it flows through the modulating orifices at the outlet of the filter. If tank inflow becomes temporarily excessive, the fluid level in the tank will rise as the modulating orifices slow the flow through the tank, allowing maximum settling of solids. In this manner instantaneous peaks during the day are buffered. A flow balancing tank is therefore not required in these types of systems.

The size of the primary treatment tankage determines hydraulic retention time and the frequency of solids removal. Based on the annual average flow, the primary tank volume is designed to provide for sludge storage and removal at approximately a 5 year frequency and a minimum hydraulic retention time of 24 hours in the clear zone of the primary tank.The primary treatment tank is buried

with access risers to ground surface. Access covers are fiberglass and coloured green to blend with grass surface.

Recirculation Tank: Effluent from the primary tank flows by gravity, or is pumped to the recirculation tank. As the effluent is discharged to the recirculation tank it mixes with filtered effluent which has already passed through the sand filter. The mixed effluent flows through the tank where it is pumped at timed intervals to the Recirculating Sand Filter. An underdrain in the sand filter returns the effluent back to the tank where it once again mixes with fresh effluent from the primary Tank.When the recirculation tank is full, a simple floating ball valve in the recirculating tank splitter valve (RSV) diverts approximately 20% of the filtered effluent to disposal and the remaining 80% is discharge to the recirculation tank where the cycle repeats again. The design objective is that each litre of effluent is passed through the sand filter at least 4 to 5 times prior to discharge. If the recirculation tank water level is low, then 100% of the filtered effluent is returned to the recirculation tank and once again pumped through the sand filter. The recirculation tank is a precast concrete tank. The recirculation tank is equipped with pumps housed in duplex screened pump vaults and a recirculating tank splitter valve. Each pump vault is equipped with a 600 mm access riser to allow for pump inspection and maintenance.

The recirculation tank is raised with access risers to ground level. Access covers are fiberglass and coloured green to blend with grass surface.

Recirculating Sand Filter

The sand filter consists simply of an excavation in the ground, a liner frame of 7/16" waferboard which is lined with a 30 Mil PVC liner. The liner is filled with filter sand which meets a specific grading specification. The wood frame is designed to hold the shape of the filter liner stable until the surrounding soil becomes stable after construction. The wood frame will eventually bio-degrade and the sand filter liner will remain stable in place.

An underdrain is installed in the filter prior to backfilling with filter media. The 200mm slotted underdrain returns the filtered effluent back to the recirculation tank. A pressure effluent distribution grid (sand filter laterals) is installed on the surface of the filter sand . 100 to 150mm of pea gravel is then placed over the top of the laterals.

The effluent distribution grid (sand filter laterals) is designed to operate in distinct separate zones. Each zone is fed by a high head pump which is dedicated to that zone.

The sand filter is sized according to the formula A= Total Flow per day/Hydraulic Loading Rate.

Drainfield Dosing Tank

Effluent which has been diverted to disposal from the recirculation tank flows by gravity to a precast concrete drainfield Dosing Tank and from there to final disposal.

APPENDIX E

Opinion of Probable Cost Estimates

Preliminary Opinion of Probable Construction Cost Estimate For
Regional Facility (Based on SBR, Site #1 and 85,100 GPD Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	8" Sewer interceptor system from Fall Creek area to Site #1	LF	20000	$ 75	$ 1,500,000
2	Pressure sewer from Lower Placerville to Site #1, Saw Pit to Fall Creek (2" to 4")	LF	15000	$ 25	$ 375,000
3	Highway and river crossing	LS	1	$ 125,000	$ 125,000
4	Lift stations	LS	1	$ 150,000	$ 150,000
	Collection System Cost				**$ 2,150,000**
1	Earthwork	LS	1	$ 55,000	$ 55,000
2	Enclosure Building	LS	1	$ 200,000	$ 200,000
3	Yard Piping	LS	1	$ 65,000	$ 65,000
4	Outfall	LS	1	$ 45,000	$ 45,000
5	Duplex Lift Station	LS	1	$ 80,000	$ 80,000
6	Bar Screen	EA	1	$ 75,000	$ 75,000
7	Two Trains SBR System	LS	1	$ 300,000	$ 300,000
8	Sludge Holding Tank	EA	1	$ 70,000	$ 70,000
9	Effluent disinfection system	LS	1	$ 25,000	$ 25,000
10	Electrical/controls	LS	1	$ 170,000	$ 170,000
11	Standby generator	LS	1	$ 65,000	$ 65,000
12	Mechanical system and odor control	LS	1	$ 100,000	$ 100,000
	Treatment Facility Cost				**$ 1,250,000**
1	total cost for collection and treatment facilities				**$ 3,400,000**
2	Contingency (15%)				$ 510,000
3	Engineering and construction administration (15%)				$ 510,000
4	Mobilization (5%)				$ 170,000
5	Permitting	LS	1	$ 35,000	$ 35,000
6	Legal services for land, easement acquisition, dist formation	LS	1	$ 60,000	$ 60,000
7	Wastewater treatment facility land cost based on 6000 sq. ft	LS	1	$ 80,000	$ 80,000
	Grand Total Price (Project Cost)				**$ 4,765,000**
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 35,000	$ 35,000
2	Maintenance	LS	1	$ 75,000	$ 75,000
3	Labor, part time	LS	1	$ 45,000	$ 45,000
4	Sludge disposal	LS	1	$ 30,000	$ 30,000
	Total O & M				**$ 185,000**

x 33 % 6
- 6,2 m

Note:
1) Potential easement acquisition costs are additional. Land cost was estimated based on information provided by County Assessor office, for three (3) lots site ranging from 7500 sq. ft to 12000 sq ft in Placerville area, value is assessed for $80000 effective May 1, 2003.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.
3) Costs for resident/customer for abandodment of septic system, service connection to sewer or grinder pump system are not included in the estimate. Anticipated costs for sewer service connection is $17 to $20/LF for 4" line. Ancipitated costs for abandonment of septic tanks and restoration is $500 to $700 per system.

Preliminary Opinion of Probable Construction Cost Estimate
For
Placerville Cluster (Based on RGMF Process and 22,500 gpd Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	Earthwork	LS	1	$ 27,500	$ 27,500
2	RMF system enclosure	LS	1	$ 50,000	$ 50,000
3	Precast pretreatment (septic) tank	LS	1	$ 40,000	$ 40,000
4	Recirculating tank	LS	1	$ 45,000	$ 45,000
5	Lined RGMF	LS	1	$ 15,000	$ 15,000
6	Sand filter media/gravel	LS	1	$ 40,000	$ 40,000
7	Pumps and controls	LS	1	$ 30,000	$ 30,000
8	Piping	LS	1	$ 25,000	$ 25,000
9	Effluent disinfection system	LS	1	$ 20,000	$ 20,000
10	Outfall	LS	1	$ 35,000	$ 35,000
11	Electrical	LS	1	$ 40,000	$ 40,000
12	Standby generator	LS	1	$ 35,000	$ 35,000
13	Gravity sewer collection system	LF	8500	$ 75	$ 637,500
14	Mechanical system and odor control	LS	1	$ 75,000	$ 75,000
	Subtotal (Construction Cost)				**$ 1,115,000**
15	Contingency (15%)				$ 167,250
16	Engineering and construction administration (15%)				$ 167,250
17	Mobilization (5%)				$ 3,750
18	Permitting	LS	1	$ 20,000	$ 20,000
19	Legal services for land/easement acquisition, etc.	LS	1	$ 35,000	$ 35,000
20	Wastewater treatment facility land cost based on 7500 sq. ft	LS	1	$ 80,000	$ 80,000
	Grand Total Price (Project Cost)				**$ 1,588,250**
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 7,500	$ 7,500
2	Maintenance	LS	1	$ 20,000	$ 20,000
3	Labor, part time	LS	1	$ 20,000	$ 20,000
4	Sludge disposal	LS	1	$ 15,000	$ 15,000
	Total O & M				**$ 62,500**

2.1 m

Note:
1) Potential easement acquisition costs are additional. Land cost for the facility site was estimated based on information provided by the County Assessor office.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.
3) Costs for resident/customer for abandodment of septic system, service connection to sewer or grinder pump system are not included in the estimate. Anticipated costs for sewer service connection is $17 to $20/LF for 4" line. Ancipitated costs for abandonment of septic tanks and restoration is $500 to $700 per system.

Preliminary Opinion of Probable Construction Cost Estimate
For
Fall Creek Cluster (Based on RGMF Process and 31,100 gpd Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	Earthwork	LS	1	$ 35,000	$ 35,000
2	RGMF enclosure	LS	1	$ 60,000	$ 60,000
3	Precast pretreatment (septic) tank	LS	1	$ 50,000	$ 50,000
4	Lined RGMF	LS	1	$ 20,000	$ 20,000
5	Filter tanks	LS	1	$ 50,000	$ 50,000
6	Sand filter media	LS	1	$ 48,000	$ 48,000
7	Pumps and controls	LS	1	$ 35,000	$ 35,000
8	Piping	LS	1	$ 30,000	$ 30,000
9	Effluent disinfection system	LS	1	$ 25,000	$ 25,000
10	Outfall	LS	1	$ 35,000	$ 35,000
11	Electrical	LS	1	$ 50,000	$ 50,000
12	Standby generator	LS	1	$ 40,000	$ 40,000
13	Gravity sewer collection system	LF	7000	$ 75	$ 525,000
14	mechanical system and odor control	LS	1	$ 75,000	$ 75,000
	Subtotal (Construction Cost)				**$ 1,078,000**
15	Contingency (15%)				$ 161,700
16	Engineering and construction administration (15%)				$ 161,700
17	Mobilization (5%)				$ 3,750
18	Permitting	LS	1	$ 20,000	$ 20,000
19	Legal services for land/easement acquisition, etc.	LS	1	$ 35,000	$ 35,000
20	Wastewater treatment facility land cost based on 10,000 sq ft	LS	1	$ 40,000	$ 40,000
	Grand Total Price (Project Cost)				**$ 1,500,150**
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 8,500	$ 8,500
2	Maintenance	LS	1	$ 23,500	$ 23,500
3	Labor, part time	LS	1	$ 20,000	$ 20,000
4	Sludge disposal	LS	1	$ 15,000	$ 15,000
	Total O & M				**$ 67,000**

-2.M

Note:
1) Land and potential easement acquisition costs are additional. Land cost for the facility site was estimated based on information provided by the County Assessor for the Fall Creek area.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.
3) Costs for resident/customer for abandodment of septic system, service connection to sewer or grinder pump system are not included in the estimate. Anticipated costs for sewer service connection is $17 to $20/LF for 4" line. Ancipitated costs for abandonment of septic tanks and restoration is $500 to $700 per system.

Preliminary Opinion of Probable Construction Cost Estimate
For
Placerville Commercial Users (Based on RGMF Process and 11,500 gpd Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	Earthwork	LS	1	$ 12,000	$ 12,000
2	RMF system enclosure	LS	1	$ 25,000	$ 25,000
3	Precast pretreatment (septic) tank	LS	1	$ 25,000	$ 25,000
4	Recirculating tank	LS	1	$ 25,000	$ 25,000
5	Lined RGMF	LS	1	$ 10,000	$ 10,000
6	Sand filter media/gravel	LS	1	$ 20,000	$ 20,000
7	Pumps and controls	LS	1	$ 20,000	$ 20,000
8	Piping	LS	1	$ 18,000	$ 18,000
9	Effluent disinfection system	LS	1	$ 15,000	$ 15,000
10	Outfall	LS	1	$ 30,000	$ 30,000
11	Electrical	LS	1	$ 30,000	$ 30,000
12	Standby generator	LS	1	$ 30,000	$ 30,000
13	Gravity sewer collection system @ $75/LF	LS	1	$ 130,000	$ 130,000
14	Mechanical system and odor control	LS	1	$ 40,000	$ 40,000
	Subtotal (Construction Cost)				**$ 430,000**
15	Contingency (15%)				$ 64,500
16	Engineering and construction administration (15%)				$ 64,500
17	Mobilization (5%)				$ 6,500
18	Permitting	LS	1	$ 10,000	$ 10,000
19	Legal services for land/easement acquisition, etc.	LS	1	$ 25,000	$ 25,000
20	Wastewater treatment facility land cost based on 4000 sq. ft	LS	1	$ 50,000	$ 50,000
	Grand Total Price (Project Cost)				**$ 650,500** 720K
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 3,500	$ 3,500
2	Maintenance	LS	1	$ 8,000	$ 8,000
3	Labor, part time	LS	1	$ 17,000	$ 17,000
4	Sludge disposal	LS	1	$ 10,000	$ 10,000
	Total O & M				**$ 38,500**

Note:
1) Potential easement acquisition costs are additional. Land cost for the facility site was estimated based on information provided by the County Assessor office.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.
3) Costs for resident/customer for abandodment of septic system, service connection to sewer or grinder pump system are not included in the estimate. Anticipated costs for sewer service connection is $17 to $20/LF for 4" line. Ancipitated costs for abandonment of septic tanks and restoration is $500 to $700 per system.

Preliminary Opinion of Probable Construction Cost Estimate
For
SBR System (Based on 22,500 gpd Placerville Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	Earthwork	LS	1	$ 13,500	$ 13,500
2	Enclosure building	LS	1	$ 125,000	$ 125,000
3	Yard Piping	LS	1	$ 35,000	$ 35,000
4	Outfall	LS	1	$ 35,000	$ 35,000
5	Duplex Lift Station	LS	1	$ 65,000	$ 65,000
6	Bar Screen	EA	1	$ 65,000	$ 65,000
7	Two Trains of SBR System	LS	1	$ 185,000	$ 185,000
8	Sludge Holding Tank	EA	1	$ 50,000	$ 50,000
9	Effluent disinfection system	LS	1	$ 20,000	$ 20,000
10	Electrical/controls	LS	1	$ 125,000	$ 125,000
11	Standby generator	LS	1	$ 50,000	$ 50,000
12	Mechanical system and odor control	LS	1	$ 80,000	$ 80,000
	Subtotal (Construction Cost)				**$ 848,500**
13	Contingency (15%)				$ 127,275
14	Engineering and construction administration (15%)				$ 127,275
15	Mobilization (5%)				$ 42,425
16	Permitting	LS	1	$ 20,000	$ 20,000
17	Legal services	LS	1	$ 35,000	$ 35,000
18	Land cost based on 2500 sq ft	LS	1	$ 35,000	$ 35,000
	Grand Total Price (Project Cost)				**$ 1,235,475**
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 25,000	$ 25,000
2	Maintenance	LS	1	$ 52,500	$ 52,500
3	Labor, part time	LS	1	$ 30,000	$ 30,000
4	Sludge disposal	LS	1	$ 22,500	$ 22,500
	Total O & M				**$ 130,000**

Note:
1) Potential easement acquisition costs are additional.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.

Preliminary Opinion of Probable Construction Cost Estimate
For
RGMF System (Based on 22,500 gpd Placerville Flow)

Placerville / Fall Creek Area Sewer Feasibility Study for San Miguel County

Project No.: 1004-001

Item #	Item Description	Unit	Quantity	Unit Price	Total Item Price
1	Earthwork	LS	1	$ 27,500	$ 27,500
2	RGMF system enclosure	LS	1	$ 50,000	$ 50,000
3	Precast pretreatment (septic) tank	LS	1	$ 40,000	$ 40,000
4	Recirculating tank	LS	1	$ 45,000	$ 45,000
5	Lined RGMF	LS	1	$ 15,000	$ 15,000
6	Sand filter media/gravel	LS	1	$ 40,000	$ 40,000
7	Pumps and controls	LS	1	$ 30,000	$ 30,000
8	Piping	LS	1	$ 25,000	$ 25,000
9	Effluent disinfection system	LS	1	$ 20,000	$ 20,000
10	Outfall	LS	1	$ 35,000	$ 35,000
11	Electrical	LS	1	$ 40,000	$ 40,000
12	Standby generator	LS	1	$ 35,000	$ 35,000
13	Mechanical system and odor control	LS	1	$ 75,000	$ 75,000
	Subtotal (Construction Cost)				**$ 477,500**
14	Contingency (15%)				$ 71,625
15	Engineering and construction administration (15%)				$ 71,625
16	Mobilization (5%)				$ 23,875
17	Permitting	LS	1	$ 20,000	$ 20,000
18	Legal services	LS	1	$ 35,000	$ 35,000
19	Land cost based on 7500 sq. ft at Placerville	LS	1	$ 80,000	$ 80,000
	Grand Total Price (Project Cost)				**$ 779,625**
	Plant O & M Cost Estimate				
1	Power	LS	1	$ 10,000	$ 10,000
2	Maintenance	LS	1	$ 20,000	$ 20,000
3	Labor, part time	LS	1	$ 20,000	$ 20,000
4	Sludge disposal	LS	1	$ 12,500	$ 12,500
	Total O & M				**$ 62,500**

Note:
1) Potential easement acquisition costs are additional.
2) Every effort were made to try to include all potential costs for the project based on our best professional judgement, experiences, and information available to us about the project at present. It is understood that the opinion of probable cost may not represent the final construction cost. This opinion of the probable cost was provided for budgeting or construction forecasting purpose.

SEAR·BROWN

CLIENT: San Miguel County Project No: 1004-001

Project: Fall creek/placerville sewer study Checked By: _____

By: NL Date: 1-29-03 Sheet: 1 Of: 1

10:05 Am

San Miguel County
Assessor in Norwood 327-4543
728-7845

Assessor in Telluride 970-728-3174
Peggy Cannor
In the process of evaluating, going to be available in May, 2003.

John Huebner
Fall creek median value
#104000/site
130 Building Sites. 0.76 Acres medi.
1.11 Acres Averag
may 1, 2003

STein Totland.
placerville
site size 7500 S.F
~12000 S.F
3 lots site #80000/site
5 lots site #145000/site
0.75 Acres
join lot site #
River site #100000/site
May 1, 2003

APPENDIX F

Correspondences

SAN MIGUEL COUNTY
PLANNING DEPARTMENT

P.O. BOX 548, TELLURIDE, COLORADO 81435
FAX: (970) 728-3098 TELEPHONE: (970) 728-3083

MEMORANDUM

TO: William

FROM: Karen Henderson, Associate Planner

DATE: 1/28/03

MESSAGE:

Please replace "worst" with "the maximum"

Also please add "cabinet shop" to auto repair service & 4 units at Truan PUD

Karen

TOTAL NO. OF PAGES (INCLUDING THIS ONE): 2

William - Please change to "maximum" the

Uses	Place Description	Number of Lots	Population	Notes
Commercial	Placerville Commercial	50	115	50 platted town lots. Theoretically, one residential or commercial unit per lot for central sewer system. 50 units are worst scenario for wastewater system planning. But due to site constraint and setback requirements, practical/feasible units shall be far less than 50 units.
	Corner of Hwy 145 & 62	5	12	2.74 acre parcel zoned for PC. Assuming 0.55 acre per unit.
	Truan PUD	5	11	An automotive repair service and 4 residential units.
	Down Valley Park	3.4	8	Augmentation plan indicates 0.88 acre-foot water usage per year. This equates 3.4 residential equivalent units.
	Placerville Park/Fire Station	3.6	8	200 users per day for the restroom in the park. This equates 3.6 residential equivalent units.
	Total	**67**	**154**	Total 67 residential equivalent units. Blue Jay PUD is not included since they have their own wastewater facility.
Residential	Fall Creek from Sawpit to Down Valley Park	185	423	185 parcels
	Placerville R/F Zone from Down Valley Park to Western Placerville	88	202	12 lots west of river, 37 lots of east river, 39 units in Placerville
	Ellerdville/Lower Placerville	27	62	27 parcels
	San Miguel Canyon	3	7	3 parcels
	Total	**303**	697	Total 303 residential units. More than one unit may be allocated on some parcels.
Total Study Area		**370**	**851**	Total ~~367~~ 370 residential equivalent units.

(1) Down Valley Park EQR Calculation
Annual water usage = 0.88 acre-foot water = 38,333 cubic feet water = 206,729 gallons water = 786 gallons/day
Each EQR = 2.3 people, 230 gallons/day
Down Valley Park EQR = 786/230 = 3.4

(2) Placreville Park EQR Calculation (fixtures in the restrooms will be toilets, sinks and urinals)
Daily users = 200 people.
Assuming each user use 3.0 gallons (toilet per flush 2.5 gallons, urinal per flush 1 gallon, sink per user 0.5 gallon).
Daily water usage = 200 x 3.0 = 600 gallons/day
Placerville Park EQR = 600/230 =2.6

(3) Placerville Fire Station = 1 EQR

(4) Will provide evaluation for treatment alternative and cost for the PC users only.

(5) Will discuss sensitivity of the treatment alternatives to flow changes. Generally speaking, SBR is not sensitive to flow change in terms of cost and footprint. But RCMF is very sensitive to flow change. Typical design loading for RCMF is 4 gallons/sq. ft /day.

SAN MIGUEL COUNTY
ENVIRONMENTAL HEALTH DEPARTMENT

RECEIVED
NOV 12 2002
BY: John M.

Date: October 29,2002
To: John McGee
From: David Schneck, San Miguel County Environmental Health Director
Re: Review comments on Wastewater Collection and Treatment Feasibility Study For Placerville/ Fall Creek Area, San Miguel County

John, the following are questions/ comments I would like to see addressed in the final version of the feasibility study.

The introduction states " It is reported that several ISDS units" have failed and have been replaced. In the 12 years I have been with the County working on septics, only four failures have occurred along the river to my knowledge and three have been repaired and the fourth is in the process of a final resolution. Additionally, I have conducted water quality testing in wells and in the San Miguel River looking for indicators of wastewater contamination and have found no evidence suggesting septics are currently presenting any health or environmental problems. It should however be recognized that septic failures will continue to occur as long as this area is served by individual sewage disposal systems.

The information in the "Design Flow and Organic Loading Estimates" on page 1 needs to be discussed with the County planning department. I believe better information is available and was provided to your staff. We should discuss the likely uses on the commercial lots and confirm that treating them the same as residential is appropriate. I also want to confirm that you were aware of the fact that the Blue Jay commercial uses will be served by their own central treatment facility. We also discussed looking at the Placerville commercial as a separate service pod. I would still like to see this evaluation using the density allowances currently available with central sewer in the County land use code.

It was outside of the scope of work for this study to identify specific locations for facility siting. However, I think best estimates of square footage requirements for the treatment alternatives should be provided and incorporated into the cost estimates at an accepted per square value provided by local appraisers or the County assessor. I requested you look at the area west of the Placerville fire station as a potential site for a treatment facility. The pictures are of the east side of the station. This is not a big deal at this point as we are not actually trying to propose and evaluate a specific location but it might be relevant to know if the square footage requirements could be met in the area west of the fire station.

Box 4130 • Telluride, CO 81435 • Miramonte Bldg., Room 301 • (970) 728-0447 • FAX (970) 728-6325

Could you elaborate more on the potential for odor problems? This will be an issue of great concern anywhere in the analyzed service area. Are the proposed types of facilities commonly sited in residential areas? In what proximity to residential uses have they been sited in your experience?

Most people in the service area have existing tanks. Are these of any value? Would they allow or would there be any advantage to the use of non-grinder pumps?

In the cost estimate breakdowns I didn't see any cost estimates for permitting or NEPA compliance as was requested. If federal funding is sought to implement this project is NEPA analysis not required? Please include these estimates in your cost evaluation if they are not already incorporated into another line item. Do your per tap cost estimates include the cost for the connection of individual homes to the central facility infrastructure? If not please provide an estimate of any required pumps or plumbing in your per tap cost estimates. Also, please include a per tap annual O&M in your cost estimates.

Give me a call if you have questions regarding these comments and I appreciate the incorporation of these comments into the final document. We should arrange a meeting to discuss these and any other comments prior to the preparation of the final report.

SEAR·BROWN

ARCHITECTURE
ENGINEERING
PLANNING
CONSTRUCTION

209 South Meldrum
Fort Collins, CO
80521-2603

970.482.5922 phone
970.482.6368 fax

www.searbrown.com

March 22, 2002

David Schneck
San Miguel County
Environmental Heath Department
P.O. Box 4130
Telluride, CO 81435

RE: Feasibility Study - Central Wastewater Treatment and Collection System for Placerville/Fall Creek Area

Dear Dave:

We are very pleased that the County has decided to have Sear-Brown assist the County with engineering services on the above referenced project. As we discussed I have included two (2) copies of our Standard Contract for Professional Services for the County's review and signature. Please return one (1) copy back to us.

It is our understanding that the County will seek funding sources to complete the feasibility study and has requested Sear-Brown to hold their scope and fee for a 90-day period. This is acceptable to Sear-Brown. As requested, I have included two (2) copies of our original proposal dated January 30, 2002.

If you have any questions regarding the attached contract, please feel free to contact me. We look forward to working on this important project with the San Miguel County Environmental Health Department.

Sincerely,

John P. McGee, P.E.
Project Manager

OFFICE OF
SAN MIGUEL COUNTY
BOARD OF COMMISSIONERS

P. O. BOX 1170
TELLURIDE, COLORADO 81435
970-728-3844 OFFICE / 970-728-3718 FAX

July 1, 2002

FAX 970-482-6368

Mr. John P. McGee
Sear-Brown
209 South Meldum
Fort Collins, CO 80521

Dear Mr. McGee,

On June 27, 2002 the San Miguel County Commissioners signed the enclosed agreement. This is your notice to proceed. The Commissioners requested that the starting date be from today's date, July 1, 2002. Your draft report should be completed on or before August 12, 2002 for presentation to the Commissioners.

If you have any questions concerning this completion date, please contact Kevin Geiger, Assistant County Attorney at 970-728-3879.

Sincerely,

Marie A. Thomas

Marie A. Thomas
Chief Deputy Clerk to the Board

SAN MIGUEL COUNTY BOARD OF COMMISSIONERS
WEDNESDAY, JULY 24, 2002
TELLURIDE WORK SESSION
MIRAMONTE BUILDING, SECOND FLOOR

11:30 a.m. – 11:50 a.m.	Sear-Brown/Feasibility Study/Scope of Work (John McGee)
1:30 p.m. – 1:50 p.m.	Mental Health Office update (Rick Meredith)
1:50 p.m. – 2:10 p.m.	Historic site designations (Kari Distefano) Wilson Mesa Trailhead (Linda Luther, Kevin Geiger)
2:10 p.m. – 2:30 p.m.	Administrative Matters: Second Lot Option/Illium Valley (Lynn Black) Dave Wood Rd. Public Access (Mike Horner, Kevin Geiger) Update on Outside Meetings Calendars
2:30 pm – 3:30 pm	*Dept. Heads and Elected Officials*
3:30 p.m. – 3:45 p.m.	Kinder-Morgan update (Gail Neben)
3:45 p.m. – 4:30 p.m.	Earth Charter (Betsy McKinney)
4:30 p.m. – 5:00 p.m.	Water Issues (Aaron Todd)
5:00 p.m. – 5:15 p.m.	Open Space direction (Linda Luther, Kevin Geiger)

Distribution:

Commissioners
Lynn Black
Steve Zwick
Mike Rozycki
Kevin Geiger
Mike Horner
Linda Luther
Kari Distefano

Daily Planet
KOTO
Telluride Watch
Norwood Post FAX 327-0544
R.Meredith (by phone)
J.McGee FAX 970-482-6368
Betsy McKinney (by phone)
Aaron Todd (by phone)
April Montgomery (by phone)
M.E.Geiger FAX 970-945-6292

APPENDIX G

Project RFP and Contract Documents

SAN MIGUEL COUNTY
ENVIRONMENTAL HEALTH DEPARTMENT

RECEIVED
DEC 2 0 2001
BY:_____

Date: **December 10, 2001**
To: **Interested Parties**
From: **David Schneck, San Miguel County, Environmental Health Director**
Re: **Request for Proposals to Conduct a Feasibility Study for the Provision of a Central Wastewater Treatment and Collection System to Serve the Placerville/Fall Creek Area**

San Miguel County is soliciting proposals from qualified firms to conduct a preliminary budget level study to evaluate the provision of central sewer service to the above referenced area. The proposed service area would include Placerville, lower Placerville, and 3.2 miles along highway 145. The approximate number of residential lots served will be 258 and 15 commercial lots with an approximate service population of 800 people. The study would include evaluation of siting alternatives, collection alternatives and treatment alternatives. These alternatives would be evaluated analyzing Placerville, lower Placerville, and the 3.2 mile area along highway 145 independently. Lower Placerville has 28 parcels for an approximate future population of 84, Placerville has 80 parcels for an approximate future population of 240, the Fall Creek/Placer Valley Village area has 165 parcels for an approximate future population of 495 people. The evaluation of these alternatives would include: estimates of facility size, estimates of cost of engineering and planning, cost of permitting, cost of NEPA compliance, site acquisition and development, and cost of construction.

The Colorado Department of Transportation is planning a major highway project in this area to be evaluated in 2003. The study would also include an estimate of cost savings that could result from implementing the sewer project or portions thereof in conjunction with the CDOT construction work.

In addition the study will include the identification and evaluation of available funding sources to implement the project.

San Miguel County will provide background information such as potential sites, aerial photos, land uses, service area populations and locations. Interested parties will supply the County with a statement of qualifications, including relevant experience with similar projects and references. For additional information on this request for proposals contact David Schneck, San Miguel County Environmental Health Director at 970-728-0447 or E-mail, SMCEH@Telluridecolorado.net. Send proposals to PO Box 4130, Telluride, CO 81435.

Proposals must be received by January 30, 2002.

Box 4130 • Telluride, CO 81435 • Miramonte Bldg., Room 301 • (970) 728-0447 • FAX (970) 728-6325

File Copy

SEAR·BROWN

Letter Of Transmitta

209 South Meldrum
Fort Collins, CO 80521
970.482.5922 Fax: 970.482.6368

TO San Miguel County Attorney's Office
PO Box 791
Telluride, Colorado

ATTN Mr. Kevin Geiger, Attorney

DATE 6/11/2002	**PROJ. NO.** MK-70
RE Wastewater Feasibility Study-Placerville Are	

WE ARE SENDING YOU

- ☒ Attached
- ☐ Under Separate Cover
- ☐ Transmitted Via _____
- ☐ Prints
- ☐ Reproducibles
- ☐ Specifications
- ☐ Shop Drawings
- ☐ Copy of Letter
- ☐ Change Order
- ☐ _____

COPIES	DRAWING	DATE	DESCRIPTION
2	n/a		Revised Agreement for Professional Services

TRANSMITTED

- ☒ For Approval
- ☐ As Requested
- ☐ For Your Use
- ☐ For Review and Comment

COMMENTS
Kevin

I made the modifications to the Agreement per your request. Please call if you have any questions.

COPY TO _____ with (☐) Enc.
_____ with (☐) Enc.

SIGNED _____
John P. McGee

#SB-AD-01 (01/02)

SEAR·BROWN

Standard Contract For Professional Servi

Project Number _____

Client Name	San Miguel County	Project Location	Telluride, CO 81435
Address	Board of County Commissioners		
	P.O. Box 4130		
Contact	Mr. David Schneck		
Phone	(970) 728-0447	Fax	

Description of Work

See attached Exhibit A - Scope of Services and Fee

Fee Schedule

☐ Fixed Fee-Amount _____

☐ We will perform the services noted for a fee equal to payroll costs for project personnel times a factor of 3.0 to provide for overhead, other costs and profit. Expenses and/or outside services would be billed at 1.1 times our direct cost.

☒ **Cost plus Maximum Fee - $9920**

Estimated Fee _____

Conditions of Payment

☐ Retainer-Amount _____

☐ Payment in full before drawing is released.

☐ To be billed upon completion with payment due within 30 days.

X To be billed monthly with payment due within 30 days.

This proposal is valid for 90 days from the date it is signed by Sear-Brown.

Doc ID#

TERMS AND CONDITIONS

ARTICLE I: CLIENT'S RESPONSIBILITIES

A) Client's Representative: The Client shall appoint a representative uthorized to act on the Client's behalf with respect to the Project. The Client or ts representative shall make decisions in a timely manner regarding all aspects of the Project, shall examine documents submitted by Sear-Brown and render decisions in a timely manner to avoid unreasonable delay in the orderly and equential progress of Sear-Brown's services and the Project schedule accepted by Client.

B) Client's Program and Budget Requirements: Client shall provide Sear-Brown full information in a timely manner regarding all its requirements for the Project including its objectives, schedule, criteria, constraints and budget ncluding reasonable contingencies.

C) Right of Entry: Client shall provide right of entry for Sear-Brown, its staff, subconsultants, and all necessary equipment to complete the Work. Sear-Brown will take reasonable precautions to minimize damage to property. Client nderstands that in the normal course of work some damage may occur, the correction of which is not part of this Agreement.

D) Required Information: Client will furnish Sear-Brown all information, requirements, data, reports, surveys and instructions required to complete the Scope of Services, including identifying the type and location of underground mprovements and utilities, and all existing conditions. Sear-Brown shall have the right to rely upon the completeness and accuracy of such information. Client acknowledges that certain assumptions will be made regarding existing conditions that cannot be verified without destruction or damage to existing facilities. To the fullest extent permitted by law, Client agrees to waive all claims against, and to hold harmless ~~and indemnify~~, Sear-Brown and its subconsultants, for damages to underground improvements and utilities and for any costs associated with undisclosed existing conditions.

E) Invoices: Sear-Brown will render invoices every thirty days. Payment is due upon presentation of invoice and is past due thirty (30) days from invoice date. Client agrees to pay a service charge of one and one half percent (1½%) per month, or the maximum rate allowed by law, on past due accounts. Payment of invoices shall not be subject to any discounts, set-offs, or backcharges by Client unless agreed to in writing by Sear-Brown. Client shall pay all costs, expenses, and distributions, including collection agency fees and expenses, court costs and reasonable attorneys' fees incurred by Sear-Brown, in the event collection or legal processes are employed to collect outstanding bills.

F) Sales Tax: ~~Client will pay any applicable sales tax whenever deemed to be due. Payment terms are exclusive of sales tax.~~

ARTICLE II: SEAR-BROWN'S RESPONSIBILITIES

A) Standard of Care: Sear-Brown shall perform the services called for by this Agreement with the level of care and skill ordinarily exercised by members of the same professions currently practicing under similar conditions. No other warranty, expressed or implied, is made. Client acknowledges that increased costs and changes may be required due to omission, ambiguities and inconsistencies in the drawings and specifications. Client agrees to set aside a contingency of at least 3% of the Project construction cost to pay for these costs and changes. Client further agrees it will make no claims against Sear-Brown for any such costs and changes covered by such contingency fund.

B) Compliance with Laws, Codes and Standards: Consistent with the professional standard of care, Sear-Brown will comply with laws, codes, and standards applicable to the Project design as of the effective date of this Agreement or the issuance of the construction plans and specifications, whichever is later.

C) Certifications: Sear-Brown shall sign, if requested by Client, a statement that to the best of its knowledge, information and belief, based in whole or in part on information provided by others, the accuracy of which has not been verified, that the Project has been completed in general conformance with the plans and specifications. Sear-Brown shall not be required to sign any documents, no matter by whom requested, in which Sear-Brown is required to certify, guarantee or warrant the existence of conditions the existence of which Sear-Brown has not or cannot ascertain.

D) Construction Phase Services: If construction phase services are required in the Scope of Services, the following terms shall apply:

1) Site Observation: If site observation visits are to be provided by Sear-Brown, Sear-Brown shall visit the site at intervals appropriate to the stage of the construction, or as otherwise expressly agreed to in the Scope of Services, in order to observe the progress and quality of the work completed by the contractor. Such observation is not meant to be an exhaustive check or a detailed inspection of the contractor's work but rather to allow Sear-Brown to become generally familiar with the progress of the Work and to determine in general if the work is being performed in a manner indicating that, when fully completed, the work will be in accordance with the Contract Documents. Sear-Brown shall not be required to make continuous or exhaustive inspections to check the quantity and quality of th nor shall Sear-Brown be responsible for the Contractor's failure to perform the W accordance with the Contract Documents.

2) Rejection of Work: Sear-Brown shall have the authority to reject any work contractors that is not, in Sear-Brown's professional judgment, in accordance w Construction Documents. Neither this authority nor the good faith judgment to r not reject any such work shall subject Sear-Brown to any liability or cause of ac behalf of the contractors, subcontractors or any other suppliers or persons per portions of the work on the Project.

3) Work Site Safety: Client agrees that Sear-Brown shall not supervise or di have any responsibility for, control over or charge of, the Contractors' work construction means, methods, techniques, sequences or procedures, or for the w safety precautions or programs in connection with the Work. These righ responsibilities are solely those of the party or parties performing the actual cons of the Project. Neither the professional activities of Sear-Brown, nor the pres Sear-Brown personnel and subconsultants at the construction site, shall reli Contractors and any other entity of their obligations, duties and respons including, but not limited to, construction means, methods, sequence, techni procedures necessary for performing, superintending or coordinating all portion Work safely and in accordance with any health or safety requirements of any reg agency. The Client agrees that the Client, Sear-Brown and its subconsultants s indemnified by the Contractors and shall be made additional insureds un Contractors' general, umbrella and excess liability insurance policies.

4) Submittals and Shop Drawings: If the Scope of Services includes the re Contractor submittals and shop drawings, then Sear-Brown will review such su and shop drawings for the limited purpose of checking for conformance with the concept expressed and the information provided in the Construction Documen review shall not include review of the accuracy or completeness of details, quantities, dimensions, weights or gauges, fabrication processes, construction m methods, coordination of the work with other trades or construction safety prec all of which are the responsibility of the Contractors. The review shall be co with reasonable promptness while allowing sufficient time in Sear-Brown's judg permit adequate review. Review of a specific item shall not indicate that Sear-Bro reviewed the entire assembly of which the item is a component. Sear-Brown shal responsible for any deviations from the Contract Documents not brought to its a in writing by the Contractor. Sear-Brown shall not be required to review submissions or those for which submissions of correlated items have not been rece

5) Requests for Clarification or Interpretation: Sear-Brown shall provid reasonable promptness, written responses to requests from Contractors for clari and interpretation of the requirements of the Contract Documents. If such requ information, clarification or interpretation are, in Sear-Brown's professional opin information readily apparent from reasonable observation of field conditions or a of the Contract Documents, or reasonably inferable therefrom, Sear-Brown s entitled to additional compensation at its regular billing rates for its tim responding to such requests.

6) Record Documents: If required by the Scope of Services, upon completion Work, Sear-Brown shall compile for and deliver to the Client a reproducible Record Documents conforming to the marked-up prints, drawings and oth furnished to Sear-Brown by the Contractor. This set of Record Documents wi significant changes made during construction. Because these Record Docume based on unverified information provided by other parties that Sear-Brown will to be reliable, Sear-Brown cannot and does not warrant their accuracy.

E) Insurance: Sear-Brown shall maintain worker's compensation insurance r by law. Sear-Brown represents and warrants that it maintains general liabil property damage insurance. Certificates for such policies shall be provided to upon written request. Client shall maintain at its own cost and expense, its own liability and property damage insurance. Client and Sear-Brown waive all rights each other and Sear-Brown's subconsultants, agents and employees for damages by any peril to the extent covered by the property insurance maintained by Client to the extent such proceeds are held by Client as trustee. This waiver of subr shall be effective as to a person or entity even though that person or entity otherwise have a duty of indemnification, contractual or otherwise, did not insurance premium directly or indirectly, and whether or not the person or entity insurable interest in the property damaged.

Article III: General Legal Provisions

A) Ownership of Documents: Drawings, specifications, and all other doc prepared by Sear-Brown or its subconsultants, including those in electroni (collectively "Design Documents") are instruments of service. Sear-Brown sha all common law, statutory and other reserved rights, including copyright theret Design Documents, including those in electronic form are furnished for use sole respect to this Agreement. Client is permitted to retain copies of the Design Doc including those in electronic form, for information and reference in connection w Project. Client shall not use the Design Documents, including those in electron

urnished by Sear-Brown or its subconsultants on other projects, for additions to his Project, or for the completion of this Project by others, without the express written consent of Sear-Brown. Any reuse without written consent shall be at Client's risk and full legal responsibility. ~~Client agrees to hold harmless and indemnify Sear-Brown and its subconsultants from any and all claims, suits, demands, damages, liabilities, and costs, including reasonable attorney fees, arising from such reuse.~~

B) Retention of Documents: Sear-Brown will retain, pursuant to its usual document retention policy, records relating to the Work for a period of three (3) years following completion of the Work. During this period, records will be made available to the Client at Sear-Brown's offices during normal business hours upon seven (7) day's notice.

C) Asbestos and Hazardous Materials: Unless otherwise specifically provided in the Scope of Services, Sear-Brown and its subconsultants shall have no responsibility for the discovery, presence, handling, removal, or disposal of asbestos or hazardous or toxic materials.

D) Termination and Suspension: This Agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. Such termination shall not be effective if the substantial failure is remedied before expiration of the seven (7) days. Client's failure to pay invoices within thirty (30) days shall be deemed a substantial failure to perform. In such event, Sear-Brown may terminate this Agreement or immediately suspend the performance of services until such failure has been cured. The Client may terminate this Agreement for its convenience upon fourteen (14) days written notice. In the event of a termination for convenience, Client will pay Sear-Brown for services performed to the termination effective date plus reasonable termination expenses within ten (10) calendar days of receipt of a final invoice.

In the event the project, or any phase of it is delayed for reasons beyond Sear-Brown's control, unbilled work will be invoiced at the standard hourly rates for the actual number of hours expended. Completed phases will be billed at fees quoted herein.

E) Disputes: In an effort to resolve any conflicts that arise during the design or construction of the Project or after completion of the Project, all claims, disputes, or other matters in question between the parties to this Agreement that arise out of or relate to this Agreement or the breach thereof shall be submitted to nonbinding mediation before a neutral third-party mediator acceptable to both parties. Such mediation shall be a condition precedent to the commencement of any legal action arising out of this Agreement except those legal proceedings related to Client's failure to pay.

The mediation shall be conducted in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect unless the parties agree otherwise. The cost of the mediator shall be borne equally by the parties. A demand for mediation shall be made within a reasonable time after the claim, dispute or other matter has arisen. In no event shall such demand be made after the date applicable statutes of limitation or repose would bar a legal or equitable action based on such claim, dispute or other matter.

In the event of litigation relating to the sufficiency or adequacy of performance of services called for by this Agreement, should Sear-Brown obtain a judgment dismissing Client's action or claim or other resolution wherein Sear-Brown is not required to make compensation to Client in excess of its final offer made to Client in the mediation, Sear-Brown shall be entitled to recover all costs incurred in the defense of the claim including staff time, court costs, expert witness fees, and reasonable attorneys' fees, and other claim related expenses.

F) Choice of Law/Venue: This Agreement shall be governed by the laws of the state in which the Sear-Brown office identified below is located, without regard to its law of conflict of laws. Any legal action or proceeding shall be venued in the Federal Court nearest the municipality in which Sear-Brown's office is located.

G) Statute of Limitations/Repose: Causes of action pertaining to this Agreeme be deemed to have accrued and the applicable statutes of limitation and repo commence to run at the earlier of either the date of Substantial Completion of the or the date Sear-Brown's services are substantially complete.

H) Assigns: Neither the client nor Sear-Brown may delegate, assign, or tran duties or interest in this Agreement without consent of the other party, excep Brown may in its discretion utilize qualified subconsultants in the performance Scope of Services.

I) Force Majeure: Neither party to this Agreement shall be liable to the other fo in performing the obligations called for by this Agreement, or the direct and costs resulting from such delays, that are caused by labor strikes, riots, war, government authorities, extraordinary weather conditions or other natural catastro any other cause beyond the reasonable control or contemplation of either party.

J) No Third-Party Beneficiaries: Nothing in this Agreement shall create a con relationship with or give any right or benefit to any third party.

K) Severability, Reformation and Survival: If any provision in this Agreemen invalid, illegal, or unenforceable, the enforceability of the remaining provisions s be impaired thereby. The invalid, illegal or unenforceable provision shall be repl a mutually acceptable provision, which, being valid, legal and enforceable, comes to the parties' intention underlying the invalid, illegal or unenforceable pr Limitations of liability, indemnities, and other express representations shall termination of this Agreement for any cause.

L) Risk Allocation/Limitation of Liability: Client and Sear-Brown have discu risks, rewards, and the benefit of the project and Sear-Brown's total fee for servic risks have been allocated such that the Client agrees that to the fullest extent perm law, Sear-Brown's total liability to Client and construction contracto subcontractors for any and all injuries, claims, losses, expenses, damages or expenses arising out of this Agreement from any cause or causes, is limited to a not exceed Sear-Brown's fee or $250,000 whichever is smaller. Such causes incl are not limited to design professional's negligence, negligent misrepresentation omissions, strict liability and breach of contract. Higher limits of liability are a for a negotiated fee.

M) Indemnification: ~~To the fullest extent permitted by law, Client agrees to ind and hold harmless Sear-Brown, its officers, directors, employees, agen subconsultants from all claims, damages, injuries, liabilities, costs and ex including reasonable attorneys fees arising from or claimed to arise from th omissions, negligence, fault, breach of contract, breach of warranty, or strict liab Client or its employees, agents, contractors and subcontractors.~~

N) Consequential Damages: Notwithstanding any other provision of this Ag and to the fullest extent permitted by law, neither Client nor Sear-Brown shall b for any consequential damages incurred due to the fault of the other party regar the nature of the fault or whether it was committed by Client, Sear-Brow employees, agents, subconsultants or subcontractors. Consequential damages but are not limited to, loss of use and loss of profit.

O) Complete Agreement: This Agreement constitutes the entire agreement betw parties hereto and supersedes all previous understandings and agreements with re the Project or any of the provisions hereof. No statement, promise, co understanding, inducement, or representation, oral or written, expressed or i which is not contained herein shall be binding or valid and this Agreement shal changed, modified or altered in any manner except by an instrument in writing e by the parties hereto.

By signing this Agreement, you are consenting to the Terms and Conditions set forth herein. Please retain a copy for yourself and return a signed original to Sear-Bro

Client	**San Miguel County**		**Sear-Brown**
	(Company Name)	**Address**	209 South Meldum
		City State	Fort Collins, CO 80521
By		By	
	(Signature)		(Signature)
	(Print)		(Print)
Date		Date	

Exhibit A – Scope of Services and Fee

Project Understanding

It is our understanding from the Request for Proposals that San Miguel County ('County') is in a budget level study to evaluate central sewer service and wastewater treatment to serve the Placerville / Fall Creek areas. The approximate number of existing residential lots to be served is 258 and 15 commercial lots. There are approximately 273 parcels within the study area that are proposed for future development. The approximate existing population is 800 and an added future population of 819. Existing residents and commercial establishments are served by Individual Sewage Disposal Systems (ISDS). Commercial and residential establishments along highway 145 have no land or space to expand or replace ISDS. Also, several ISDS along the San Miguel River have failed and have been replaced which have an effect on the ground water and surface water in the area. The feasibility study will include the evaluation of collection and treatment alternatives to serve the Placerville, lower Placerville and the 3.2 mile area along State Highway 145. The evaluation of selected alternatives will include estimates of facility size, estimates of cost of engineering and planning, cost of permitting, cost of NEPA compliance, site acquisition and development and opinion of probable cost for construction.

Scope of Work

To prepare a feasibility study, we propose the following scope of work:

Task 1 – Kick-off Meeting and Data Collection. Sear-Brown will meet with the County to discuss project objectives and schedule. Sear-Brown will collect from the County necessary background information including study area boundaries, topographic and aerial photo mapping (hard copies and electronic), land uses, service area populations and locations and potential treatment facility sites. Sear-Brown will contact CDPHE to obtain necessary (if any) background information related to study area.

Task 2 – Collection System Alternatives Evaluation. A minimum of two (2) collection system alternatives will be evaluated for serving the proposed study area. The collection systems to be evaluated will be (1): Conventional Gravity Sewers; (2): Small Diameter, Variable Grade Sewers; and (3): Low-pressure Sewers. A combination of the above systems may also be incorporated. Sear-Brown will prepare preliminary layouts and alignments for the collection systems alternatives. Opinions of probable project cost (includes engineering, permitting, NEPA compliance, right of ways and construction cost) will be prepared for each alternative and compared based on a present worth cost and feasibility. Existing rights-of-way and public utility easements will be proposed for alignment wherever practical.

Task 3 – Wastewater Treatment Alternatives. A regional wastewater treatment facility will be evaluated at a site downstream of the study area. Two (2) treatment alternatives will be evaluated: (1): a mechanical activated sludge wastewater treatment facility; and (2): a lower technology wastewater treatment system (e.g. recirculating media filter system). Potential sites for the facility will be selected by the County. Sear-Brown will work with the County to assist in the potential site selection process. A present worth cost analysis will be conducted for each alternative. Opinions of probable project cost (includes engineering, permitting, NEPA compliance, right of ways and construction cost) will be prepared for each alternative and compared based on a present worth cost and feasibilityOne-line flow diagrams and preliminary site layouts for each treatment alternative will be presented.

Task 4 – Recommended Alternative/s and Summary Report. Sear-Brown will meet with the County to discuss the findings and alternatives. With the County's input, a collection and treatment alternative will be recommended and presented in a summary report. A draft report will be presented to the County for review. Sear-Brown will finalize the report based on comments and input from the County.

The following fee for engineering services is estimated:

Task	Hours	Rate	Total
Task 1 - Data Collection	PM – 2 hrs	$90/hr	$180
	Civil – 16 hrs	$80/hr	$1280
	Tech – 4 hrs	$60/hr	$240
		SUB-TOTAL	$1700
Task 2 - Collection Eval	PM – 2 hrs	$90/hr	$180
	Civil – 30 hrs	$80/hr	$2400
	Tech – 20 hrs	$60/hr	$1200
		SUB-TOTAL	$3780
Task 3 - Treatment Eval	PM – 2 hrs	$90/hr	$180
	Civil – 24 hrs	$80/hr	$1920
	Tech – 8 hrs	$60/hr	$480
		SUB-TOTAL	$2580
Task 4 - Summary Report	PM – 2 hrs	$90/hr	$180
	Civil – 10 hrs	$80/hr	$800
	Tech – 8 hrs	$60/hr	$480
		SUB-TOTAL	$1460
Reimbursables	Travel, phone, copies etc		$400
	TOTAL ESTIMATED FEE		**$9920**

The above fee is an estimate and we will not exceed this fee without prior approval from the County. We will endeavor to complete the draft report for the County to review within 6 weeks from notice to proceed.

SEAR·BROWN

Fax Transmittal Cover Sheet

Please deliver the forthcoming pages to:

Name Karen Henderson
Firm San Miguel County Planning Department
Address
Fax Machine # (970) 728-3098
From John McGee
Date April 23, 2003

209 South Meldrum
Fort Collins, CO 80521
970.482.5922
970.482.6368 (FAX)

Transmission includes this page plus 2 page (s).
If you do not receive all the pages, please call us as soon as possible.

Comments

Karen,

Our responses to your comments on the Final Draft of the Wastewater Treatment Facility Study for the Placerville / Fall Creek area. If you have any questions, please do not hesitate to contact us.

Cc: Dave Schneck (Fax # 728-3718)

Date response is expected _____

Project # 1004001
Project Name Fall Creek / Placerville WWTF

AMENDMENTS
TO
The Wastewater Collection and Treatment Feasibility Study
for Placerville/Fall Creek Area in San Miguel County
Dated February, 2003

1. Page 1: Delete "Recent proposed development plans indicate potential growth in the Area" in Paragraph 2.

2. Page 2: Delete "More than one unit may be allocated on some parcels" from the second row from the bottom of **Table 2.1**.

   Add " /School House/Meeting Room" after "Placerville Park/Fire Station" in the Commercial Section of **Table 2.1**.

   Add note (5) under the **Table 2.1** for population in the table. Note (5) shall read as "The numbers for future populations in this report are not estimated or projected population for the San Miguel Canyon area, rather these numbers are intended to identify the maximum potential usage of the existing platted lots and parcels within the study area at buildout under the current zoning, if or when that would occur. The total population number is theoretical and buildout is unlikely to occur due to site constraints, setbacks, parking and other code requirements and considerations. Some lots are considered unbuildable at this time. No research has been done to determine how many lots have residences or commercial uses at this time or how many are unbuildable at this time."

To all study report holders, please add these Amendments to your report. The Amendments were issued on April 18, 2003.

SAN MIGUEL COUNTY
PLANNING DEPARTMENT

P.O. BOX 548 333 W. COLORADO AVENUE, 3RD FLOOR TELLURIDE, COLORADO 81435
TELEPHONE (970) 728-3083 FAX (970) 728-3098 email: smcplanning@telluridecolorado.net

March 19, 2003

RECEIVED
MAR 24 2003
BY: John M

John Mc Gee
Sear Brown, Inc.
209 S. Meldrum
Fort Collins, CO 80521

Dear John:

Planning Department staff has had the opportunity to review the Final Draft of the Wastewater Treatment Facility study for the Placerville/Fall Creek areas. We have a few comments and would like to see a couple of amendments to the study to reflect a more accurate picture of the area.

Page 1 Paragraph 2 states "Recent proposed development plans indicate potential growth in the area." Staff does not know what this refers to as no development proposals have come before the County. Could we get a better explanation as to what this means?

Page 2 Summary Chart Total states "More than one unit may be allocated on some parcels." While this is true in some cases (the Land Use Code does not allow secondary dwelling units in the San Miguel Canyon area), the statement we talked about on the phone referred to the fact that "more than one lot may be allocated to one unit."

Page 2 Summary Chart should add School House/Meeting Room to the Commercial section with Placerville Park/Fire Station/School House/Meeting Room.

The above chart and several paragraphs refer to Population (people) based on the Census data. Staff believes an explanation should be added that states that this number is not an estimated or projected population for the San Miguel Canyon area, rather this number is intended to identify the maximum potential usage, or average daily flow, of existing platted lots and parcels within the study area at build-out under the current zoning, if or when that would occur.

This total population number is theoretical and build-out is unlikely to occur due to site constraints, setbacks, parking and other code requirements and considerations. Some lots are considered unbuildable at this time. No research has been done to determine how many lots have residences or commercial uses at this time or how many are unbuildable at this time.

Please contact the Planning Department if you have questions.

Sincerely,

Karen Henderson

Karen Henderson, Associate Planner

[text/word/Placerville.wastewater.ltr]