

**EARLY WARNING SYSTEM GRANT PROPOSAL
FOR
MIDDLE CREEK DAM, BOZEMAN, MONTANA**



**Submitted To
Montana Disaster and Emergency Services (DES)
For State Homeland Security Grant Program (SHSGP)**

By:

**Gallatin County
311 West Main
Bozeman, MT 59771**

February, 2008



GALLATIN COUNTY

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County Commission

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February 26, 2008

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

The Gallatin County Emergency Management is pleased to submit this request for funding for the Middle Creek Dam Early Warning System for your review.

The proposal is for \$267,206 to procure and install an Early Warning System (EWS) at the Middle Creek Dam located south of Bozeman, Montana in Hyalite Canyon. The EWS would give Gallatin County's Emergency Services advance warning of a potential dam failure and ensuing flood, and would allow for public notification and evacuation. The population downstream of the dam has increased due to residential and business development. The EWS would save lives and reduce property losses in the event of a dam failure caused by terrorist activities or natural disasters. The project is supported by local residents, Gallatin County, the City of Bozeman, the Montana Department of Natural Resources and Conservation (DNRC), and Senator Max Baucus.

The total cost of the project will be \$322,906. Costs above the grant request will be paid by Gallatin County and Montana DNRC with in-kind services.

Gallatin County's mission is to minimize loss of life and personal injury, damage to property and the environment from disasters, both natural and man made. We feel that the Middle Creek Dam EWS would greatly enhance our ability to mitigate potential loss of life due to a dam failure. The project also would increase the cooperative effort among the various emergency services in the county.

Sincerely,

William A. Murdock, Chairman
Gallatin County Commission

Application Summary

- 1. Name of Applicant(s):** Gallatin County Emergency Management
- 2. Project Title:** Early Warning System – Middle Creek Dam
- 3. Total Cost of Project:** \$322,906
- 4. Cost of Grant Proposal:** \$267,206
- 5. Federal Tax Identification Number:**
- 6. Type of Entity:** County Agency
- 7. Type of Project:** Public Safety/Dam Safety
- 8. Project Location:** Middle Creek Dam - South Of Bozeman, MT
- 9. State Senate District:** 35
State House District : 70
- 10. Population Served by Project:** 2,846 Residents ; Recreational Users - est.
at 20,000 annually,
- 11. Number of Households Served by Project:** estimated at 2,000
- 12. Number of Farms or Ranches Served by Project:** estimated at 73
- 13. Number of Acres Served by Project:** 5,000
- 14. Authorized Representative:** Patrick Lonergan
Gallatin County Emergency Management
- 15. Mailing Address:** P.O. Box 1230, Bozeman, MT 59771-1230
- 16. Contact Phone:** 406-582-2395

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1.0 INTRODUCTION

Middle Creek Dam is a 125-foot high earth-fill dam located within the Gallatin National Forest approximately 16 miles south of Bozeman, MT (Figure 1). Dam construction was started in 1939 and completed in 1956. Rehabilitation work consisting of raising the embankment 10 feet, replacing the principle spillway, and construction of an auxiliary spillway was completed in 1992.

The Department of Natural Resources and Conservation (DNRC) maintains a dam safety program at each dam that includes monthly monitoring of reservoir pool levels and embankment instrumentation during the irrigation season, and annual dam safety inspections. The intent of the program is to verify that each dam is performing adequately, and to identify any potential problems that may be developing as early as possible (DNRC 2007). The monitoring program is not structured to detect and alert of an immediate threat at a dam.

An undetected failure of Middle Creek dam would inundate numerous residences in the Gallatin Valley with little or no warning and result in a large loss of life of life. Dam failures can be caused by acts of terrorism, natural disasters such as earthquakes or storm flood events, or dam structural problems. The Emergency Warning System (EWS) would significantly reduce the risk to downstream residents and businesses and would save numerous lives in the event of a dam failure.

2.0 PROJECT SUMMARY

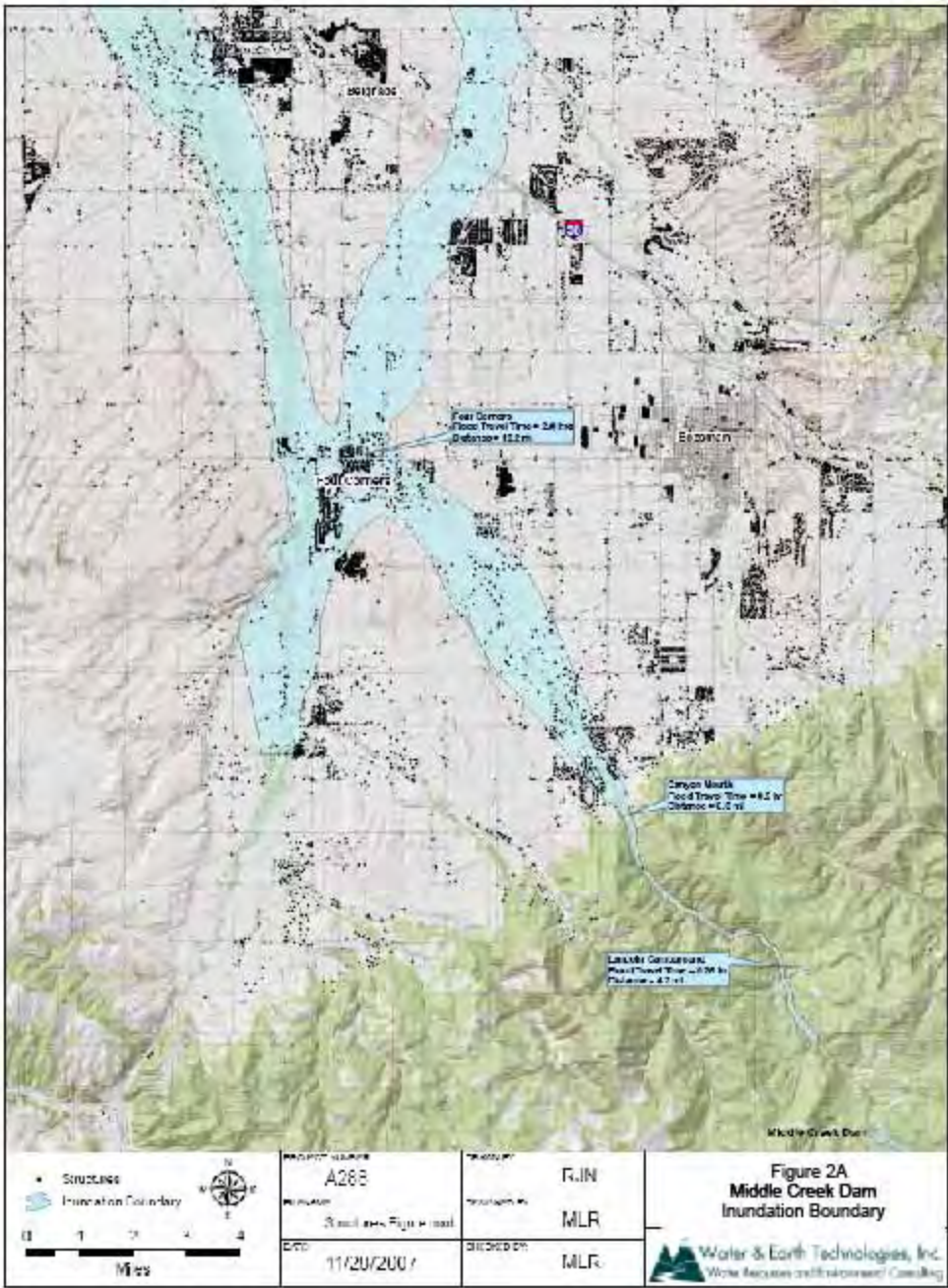
The purpose of this project is to add to the current dam safety program at Middle Creek Dam by installing an EWS. The EWS would give Gallatin County emergency responders vital time to respond to a dam failure. The need for an EWS at the Middle Creek Dam is based on the large amount of development in the flood inundation zone (Figure 2A & B) and the loss of life that would result from a dam failure.

The project consists of the following tasks:

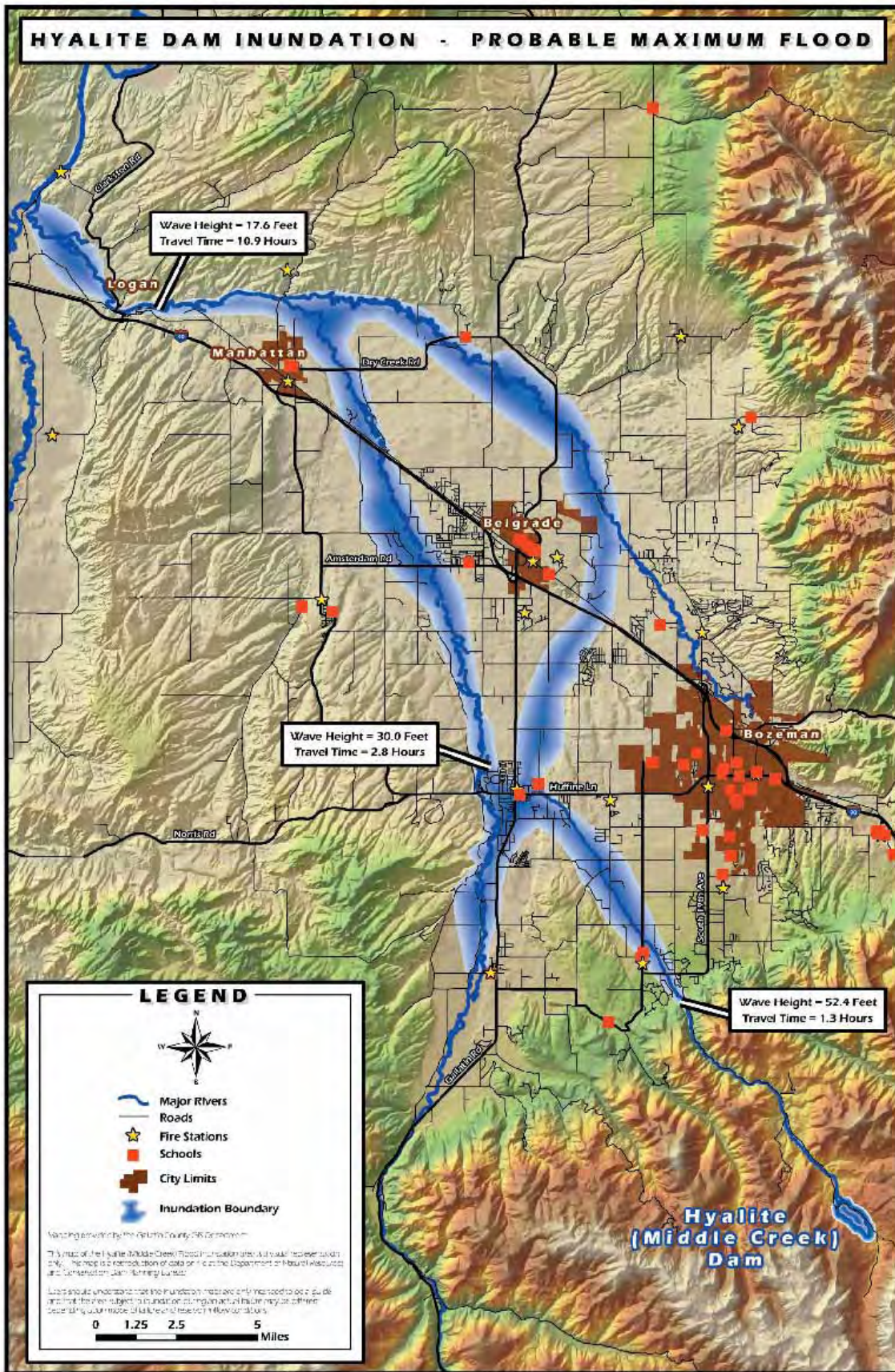
1. Perform a Feasibility Study (FS) for an EWS at Middle Creek Dam. The FS has already been completed (Appendix A) indicating an EWS would work at the dam and that the EWS would give additional time for emergency responders and the public to react to a dam failure, thereby saving lives. The FS also completed a preliminary design for two systems that would work at Middle Creek Dam. The FS was completed using funds from a DNRC Renewable Resource grant (RRG), Montana State Water Projects Bureau in-kind funding and GCEM in-kind funding.



Figure 1
 Site Location Map
 Middle Creek Dam



HYALITE DAM INUNDATION - PROBABLE MAXIMUM FLOOD



LEGEND

- Major Rivers
- Roads
- Fire Stations
- Schools
- City Limits
- Inundation Boundary

Map created by the Daniels County GIS Center
 This map of the Hyalite (Middle Creek) Flood Inundation area is a simplified elevation only. The map is a reproduction of data on file at the Department of Natural Resources and Conservation Planning Unit.
 Users should understand that the inundation portrayed only needs to be a guide and that they are subject to its inaccuracy. In any actual failure, they are advised to consult with the local emergency response organizations.

0 1.25 2.5 5 Miles

2. Produce the final design and construction plans for the EWS (HLS grant funding)
3. Produce a specific response plan for using the EWS in the event of a dam failure (HLS grant funding).
4. Procure and install the EWS (HLS grant funding).
5. Revise the Emergency Action Plan based on the new EWS (SWPB in-kind funding).
6. Perform project administration in the form of project oversight, contracting, invoice review and payment, agency coordination, and reporting. The GCEM will perform project administration for the project. Project administration funding will come from Gallatin County in-kind services.

3.0 PROJECT COSTS

The funding in this request would be used to develop the final design for the EWS, develop a site specific response plan, and procure and install monitoring and communications equipment for the EWS. Gallatin County is requesting a HSHP grant in the amount of \$272,206. The GCEM will assume the lead role in project management, intending to contribute in-kind services for administrative and technical work amounting to approximately \$20,000. GCEM has already spent \$1,340 of in-kind services on the FS for the EWS. The SWPB has spent \$5,360 of in-kind services for the FS and \$24,000 of RRG funds. The SWPB will spend another \$5,000 worth of in-kind services to re-write the EAP for the dam once the EWS is installed. Yearly O&M for the EWS will be budgeted for by Gallatin County. A detailed budget is presented in Section 7.

4.0 PROJECT GOALS AND OBJECTIVES

The goal of this project is to install and use an EWS at Middle Creek dam. Tasks remaining in the project include performing the final design and construction plans for the EWS, develop a specific response plan for the EWS, procure and install monitoring and communication equipment for the EWS, and revise the EAP for the dam.

The objective of the EWS is to decrease the risk to human life by warning of a possible dam failure in time for the public to evacuate the flood inundation zone. The FS that has been performed for the project indicates that the population at risk during a night time dam failure would be as high as 2,846 people (WET 2008, Figure 2, Table 1). The population at highest risk is located immediately below the dam to the Four Corners area (WET 2008). A day time dam failure could potentially put more people at risk since five schools, 158 commercial structures, one church, and one government structure are also in

the flood zone. These structures are not counted as populations at risk during a night time flood. In addition to the full time population, recreational users, and people traveling in the flood zone would be at risk.

Table 1 - Estimated Population at Risk from Canyon Mouth to Four Corners

Structure Type	Structure Count	Occupancy at Night	Persons per Household*	Population at Risk
Church	1	No	--	--
Clinic/hospital	1	Yes	50 (estimate)	50
Commercial	158	No	--	--
Farmstead	48	Yes	2.46	118
Fire station	1	Yes	10 (estimate)	10
Garage	5	No	--	--
Government	1	No	--	--
Multi-family	31	Yes	2.46	76
Residential	834	Yes	2.46	2,051
School	5	No	--	--
Trailer	220	Yes	2.46	541
TOTAL	1,305	--	--	2,846

* U.S. Census Bureau, 2000 census data, average persons per household in Gallatin County, Montana was 2.46. Source: Final Middle Creek Early Warning System Feasibility Study (WET 2007)

5.0 TARGET POPULATION

The objective of the EWS is to enable evacuation of people in the flood zone in the event of a dam failure. As such, the target population is all people in the flood zone and local emergency service providers, who will begin notifying the public and performing evacuations. Any individual within the flood zone from the dam down to the Four Corners area and possibly beyond are part of the target population. That population includes residents, ranchers, recreational users, business personnel, travelers, students, church goers, hospital workers/patients, and emergency services.

6.0 PROJECT TASKS

Project activities consist of the following items and scheduled as outlined in the table below.

Table 2 - Project Tasks

Task	Date Scheduled
Perform EWS Feasibility Study	June 2007 - January 2008 (completed)
Develop Final Design & Construction Plans	December 2008 - June 2009
Develop Site Specific Response Plan	June 2009 - December 2009
Procure and Install EWS	January 2010 - August 2010
Revise EAP	August 2010 - December 2010
Project Administration & Reporting	June 2007 - December 2010

The specifics of each task are detailed below.

Task 1 - Perform a Feasibility Study for the EWS

The SWPB contracted a consultant in 2007 to perform a FS for an EWS at Middle Creek Dam. The FS consisted of:

1. Determining if EWS communication was possible from the dam to emergency services and the public.
2. Determining if an EWS would increase the time available to respond to a dam failure.
3. Evaluate potential EWS systems.
4. Prepare a preliminary design for the EWS.
5. Prepare a cost estimate to procure and install an EWS along with performing any additional tasks necessary toward that end.

Based on public concern, the SWPB in 2006 developed a grant package for performing a FS for the EWS. The grant package consisted of a \$100,000 grant and \$37,000 of in-kind services to produce an FS for the EWS and to procure and install automated monitoring equipment at the dam. In 2007, the DNRC contracted Water and Earth Technologies (WET) of Fort Collins, Colorado to perform the FS. WET completed the FS in January 2008 (Appendix A). The results of the FS are:

1. EWS communications from the dam to emergency services and the public are possible.
2. Approximately 2,846 people are at risk during a night time failure. Statistics were used for a night time event when most residents would be in their homes. This does not take into account additional people who are in the flood zone during the day at schools, places of business and government buildings.
3. A significant and growing population is at risk in the event of a dam failure and the EWS would provide additional time to respond to a dam failure, especially from near the dam down to the Four Corners area (Figure 2).
4. The FS also analyzed which types of communication systems would work at the dam location and evaluated seven different systems.
5. Based on the system evaluation, two types of systems were chosen as most suitable for Middle Creek dam. The first system is a satellite telemetry service (StormLink) offered by OneRain Inc (Figure 3). The second option includes transmission of data from the monitoring network in real-time using VHF radio telemetry and the Automated Local Evaluation in Real-Time (Alert) protocol (Figure 4). The county presently prefers the second option since it will tie in better to the present emergency services communications network.
6. Cost estimates were developed for the two communications systems and recommendations were made as to how to proceed with the project.

Task 2 - EWS Final Design and Construction Planning

During the spring of 2008, Gallatin County will put out a Request for Proposals for the EWS Final Design and Construction Planning and contract a consultant for the work by June of 2008. Final design and construction plans will be developed by December 2008. Final Design and Construction Plans would be funded by the HLS grant while project administration for this task would be funded by Gallatin County in-kind services.

Task 3 - Produce Specific Response Plan Based on the EWS

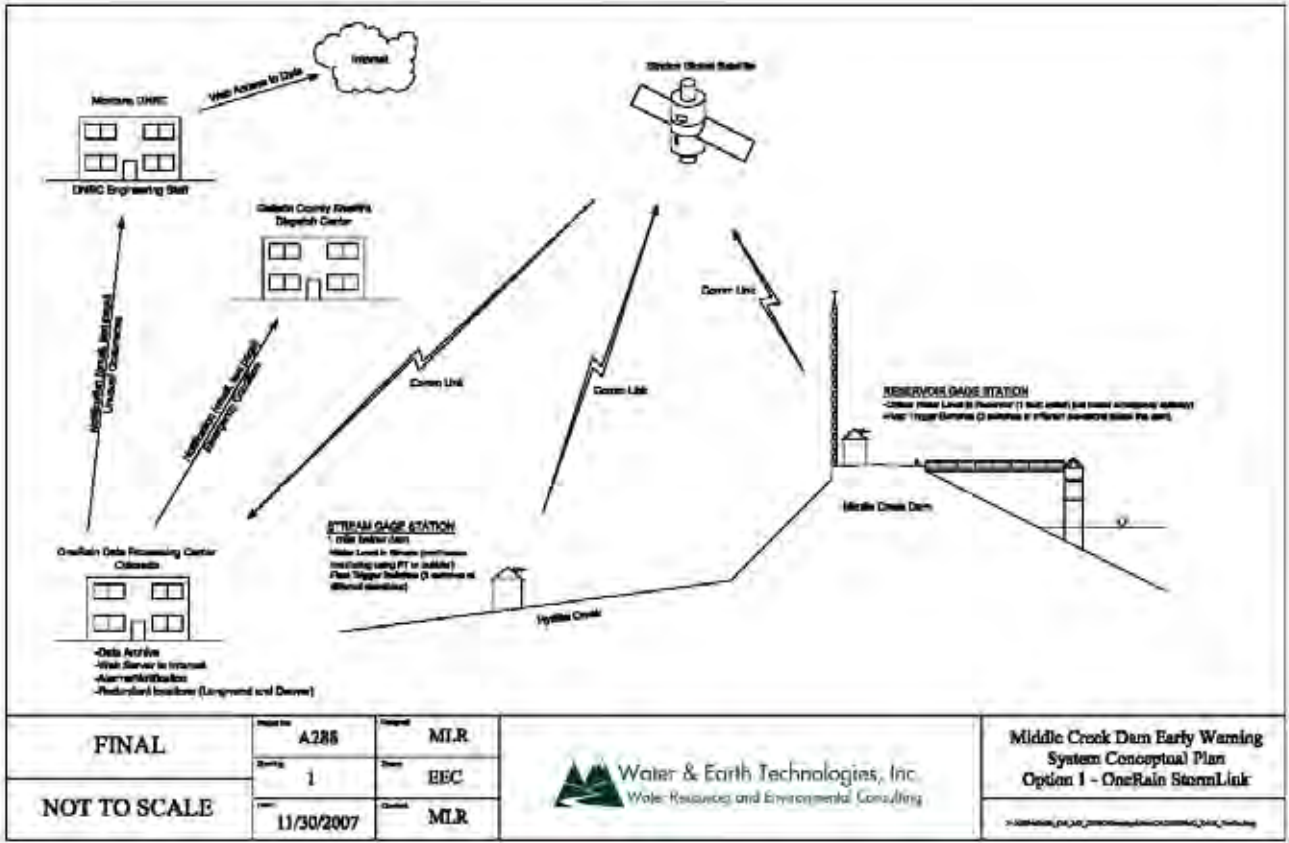
A response plan will be developed based on the final EWS design. The response plan will detail who will get emergency notification and how the notification will be transmitted throughout the public safety communications system. It will also detail, what actions will be taken after receiving a notification and who will take that action. The response plan will also locate evacuation centers, determine who is in the impact zone and the order in which people will be notified and evacuated. The response plan will be developed from January 2009 through March 2009 by the GCEM using funds from the HLS grant and will be developed after receiving the final EWS design and before the procurement and installation of the EWS.

Task 4 - Procurement and Installation of EWS Equipment

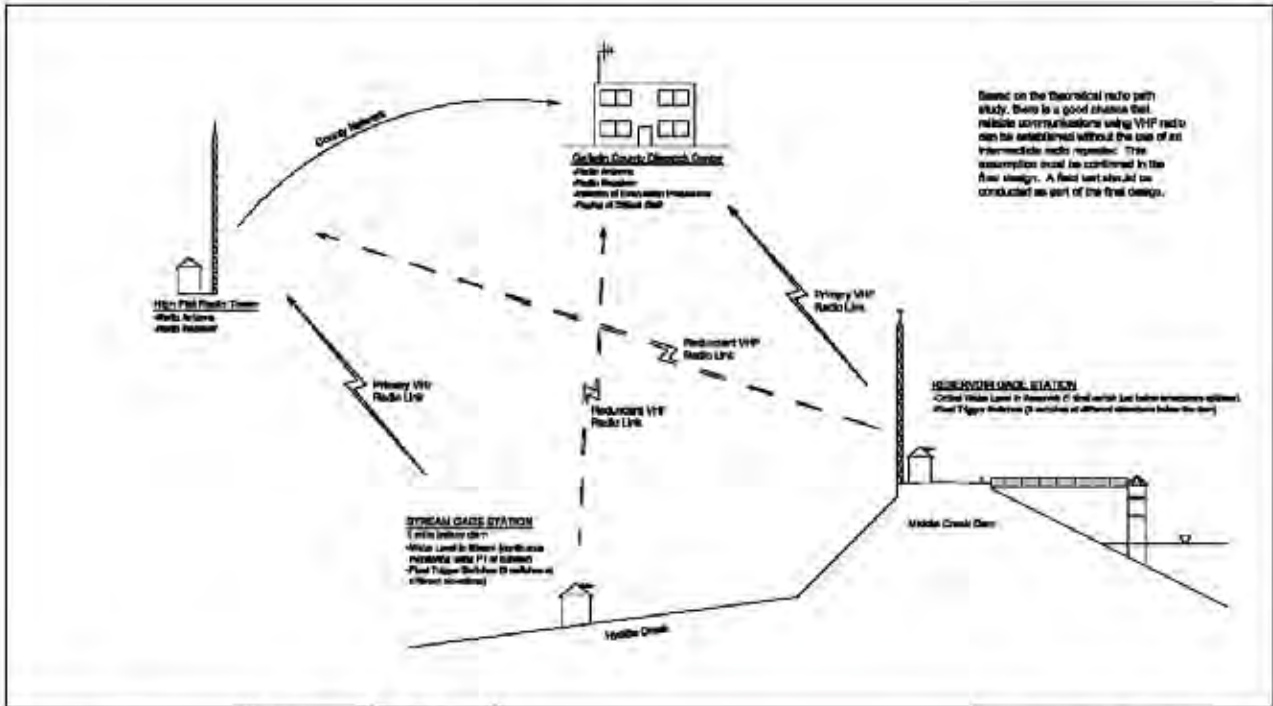
Procurement and installation of the EWS will be performed after the final design and construction plans are finished. It is planned that the EWS installation will be performed in the spring and summer of 2009. Funding for this part of the project will come from the HLS grant.

EWS equipment will consist of monitoring and communication equipment. The monitoring system will include a monitoring station in the creek immediately downstream of the dam that will include three float trigger switches installed at different elevations to measure quickly rising water levels. A station one mile down stream will measure water levels in Hyalite Creek. This station would include three float trigger switches and a continuous water level monitor (WET 2008).

The communications equipment will depend on the system chosen in the final design. For the satellite system, a satellite transmitter is located at each station. Data are transmitted from the monitoring equipment using L-band radios via a secure connection on the Stratos Global satellite system. Data are received, validated, and archived into OneRain's secure 24x7 database. Pre-set threat detection criteria will set off an automatic notification that will be sent to



FINAL	Project No.	A286	Contract	MLR
	Sheet No.	1	Phase	EBC
	Date	11/30/2007	Contract	MLR
NOT TO SCALE	 Water & Earth Technologies, Inc. Water Resources and Environmental Consulting			
Middle Creek Dam Early Warning System Conceptual Plan Option 1 - OneRain StormLink				



FINAL	Project No. A288	Phase MLR	 Water & Earth Technologies, Inc. Water Resources and Environmental Consulting	Middle Creek Dam Bary Warning System Conceptual Plan Option 2 - VHF Radio
	Revision 2	Phase EEC		
NOT TO SCALE	Date 11/30/2007	Phase MLR		

pre-determined personnel within Gallatin County and the SWPB. With the VHF telemetry system a radio transmitter located at each monitoring location will transmit data from the specific location to a central on-site data logger. Data from the data logger are transmitted using a VHF frequency to the Gallatin County Dispatch Center. The data will be processed by specialized software and set off an alert based on threat detection criteria. Further alert notifications will be sent out to pre-determined personnel using the County's existing communications infrastructure (WET 2008).

Task 5 - Revise EAP

The emergency plan is prepared in compliance with the Montana Dam Safety Act and the resultant administrative rules. The purpose of the plan is to provide maximum early warning to affected persons in the unlikely event of failure of the Middle Creek Dam. The plan is intended to provide instructions for notifying the proper authorities of a problem at the dam (DNRC 2007a).

The EAP will be revised by the SWPB based on the site specific response plan that the county develops for the EWS. Changes to the EAP will include the procedure to be followed in the event of an alert. The emergency responder notification list will also be included with the names of all people to be notified, their locations, and their duties. A public notification list will also be prepared with property addresses and phone numbers if that is part of the site specific response plan. EAP revisions will be performed using in-kind services of the SWPB and Gallatin County.

Task 6 - Project Administration

Project administration will take place during the lifetime of the project. Project administration tasks will include planning, oversight, contracting, financial management, coordination of agencies, the public and contractors, and reporting. GCEM will perform project administration of the final design and construction plans, the site specific response plan, and the procurement and installation of the EWS. GCEM will also be responsible for any project reporting requirements. Funding for Gallatin County project administration will come from the county's operating budget.

The DNRC has performed project management of the FS and will also be responsible for revising the EAP. Funding for EAP revisions will come from SWPB's operating budget.

7.0 PROJECT BUDGET

Total project costs are estimated at \$322,906. The figure includes performing the FS for the EWS (\$30,700), final design of the EWS (\$52,800), capital costs and one-time fees (\$99,566), construction (\$99,840), specific response plans

(\$15,000), revising the EAP (\$5,000) and project administration (\$20,000). The FS was finalized in January 2008. The cost for project administration, final design and construction of the EWS will be incurred in FY 2008 – FY 2009. EAP revision costs will be incurred in FY 2009. The individual cost breakdowns for the project are shown below.

Feasibility Study Costs

The FS was started in 2007 with RRG funds and SWPB in-kind funding. Water and Earth Technologies (WET) from Fort Collins, Colorado was contracted to perform the FS. The Final FS was completed in January 2008.

The FS reviewed seven different communications options for an EWS at the Middle Creek dam. Two options (satellite – OneRain and VHF/UHF-Alert One) were chosen as the best systems for the dam based on their ability to work at the dam location, the time for the system to deliver the warning, and reliability. Preliminary design and cost estimates were developed for each method and shown below. Gallatin County prefers the VHF/UHF option due to its compatibility with the county’s emergency services communications. Costs for the FS are shown below.

Table 3 - Feasibility Study Costs

Feasibility Study (from DNRC Grant)	\$24,000
DNRC In-Kind services (project management/FS review)	\$5,360
Gallatin County In-Kind services (meetings/review)	\$1,340
Total	\$30,700

Final Design and Construction Planning Costs

The implementation of a design option will require the development of a final design including a set of construction plans before the early warning system can be built. The final design for Option 2 should include a physical radio path study (to confirm the theoretical results presented in the feasibility report), equipment specification, determination of final sensor configuration (sensor type and location), details for equipment integration, interface planning (radio to microwave interface at County radio tower, CAD interface at dispatch center) and development of installation plans. The product from this work phase will be a complete set of construction plans that can be used to solicit bids for the construction of the system. Estimated costs to complete the engineering design and to develop the constructions plans are shown.

Table 4 - Final Design and Construction Planning Costs

Work Task	Option 1 - OneRain (satellite)	Option 2 - VHF Radio
Radio telemetry planning/testing	\$0	\$5,200
Radio frequency licensing	\$0	\$2,000
Sensor specification (type and location)	\$4,000	\$4,000
Equipment integration planning	\$4,000	\$14,000

Software integration planning	\$0	\$6,000
Installation/construction planning	\$4,200	\$4,200
Construction plans/specs	\$5,600	\$8,600
Final Design Sub-Total	\$17,800	\$44,000
Contingency 20%	\$3,560	\$8,800
Final Design Total	\$21,360	\$52,800

Source: Final Middle Creek Early Warning System Feasibility Study (WET 2008)

Capital Costs and One-Time Set-Up Fees

The capital costs and one-time set-up fees associated with both design options are estimated.

Table 5 - Capital Expenditures and Initial Fees

Description	Option 1 - OneRain (satellite)	Option 2 - VHF Radio
Middle Creek Dam Station		
Electronics enclosure	\$824	\$824
30 foot Rohn tower	\$950	\$950
Float switch (4 @ \$603)	\$2,508	\$2,508
Data logger	\$1,700	\$1,700
StormLink telemetry system	\$2,541	\$0
StormLink communications engine	\$2,508	\$0
VHF ALERT radio	\$0	\$800
VHF radio antenna/cables	\$0	\$100
Intrusion sensor (door switch)	\$139	\$139
Solar panel (20 watt)	\$732	\$732
Grounding kit	\$20	\$20
Misc. hardware (conduit, connectors, etc.)	\$500	\$500
Middle Creek Dam Station Sub-Total	\$12,422	\$8,273
Hyalite Creek Stream Gage		
Electronics enclosure	\$824	\$824
30 foot Rohn tower	\$950	\$950
Float switch (3 @ \$603)	\$1,809	\$1,809
Continuous water level sensor	\$2,105	\$2,105
Data logger	\$1,700	\$1,700
StormLink telemetry system	\$2,541	\$0
StormLink communications engine	\$2,508	\$0
VHF ALERT radio	\$0	\$800
VHF radio antenna/cables	\$0	\$100
Intrusion sensor (door switch)	\$139	\$139
Solar panel (20 watt)	\$732	\$732
Grounding kit	\$20	\$20
Misc. hardware (conduit, connectors, etc.)	\$500	\$500
Hyalite Creek Stream Gage Sub-Total	\$13,828	\$9,679
High Flat Receiver/Radio Repeater		
Electronics enclosure	\$0	\$824
VHF ALERT transceiver	\$0	\$800
Data Logger Repeater	\$0	\$7,500
VHF radio antenna/cables	\$0	\$1,500
Solar Panel	\$0	\$732
Grounding kit	\$0	\$20
Integration components to County Equip.	\$0	\$5,500
High Flat Receiver/Radio Repeater Sub-Total		\$16,876
County EOC Receiver		
Electronics enclosure	\$0	\$824

VHF ALERT receiver	\$0	\$800
ALERT decoder (audio digital modem)	\$0	\$2,500
VHF radio antenna/cables	\$0	\$500
Grounding Kit	\$0	\$20
Integration components to County Equip.	\$0	\$5,500
County EOC Receiver Sub-Total		\$10,144
Communication Set-Ups		
StormLink one-time setup	\$1,020	\$0
Terminal interface at EOC	\$0	\$5,500
High Flat interface to County Comm.	\$0	\$10,000
Base station software/CAD interface**	\$0	\$20,000
Software training	\$2,500	\$2,500
Capital Costs Sub-Total	\$29,770	\$82,972
Contingency 20%	\$5,954	\$16,594
Capital Costs and Initial Fees Total	\$35,724	\$99,566

Source: Final Middle Creek Early Warning System Feasibility Study (WET 2008)

Construction Costs

Construction, configuration and testing costs are estimated. These costs include installation of the monitoring network, installation of the telemetry system, installation and configuration of the software at the County Dispatch Center, integration of new software with County CAD system, and end-to-end testing.

Table 6 - Construction Costs

Description	Option 1 - OneRain (satellite)	Option 2 - VHF Radio
Sensor/monitoring network	\$25,000	\$25,000
Satellite telemetry network	\$0	\$0
Radio telemetry network/tower interface	\$0	\$15,000
Base station software/CAD interface	\$0	\$23,200
System configuration and testing	\$10,000	\$20,000
Construction Sub-Total	\$35,000	\$83,200
Contingency 20%	\$7,000	\$16,640
Construction Total	\$42,000	\$99,840

Source: Final Middle Creek Early Warning System Feasibility Study (WET 2008)

Design Response Plans

Specific response plans for the installed EWS will need to be developed to coordinate the logistics of public evacuation among all the emergency responder agencies. The estimated cost for developing a specific response plan is \$15,000 which will come from Gallatin County in-kind services .

Revising the EAP

The EAP will need to be revised once the EWS is installed and a specific response plan is installed. Revising the EAP will be done with DNRC in-kind services and is estimated at \$5,000 (one fte at \$33.50/hr for 150 hours).

Project Administration

Project administration will consist of project management, contracting, coordination, oversight of final design and construction plans, oversight of construction activities, performing equipment procurement, project reporting, and financial management. Project administration will be conducted by GCEM and costs are estimated at \$20,000 (approximately one fte at \$35/hr for 470 hrs).

Funding Structure

The proposed source of funding for the project includes the State Homeland Security Program Grant, a DNRC Renewable Resource Grant (already obtained), the State DNRC Water Projects Bureau In-Kind services, and the Gallatin County Emergency Management In-Kind Services. In-kind services are obtained through the general operating budgets for the DNRC and Gallatin County.

The grant request is for \$267,206 or approximately 83% of the project budget. The in-kind services and grant funding to be provided by DNRC and Gallatin County is \$55,700 or approximately 17.5% of the project budget. Total estimated project cost (including in-kind and other grant funding) is approximately \$322,906

Table 7 - Funding Structure

Funding Source	Amount
Homeland Security Grant	\$267,206
DNRC Grant Funding (Feasibility Study)	\$24,000
DNRC In-Kind Services (Feasibility Study Project Management)	\$5,360
Gallatin County In-Kind Services (Feasibility Study – Meetings/Review)	\$1,340
DNRC In-kind Contribution (future - EAP)	\$5,000
Gallatin County Emergency Management – In-Kind Services	\$20,000
Total	\$322,906

8.0 QUALIFICATIONS

The Gallatin County employees planners, grant administrators, and radio system personnel throughout its departments to administer and facilitate this process.

For this project, the DNRC has the staffing commitment to manage the planning, design, coordination, and implementation of its specific tasks and

will include SWPB and Bozeman Water Resources Regional Office (BWRRO) personnel.

The SWPB employs licensed professional engineers (PE), engineers in training (EIT), geologists, project and environmental coordinators. DNRC's project engineer will be a PE. The SWPB constructs water projects under the authority of MCA Title 85 throughout the state of Montana and has conducted the planning, oversight, procurement, and installation of automated monitoring systems at numerous state owned dams. EAP revisions will be performed by SWPB staff. The SWPB produces numerous revised EAPs on a regular basis.

9.0 SUMMARY

Middle Creek Dam is a 125-foot high earth-fill dam located within the Gallatin National Forest approximately 16 miles south of Bozeman, MT. Dam construction was started in 1939 and completed in 1956. Rehabilitation work consisting of raising the embankment 10 feet, replacing the principle spillway, and construction of an auxiliary spillway was completed in 1992.

Due to residential and business development since 1951, and the increasing rate of development with time, the flood inundation zone from a dam failure has become heavily populated. While the DNRC maintains a dam safety program which includes yearly inspections and regular water level monitoring at the dam, county residents and emergency service agencies are concerned that the present safety program would not detect a sudden dam failure in time to alert the public and evacuate the flood zone. The county proposes to install an Early Warning System at the dam which would immediately notify emergency services and the public in the event of a sudden dam failure. Sudden dam failures could be caused by terrorist activities, natural disasters, or inherent structural problems at the dam.

A Feasibility Study to determine if an EWS would work at the dam was completed in January 2008. The FS determined that it is possible to install an EWS at the dam and that the EWS would give the emergency services and the public additional time to evacuate the flood zone thereby saving lives.

Project tasks are outlined in the table below:

Table 8 - Tasks And Completion Dates

Task	Completion Date
Perform EWS Feasibility Study	January 2008 completed
Develop Final Design & Construction Plans	June 2009
Develop Site Specific Response Plan	December 2009
Procure and Install EWS	August 2010
Revise EAP	December 2010
Project Administration & Reporting	December 2010

The project would be completed with a combination of funding from a Montana DNRC grant (already received), DNRC in-kind services, Gallatin County in-kind services and the State Homeland Security Program grant.

Gallatin County Emergency Management's mission is to minimize loss of life and personal injury, damage to property and the environment from disasters, both natural and man made. GCEM and county residents feel strongly that an EWS would save numerous lives and property in the event of a dam failure.

The project is supported by GCEM, county residents, the City of Bozeman, the Montana DNRC, and Senator Max Baucus.

REFERENCES

- Department of Natural Resources and Conservation (DNRC). 2007a. Request for Proposals, Middle Creek (Hyalite) Dam Early Warning System Feasibility Study. April.
- DNRC. 2007b. Middle Creek Dam Emergency Action Plan. August.
- Water and Earth Technologies. 2008. Middle Creek Early Warning System Feasibility Study. January.



ANDERSON SCHOOL DISTRICT NO. 41

10040 Cottonwood Road
Bozeman, Montana 59718

RECEIVED
FEB 20 2008
Bozeman Fire Dept.

To: Montana Homeland Security Senior Advisory Committee
From: Terry Vanderpan, Anderson District #41 Superintendent of Schools
Re: Support letter for Hyalite Reservoir & Middle Creek Dam Early Warning System

Date: February 19, 2008

Sirs:

As superintendent of the Anderson School District #41 I am writing on behalf of our school board, staff, 200 school children and their parents to show our support for an early warning system that needs to be developed for the Hyalite Reservoir & Middle Creek Dams that are located directly above our K-8 elementary school.

The Anderson Elementary School District is located directly in the flood path and according to latest research, if the dams were to break, we would be under water in 30 to 45 minutes. We presently have no way of knowing whether or not the dam has failed.

We have practiced loading the students on buses and evacuating the school grounds and buildings in case of a breach, but we have "no way" of learning about a flood unless we are warned somehow. Because the mouth of the canyon where the dam is located is so close (approx. 5 miles), we desperately need to be warned early in order to get 200 students and 30 other district employees to safety.

Please consider this letter as one of support for the early warning system grant.

If you have any questions, please call 406.587.1305

Thank you.



BOZEMAN WATER TREATMENT PLANT

P.O. Box 1230 BOZEMAN, MONTANA 59771

PHONE (406) 586-7158

FAX (406) 585-0058

February 20, 2008

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789-1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

On behalf of the City of Bozeman Department of Public Services, I would like to express support for Gallatin County Emergency Managements grant proposal for the Middle Creek Dam Early Warning System.

The dam is located in a remote area and the only practical egress rout is in the direct path of floodwaters, should there be a failure. Communication is difficult from the site, with no landline phone service, cell service, nor radio contact possible due to the mountainous terrain.

During the course of my employment, for the last twenty-four years, at the City of Bozeman Water Treatment Plant, I have visited this site on numerous occasions. Much of the time there is no one in the area. Thus, a dam failure could easily go undetected.

It is clear that this Early Warning System has the potential to save many lives in the event of dam failure.

Sincerely,

A handwritten signature in cursive script that reads "Rick Moroney".

Rick Moroney
Superintendent

City of Bozeman Water Treatment plant

Rae Rural Fire Department
P.O. Box 4401
Bozeman, Montana 59772

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

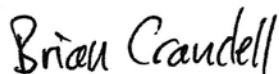
Date: February 19, 2008

Schools, homes, fire stations, businesses, infrastructure and many residents - all are in danger of being swept away within Rae Fire District should Middle Creek Dam be breached. As fire chief of this district I'm deeply concerned with the safety of those who live here.

During the last five years I've worked with representatives of the DNRC to find a way to protect our citizens in the event of a terrorist attack on the dam or a natural disaster. A team hired by DNRC has evaluated the dam and has recommended placement of an early warning system to help protect our citizens.

We would very much appreciate your consideration of a grant to make this solution a reality.

Sincerely,



Brian Crandell, Fire Chief
Rae Fire Department

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

February 18, 2008

Sourdough Rural Fire Department Board of Trustees gives its wholehearted support to this grant request for funding for an early warning system on Middle Creek Dam.

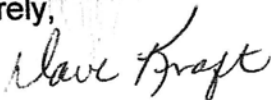
For many years now we've been searching for a way to mitigate the deadly impact a breach of the dam would have on our residents, fire stations, schools, businesses and infrastructure. Now that a team of professionals hired by DNRC has determined that an early warning system is feasible, and has provided a plan, we need funding to make it happen.

Engineers have determined that a breach of this dam has the potential of creating a huge loss of life in Gallatin County, with more than 6,000 persons affected. Within 30 minutes of a breach lives would be lost. Hence the need of an early warning system to mitigate that loss.

Our residents deserve this protection from terrorists who might breach the dam for reasons of their own and from natural disasters such as earthquakes.

We ask you to thoughtfully consider this grant request.

Sincerely,



Dave Kraft, Chair
Sourdough Fire Board of Trustees
4541 South Third Avenue
Bozeman, Montana 59715

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

February 19, 2008

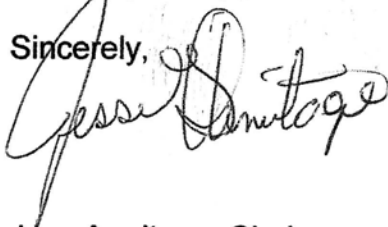
Rae Rural Fire Department Board of Trustees requests your assistance with funding for an early warning system on Middle Creek Dam.

We've been very concerned about the impact a breach of the dam would have on our residents for some time now. The engineering studies paint a very bleak picture for our neighbors who live in the inundation area. The disaster would be widespread and would encompass schools, churches, fire stations and places of business in our fire district.

Currently the only way to help mitigate loss of life following a breach of Middle Creek Dam from a terrorist or natural disaster is an early warning system. We're asking for your help to provide the funds to make this happen.

We ask you to please consider this grant request.

Sincerely,

A handwritten signature in black ink, appearing to read "Jess Armitage". The signature is written in a cursive style with a large initial "J".

Jess Armitage, Chair
Rae Fire Department Board of Trustees
P.O. Box 4401
Bozeman, Montana 59772

SOURDOUGH RURAL FIRE DEPARTMENT

4541 South Third Avenue

Bozeman, Montana 59715

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal

DATE: February 19, 2008

As Chief of Sourdough Fire Department I am charged with the safety of the more than 6,000 residents who live and work within our district. I'm very concerned about the lack of any early warning system on Middle Creek Dam should it fail from a terrorist attack or an earthquake.

For several years now we've been working to find a solution that would mitigate the loss of life in the event of a disaster on this dam. We now have a feasible solution.

Please consider funding an early warning system on Middle Creek Dam. It could be immensely important to the preservation of life of hundreds of our residents.

Thank you for your consideration.

Sincerely,

Brian Crandell

Brian Crandell, Fire Chief
Sourdough Rural Fire Department

HYALITE MEADOW

Community Emergency Response Team

13 Indian Paintbrush Drive, Bozeman, MT 59718

Sheri Lanz
Homeland Security Grants Director
Disaster and Emergency Services
P.O. Box 4789 - 1900 Williams Street
Fort Harrison, Montana 59636-4789

RE: State Homeland Security Program Grant Proposal DATE: February 20, 2008

Members of the Hyalite Meadow C.E.R.T. ask your consideration for a grant to fund the early warning system on Middle Creek Dam.

CERT members in this subdivision have met monthly for the last six years to learn skills to care for ourselves, our families and our neighbors in the event of a disaster. We took CPR and First Aid together. We've created our 72 Hour Kits, learned how to turn off our gas and electric, how to safely extricate persons trapped under debris in the event of an earthquake and have created defensible space around our homes. We've assisted our local fire departments with three wildfires that threatened our neighborhood and set up Neighborhood Network phone trees to help keep neighbors informed of impending dangers.

However, we can't raise the money on our own for an early warning system on the dam. We are a subdivision composed of couples with young children, families with teenagers and retired folks. Should Middle Creek Dam fail, engineering studies show we'd have 30 minutes to evacuate before being inundated by a 40' wall of water, rocks and debris IF we had a warning.

We've done all we can as citizens to learn how to protect ourselves and our neighbors. Now we're asking for your help.

We are grateful for your consideration of this grant.

Sincerely,



Kandy Rose, Chair

Hyalite Meadow CERT