

WaterSMART Title XVI Feasibility Studies for Water Reclamation and Reuse Projects

Pitkin County Clean Water Effluent Re-Use Feasibility Study

Applicant and Study Manager

Contact:

Cathleen Hall, Solid Waste Manager

Pitkin County Solid Waste Center

76 Service Center Road

Aspen, Colorado 81611

Email: cathy.hall@pitkincounty.com

Phone: 970-429-2882

Fax: 970-923-2043

Prepared For:

US Department of the Interior, Bureau of Reclamation

Policy and Administration

Funding Opportunity Number: R14AS00030

Prepared By:

Pitkin County Colorado, Solid Waste Center

DUNS Number: 085278844

COPY

MAY 6 '14 AM 11:54

Contents

Executive Summary.....	2
Background.....	3
Technical Study Description.....	4
Evaluation Criteria.....	4
Evaluation Criterion 1: Statement of Problems and Needs.....	4
Evaluation Criterion 2: Water Reclamation and Reuse Opportunities.....	5
Evaluation Criterion 3: Description of Potential Alternatives.....	7
Evaluation Criterion 4: Stretching Water Supplies.....	9
Evaluation Criterion 5: Environment and Water Quality.....	10
Evaluation Criterion 6: Legal and Institutional Requirements.....	12
Evaluation Criterion 7: Renewable Energy and Energy Efficiency.....	12
Evaluation Criterion 8: Watershed Perspective.....	13
Required Permits or Approvals.....	13
Funding Plan and Letters of Support.....	14
Table 1. Summary of non-Federal and Federal Funding Sources.....	14
Letters of Support.....	15
Official Resolution.....	15
Pitkin County Clean Water Effluent Re-Use Feasibility Study Project Personnel.....	15
Budget Narrative.....	17
Table 2. Pitkin County Clean Water Effluent Re-Use Feasibility Study.....	18
Budget and Funding Breakdown Summary.....	18
Table 3. Partnership Table.....	19

Executive Summary

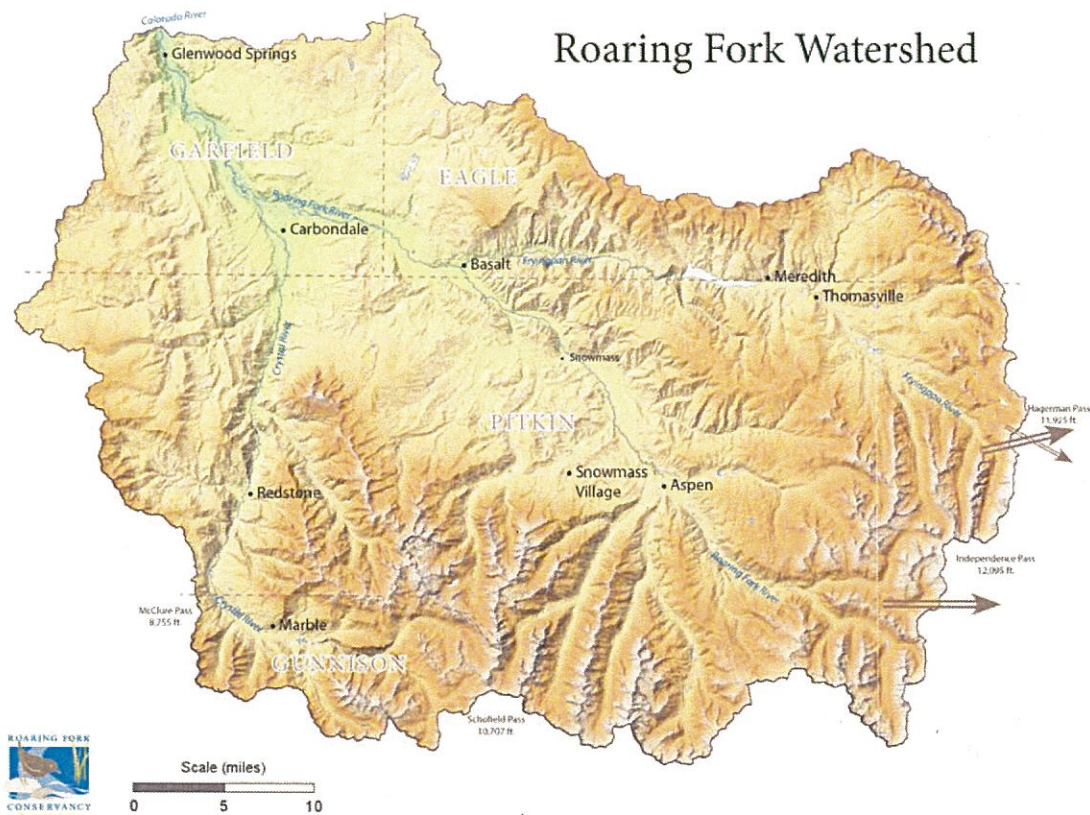
May 6, 2014

Pitkin County Solid Waste Center
Snowmass, Pitkin County, Colorado

Residential septic sewage from Pitkin County, Colorado is hauled many miles away for treatment because there are no nearby treatment facilities. The high cost of treatment causes homeowners to delay proper maintenance of their systems. We risk potential environmental accident to shallow aquifers and nearby rivers and streams at both the source and on the road as waste is transported over slick mountain roads in winter.

To address this issue, Pitkin County is building a modular wastewater treatment facility to offer a local option and proposes studying the feasibility of innovative uses for the effluent. One such is the sale of effluent to construction and earthmoving companies to replace their current purchases of potable water for commercial/industrial purposes more suitably served by non-potable water. An estimated one million gallons of potable water per year might be so diverted.

This 18-month Clean Water Effluent Re-Use Feasibility Study will be completed March 2016.



Copyright 2013, S. K. Mason Environmental, LLC

Background

The Pitkin County Solid Waste Center sits eight miles west of Aspen, Colorado on Colorado Highway 82 and just west of the continental divide. We have been in operation since the mid-1960s and the current operation includes a landfill, recycling collection (including e-waste, metal and tire diversion,) a ten-acre compost operation (including food waste composting), aggregate crushing, topsoil screening, household hazardous waste collection, and aggregate, compost, topsoil and potting mix sales.

We are a rural and remote resort community with a year-round population of about 10,000 people swelling to 25,000 at the busiest times of our tourist season. Our economy is three pronged: tourism, real estate development and the non-profit sector that employs much of our labor force and conducts many special events. All are very demanding on public infrastructure systems, including our water and waste treatment plants.

To remain a rural area Pitkin County chose to adopt rigorous growth control measures, including a stringently maintained urban service boundary, in the 1970s. Many of our homes, most of them quite large, are not supplied with municipal sewage and must rely on septic systems. Pitkin

County Environmental Health Department estimates there are 3,000 such systems in just Pitkin County and many more in our watershed.

And like most of the Western US, Colorado has experienced severe drought conditions. To address this at the local level, this community has acted to support policies protecting our watershed. For example, Pitkin County voters created the Healthy Rivers and Stream Fund and Board in 2010 out of concern for in-stream flows and Front Range water diversions. Pitkin County is a signatory to the Roaring Fork Watershed Plan adopted in 2009 from the work of the Roaring Fork Conservancy. The plan is a comprehensive document about the proper administration of our watershed and was consulted in the creation of this application.

Technical Study Description

Pitkin County Solid Waste Center in collaboration with local businesses, interested non-profit organizations, our rural fire protection district and our municipal water utility and waste treatment plant is sponsoring the Clean Water Effluent Re-use Feasibility Study for an area of rural Colorado that encompasses portions of three counties: Pitkin, Eagle and Garfield—the Roaring Fork River Watershed. (See image above.)

Our project will evaluate innovative re-uses for the estimated two million gallons of effluent reclaimed from our new modular treatment facility for our own non-potable on-site use and with the help of our private and public partners study creating a new water market and reclaimed water distribution system to use effluent to replace potable water currently being used when non-potable would suffice. We will also study innovative engineering solutions for the treatment and storage of effluent and educate the public about wastewater treatment and effluent re-use. We hope other rural and remote communities in our region can replicate our program.

Evaluation Criteria

Evaluation Criterion 1: Statement of Problems and Needs

Here in Pitkin County we have many concerns about our watershed—the Roaring Fork River—and its proper management. One is the potential for contamination from septage spills from improper homeowner maintenance; another is the unnecessary use of potable water for non-potable water purposes like dust suppression and soil compaction on roads, jobsites and construction projects.

Each day septic haulers in our watershed transport residential septic waste up to nearly two hundred miles—one way—to the nearest treatment facilities, the closest of which is in Glenwood Springs, Colorado (45 miles,) or Rifle, Colorado (70 miles) or the most distant facility in Delta County, Colorado (170 miles.) We are concerned some homeowners are not performing adequate septic system maintenance due to the high cost of treatment. Potential system failure and release of septage into ground and surface water, especially some of our shallow aquifers, is of great concern as is the potential for an accident should a septic truck overturn due to icy

mountain roads in winter.

To provide residents with a better, more convenient, more affordable option and to further our goals of water conservation and improved water quality the Pitkin County Board of County Commissioners (BOCC) has authorized the installation of a modular wastewater treatment system estimated to produce two millions gallons of effluent water available for re-use each year.

This is water currently being taken out of our watershed and hauled away. The question for us is: what do we do with it? We think water reclamation and innovative re-use will provide a solution.

The Pitkin County Solid Waste Center (the landfill) does not have an on-site water supply. One hundred percent of water used at the landfill for operations and employee use is supplied by offsite water brought here and stored in tanks. Current water demands for landfill operations are approximately 500,000 gallons a year for dust control, storage for fire mitigation, supplemental moisture for the compost operation, and for use in onsite bathroom facilities. We anticipate this demand to remain steady.

However, there are many other water demands in our community and they are growing. For example, the City of Aspen Utilities Department, one of our supporters, estimates they sell about a million gallons of potable water to construction and earth moving companies for dust suppression soil compaction each year. Another of our partners, SGEarthmoving, a local construction company, alone purchased nearly 400,000 gallons of potable water from the city for that purpose in 2013. Demand for water will increase as the economy rebounds and our construction industry picks up.

Our project seeks to increase our community's overall water supply by generating non-potable water ourselves for our use and for others to use on their sites instead of using potable water.

Evaluation Criterion 2: Water Reclamation and Reuse Opportunities

(1) Describe how the feasibility study will investigate potential uses for reclaimed water (e.g., environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation).

Pitkin County is working with SGM, Inc. the leading wastewater firm in western Colorado, the Sustainable Practices Department of the University of Colorado, Boulder, and our local partners and supporters to identify innovative uses for the estimated two million gallons of effluent we expect to reclaim from septage each year.

Specifically, the Clean Water Effluent Re-Use Feasibility Study will study these potential uses:

- **Environmental Restoration Purposes** – We will investigate the potential impact of increasing in-stream flows on the preservation of wildlife habitat in the Roaring Fork Valley.
- **Benefiting Fish and Wildlife** – We will examine the impact bio-retention ponds might have on attracting wildlife, such as bears and rare bird species.
- **Municipal**– We will look at the use of effluent for fire mitigation. We will also investigate the

projected tax revenues from selling effluent, the potential impact of septic waste disposal fees, look at setting up a new public utility for septage and reclamation, and monitor the impact a nearby facility has on residential septic system maintenance.

- **Domestic**– We will investigate the improvement timely septic system maintenance has on septic system compliance and the how much potable water currently purchased for construction purchases can be replaced with a non-potable source.
- **Industrial Uses**– We will examine the use of non-potable water at construction and other job sites for industrial purposes—concentrating on the economic impact and amount of reduction in use of potable water currently used for industrial purposes.
- **Agricultural Uses**– We will study the use of treated wastewater effluent for potential irrigation of crops and dust suppression on rural roads.
- **Power Generation Use**– We will investigate the potential for incorporating low-head hydropower and solar technologies into the design of the bio-retention treatment ponds.
- **Recreational Uses**– We will conduct a preliminary investigation of the permitting requirements needed to contribute to increased in-stream flows with the effluent. For example, we will study whether multiple cascading bio-retention ponds clean the effluent sufficiently for this purpose.
- **Educational Uses**–We will explore the use of Living Machine technology and create a community garden greenhouse to educate the public about the use of effluent for irrigation and sludge for compost.

The initial investigation will include activities such as:

- Researching different bio-retention technologies to determine their applicability for our purposes;
- Evaluating the retrofit or engineering requirements necessary for any technology or new use we are considering relative to our specific needs as a remote landfill;
- Determining the permit requirements for the technologies and new uses we are studying;
- Arriving at an initial cost/benefit analysis and comparison for each technology or new use.

The partnership between the County, local groups and the University of Colorado will also yield the development of a new curriculum based on our findings to help the region and state benefit from our experience.

(2) Describe the potential water market available to use any recycled water that might be produced upon completion of a Title XVI project, as well as methods to stimulate recycled water demand and methods to eliminate obstacles for use of reclaimed water.

There is a large water market for the two million gallons of effluent we estimate we will be producing annually. The Pitkin County landfill will cease hauling in 500,000 gallons of water a year and use our effluent instead for our on-site operations like dust suppression and storage for fire mitigation.

We have consulted with the major potable water supplier in our watershed, the City of Aspen Water Department and secured them as a partner in this effort (see attached letter of support.)

They estimate they sell one million gallons of treated water from the Castle/Maroon Creek headwaters each year to earthmoving and construction companies. Almost all this is for dust suppression or soil compaction and can easily be replaced by a non-potable water source.

Please refer to the letter of support from SGEarthmoving outlining how much potable water they purchase for this purpose. The letter further states they would prefer to buy non-potable water from us as they expect it will be easier to get from our location and less expensive.

During this feasibility study our partners will help us identify other local building contractors, earth movers, ranch owners, landscapers and other commercial interests to whom we can sell effluent for their needs of fire mitigation, dust suppression and irrigation. We have a strong educational program that will play an important role in our water re-use program as we wish to use effluent for a constructed wetlands demonstration project to assist in our school outreach and education programs and to irrigate our community garden greenhouse project.

If thorough examination suggests effluent is potentially acceptable for in-stream flows or irrigation we would need to obtain a National Pollutant Discharge Elimination System (NPDES.) We would work closely with our partners, local authorities, interested parties and the NPDES permitting authority to analyze if the discharge causes or has the "reasonable potential" to cause or might contribute to an excursion of any water quality criteria in the receiving water. Where effluent limits based on water quality standards are necessary, the permitting authority would allocate responsibility for controls through waste load allocations and then effluent limits in NPDES permits consistent with those waste load allocations.

Should it become necessary to stimulate demand for our effluent we would consult with the City of Aspen Utilities Department to investigate using their innovative fee for use pricing structure to consider making the purchase of potable water for non-potable purposes less attractive. We do not expect the need to arise as we anticipate our effluent will be less expensive than potable water and we are a more conveniently located source for many of our expected customers, many of whom already use our facility in their day-to-day business.

(3) *Describe the sources of water that will be investigated for potential reclamation, including impaired surface and ground waters.*

The source of all the water under consideration for reclamation and re-use is from residential septic systems in Pitkin County and the Roaring Fork Valley. Our modular wastewater treatment facility is being designed to accommodate 40,000 gallons a week and yield approximately two million gallons of effluent a year. This septage is currently being taken out of our watershed for treatment and we propose treating it here, reclaiming the water for re-use and substituting it (in large part) for the potable water currently being purchased for industrial/construction purposes.

Evaluation Criterion 3: Description of Potential Alternatives

(1) *Describe the objectives all alternatives will be designed to meet. What other water supply alternatives will be investigated as part of the Title XVI feasibility study?*

In the past we have considered alternatives such as a new well. But the focus of the project description here is the wastewater treatment option because we have committed to the design and construction of a modular facility to be on-line and producing effluent in 2015.

All alternatives are required to meet two primary objectives: 1) To provide a new water source for non-potable water; and 2) To provide a means for water storage for the effluent. Comparative analysis will include a preliminary exploration of the economic, environmental, and legal impacts of each alternative.

Specifically, we will evaluate the:

- economic costs and benefits associated with each alternative;
- environmental permitting requirements associated with the alternative; and
- potential water rights issues relevant to each alternative option.

Legal implications related to water rights are expected to be an important aspect of the final determination, especially given the history of negotiating water rights in the Roaring Fork Valley. In fact, our preliminary research related to the well option indicated that water rights would need to be purchased to serve our dust suppression needs, and/or bathroom use.

For example, when we explored the option of using an existing well on the property in 2013, the pump test results determined the 1-2 gallons a minute flow would be adequate for water storage for fire suppression, but inadequate for dust suppression or toilet and bathroom use. Therefore, we would need to purchase water rights to meet our water supply needs with the well option, something that wouldn't need to occur with the septic wastewater treatment option.

More importantly a new well fails to solve other community goals such as the need to treat septege locally and retain that water in our watershed.

(2) *Provide a general description of the proposed project that will be the subject of a Title XVI feasibility study.*

Pitkin County is building a modular wastewater treatment facility capable of producing two million gallons of effluent a year. We wish to study the feasibility of innovate uses for the effluent, including sale to construction and earthmoving companies to replace their current annual consumption of an estimated one million gallons of potable water for purposes better suited for non-potable water, such as dust suppression.

We are building such a facility because our residential septic sewage is hauled many miles away for treatment because there are no nearby treatment facilities. Expense is causing homeowners to delay proper maintenance and we fear we risk potential environmental accident to shallow aquifers and nearby rivers and streams at the source and on the road as waste is hauled over often treacherously slick mountain roads.

(3) Describe alternative measures or technologies for water reclamation, distribution, and reuse that will be investigated as part of the Title XVI feasibility study.

In addition to the study of the use of our effluent to replace the potable water currently being used for commercial/industrial purposes, the Clean Water Effluent Re-Use Feasibility Study will examine alternative methods for re-use such as cascading bio-retention ponds, a constructed wetlands, applicability of Living Machine technology and year-round irrigation for a community garden greenhouse employing 4-season harvest technology. To our knowledge none of these re-use technologies has been tried in an alpine, high alpine desert location using wastewater effluent before.

Evaluation Criterion 4: Stretching Water Supplies

1. Describe the potential for the project to reduce, postpone, or eliminate the development of new or expanded water supplies. Include description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

Construction of our treatment facility will be complete in 2015 and will capture water currently being taken out of our watershed for treatment. We consider this to be regaining “lost” water—currently lost to us, soon to be available for re-use.

We hope to reduce both our water consumption at our landfill and help a significant sector of our economy—construction—reduce theirs, to postpone indefinitely a new well, and to eliminate the need for new or expanded water supplies. Our project will even ease demand for water now supplied by the City of Aspen to construction and earthmoving companies.

Effluent from treatment will make us nearly self-sufficient from a water perspective, provide a community and commercial benefit and be a model for other rural communities to follow. Although the drilled water supply is still a viable option, it is not preferred as it intensifies use of a scarce resource. We propose—and prefer—capturing and reusing what is now a lost resource.

(2) Describe the potential for the project to reduce or eliminate the use of existing diversions from natural watercourses or withdrawals from aquifers. Include description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

We propose studying how to eliminate an existing headwater diversion of nearly a million gallons of water a year for treatment for industrial use and replacing that need with non-potable water reclaimed from local residential septic systems.

The City of Aspen Utilities Department indicates that each year upwards of one million gallons of fresh mountain water drawn from the headwaters of the Castle and Maroon Creeks and treated in their facility is sold to construction and earthmoving companies for use on roads and building projects for dust suppression and soil compaction. SGEarthmoving, a local construction company

and supporter of this proposal, confirms they alone purchased approximately 400,000 gallons of water from the City of Aspen in 2013 nearly all of it for construction/industrial uses. (Refer to COA and SGE letters of support.)

All involved think there is a better way. With the Pitkin County Clean Water Effluent Re-Use Feasibility Study we hope to treat septic water from our county, capture it for re-use in our county and negate the need for potable water drawn from headwaters in our county to be used unnecessarily for a non-potable water purpose.

(3) Describe the potential for the project to reduce the demand on existing Federal water supply facilities. Include description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

The proposed project does not involve any use of the Federal water supply.

Evaluation Criterion 5: Environment and Water Quality

(1) Describe the potential for the project to improve the quality of surface or groundwater, including description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

We risk potential environmental accident to shallow aquifers and nearby rivers and streams because residential septic sewage from Pitkin County Colorado is hauled many miles away for treatment because there are no nearby treatment facilities. To address this issue, Pitkin County is building a local treatment facility to reduce this risk to our surface and groundwater.

A less expensive, local treatment option will help avoid septic overflow that currently occurs in residential properties as homeowners will be less reluctant to have their septic systems properly maintained. Any reduction in septic overflow, especially for properties near rivers and streams, will help protect local waterways and mitigate contamination to local groundwater supplies.

Proposed bio-retention ponds will help improve quality of surface and groundwater because they will more thoroughly and naturally clean and filter the wastewater effluent than the modular treatment system can alone. Further, we intend to incorporate different vegetative technologies into the various bio-retention ponds, so we can test the performance of the different technologies in a controlled environment.

In fact, we have designed this project as a demonstration project, to help monitor and evaluate the use of innovative engineering technologies on the water treatment and storage of wastewater effluent for non-potable purposes. Specifically, by incorporating bio-retention facilities, constructed wetlands, irrigation for a community garden greenhouse and/or a Living Machine biological filtering system.

Whenever possible, we will install monitoring equipment to help track and record the performance of the water quality interventions, and will create protocols for data collection to help measure outcomes and performance indicators. Laboratory sampling will be part of the

protocol testing the effectiveness of the treatment system on water quality. Results of any laboratory analytical results will be disseminated and published in the feasibility study report. An analysis of results will help the project team determine the most effective treatment options and the best use of the water depending on the treatment quality.

Most importantly, if, through this study, we can substitute the use of non-potable water from our effluent and eliminate the current estimated use of one million gallons a year of potable water sold by the City of Aspen Utilities Department to construction and earthmoving companies for dust suppression and soils compaction then our surface and groundwater will be one million gallons better off.

(2) Describe the potential for the project to improve flow conditions in a natural stream channel, including description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

One of the concepts the Clean Water Effluent Re-Use Feasibility Study will consider is the potential for cleaning the effluent sufficiently well to be added back to the Roaring Fork River to help improve in-stream flows on our gold medal fishing river. This is currently being done at the wastewater treatment facility in Rifle, Colorado, and we would like to explore the possibility of replicating that process in the Roaring Fork Valley. After all, since much of our local septic is hauled to Rifle for treatment it is being added to in-stream flows there. We wish to study the potential for treating our own waste here instead of exporting it to Rifle and beyond.

Although a thorough analysis of the feasibility of this option exceeds the scope of the proposed project, we will conduct a preliminary assessment of environmental permitting requirements and timeline scenarios to help guide initial planning. When possible, we will obtain information from the Rifle wastewater treatment plant to identify and avoid pitfalls. We will explore the process for obtaining an NPDES permit, and regulatory requirements for sampling and testing water quality.

(3) Describe the potential for the project to provide water or habitat for federally listed threatened or endangered species, including description of any specific issues that will be investigated or information that will be developed as part of the Title XVI feasibility study.

We will consult with local project partners to assess the impact on existing wildlife. Specifically, we will work with the Colorado Division of Wildlife, and the U.S. Forest Services to determine if any federally listed threatened or endangered species might be impacted by the wastewater reclamation project.

Our preliminary assessment indicates that wildlife could potentially be impacted by the project in two different ways. First, the creation of bio-retention facilities might attract new or more wildlife to the landfill property. Secondly, new composting processes we discover from the study may alter the presence of local wildlife.

(4) Connect with local resources to identify potential wildlife impacts

While conducting the Clean Water Effluent Re-Use Feasibility Study, we will connect with local resources to research and identify potential wildlife impacts.

Specifically, we will:

- Request technical assistance from state, federal, and local government agencies that provide technical support (e.g., the Colorado Division of Wildlife, the U.S. Forest Service, ACES, Rock Bottom Ranch, Aspen TREE, Cozy Point Ranch, Healthy Rivers and Stream Board, Roaring Fork Conservancy, Aspen Consolidated Sanitation District, City of Aspen Utilities);
- Research the possible species (i.e., federally listed or endangered species) that might be impacted by the installation of a constructed wetland;
- Liaise with local non-profit agencies aimed at the protection of local wildlife habitats. We are actively expanding our list of project partners we can rely on during the implementation of this project and subsequent phases;
- Engage local funders, corporations, and philanthropists to help raise matching funds for the full-scale launch of the demonstration project.

Evaluation Criterion 6: Legal and Institutional Requirements

This project will assess and evaluate all legal requirements and/or permitting barriers to implementing the Clean Water Effluent Re-Use Feasibility Study to help determine the best course of action.

Specifically, we will evaluate the legal and permitting requirements related to:

- water right issues impacting implementation of the modular system and the treatment and storage of the effluent;
- water rights and revenue implications related to selling effluent;
- managing the effluent supply for onsite and offsite uses

Pitkin County has two in-house attorneys who specialize in water law/rights. To date we have had tremendous support from local institutions, such as the City of Aspen, other Pitkin County departments, the local fire district, and local businesses. Please refer to the letters of support in the attachments and Table 3.

Evaluation Criterion 7: Renewable Energy and Energy Efficiency

Low-head hydropower and solar cells will be evaluated as additional power sources to supplement the power needs for the modular wastewater treatment facility. Low-head hydropower would consist of small-scale hydro-powered turbines running off the effluent as it flows from the treatment system. In a later phase we will consider low-head hydropower at the cascading outfall areas connecting the bio-retention ponds.

Part of the Clean Water Effluent Re-Use Feasibility Study will:

- investigate the cost effectiveness of low-head hydropower;
- determine if the hydro installation could supply enough power to run the treatment

system's electrical demands and/or what portion of the on-site electrical demands at the SWC;

- evaluate wheeling back into the power grid any excess electricity generated.

Since low-head hydro has not been adequately tested and evaluated in alpine settings, the performance measures associated with this project will prove useful in evaluating this use for future benefit. In addition, the County is currently investigating the use of solar collectors to provide for supplement power to operate the treatment system's electrical needs. During the Clean Water Effluent Use Feasibility Study we will consider solar power to determine whether to invest in the infrastructure necessary to accommodate this type of system.

Evaluation Criterion 8: Watershed Perspective

Pitkin County has been active in improving our watershed for years, has instituted many progressive programs such as the Pitkin County Healthy Rivers and Streams Fund and Board and provides support for the Ruedi Water and Power Authority and the Roaring Fork Conservancy.

The Pitkin County Clean Water Effluent Re-Use Feasibility Study will continue this work. It addresses a common watershed problem—septic waste treatment—and proposes a solution that keeps water from our watershed in our watershed instead of being hauled away. It has the additional benefit of reducing existing demand on the watershed by perhaps a million gallons of water—water that will be drawn for commercial/industrial purposes from our effluent source instead of the City of Aspen's potable source, as is currently the case.

We hope to educate the public about our watershed and common watershed issues with this project and that other rural and remote western communities may learn from our experience. We think this project can demonstrate the performance of modular wastewater treatment systems in high alpine desert settings and prove its impact by improving our environment and protecting local watersheds.

Results from this demonstration projects will help:

- Provide better and more efficient treatment options than allowing septic tanks to overflow;
- Control dust on landfill service roads and offsite construction projects;
- Re-introduce water into the water table from constructed wetlands;
- Provide additional treatment of effluent;
- Help capture and retain local water (from septic tanks) that would otherwise be transported to the South Canyon and Rifle, Colorado sites and beyond;
- Eliminate the use of a million gallons of potable water for non-potable purposes;
- Help eliminate the need to transport and dispose of a potential water source outside of the Roaring Fork Valley.

Required Permits or Approvals

As part of the Clean Water Effluent Re-Use Feasibility Study, any potential environmental impacts will be identified and examined. Permitting research will be conducted at each step by our

consultants and this research will inform the full-scale implementation and will support our activities. These potential future impacts will be addressed separately from this feasibility study. Potential extra permits may include construction of wetlands, implementation of a low-head hydropower and connection to the power grid. Any additional required permits will be obtained during the construction and implementation phases of the project.

To ensure that our feasibility study report complies with Pub. L. 102-575, we will require that the engineering team (SGM), at minimum, address all items listed in Section 4B in Reclamation’s Directives and Standards Policy.

Funding Plan and Letters of Support

The non-Bureau of Reclamation share of the Pitkin County Clean Water Effluent Re-Use Feasibility Study will be provided solely by Pitkin County.

The funding plan for the proposed Clean Water Effluent Re-Use Feasibility Study is as follows:

1. The Pitkin County contribution to the cost-share requirement will be the cost of the engineering pro-forma study, to be completed Summer 2014 and paid to SGM Engineering. Pitkin County will also cover the entire cost of the installation of the modular wastewater treatment system that will produce the clean effluent.
2. No in-kind costs are being used to meet the cost-share requirements.
3. No funding is being provided by another funding source. All funding is being provided solely by Pitkin County.
4. No funding has been requested or received from other Federal partners.
5. There are no pending funding requests that have not been approved.

Table 1. Summary of non-Federal and Federal Funding Sources

Funding Sources	Funding Amount
Non-Federal Entities	
Pitkin County Colorado	\$ 848,733.55
Other Federal Entities	\$ -
Requested Reclamation Funding	\$ 149,500.00

Letters of Support

The County has obtained several letters in support of this application. They are provided as an attachment to this document.

Official Resolution

The Pitkin County Board of County Commissioners (BOCC) will be presented with the official resolution at the May 14, 2014 board meeting. The BOCC will execute an agreement with the United States Bureau of Reclamation for grant funding to conduct a feasibility study under the WaterSMART program. A copy of the resolution will be forwarded as an addendum to this proposal once all required signatures are obtained.

Pitkin County Clean Water Effluent Re-Use Feasibility Study Project Personnel

Key personnel will include personnel from within the County organization, as well as an engineering/consulting firm with a strong background in wastewater treatment and water permitting experience, and a sustainability expert from the University of Colorado. Full resumes can be obtained upon request.

Cathleen Hall, Project/Study Manager

Ms. Hall has 21 years of experience in the solid waste industry. She is the Solid Waste Manager for Pitkin County. Her responsibilities include managing the integrated solid waste program for the County. She received a Bachelor of Science in Geology from Ohio State University, and a Masters in Business Administration from the University of Maryland. She is a Certified Manager of Landfill Operations through the Solid Waste Association of North America (SWANA). *Her role on the project will be to coordinate the team, organize and maintain a schedule for the feasibility study deliverables, conduct regular progress meetings, and provide administrative support for the grant reporting requirements.*

G.R. Fielding, PE, County Engineer

Mr. Fielding has been Pitkin County's Engineer since 2007. During his time with the County Mr. Fielding has acted as a project manager, owner's representative, and procurement officer on all road and infrastructure projects for the County. Additionally, he is responsible for overseeing Right of Way Permitting, and acts as a consulting engineer on many community development earth-moving permits. Mr. Fielding graduated with a bachelor of science in Environmental Resources and Forest Engineering from the State University of New York College of Environmental Science and Forestry at Syracuse University. *Mr. Fielding will serve as a consulting engineering providing technical support and advice in regards to feasibility of any proposed technology.*

Jack Johnson, Public Outreach and Education Coordinator

Mr. Johnson is the Public Outreach and Education Coordinator for the Pitkin County Solid Waste Center. He is a former Aspen City Councilman and holds a B. Arch from the University of Kentucky, School of Architecture. *Mr. Johnson will provide oversight for the educational and*

outreach components of the Pitkin County modular wastewater treatment plant and the use of the clean effluent as it pertains to the study.

SGM Engineering

SGM is the largest full-scale engineering firm on the Western Slope of Colorado. SGM specializes in wastewater collection and treatment, water resource and water conservation studies, and water and wastewater utility operations and permitting. SGM is the contracted with Pitkin County to develop the design specifications and permitting requirements for the proposed septic wastewater treatment system to be located at the Landfill. *SGM has identified Mr. Cooper Best and Mr. Bob Pennington as the designated engineering staff to lead the engineering, permitting, and regulatory portion of the feasibility study efforts.*

Cooper Best, Contracted Project Engineer

Mr. Best has over 14 years of experience in planning, permitting and design of water and wastewater projects throughout Colorado, Wyoming and Nebraska. He is currently a Project Manager with SGM Engineering. His experience includes: master planning, state and federal permitting, hydraulic modeling, design of municipal water and wastewater treatment systems as well as pump stations.

Bob Pennington, Contracted Project Engineer

Mr. Pennington's background in wastewater and water related fields ranges from small individual sewage disposal systems for residences to large regional wastewater treatment facilities; and individual domestic water wells and pressure systems to large water resource development, treatment and distribution systems for major municipalities, respectively. He currently serve's as SGM Engineering's Wastewater Team Leader.

Kelly Simmons, Sustainability Professional, University of Colorado

Kelly Simmons has been the manager of the Sustainable Practices Program at the Environmental Center at the University of Colorado, Boulder, since 2010. She teaches a Permaculture Design course for the University's Environmental Studies Department. Kelly recently won a Sustainability Award for her work designing the Population Conversation Training program to preserve Dr. Al Bartlett's award winning presentation "Sustainability, Population and Energy." *She will provide academic focus to our study.*

Budget Narrative

The enclosed budget table summarizes the proposed costs associated with the project. All project costs are associated with the use of county employees, an engineering firm with expertise in wastewater treatment and water use, and academic personnel with expertise in environmental sustainability issues.

1. **Salaries and Wages:** Pitkin County has identified three appropriate staff members to be allocated to this project. Salaries and wages are part of the County match for the feasibility study. Hourly rates are identified on Table 2.
2. **Fringe Benefits:** The three designated county employees are shown on Table 2 of this document. Fringe benefits are part of the County's match for the feasibility study.
3. **Travel:** Travel to investigate potential technology uses and treatment and use of wastewater effluent, as well as conference and seminar presentations highlighting the feasibility study findings have been allocated. Budget details for travel are shown on Table 2.
4. **Contractual:** Pitkin County has partnered on this project with two entities to assist in the feasibility study. SGM Engineering will provide the engineering and permitting needs for treatment and use of the water. SGM will lead the efforts to design and develop the desktop feasibility portion of the study, and provide engineering and construction oversight of any pilot scale studies to test the BMPs as determined from the desktop study. Kelly Simmons, University of Colorado will provide insight into innovative and best use of the water for environmentally sustainable practices. She will advise on the education and outreach component of the feasibility study, as well as direct us on how to best disseminate the data collected from the pilot scale study.
5. **Supplies and Materials:** Office supplies and materials such as printing costs, postage, preparation of outreach materials and website design are included in Table 2.
6. **Constructions Costs:** Construction and materials required as part of the feasibility study are part of the grant-funding request. An equipment budget to prepare a small-scale pilot study as well as site preparation work (earthmoving, and pilot study design) is designated on Table 2. This budget covers the costs associated with constructing a small-scale pilot study for effluent treatment technologies. The County will provide the total costs for construction and permitting of the modular treatment system. Costs for each event are designated in Table 2.
7. **Indirect Costs:** Refers to administrative costs, equal to 5 percent, the total project, including construction of the modular treatment system and to conduct the pilot study. The indirect costs will be covered as the County match. Reporting costs for status reports as well as the final feasibility study will be covered under administrative costs.

Table 2 presents the budgeting information required for this grant application proposal. All project costs are associated with use of three designated Pitkin County employees, an engineering firm to perform the work and prepare the feasibility study report, and consulting services from a sustainability expert associated with the University of Colorado.

**Table 2. Pitkin County Clean Water Effluent Re-Use Feasibility Study
Budget and Funding Breakdown Summary**

Budget Item Description	\$/amount	Quantity	Quantity Type	County Cash		Total Cost (\$)
				Match	Grant Match	
Salaries/Hourly Rate						
Cathleen Hall, Project Manager	\$ 39.43	312	Per Hour	\$ 12,302.16	\$ -	\$ 12,302.16
GR Fielding, Project Engineer	\$ 46.69	312	Per Hour	\$ 14,567.28	\$ -	\$ 14,567.28
Jack Johnson, Public Outreach	\$ 21.91	156	Per Hour	\$ 3,417.96	\$ -	\$ 3,417.96
Fringe Benefits						
Cathleen Hall, Project Manager	\$ 12.22	312	Per Hour	\$ 1,906.00	\$ -	\$ 3,812.64
GR Fielding, Project Engineer	\$ 16.73	312	Per Hour	\$ 2,609.00	\$ -	\$ 5,219.76
Jack Johnson, Public Outreach	\$ 13.88	156	Per Hour	\$ 1,082.00	\$ -	\$ 2,165.28
Travel						
Conference Presentation/Technical White Paper Publication	\$ 1,500.00	3	Per Trip	\$ -	\$ 4,500.00	\$ 4,500.00
Technology Investigation Site Visit	\$ 2,000.00	2	Per Trip	\$ -	\$ 4,000.00	\$ 4,000.00
Contractors						
SGM, Engineering Firm	\$ 100,000.00	1	Contract Cost	\$ -	\$ 100,000.00	\$ 100,000.00
University of Colorado, Sustainability Practices	\$ 10,000.00	1	Contract Cost	\$ -	\$ 10,000.00	\$ 10,000.00
Chase Park Grants	\$ 17,000.00	1	Contract Cost	\$ 17,000.00		\$ 17,000.00
Supplies and Materials						
Office Supplies	\$ 200.00	1	Total	\$ 200.00		\$ 200.00
Computer Rental	\$ 1,800.00	1	Total	\$ 1,800.00		\$ 1,800.00
Outreach Materials	\$ 3,000.00	1	Total	\$ -	\$ 3,000.00	\$ 3,000.00
Project Website Development	\$ 3,000.00	1	Total	\$ -	\$ 3,000.00	\$ 3,000.00
Construction Costs						
Pilot Study Construction Materials and Site Preparation	\$ 35,000.00	1	Total	\$ 10,000.00	\$ 25,000.00	\$ 35,000.00
Construction of the Septic Wastewater Treatment System	\$ 735,000.00	1	Total	\$ 735,000.00		\$ 735,000.00
Indirect Costs						
Administrative Costs	\$ 48,849.15	1	Total	\$ 48,849.15	\$ -	\$ 48,849.15
Total Feasibility Study Costs				\$ 848,733.55	\$ 149,500.00	\$ 1,003,834.23

Table 3. Partnership Table

Partner Agency	Advisory Role	Representative & Title
City of Aspen - Utilities	Water and Utilities Advisor, Clean Water Advocate	David Hornbacher, Director of Utilities and Environmental Initiatives, City of Aspen
City of Aspen - Utilities	Water and Utilities Advisor, Clean Water Advocate	Phil Overeynder, former director, and Utilities Engineer, Special Projects, City of Aspen
Aspen Tree	Eco-Design Advisor	Eden Vardy, Founder, President
Aspen Tree	Eco-Design Advisor	Paul Huttonhower, Program Director
University of Colorado, Boulder Environmental Center	Evaluation and Planning, Academic Consultant	Kelly Simmons, Manager, Sustainability Practices Program
Snowmass-Wildcat Fire Protection District	Fire Mitigation Advisor	John Mele, Fire Marshall
SGEarthmoving	Potential Water Customer	Charlie Montover, VP Field Operations
Aspen Consolidated Sanitation District	Septic Treatment Advisor	Bruce Matherly, District Manager
Pitkin County Environmental Health	Evaluation and Planning, Septage Advisor	Kurt Dahl, Environmental Health Manager

Attachment A
Letters of Support

May 1, 2014

Pitkin County Solid Waste Center
ATTN: Cathy Hall
76 Service Center Road
Aspen, CO 81611



THE CITY OF ASPEN
WATER DEPARTMENT

Dear Ms. Hall,

We are pleased to write this letter of support for your grant request to study re-use of effluent wastewater from the modular treatment plant being built by Pitkin County. As the director and former director of the City of Aspen Utilities Department we are very aware of the need, among other benefits, to study ways non-potable water sources can replace potable sources. We also support efforts to ensure that potential sources of source water contamination are properly managed.

You are aware that the city and county governments in Aspen and Pitkin County have long partnered on environmental issues including water and we strongly support this study. Coming from mountain streams in the Rockies, our water suffers little from upstream contamination. Pitkin County's proposal will keep relatively clean water closer to the source. We are protective of our early water rights and encourage innovative ideas for beneficial use and re-use.

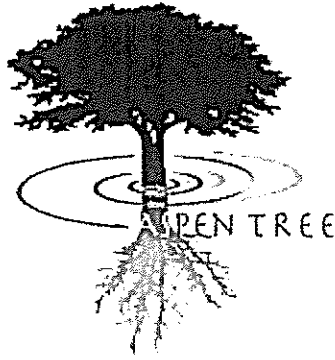
We encourage conservation of water through a novel pricing structure rewarding conservation and have lowered consumption rates by over 60% in recent years. We have invested much effort and money to design an innovative re-use of effluent ourselves at our municipal golf course irrigation system.

We think this study will be consistent with our goals and improve water quality, in-stream flows, and our local water resources. Most importantly it will provide a non-potable alternative for current potable uses. This makes our water better and puts less demand on our system.

Our elected officials in Aspen and Pitkin County are fully behind our water conservation efforts and our citizens demand them too and have passed ballot initiatives to create, support and fund these efforts.

Phil Overeynder, Utilities Engineer, Special Projects, City of Aspen

David Hornbacher, Director of Utilities and Environmental Initiatives, City of Aspen



TRUSTEE RECOMMENDATION OF THE BOARD OF DIRECTORS OF ASPEN TREE

May 1, 2014

Pitkin County Solid Waste Center
ATTN: Cathy Hall
76 Service Center Road
Aspen, CO 81611

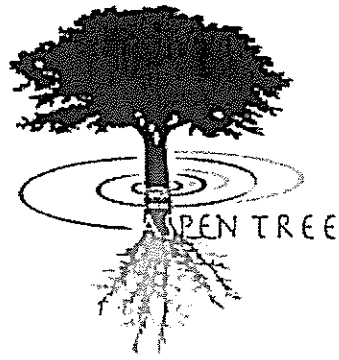
Dear Ms. Hall,

We are writing to express our support for Pitkin County's proposal to study the feasibility of innovative re-uses of wastewater effluent from a modular wastewater treatment facility located at the landfill. Please include this letter in your grant proposal to the Bureau of Reclamation, as we would like them to know more about the reasons for our support and our collaboration.

As you know, Aspen TREE is a non-profit dedicated to educating children and the general public about issues of sustainability through ecological design employing permaculture principles. Our mission and vision is to make the Aspen area a model of sustainable practice and to support others doing the same. To that end we recently began collaboration with the landfill on the Living Lab Workshop series and are advising on the project to reclaim the crew yard and hazardous waste collection site using permaculture design.

We at Aspen TREE think the proposal to study the re-use of effluent wastewater fits our mission and will lead to sensitive and more sustainable uses of water in our area, fits the permaculture ethos, and can lead to a model for other rural counties in the west to follow. The plan to study how effluent water might be used for a constructed wetlands/living machine and community garden greenhouse is novel to our experience and we very much look forward to collaborating with the landfill on how to design educational programs around it.

Board of Directors: * Eden Vardy * John Tangen, CPA * River Morgan * Judy Lovins * Jason Haber * Kathy McDewitt * Piper Foster
www.aspen-tree.org



TOGETHER REDEFINING THE ENVIRONMENT THROUGH EDUCATION

Please do not hesitate to contact me with any questions in reference to this endorsement or to further discuss the values of this project for our community. I can be reached at (970) 379-2323 or at info@aspen-tree.org

Sincerely yours,

A handwritten signature in black ink, appearing to be "E. Vardy", written in a cursive style.

Eden Vardy
Executive Director / Founder
Aspen TREE
www.aspen-tree.org

(970)379-2323

Board of Directors: * Eden Vardy * John Tangen, CPA * River Morgan * Judy Lovins * Jason Haber * Kathy McDevitt * Piper Foster
www.aspen-tree.org



SNOWMASS - WILDCAT FIRE PROTECTION DISTRICT

May 2, 2014

Ms. Cathy Hall
Pitkin County Landfill
76 Service Center Road
Aspen, CO 81611

Dear Ms. Hall,

The Snowmass Wildcat Fire Protection District has been called many times to the Pitkin County landfill to cope with fires. Being in a rural/urban interface zone and without an on-site water source in a drought plagued area presents many challenges to those of us charged with protecting the landfill and its neighbors from fire.

We have recommended for many years that Pitkin County install storage for fire suppression at the landfill. We will be better able to fight fires there with stored water and this will leave valuable resources for other entities unable to capture and store water for their own needs.

We fully support your study and look forward to talking more with you about your fire mitigation storage capacity and needs.

Sincerely yours,

John Mele,
Fire Marshal
Snowmass Wildcat Fire Protection District

PO Box 6436 SNOWMASS VILLAGE, CO 81615
970-923-2212 PHONE • 970-923-2224 FAX
WWW.SWFPD.COM