STATE OF COLORADO

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, Colorado 80203
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Fax: (303) 866-4474
www.cwcb.state.co.us

TO: Colorado Water Conservation Board Members

FROM: Todd Doherty, Water Supply Planning Section

DATE: March 9, 2012

SUBJECT: **Agenda Item 14.b, March 20-21, 2012 Board Meeting**
Finance Section/Water Supply Planning Section
City of Trinidad – North Lake Dam Rehabilitation Project
Water Supply Reserve Account Application

Introduction and Background

Please refer to the attached Water Activity Summary Sheet, basin roundtable approval letter, and application materials for details on the City of Trinidad's request for funds from the Water Supply Reserve Account.

Staff Recommendation

Staff recommends approval of up to $702,273 of Statewide WSRA funds and up to $36,962 of Arkansas Basin WSRA funds (total of $739,235) to help complete the North Lake Dam Rehabilitation Project.

Water Supply Reserve Account – Grant and Loan Program
Water Activity Summary Sheet
Agenda Item 14b

Applicant: City of Trinidad

Water Activity Name: North Lake Dam Rehabilitation Project

Water Activity Purpose: Structural Activity

County: Las Animas

Drainage Basin: Arkansas

Water Source: North Fork of the Purgatoire

Amount Requested: $739,235

Source of Funds: Arkansas basin account ($36,962) and Statewide Funds ($702,273)

Matching Funds: Yes, $369,616 (50%)

Staff Recommendation
Staff recommends approval of up to $702,273 from the Statewide Account and up to $36,962 from the Arkansas basin account (total $739,235) to help fund the North Lake Dam Rehabilitation Project contingent upon resolution of the items listed in the issues/additional needs section below.

Water Activity Summary:
The City of Trinidad plans on rehabilitating North Lake Dam. North Lake Reservoir is located approximately 40 miles west of Trinidad and is the primary source of municipal water for the City. Because of safety concerns, the Office of the State Engineer imposed a restriction on the dam. To avoid further restrictions, the City intends to address the dam safety concerns by constructing a new stability berm and replacing the spillway. The total project cost is estimated to be $1,848,086.

Based upon the engineer's Opinion of Probable Construction Cost, the cost of this project is estimated at $1,848,086.00. Sources of funding are as follows:

- The City of Trinidad is prepared to contribute: **$369,616.00 (20%)**
- Proposed total WSRA grant funding: **$739,235.00 (40%)**
- CWCB Loan: **$739,235.00 (40%)**

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$1,848,086.00 (100%)

Discussion:
Staff believes this project is an important project in that it will help the City of Trinidad regain the yield in the North Lake Reservoir that is currently restricted. This reservoir is the main source of supply for the city and ensuring a reliable and firm water supply for this community is critical. Staff evaluation of this project was based on how well this project appeared to meet the various evaluation criteria in the grant program's criteria and guidelines. This is one of the first "CWCB loan/WSRA grant packages" to be considered by the CWCB as defined by the WSRA Criteria and Guidelines. The Criteria and Guidelines requires that grant/loan packages have a CWCB loan/WSRA grant ratio of 1:1 or higher, with preference will be given to those with a higher loan/grant ratio. While this application is requesting a Statewide WSRA grant with the minimum loan/grant ratio of 1:1, upon

review of the application, the project seems to meet most of the evaluation criteria. Due to this, staff is recommending approval of the total grant request of $739,235.

Issues/Additional Needs: The City of Trinidad is a covered entity and is eligible for grants/loans from the CWCB only if they have adopted a water conservation plan, as defined in Section 37-60-126 C.R.S. Therefore, staff recommends that funding of this project be contingent upon a CWCB approved water conservation plan. .

Reporting and Deliverables: All products, data and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of the project documentation. This information will in turn be made widely available to Basin Roundtables and the general public and will help promote the development of a common technical platform.

In accordance with the revised WSRA Criteria and Guidelines, staff would like to highlight additional reporting and final deliverable requirements. The specific requirements are provided below.

Reporting: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the scope of work including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Deliverable: At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings and engineering reports/designs.

Engineering: All engineering work (as defined in the Engineers Practice Act (§12-25-102(10) C.R.S.)) performed under this grant shall be performed by or under the responsible charge of professional engineer licensed by the State of Colorado to practice Engineering.

Arkansas Basin Roundtable
Official Records Location
c/o Board of Water Works of Pueblo
Attention: Leslie Martinez
P.O. Box 400
Pueblo CO 81002-0400

January 12, 2012

Mr. Todd Doherty
Interstate Water Management Development Section
Colorado Water Conservation Board
1580 Logan Street, Suite 600
Denver, Colorado 80203

Re: Water Supply Reserve Account Grant Application for North Lake Reservoir Rehabilitation and Multiple Use

Dear Todd:

The WSRA grant application for North Lake Reservoir Rehabilitation and Multiple Use previously approved by the Arkansas Basin Roundtable was increased by $12,000 at the January, 2012 meeting. Attached is a revised application and exhibits.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Gary Barber
Chair

c: Executive Committee, Ark Roundtable

NORTH LAKE DAM RESERVOIR

Las Animas County, Colorado

Rehabilitation & Multiple Use Project

ARKANSAS RIVER BASIN ROUNDTABLE

Water Supply Reserve Account

Grant Application

Amended July, 2011

Prepared by:
James Fernandez
Utility Superintendent,
City of Trinidad, Colorado

COLORADO WATER CONSERVATION BOARD

WATER SUPPLY RESERVE ACCOUNT
2011 GRANT APPLICATION FORM

NORTH LAKE RESERVOIR: Rehabilitation & Multiple Use
Arkansas River Basin

Name of Water Activity/Project

River Basin Location

$ 12,000.00	X	Basin Account	X	Yes
$727,235.00	X	Statewide Account		No

Amount of Funds Requested

Please Check Applicable Box

Approval Letter Signed By Roundtable Chair and Description of Results of Evaluation and Approval Process

*** For the Basin Account, the Application Deadline is 60 Days Prior to the Bimonthly CWCB meeting. The CWCB meetings are posted at www.cwcb.state.co.us and are generally the third week of the month.**

*** For the Statewide Account, the Application Deadline is 60 Days Prior to the March and September CWCB Board Meetings.**

* In completing the application you may attach additional sheets if the form does not provide adequate space. If additional sheets are attached please be sure to reference the section number of the application that you are addressing (i.e., A.1. etc.).

Instructions: This application form must be submitted in electronic format (Microsoft Word or Original PDF are preferred). The application can be emailed or a disc can be mailed to the address at the end of the application form. The Water Supply Reserve Account Criteria and Guidelines can be found at http://cwcb.state.co.us/IWMD/. **The criteria and guidelines should be reviewed and followed when completing this application**. You may attach additional sheets as necessary to fully answer any question, or to provide additional information that you feel would be helpful in evaluating this application. Include with your application a cover letter summarizing your request for a grant. If you have difficulty with any part of the application, contact Rick Brown of the Intrastate Water Management and Development (Colorado Water Conservation Board) for assistance, at (303) 866-3514 or email Rick at rick.brown@state.co.us.

Generally, the applicant is also the prospective owner and sponsor of the proposed water activity. If this is not the case, contact the Rick Brown before completing this application.

Part A. - Description of the Applicant (Project Sponsor or Owner);

1. Applicant Name(s): **CITY OF TRINIDAD, COLORADO**

Mailing address: P.O. Box 2440
Trinidad, CO 81082

Taxpayer ID#: 84-6000625 Email address: jim@historictrinidad.com

Phone Numbers: Business: 719-846-9843
Home: 719-846-9365
Fax: 719-846-4140

2. Person to contact regarding this application if different from above:

Name: James Fernandez

Position/Title Utility Superintendent

3. Provide a brief description of your organization below: see "Description of Applicant" in Part 2 of Criteria and Guidance for required information.

Organization & History:

The City of Trinidad, Colorado, submits its application as an eligible applicant under the guidelines of Senate Bill 06-179. The City of Trinidad was incorporated in 1876 and is the County seat of Las Animas County, Colorado. The City of Trinidad is the primary provider of treated drinking water for the City, the rural area encompassing the City, the Colorado Department of Corrections State Prison, the U.S. Army Pinon Canyon Maneuver Site, and approximately 867 rural customers served through twenty-two (22) rural water associations. These entities represent a customer base of 3,759 urban and rural residential water customers and 963 urban and rural commercial customers. In addition to providing water to these customers, the City of Trinidad currently supplies untreated water from its municipal pool in Trinidad Lake for augmentation purposes to other rural customers who must augment their use of well or stream water.

North Lake is the primary source of Trinidad's drinking water located approximately 46 miles west of Trinidad in Las Animas County. The lake has a capacity of approximately 4,300 acre feet of water and is fed by the North Fork stream, all in the Arkansas River Basin of the State of Colorado. The original North Lake dam was built in the 1930's, but was expanded in 1964. It is an earthen dam with a concrete control tower and concrete spillway. The dam recently was placed on restriction by the State Water Engineer's Office requiring the lake to be lowered by five (5) feet which represents a loss of 541 acre feet of water. The State has also issued a mandate to the City that certain improvements must be made to the dam or else the water level in the lake would be lowered even further to what is deemed a "safe level". Refer to attached letter from State Water Engineer , Mr. Dick Wolfe dated June 13, 2011. Also attached is a Reservoir Capacity Table prepared by GEI Consultants.

To this end, the City engaged the services of a professional engineer, GEI Consultants, to design and rebuild the intake piping and control valves within the existing tower, installed a new drain pipe, and emergency relief outlet works at the base of the dam at a cost of **$847,232.59**. The two immediate remaining areas of work remaining to be accomplished are the reinforcement of the earthen dam as it is leaking at the groin area of the dam and the replacement of the concrete spillway with a pipe spillway. The remaining work has already been designed by the firm of RJH Consultants at a cost of **$296,317.68**. Although the design work is complete and awaits final approval by the State Engineer's Office (SEO), the construction work is unfunded. The current estimate to accomplish these mandated repairs is **$1,848,086.00**. The City of Trinidad is seeking grant funds for this project. Grant funds are being sought as opposed to a loan due to the fact that the City is presently faced with a bonded indebtedness for a previously expanded and renovated waste water treatment plant which was also an unfunded mandate from the State in 2000.

4 ***If the Contracting Entity is different then the Applicant (Project Sponsor or Owner) please describe the Contracting Entity here. N/A – Applicant will contract for this proposal.***

Part B. - Description of the Water Activity – Please Refer to Criteria and Guidance Document for Eligibly Requirements

1. Name of water activity/project:

CITY OF TRINIDAD NORTH LAKE RESERVOIR:
Rehabilitation & Multiple Use Construction

What is the purpose of this grant application?

[ ] Environmental compliance and feasibility study

[ ] Technical Assistance regarding permitting, feasibility studies, and environmental compliance

[ ] Studies or analysis of structural, nonstructural, consumptive, nonconsumptive water needs, projects

Study or Analysis of:

- [ ] Structural project or activity
- [ ] Nonstructural project or activity
- [X] Consumptive project or activity
- [X] Nonconsumptive project or activity

[X] Structural and/ or nonstructural water project or activity

2. Describe how the water activity meets these Threshold Criteria.

Project Summary (Inserted here for clarity):
The Colorado State Engineer has placed a restriction of water level in North Lake's storage capacity due to safety considerations. North Lake currently contains approximately 4,300 acre feet of water. The earthen dam is leaking at the groin of the dam and the concrete spillway is significantly deteriorated. The groin leak has been a serious and long-standing seepage problem on the dam. Continuing deterioration and loss of structural integrity of the dam are causing serious concerns, and thus North Lake dam is listed as a "high hazard" dam due to number of homes and ranches below the dam. The dam was originally constructed in the 1930's, but was expanded in 1964. The source of the water for North Lake is the North Fork stream through a diversion pipeline. The importance of North Lake is evident by the number of urban and rural residential customers, urban and rural commercial customers, the Colorado Department of Corrections prison and the U.S. Army Pinon Canyon maneuver site it serves. If water levels were restricted, the seriousness of this matter manifests itself in the possibility of a reduced water supply for all these customers.

The City has already conducted engineering, hydrological and hydraulic studies and designs of all structures to be funded by this proposal (the Project). The engineering design has identified the best approach to restore capacity to the reservoir by improving the dam and replacing the old concrete spillway. The objective of this funding will be to remove the State-imposed restrictions on storage and to restore full operating efficiencies to North Lake. This will allow Trinidad to hold and control water; and enhance its ability to provide the basic necessity of life, water, in times of drought it will also allow the City to continue to serve third parties, provide for and greatly improve fisheries, and wildlife habitat.

1. The water activity meets the eligibility requirements outlined in Part 2 of the Criteria and Guidelines.

    - The City of Trinidad is proposing an eligible water activity, as identified in Senate Bill 06-179, involving the performance and implementation of existing design and engineering towards a multi-use facility in order to correct long-standing seepage problems and failing water storage and conveyance structures into resources with expanded, cultural, environmental, wildlife, and recreational uses.

    - The North Lake dam improvements project is an eligible entity, as described in SB 06-179 and this proposal is submitted in accordance with CWCB guidelines for this funding proposal.

    - The City of Trinidad is requesting funds of **$739,235.00** from the State account, and will comply with all applicable submission criteria and deadlines.

2. The water activity is consistent with Section 37-75-102 Colorado Revised Statutes. The requirements/language from the statute is provided in Part 3 of the Criteria and Guidelines.

    - This water activity meets the eligibility requirements in Part 2 of the criteria and guidelines as detailed above.

    - The water activity is consistent with Section 37-75-102 C.R.S. because this project utilizes prior studies, implements engineering and hydrology studies which have been completed prior to structural repairs and upgrades on existing structures, and performs a multi-use project resulting in the optimization of, North Lake water supply and

recreational area. This project therefore does not supersede, abrogate, or otherwise impair the State's current system of allocating water within Colorado nor does it in any manner repeal or amend the existing water rights adjudication system. This project does not affect the State constitution's recognition of water rights as a private usufructuary property right nor is it intended to restrict the ability of the holder of a water right to use or to dispose of that water right in any manner permitted under Colorado law.

3. Evaluation and approval of the North Lake dam project water activity by the Arkansas Basin Roundtable (ABRT) is requested. The City of Trinidad is seeking general agreement by the roundtable. This information, including any opposition (if any) of who opposed the activity and why they opposed it will be included in writing from the roundtable chair.

    - This information will be submitted to the CWCB, within this proposal.

4. The water activity meets the provisions of Section 37-75-104(2), Colorado Revised Statutes. The requirements/language from the statute is provided in Part 3 of the Criteria and Guidelines.

    - This water activity meets the provisions of Section 37-75-104 (2) (c), C.R.S. regarding the results of SWSI in fulfilling its water use goals and storage objectives. The source of water stored by this reservoir generates from established historical and adjudicated water rights on the North Fork stream. North Lake is a multiple use facility and provides benefits to rural and urban water customers and as a recreational fishing area. The Project will provide more efficient use of consumptive and non-consumptive needs of the Arkansas River Basin. This will include the potential to store water at North Lake's maximum potential for all parties. The threat of loss of storage will be eliminated. In addition, the SWSI goal to increase non-consumptive uses associated with recreation (fishing and boating) will be met and enhanced by successful funding of this project.

    - In this process, the City of Trinidad consulted with and obtained the active support of the Purgatoire River Water Conservancy District (PRWCD), and the Colorado Division of Water Resources. For effects upon recreation, wildlife, and flood control the Boards of Commissioners of Las Animas County support this project. Letters of support express the advice and input the City of Trinidad has counted on from many stakeholders as it prepares to conduct the necessary repairs to restore North Lake Reservoir to tits full functionality and potential.

3. For Applications that include a request for funds from the Statewide Account, describe how the water activity meets the Evaluation Criteria. See Part 3 of Criteria and Guidelines.

- Promoting Collaboration and Cooperation

a. The water activity addresses multiple needs or issues, including consumptive and/or non-consumptive needs, or the needs and issues of multiple interests.

This Project addresses multiple needs and issues by addressing and proposing cures to the deficiencies in a complex reservoir-stream system. The project will focus on historic consumptive and non-consumptive water use practices which have been negatively impacted by the State Water Engineer's Office. North Lake dam has been plagued by decades of leaks and seeps. Not only have these problems caused water losses and inefficient use of storage water, but also diminishes the ability to improve on

and to take advantage of potential non-consumptive resources. This work is considered a complete repair of the dam and is not just a temporary fix. Successful funding of this project will not only cure the leaks and seeps but will also address and overcome many of the limitations and adverse effects of imposed water level restrictions on a state fishing and recreational area, on wildlife, for a productive fishery, and for improving their ability to sustain and increase the natural habitat. Sustainable reservoir storage also enables the City of Trinidad to respond to water demands in case of an uncontrollable situation such as a drought. This project will afford a greater control and flexibility in the operation of the reservoir especially in a time of unpredictable snow pack and precipitation. Not only will the general public benefit from this project but it will serve the purposes of wildlife by providing a full reservoir and source of water in drought years.

b. The number and types of entities represented in the application and the degree to which the activity will promote cooperation and collaboration among traditional consumptive water interests and/or non-consumptive interests, and if applicable, the degree to which the water activity is effective in addressing intrabasin or interbasin needs or issues.

This application represents excellent collaboration between the City of Trinidad, the Department of Water Resources, the US Forest Service, and the CDOW, with open channels to address multiple non-consumptive water interests and traditional consumptive interests. The CDOW also has direct concerns regarding water availability for its non-consumptive needs associated with the North Lake fishery. This emphasizes the importance of enlarging present storage-and- release capabilities throughout the year to include transmountain water, (if any), thus promoting and maintaining fish populations and recreational activities. In addition, this will assist in the efficient delivery of water for all customers at all times of the year.

By rehabilitating the North Lake dam and maintaining its history of multiple uses, this Project addresses the present day issues and future water supplies. The City of Trinidad will conform to established bid processes and will search for the contractor best suitable to perform the work. This Project, when funded, will address storage/release for flood control and improved water supply, and will factor in the opportunity to enhance the fishery and recreation associated with North Lake. This Project will enable the City of Trinidad to operate at top efficiency and assurance that it will continue to meet its delivery obligations.

- **<u>Facilitating Water Activity Implementation</u>**

c. Funding from this Account will reduce the uncertainty that the water activity will be implemented. For this criterion the applicant should discuss how receiving funding from the Account will make a significant difference in the implementation of the water activity (i.e., how will receiving funding enable the water activity to move forward).

Funds from the Water Supply Reserve Account (WSRA) are critical for the City of Trinidad to complete this project. The City Water Department does maintain a Reserve account emergency fund. It is Board policy that this operating reserve is only to be utilized as a last resort or in the case of unforseen needs.

d. There is an urgency of need for the water activity and/or any compelling "window of opportunity" that may be missed without funding from the Account.

The Colorado State Engineer has notified the City of Trinidad of imposed water level restrictions upon North Lake storage capacity due to safety considerations. The spillway is significantly deteriorated and there is a serious and long-standing problem on the left embankment, where seepage water comes out of the embankment and runs into the face of the dam. Dam inspectors over the years have seen this as a critical deficiency, causing them to place North Lake on "conditional" storage. These problems are the principal reason for proposing this project, and to this end, specific studies, engineering design and specifications have been completed. Continuing deterioration and loss of structural integrity of the dam are major concerns to the proper operation of the reservoir. These repairs are long overdue. The longer it takes to cure the seepage problem, for instance, the greater the risk of compromising the structural integrity of the entire system.

The window of opportunity for obtaining funding imposes some urgency in bringing to fruition the current multi-use perspective of this project. The improvements are to be considered not just as an operation-and-maintenance challenge, but should be viewed in the context of a greater purpose. The hydraulic and hydrological studies represent a great deal of work as part of the overall engineering and design of North Lake dam. Although the effects of prolonged leaks and seepage rates are small relative to daily stream base flows, it is important to assess, and to project into the future, the effects upon the fishery and wildlife. More critically, the challenge of increasingly unpredictable climate in coming years emphasizes the critical role of North Lake for water storage. High snow pack years and high spring run-off, which are normally ideal conditions, would not and could not be taken advantage of in a restricted water level condition. Short term, our window of opportunity is to accomplish the timely completion of this work.

e. The length of time needed to implement the water activity; preference will be given to activities which can be implemented in the least amount of time taking into consideration the complexity of the activity.

It is anticipated that with additional funding, the Project will be completed in year 2011. However, depending on the time the work commences, plus whatever permitting time is required will determine the actual completion date.

f. The applicant has the expertise and ability to implement the proposed activity.

The City of Trinidad contracted with a professional engineering consultant to prepare studies, specifications and final design of the North Lake dam improvements. The firm of RJH Engineering has accomplished this task and will also perform construction inspection duties as part of their activities within the project. The firm's experience with other similar Colorado projects includes dams over 100 feet high, with multilevel piping outlets with varying capacities, spillways, river diversions, and related pipeline requirements. The City of Trinidad is satisfied that the engineering firm has the expertise and ability to implement all phases of this Project, and has submitted the project plans to the Stare Engineer's Office (SEO) for approval. Initial review of the plans has been completed, and minor changes or adjustments have been implemented. Accompanying this proposal is the detailed engineer's "Opinion of Probable Construction Cost" for each task in the Scope of Work.

g. The applicant is providing matching funds and the amount of matching funds or is obtaining partial funding from other sources and the amount and source of such other funds or is providing demonstrable in-kind contributions.

Based upon the engineer's Opinion of Probable Construction Cost, the cost of this project is estimated at **$1,848,086.00**. Sources of funding are as follows:

- The City of Trinidad is prepared to contribute: **$369,616.00 (20%)**
- Proposed CWCB grant funding: **$739,235.00 (40%)**
- The remaining balance: (see note): **$739,235.00 (40%)**

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$1,848, 086.00 (100%)

Note: The source of the remaining balance will be either other grant funds or low interest loan funds secured by the City of Trinidad.

h. The applicant has a demonstrated need for financial assistance based on the inability or difficulty obtaining funding elsewhere.

The City of Trinidad is not in a position to afford the entire cost of this project. The Arkansas Basin Roundtable process and the availability of S.B. 179 funds will certainly go a long way in reaching the objective to perform the North Lake dam improvements project. This proposal represents a direct request for a funding opportunity, offering the most direct and relevant way to solve a long-standing problem. The City of Trinidad has also requested funding for the implementation of this project from the Department of Local Affairs, Energy and Mineral Impact Assistance Program. However, due to State budget shortfalls, no funding has been awarded through this Office.

- **<u>Meeting Water Management Goals and Objectives and Identified Water Needs</u>**

i. The water activity helps complete a needs assessment, including consumptive and/or non-consumptive needs, that was not fully funded from other sources.

This water activity helps complete the needs assessment for consumptive and non-consumptive needs. Our approach is not simply to overcome the operation-and-maintenance problems caused by these seeps and leaks, but to look widely and creatively at all existing and potential assets, and to develop a multi-use inventory of systems which will benefit from the stability and sustainability of these resources. Many mutual benefits are obtained by meeting the consumptive water management goals traditionally expected of a City facility as well as the nonconsumptive water management goals of the CDOW, recognizing that consumptive and non-consumptive uses apply to both entities. Storage is being allowed under "restricted" status by the State Dam Inspector.

j. The water activity meets one or more of the water management objectives identified in the Statewide Water Supply Initiative, helps implement projects and processes identified as helping meet Colorado's future water needs, and/or addresses the gap areas between available water supply and future need as identified in the Statewide Water Supply Initiative or a roundtable's basin-wide water needs assessment done in accordance with the Colorado Water for the 21st Century Act.

The Arkansas River Basin Roundtable has determined that the single most critical water issue confronting the Basin is the current unsustainable management of surface and ground water. This project optimizes, and makes sustainable, existing and future water supplies in the North Lake Reservoir. The reservoir has been and is currently being used primarily to store raw untreated water for treatment at the City of Trinidad water treatment plant for historical rural and urban customers. In addition to storage for these entities as needed, North Lake's multiple uses include spectacular high altitude recreational fishing and boating, and wildlife habitat. CDOW makes use of the reservoir reaching its water use goals and objectives. The CDOW maintains a regular fish stocking schedule for the lake. Through this project, and by mutual agreement, the CDOW will be able to continue stocking North Lake with fresh water trout for the beneficial use as a productive fishery.

With this additional reservoir storage the City of Trinidad is also in a much better position to answer water demands in case of an uncontrollable situation such as a drought. Storing additional water also allows flexibility in how and when water is distributed to different areas, depending on needs and available resources. This operational flexibility and cost effectiveness allows for the development of new ideas and practices that will ultimately be useful to wildlife as well as to the public. Cooperative and innovative efforts which effectively and efficiently provide multiple uses throughout the Arkansas River Basin system will benefit all users and should be incorporated into water management plans. In all these ways, this project effectively addresses the Statewide Water Supply Initiative's Management Objectives and the Arkansas River Basin Roundtable's concerns regarding sustainability, restoring North Lake Reservoir to optimal operational reliability, and, in the process, complying with all applicable laws and regulations.

k. The water activity promotes water conservation and efficiency.

Conservation and efficient management of water in storage has become a critical part of ensuring a safe and abundant water supply throughout the year for all beneficiaries. The drought of 2002 impressed upon the minds of our customers the need to conserve water and the individual responsibility to not waste this precious commodity. This project will allow for conservation of water which has for decades been lost to leaks and seepage. One of the most important aspects of being prepared to face drought conditions is the availability of having full reservoirs. This project therefore improves the ability of the City of Trinidad water system to hold and more effectively manage the supply of drinking water and provide for a basic recreation need at the same time, now and into the future.

l. The applicant has an existing water conservation plan.

Due to the onset of drought conditions in 2002, the City of Trinidad established a water conservation plan including water restriction schedules. The plan is a tiered system which allows for greater restrictions upon water users as drought conditions persisted or allows those restrictions to be relaxed as the water supply became more abundant. Unfortunately, one of the results of conservation was a reduction in revenues for the water department.

m. The water activity will make new water available for use.

Although no actual "new" water will be produced as defined under water law, in effect, maximum use will be made of established historical water rights. Should North Lake water level restrictions be put into place by the State Water Engineer's Office, whatever that amount of water reduction becomes, would bypass North Lake and move downstream, thus reducing the capability of storing water to the maximum decree afforded to North Lake. This project captures these losses, thereby producing "new" water which becomes available for multiple uses.

n. The water activity involves reoperation, enlargement, or rehabilitation of existing facilities.

The North Lake Dam Improvement Project reflects a rehabilitation of the dam. The reservoir has a maximum capacity of 4,300 acre feet of storage, however, that maximum level would not be sustained under the scenario of a reduced lake level as would be imposed by the SEO. Maintaining the maximum amount of water available for storage not only benefits the potable water customers, but also those who would take advantage of a high mountain fishing lake. This project epitomizes the Arkansas River Basin Roundtable goal of developing storage facilities to their highest degree and becomes a model of working towards diminishing the projected 50 year gap in water supply.

- **The Water Activity Addresses Issues of Statewide Value**

o. The water activity helps sustain agriculture, and open space, or meets environmental or recreational needs.

The source of water to North Lake reservoir is the North Fork stream direct flow water rights that date back to 5-31-1861. The lake itself has storage rights that date back to 9-14-1905. This project, in effect , protects and preserves historic senior storage rights. North Lake Reservoir has been used primarily to store raw, untreated water for its ultimate use as potable drinking water after being delivered approximately two miles downstream by pipeline to the City water filtration plant. The treatment plant originally had a capacity of only 6.0 million gallons per day, but after renovation and modification, that plant capacity is now at 8.4 million gallons per day. Although there is a secondary source of water for the treatment plant, it is considered only as a back up or emergency supply.

North Lake serves a combined population of approximately 15,000 people in the city of Trinidad and the surrounding rural communities. North Lake is not only a basic component of the region's water system, it is a vital component with so many people depending on the water that comes from the reservoir. The multiple use factor as a spectacular high altitude recreational fishing and boating facility add to its tremendous value to the area.

p. The water activity assists in the administration of compact-entitled waters or addresses problems related to compact entitled waters and compact compliance and the degree to which the activity promotes maximum utilization of state waters.

The effects of this project help to ensure Colorado's continuing ability to meet its Compact obligations. Maximum utilization of State waters is implied by the Arkansas

River Basin Roundtable's priority of maintaining sustainable water supplies and by ensuring that North Lake will have the operational flexibility to adapt to changing conditions. This project addresses both of those goals. The North Lake Reservoir provides a uniform and stable supply of water as a recreational tool for the CDOW and as a reliable source of storage for the Trinidad valley area.

q. The water activity assists in the recovery of threatened and endangered wildlife species or Colorado state species of concern.

Although there are no known threatened or endangered wildlife species in the North Lake region, the lake area is frequented by mule deer and elk. Eagles nest in areas near the Lake. Brown bears are common to the area as well as number of smaller species of animals. The North Fork stream area which feeds North Lake is a natural habitat for all of these creatures but in a greater number. The North Lake Reservoir by and through the agreement with CDOW promotes the maintenance of fish populations and recreational activities. Specifically, Rainbow trout, Stream Trout and German Brown trout are stocked in the lake by the CDOW. By maintaining a full and operational reservoir, the City of Trinidad will continue to meet its objectives as a supporter of wildlife. The reservoir allows the City and CDOW to add to degree of flexibility in planning for the most beneficial use to wildlife. What is now a seepage problem will become a positive condition that increases a productive fishery and increases the support of wildlife habitat and specifically assists in the protection of these many other species. The North Lake dam improvement project provides a high level of benefit to Colorado in relationship to the amount of funds requested.

The benefits of a completely full reservoir which will be accomplished by his project satisfy all of the objectives outlined in the Colorado Water Conservation Board's 2004 Statewide Water Supply Initiative Study. This water activity reduces soil erosion, enhances water supplies, improves water quality, increases wildlife habitat, and reduces potential damages which would be caused by flooding if the dam were to fail. Public benefits also include protecting the natural resources that help sustain high-value environmental quality in the North Lake area, while supporting continued economic development, recreation, and scenic beauty. The amount the City of Trinidad is requesting for this rehabilitation and multiple use project is more than offset by the high value which accrues to Colorado from this Project:

s. The water activity is complementary to or assists in the implementation of other CWCB programs.

This water activity is another beneficiary of Arkansas River Basin Roundtable's efforts to provide technical assistance and funding support to its members, assisting them in planning and funding projects which might otherwise be beyond their scope. Although not directly related to each other, each project benefits from the Roundtable's collective wisdom, quite often sharing technical advice and expertise across our network. Improving the North Lake reservoir is related, through this network, to other SB 179 projects such as the Santa Maria., Continental Reservoir which stores Rio Grande Compact water, San Luis Valley Water Conservancy District water, CDOW water, and Trans-Mountain water. The San Luis Valley Irrigation District is completing a multi-use enlargement study of the Rio Grande Reservoir, with goals very similar to this project's. The

deterioration of reservoirs and spillways, imposed limitations on storage, and outlet mechanisms that are past their useful life are problems this project shares with many other reservoirs throughout the state that have seen restrictions imposed upon them by the State Engineer's Office. Terrace Reservoir and Platoro Reservoir, are two other projects in the process of seeking CWCB assistance at this time. Another was the San Luis Valley Resource Conservation & Development project on the Alamosa River for the Alamosa River Watershed Restoration Foundation. Upcoming projects to CWCB will include proposals from Alamosa Riverkeepers and Terrace Irrigation Company to upgrade Terrace Reservoir, and a riparian stabilization project by the Colorado Rio Grande Restoration Foundation.

t. The water activity helps support the State's economic vitality and competitiveness in national and international markets.

A reliable, dependable and high quality source of potable drinking water for established urban and rural residential and commercial customers is essential for economic growth and sustainability. Tourism is a main driver of the economy within t he State of Colorado and the North Lake reservoir is a component of the state's recreational attractions. This project, by restoring the integrity of the system, helps to support the State's economic vitality and competitiveness by meeting its obligations to the individuals and businesses that have come to rely and depend on this water throughout the region. The State's economic vitality is further enhanced by completing this project so that the final project, when complete, results in enhancing the diverse mix of consumptive and nonconsumptive needs and uses described above, including wildlife, fisheries, tourism, recreation, and conservation.

4. Please provide an overview of the water project or activity to be funded including – type of activity, statement of what the activity is intended to accomplish, the need for the activity, the problems and opportunities to be addressed, expectations of the participants, why the activity is important, the service area or geographic location, and any relevant issues etc. Please include any relevant TABOR issues that may affect the Contracting Entity. Please refer to Part 2 of Criteria and Guidance document for additional detail on information to include.

The Colorado State Engineer has now placed North Lake dam under restriction due to safety considerations. The dam is currently listed as a "high hazard" dam due to the fact that should it fail, there would be serious property damage and perhaps even loss of life. The restriction as imposed requires the City of Trinidad to lower the lake level by five(5) feet over a five month period. This represents a loss of 541 acre feet of water.

The concrete spillway is significantly deteriorated and there is a serious and long-standing seepage problem on the dam. Continuing deterioration and loss of structural integrity of the dam are serious concerns and the City of Trinidad has not taken them lightly. The city has accepted the responsibility to ensure to its citizens that North Lake will remain a viable and dependable source of water to the City and the surrounding communities. To this end, the City previously contracted with the engineering firm of GEI Consultants to design/build the new piping system with in the reservoir including a new drain pipe within the dam and a completely new concrete outlet works. This was accomplished at a cost of **$847,232.59**.

The City of Trinidad has obtained the services of the professional engineering firm, RGH

Consultants to design the new dam reinforcement and spillway replacement project. The final design drawings and specifications have been submitted to the State Engineer's Office and we are awaiting final review and approval. The Project to be funded by this proposal is to conduct the actual construction of the dam reinforcement and replace the deteriorated concrete spillway with a new pipe conveyance. Hydrological and hydraulic studies of the structure were also completed as part of the engineering endeavor The cost for this engineering design to date is **$296,317.68**.

The Engineer's Opinion of Probable Construction Cost identifies the amount of **$1,848,086.00** in additional funding needed for the project. Included in this dollar figure are Direct Construction Costs, Construction Engineering and Administration, Materials Testing, City Administration and Construction Contingencies. A copy of the cost estimate is attached. The requested funding from the State fund for this project is **$739,235.00 or 40%** of the project. The result of this project , if funded, will be to remove the State-imposed restrictions on storage and to restore full operating efficiencies to the reservoir. This will allow North Lake to hold and control additional North Fork stream water; improve the City of Trinidad's ability to hold and more effectively manage drinking water which will increase the system's value in and its ability to respond in times of drought; increase the City of Trinidad's options and ability to serve third parties and greatly improve and enlarge a high mountain recreational fishery and place of wildlife habitat.

Type of Activity:

This project requests construction funding to perform the actual North Lake dam improvements described above. The project addresses both consumptive and nonconsumptive water needs. The design work has already been accomplished and the State Engineer's Office is currently reviewing the plans and specifications for the project. The end result of the project will be a complete and total package which will allow the City of Trinidad to store water in the reservoir to its maximum content taking advantage of the North Fork stream which is the source of water for the reservoir. A schematic drawing of the delivery system is described in the attached drawing titled City of Trinidad Mountain Water System which alsoos tabulayes the City' water rights.

Goals and Objectives:

The City of Trinidad is requesting $739,235 in order to perform the actual construction of the North Lake dam rehabilitation and spillway replacement project as designed by the firm of RGH Consultants, thereby removing the threat of conditional storage and/or restricted water levels in the reservoir. The project will allow the full use of the reservoir up to its alloted storage right of 4,300 acre feet of water. Specific goals and outcomes of this project are as follows:

- Address the cause of seepage and resolve seepage problems at the dam.
- Return North Lake reservoir to its full storage capability
- Eliminate limitations which could be placed on the reservoir by the SEO.
- Provide stability of the dam embankment.
- Resolve questions on permeability parameters of downstream reservoir dam embankment
- Improve reservoir capacity as a primary source of water for urban and rural customers.
- Provide an economic driver as sustainable water source for residential and commercial customers.
- Maximize potential for fishery and recreation resources.

Need:

The cost of the project described herein is estimated at $1,848,086.00. The City of Trinidad has expended $847,232.59 to date on the North Lake dam rehabilitation project and simply does not have the funds to execute and complete this project. The City undertook a Waste Water Reclamation Plant expansion and improvement project in 2000 under a twenty year loan. That project was required by State of Colorado Public Health Department mandate. There are approximately nine years remaining on the note, which prevents Trinidad from additional borrowing due to bonded indebtedness. However, as part of this grant request, the City of Trinidad is committed to contribute at least 20% ($369,616.00) towards this project and may seek a low interest loan irregardless of the current bonding capacity.

Problems and Opportunities:

North Lake Reservoir is facing the problem of not being able to be used at its full available capacity. The State Water Engineer has imposed restrictions on the water level in the lake due to safety concerns. Much needed and extremely vauable storage water will be reduced. This is especially critical in times of low precipittion and drought. It appears that this portion of Southern Colorado is in a drought condition and may remain that way for a long time to come. The earthen dam is leaking and there is seepage at the groin area of the dam. Also the existing concrete spillway has deteriorated to the point where it must be replaced. Studies, plans and design specifications have been completed and are in place. The SEO has provided review of the project plans but has yet to provide its final approval. A summary of the problems follows:

(1) The Colorado State Engineer has placed a restriction on the North Fork Reservoir. Said restriction consists of lowering the lake level by five feet over the next five months. This represents a loss of 541 acre feet of water. Furthermore, if rehabilitation measures are not performed, the threat of additional water restrictions will be imposed. See attached letter from Dick Wolfe, State Water Engineere dated June 13, 2011.Rehabilitation involves reinforcement of the earthen dam with additional earth fill at the base of the dam and replacement of the existing concrete spillway.

(2). Excessive seepage through the left abutment/groin is problematic, causing concern as to present and future deterioration of the reservoir. The condition and capacity of the spillway also requires replacement. Engineering has been completed and this is basically a “shovel ready” project.

3) The designed objective of this reservoir is to store water in North Lake Reservoir up to its full capacity of 4,300 acre feet of water. Water is currently being stored under a “conditional” basis as allowed by the State Engineer’s Office. Furthermore, the dam is classified as a “high hazard” dam due to the probability of serious property damage and potential loss of life in the event of dam failure.

4) The reservoir is considered a high value fishery, with multiple opportunities to enhance fish habitat and to expand the public recreational value of the area.

Expectations of the Participants:

A rehabilitated North Lake dam will restore the reservoir’s designed capacity, providing improved options for efficient water management of raw water which is piped to the City water filtration plant. This water facility is the only water purveyor in the entire area, serving Trinidad and multiple water user associations connected to the water distributuon system. There is an established expectancy by current rural and urban households that the water they have been accustomed to receiving will always be there. Indeed , as the regions’s only water supplier and purveyor , this reponsibility weighs heavily on the City of Trinidad. To have the reservoir level reduced from it maximum content of 4,300 acre feet could be devstating especially in timesof severe driught. As a fishery, its value

to recreation in the area and to the State of Colorado generally are of extremely high value. The requested funding in the amount of $739,235 will accomplish the folowing tasks: (See "Exhibit A" for detailed project description).

Task 1.1 Contractor mobilization, erosion and sediment control, clearing and grubbing and reservoir control.

Task 1.2 Dewatering, site access road improvements and crest earthwork.

Task 1.3 Construct new spillway structure, new spillway pipe and removal of existing spillway.

Task 1.4 Perform secondary pipe grouting, gate tower repair and outlet works disposal.

Task 1.5 Furnish and place low permeabiltiy fill, furnish and place berm fill, furnish and place filter sand and furnish and place drain gravel.

Task 1.6 Place topsoil, type M riprap, type L modified riprap and riprap bedding.

Task 1.7 Install outlet works pipe, manhole, toe drain pipe, instrumentation, seeding and oyhere remaining miscellaneous work.

Importance:

A statewide benefit of this project is that increased storage capacity in North Lake Reservoir provides new options to store and control additional North Fork stream water and expands opportunities to serve the water storage and management objectives of third parties. North Lake's multiple uses include spectacular high altitude recreational fishing and boating, and wildlife habitat. In the Arkansas River Basin, as is the case throughout most of Colorado, water is overallocated, demands are growing, and river flows and uses are vulnerable to drought and climate change. As of March, 2011, snowpack in the upper Purgatoire watershed (Whiskey Creek snotel) was approximately 50% of average. Serious drought conditions began in 2002 requiring water consumption restrictions to be put into place and it appears this patternis continuing. In the 2002 drought diversions were severely curtailed, in-stream flows were diminished, reservoir storage was reduced, and extensive diversions threatened endangered species. In such times high drought impacts have drastically reduced stream depths or caused them to be completely dry, increasing the importance of water held in storage for all users and for the protection and enhancement of wildlife potential. When water levels are sufficient to maintain minimum stream flows, the streambeds and the reservoir support good to excellent trout fisheries.

Such fluctuations in flow require North Lake Reservoir to be as stabile and to maintain optimum operational flexibility as much as is humanely possible. In coming years, just this kind of high variability in the availability of water resources is predicted. Good planning for sustainability in the management of reservoir systems requires increasing the operational flexibility of North Lake Reservoir to its maximum capability – and all reservoirs in the basin -- in order to provide a regular supply that meets water demands. By addressing and curing long-standing deficiencies in the system, North Lake provides important multi-use safeguards for the uncertain times which lie ahead. There are also other lower impact activities associated with the lake such as wildlife viewing, bird watching, outdoor photography, nature research, and related pursuits. The fall season brings an influx of hunters into the region. These activities also represent a source of income to the CDOW and offer lower management costs to public agencies. It's a very important project.

Service Area – Geographic Location:

North Lake Reservoir is located in Section 19, Range 68 West, Township 33 South, in Las Animas County, on a tributary of the North Fork stream, in the Sangro de Christo Mountain range of southern Colorado. The water

rights have a remarkable history and are listed as follows:

Priority 1, 05-31-1861, 1.59 cfs.
Priority 3, 11-30-1861, 2.00 cfs.
Priority 4, 01-01-1862, 2.35 cfs.
Priority 6, 04-01-1862, 1,78 cfs.
Priority 13, 01-01-1864, 0.45 cfs.
Priority 155, 09-14-1905, 57.6 cfs.

The storage priority water rights also dates back to 1905. The original dam was built in the 1930's, and the lake was expanded in 1964 to its present configuration. The old original dam still lies in place under the lake. The high water elevation of the lake is 8,586 feet, the crest of the dam is at 8,592 feet. The reservoir can be located on the Stonewall USGS quad topographical map.

Other Relevant Issues: (none)

TABOR issues: There are none involved.

5. Please summarize the proposed scope of work. Please refer to Part 2 of the Criteria and Guidance document for detailed requirements. On the following page there is an example format for the Scope of Work. You can use the example format or your own format, provided that comparable information is included.

The scope of work should outline by task how the water activity will be accomplished. It is important that the scope of work detail the specific steps, activities/procedures that will be followed to accomplish the water activity and the specific products/deliverables that will be accomplished. The scope of work should include but not be limited to: task description, key personnel, budget, schedule and deliverables and the final report/project documentation upon completion of the water activity.

SCOPE OF WORK

The City of Trinidad selected the best engineering and consulting firm for this proposed North Lake dam rehabilitation project. Following are the basic segments of the Scope of Work. This information is elaborated upon in the attached "Exhibit A" – RGH Consultants Design Summary Report/SEO Review Submittal.

Task Description:

1. Specific tasks which have been accomplished and or completed by the engineering firm of RGH Consultants: Performed the necessary hydrologic, hydraulic geotechnical, seismic, structural and conduit evaluations and other work to determine required spillway size and method of reinforcing the earthen dam. Determined the hydrologic/hydraulic adequacy of spillway, according to State's regulations, so as to lift current restrictions. In addition, completed a complete construction report with recommendations to accomplish the work at hand. A copy of the report is included as "Exhibit A" attached herein.

2. RJH Consultants have prepared complete written specifications, design drawings of the necessary dam improvements to mitigate leakage and seepage through the dam groin area, new spillway design and other appurtenant work tasks. Engineering expenses to accomplish these tasks are just under $300,000 to date.

3. Following the acquisition of funding, the task will be to actually construct the project. The engineer's "Opinion of Probable Construction Cost" identifies a total amount of $1,848,086.00. A crucial component of this expense is the Construction Engineering and Administration costs for the Engineering firm's representatives to be on site during construction. This factor has an estimated cost of $260,000, included in the total amount.

II. Key Personnel:

Robert Huzjak, professional Engineer, RGH Consultants and representatives; State Engineer's Office dam inspectors; City of Trinidad utility department personnel.

III. Budget:

The City of Trinidad has previously expended funds in the amount of $847,232.59 towards the rehabilitation of the North Lake dam. That work consisted primarily of replacement of pipes and valving in the control tower and construction of new outlet channel at the base of the dam. The preliminary cost estimate to accomplish the remaining dam rehabilitation is $1,848,086.00. The City of Trinidad is prepared to contribute to $369,616.00. towards the project which equates to 20% of the total cost. The funding request herein from the State Water Supply Reserve Account is $739,235.00 or 40% of the total. The remaining balance is $739,235.00 (an additional 40%) which will be funded by additional grant requests by the City of Trinidad, most likely requested through the Energy and Mineral Impact Assistance Program of the Department of Local Affairs (D.O.L.A.), or through a low interest loan. A copy of the engineer's "Opinion of Probable Construction Cost" is included and attached as "Exhibit B".

IV. Schedule:

Assuming the grant request is approved and funding is obtained by this fall, the project will then be advertised for construction with bids to be received this winter. It is anticipated that actual construction would begin in the Spring of 2012.

V. Final Report/Project Documentation:

Upon completion of the work by a suitable and qualified constructer, the details of the project will then be summarized in a written report with to include photographs of the work efforts. A number of original documents will be created, one for the engineering firm's record, several for the City of Trinidad's records, and several for the entities awarding the grant funds (CWCB, DOLA, etc.)

6. Water Availability and Sustainability – this information is needed to assess the viability and effectiveness of the water project or activity. Please provide a description of each water supply source to be utilized for, or the water body to be affected by, the water activity. For water supply sources being utilized, describe its location, yield, extent of development, and water right status. For water bodies being affected, describe its location, extent of development, and the expected effect of the water activity on the water body, in either case, the analysis should take into consideration a reasonable range of hydrologic variation.

Water supplies to North Lake Reservoir include flows from the North Fork stream which also includes the old priorities of Burroughs Ditch and Clark No. 1 and Clark No. 2. The only direct flow to

North Lake is through a diversion canal from the North Fork over and into North Lake. Flows from this mountain stream are primarily regulated by the Water Commissioner for Division 2 of the Arkansas River Basin. Flows are based on reservoir requirements and storage rights within the reservoir. The effect of this water project will be to increase storage at North Lake Reservoir and to provide a full lake which is an extremely important component as a fishery for the CDOW. This Project has the effect of increasing the flexibility of CDOW to use the lake more effectively and to the greatest benefit for a variety of wildlife and wildlife habitat. Water stored in the reservoir is released to meet residential and commercial needs of both urban and rural customers' needs of potable drinking water after the reservoir flow is treated at the City's Water Filtration Plant. A secondary multiple use is for fish propagation as administered by the CDOW. Recreational fishing and boating, deer and elk big game wildlife, and waterfowl nesting are sustained and kept in balance with a full reservoir.

7. Please provide a brief narrative of any related or relevant previous studies.

As detailed above, the engineering firm of RGH Consultants has already prepared the hydraulic and hydrological studies, the geotechnical and seismic studies and the analysis of the existing structure and conduits that enabled them to prepare a complete set of written specifications and a complete set of design drawings for the construction of the North Lake dam rehabilitation project. Engineering cost to date total $296,317.68.

8. Additional Information – If you feel you would like to add any additional pertinent information please feel free to do so here.

Additional information is provided for the North Lake dam rehabilitation project by several attached documents as follows:

1) "Exhibit A" – RGH Consultants Design Summary Report/SEO Review Submittal.
2) "Exhibit B" – Engineer's Opinion of Probable Construction Costs.
3) "Exhibit C" – EIAF Report of previously expended funds.
4) "Exhibit D" – Letters of Support.
5) "Exhibit E" – Map of the City of Trinidad Mountain Water System
6) "Exhibit F" – Topographical map of under water survey of North Lake
7) "Exhibit G" – Letter from Dick Wolfe, State Water Engineer and North Lake Reservoir Capacity Table.

The above statements are true to the best of my knowledge:

Signature of Applicant: _____

Print Applicant's Name: Jim Fernandez, Utilities Superintendent

Project Title: North Lake Dam Rehabilitation Project

Date: July, 2011 (Amended)

Applicant's Telephone/FAX/E-Mail Address: Office : 719-846-9843, ext 122
Fax: 719-846-4140
e-mail: jim@historictrinidad.com

Return this application to:

Mr. Rick Brown
Intrastate Water Management and Development Section
COLORADO WATER CONSERVATION BOARD
1580 Logan Street, Suite 600
Denver, CO 80203

To submit applications by Email, send to: rick.brown@state.co.us
To submit applications by Fax, send to: (303) 894-2578

EXHIBIT “A”

RJH
CONSULTANTS, INC.

GEOTECHNICAL AND
WATER RESOURCES ENGINEERING

DESIGN SUMMARY REPORT
SEO REVIEW SUBMITTAL

NORTH LAKE DAM REHABILITATION PROJECT
LAS ANIMAS COUNTY, COLORADO

Submitted to
City of Trinidad
P.O. Box 880
Trinidad, Colorado 81082

Submitted by
RJH Consultants, Inc.
9800 Mt. Pyramid Court, Suite 330
Englewood, Colorado 80112
303-225-4611
www.rjhconsultants.com

October 2009
Project 07104

Robert J. Huzjak, P.E.
Project Manager

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SECTION 1 – INTRODUCTION

1.1 Purpose

The City of Trinidad (City) retained RJH Consultants, Inc. (RJH) to provide design engineering services to address outstanding dam safety issues at North Lake Dam. The primary elements of the North Lake Dam Rehabilitation Project (Project) include:

- A seepage collection system and stability berm to address seepage and high embankment foundation pressures downstream of the dam and to improve downstream slope stability. Replacement of the outlet works pipe at the downstream toe of the dam is required due to external loading concerns from the new stability berm.
- A new pipe spillway on the left abutment of the dam and abandonment of the existing spillway to address structural and hydraulic deficiencies with the existing spillway.
- Abandonment of the upper inlet pipe into the gate tower because the pipe is separated within the embankment near the gate tower.
- Secondary grouting of a 15-inch pipe located below the dam that extends from the original dam to complete abandonment of the pipe. Primary grouting of the pipe was performed in 2001.

The purposes of this report are to document the design analyses and design decisions for the Project and to meet the requirements and guidelines of the Colorado Office of the State Engineer (SEO).

1.2 Background

1.2.1 General

The dam is located about 35 miles west of Trinidad, Colorado, along Colorado State Highway 12, in Las Animas County, as shown on Figure 1.1. The project site (Site) is located in Section 19, Township 32 South, Range 68 West of the 6th Principal Meridian. The dam is owned and operated by the City and provides raw water storage for municipal use. The reservoir is filled from two sources: North Fork of the Purgatoire River through an aqueduct about 2,000 feet long that drains into the upper part of the reservoir, and from precipitation from a 0.76 square-mile watershed basin upstream of the dam. A smaller dam was constructed before 1950 in a location upstream of the existing dam, but

has since been abandoned. The following is a summary of construction and engineering evaluation activities that have occurred at the existing North Lake Dam:

- 1964: Construction of the existing dam.
- 1977: First identification of clear, steady seepage from a concentrated source on the right abutment downstream of the dam.
- 1998: The SEO identified possible safety concerns including insufficient slope stability, seepage issues, and deterioration of the auxiliary outlet conduit.
- 1999: GEI Consultants, Inc. (GEI) completed a geotechnical investigation and an engineering evaluation of the dam. GEI identified deterioration and holes in the auxiliary outlet conduit, high foundation pressures, and shallow fractured bedrock conveying seepage in the right abutment.
- 2001: The SEO identified additional safety concerns including spillway deterioration and uplift pressures below the spillway. Also in 2001, additional investigations were performed to confirm the stability of the upstream slope, and to observe the condition of the inlet pipes to the gate tower. The upstream slope of the dam was determined to have an acceptable stability with no limit on the rate of reservoir drawdown. A pipe separation was identified in the upper inlet pipe to the gate tower.
- 2002: The topography of the reservoir floor was surveyed and an updated stage-capacity relationship was developed. The total storage at normal pool was computed to be 4,214 acre-feet (ac-ft). The auxiliary outlet conduit was abandoned by grouting and the downstream impact basin was removed. Grouting of the 15-inch outlet works pipe that extends below the dam to the original dam was completed. All valves in the gate tower were replaced and a new stream release structure was constructed between the downstream toe and the existing valve house. A small sinkhole above the upper inlet pipe and adjacent to the gate tower was filled.

1.2.2 Previous Studies

A bibliography of previous reports and design documents is presented in the Geotechnical Data Report (RJH, 2008a). A brief summary of previous reports for North Lake Dam is summarized below:

- *Geotechnical Evaluation of North Lake Dam*, GEI, October 1999. Data was presented from five borings, and the results were used to perform initial stability and seepage analyses. Based on the results, safety issues were identified for

seepage, stability, and potential piping into and along the auxiliary outlet conduit. Several repair alternatives were recommended.

- *Upstream Slope Stability Evaluation During Rapid Drawdown*, GEI, April 2001. Data was presented from three borings upstream of the dam crest, and the results were used to perform stability analyses for the upstream slope. Based on the results, the upstream slope was determined to have an acceptable slope stability factor of safety under rapid drawdown conditions.
- Construction Drawings and Technical Specifications for North Lake Dam Stilling Basin Modifications, GEI, August 2002. This included adding a tee connection on the outlet pipe, a plug valve in the new pipe, and a new reinforced outlet works stream release structure.
- *Storage Capacity Report*, GEI, November 2002. Bathymetric survey results were presented for both North Lake and Monument Lake.
- *Technical Memorandum: North Lake Dam Relief Well Project*, GEI, December 2002. Hydraulic conductivities were selected for various dam and foundation materials based on seepage modeling. A series of relief wells were designed to improve stability of the downstream slope and the foundation.
- Construction Drawings and Specifications – North Lake Dam Foundation Pressure Relief Project, GEI, July 2003. Drawings and technical specifications for a series of relief wells were approved by the SEO, but the project was not constructed.
- *Spillway Assessment Report*, GEI, May 2005. The existing spillway was evaluated for structural and hydraulic performance. As a result of the investigation and analyses, abandonment of the existing spillway and construction of a new spillway were recommended.
- North Lake Dam Letter and Memorandum, GEI, June 2005. The preliminary option of probable cost for spillway repair was presented for the construction of a new pipe spillway on the left abutment.
- *Construction Completion Report – North Lake Dam Outlet Works Modifications*, GEI and RJH, April 2007. This report documented modifications to the outlet works including abandonment of the auxiliary outlet conduit, repairs to the gate tower, and abandonment of the old dam 15-inch pipe. Video surveys of outlet works pipes were presented.

- Construction Drawings for North Lake Dam Outlet Works Rehabilitation Project, GEI, July 2007. As-constructed conditions were presented for the work described in the Construction Completion Report.
- *Hydrology Report - North Lake Dam Rehabilitation Project*, RJH, June 2008. RJH performed hydrologic and hydraulic analyses to develop the Inflow Design Flood (IDF) for use in the final design of a replacement spillway.
- *Geotechnical Data Report - North Lake Dam Rehabilitation Project*, RJH, December 2008. This report documented the geotechnical data collected to support design of the primary elements of the Project.

1.3 Scope of Work

RJH performed the following services for final design of the project:

- Evaluated the collected geotechnical field and laboratory data and developed material properties for the foundation and embankment materials.
- Performed settlement analyses to estimate the expected settlement of the existing outlet pipe from construction of the berm and evaluated ground modifications to reduce settlement.
- Performed seepage analyses and two-dimensional limit equilibrium stability analyses to size a downstream stability berm and confirm that the final stability berm configuration provides the required factors of safety.
- Performed seepage, flow analyses, and filter compatibility to design the drainage system under the stability berm.
- Performed reservoir flood routings using the information in the *Hydrology Report* (RJH, 2008b) to design the spillway intake structure, spillway conduit, and stilling basin (outlet) structure.
- Performed structural analyses to design the spillway.
- Performed hydraulic analyses for the outlet works rehabilitation. Hydraulic analyses included an evaluation of the hydraulic impacts of the proposed outlet works rehabilitation on the system discharge capacity including abandonment of the upper inlet pipe and replacement of the 24-inch-diameter outlet pipe.
- Performed hydrologic analyses to design the surface drainage ditches and a new access road crossing downstream of the dam.
- Prepared this report documenting the final design of the Project.

SECTION 2 - PROJECT DESCRIPTION

2.1 Existing Site Description

North Lake Dam is a 72-foot-high, high hazard, earthen embankment with a total storage capacity of 4,214 acre-feet (ac-ft) at normal pool. The dam was built in 1964 as a replacement for a smaller, older dam located about 900 feet upstream. The existing dam has a maximum normal pool at Elevation (El.) 8586.5, which corresponds to a gage height of 67 feet. The dam crest is at about El. 8591.5. The crest is about 20 feet wide and 630 feet long, with an upstream slope at approximately 3 horizontal to 1 vertical (3H:1V) and a downstream slope at approximately 2H:1V as shown on Figure 2.1.

Record drawings of the existing dam are not available, but based on construction drawings, the dam should have a low permeability upstream shell, a very low permeability core extending to bedrock, and a random-fill downstream shell. There are no internal drains or filters. Based on data from previous geotechnical investigations, bedrock near the maximum section is about 117 feet below the crest of the dam and the general internal configuration of the dam appears to agree with the design drawings. The bedrock consists of moderately to intensely weathered claystone. The upper 5 to 10 feet of the bedrock is intensely weathered.

The spillway is a reinforced concrete chute at about the maximum section of the dam. The spillway has a crest width of about 6 feet at El. 8586.5. Transverse cracks are present along the chute. Slabs are cracked and separated at all major transitions in the spillway including the upstream end of the crest, the downstream end of the crest, and the transition to the stilling basin. At the spillway approach area on the upstream slope of the dam, the concrete apron is separated from embankment material by up to 1 foot.

The outlet works consists of a concrete wet-well gate tower located in the upstream face of the dam. The gate tower has three inlet pipes at different elevations and a single outlet pipe. The inlet pipes are 20-inch steel pipes with 24-inch butterfly valves located in the gate tower. The outlet pipe is a 30-inch-diameter, concrete-lined, welded steel pipe. Near the downstream toe of the embankment, the outlet pipe transitions to a 24-inch-diameter, 10-gauge, asbestos-bonded, double-riveted, asphalt-dipped pipe. The top of the pipe is about 4 feet below the existing ground. The pipe extends to a valve house about 190 feet downstream of the toe of the dam.

One 15-inch pipe extends from the old dam to the toe of the existing dam. The upstream end of the pipe is about 920 feet upstream of the existing dam centerline. The old dam 15-inch pipe has been partially abandoned on the lower end by previous grouting operations. The grouting apparatus on the downstream end of the pipe consists of a 5-inch-diameter grout pipe, with a 6-inch gate valve. The 5-inch grout pipe daylights to the right of the 24-inch-diameter outlet pipe about 40 feet downstream of the toe of the dam. The end of the partially-abandoned 15-inch pipe is encased in filter sand, and a 4-inch-diameter PVC drainpipe extends from the filter sand to the ditch downstream of the spillway. Additional information is provided in the *Construction Completion Report – North Lake Dam Outlet Works Rehabilitation* (GEI, 2007).

A 24-inch CMP auxiliary outlet located to the left of the spillway has been abandoned by grouting and the outlet structure and grouting apparatus have been removed. The end of the auxiliary outlet is encased in filter sand, and a 4-inch-diameter PVC drainpipe extends from the filter sand to the ditch downstream of the spillway. Additional information is provided in the *Construction Completion Report - North Lake Dam Outlet Works Rehabilitation* (GEI, 2007).

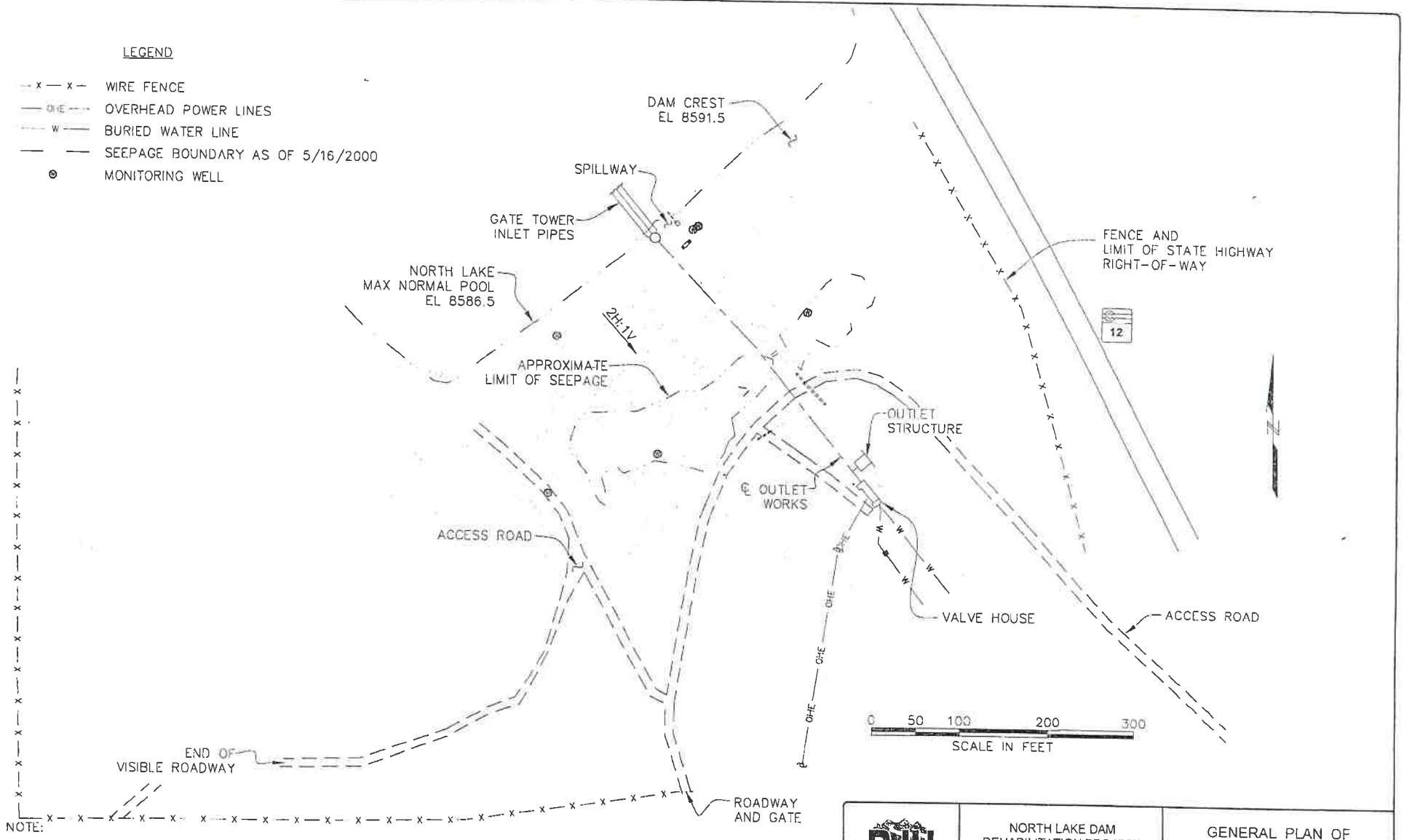
The lower half of the downstream shell of the dam is moist at the surface, and surface soils at the toe are soft and wet. The extent of the wet area is outlined on Figure 2.1. The source of the moisture appears to be seepage primarily through a concentrated flow on the right groin. The beginning of channelized flow is located about 20 feet downstream of the dam at about El. 8544. This seepage flows into a small swale on the right groin, which connects to the streambed downstream of the spillway stilling basin. About 50 feet from the end of the ditch, a sharp-crested weir is installed to measure the quantity of seepage.

2.2 Primary Project Components

The primary components of the North Lake Rehabilitation Project are shown on Figure 2.2 and described as follows:

- DOWNSTREAM STABILITY BERM: An 80-foot-wide berm with a crest at El. 8550 and a downstream slope of 2.75H:1V will be constructed on the downstream slope of the dam across the entire valley. A filter drain system will be placed below the berm to collect seepage. The rehabilitation will require replacement of a section of the lower 24-inch outlet pipe with a manhole with sleeve couplings and a 30-inch-diameter outlet pipe.

- SPILLWAY: The existing spillway will be demolished and removed and the excavation will be restored by placing fill. A new spillway consisting of a reinforced concrete intake structure with trashrack, a 36-inch diameter reinforced concrete pipe (RCP), and a reinforced concrete stilling basin will be constructed in the left abutment.
- UPPER INLET PIPE ABANDONMENT: The separated upper inlet pipe to the gate tower will be abandoned by filling 14 feet of the pipe immediately upstream of the gate tower with grout, removing the 24-inch butterfly valve, and placing a blind flange on the pipe at the tower.
- SECONDARY GROUTING OF THE OLD DAM 15-INCH PIPE: Low mobility grout will be injected into the pipe through the existing grouting apparatus to plug voids that resulted from the Phase I grouting to complete the abandonment of the pipe.
- ACCESS ROAD: A segment of the access road will be relocated. The approximately 400-foot-long segment is located downstream of the dam in the vicinity of the proposed stability berm. The new alignment will be downstream of the outlet works stream release stilling basin. An embankment with a culvert will be constructed where the road crosses the incised channel in the center of the valley. The new access road will tie in to the existing access road on either side of the valley.
- SITE WORK: Additional site work will include crest regrading, riprap-lined ditches along the downstream groin of the embankment, reclamation of work areas, and instrumentation.

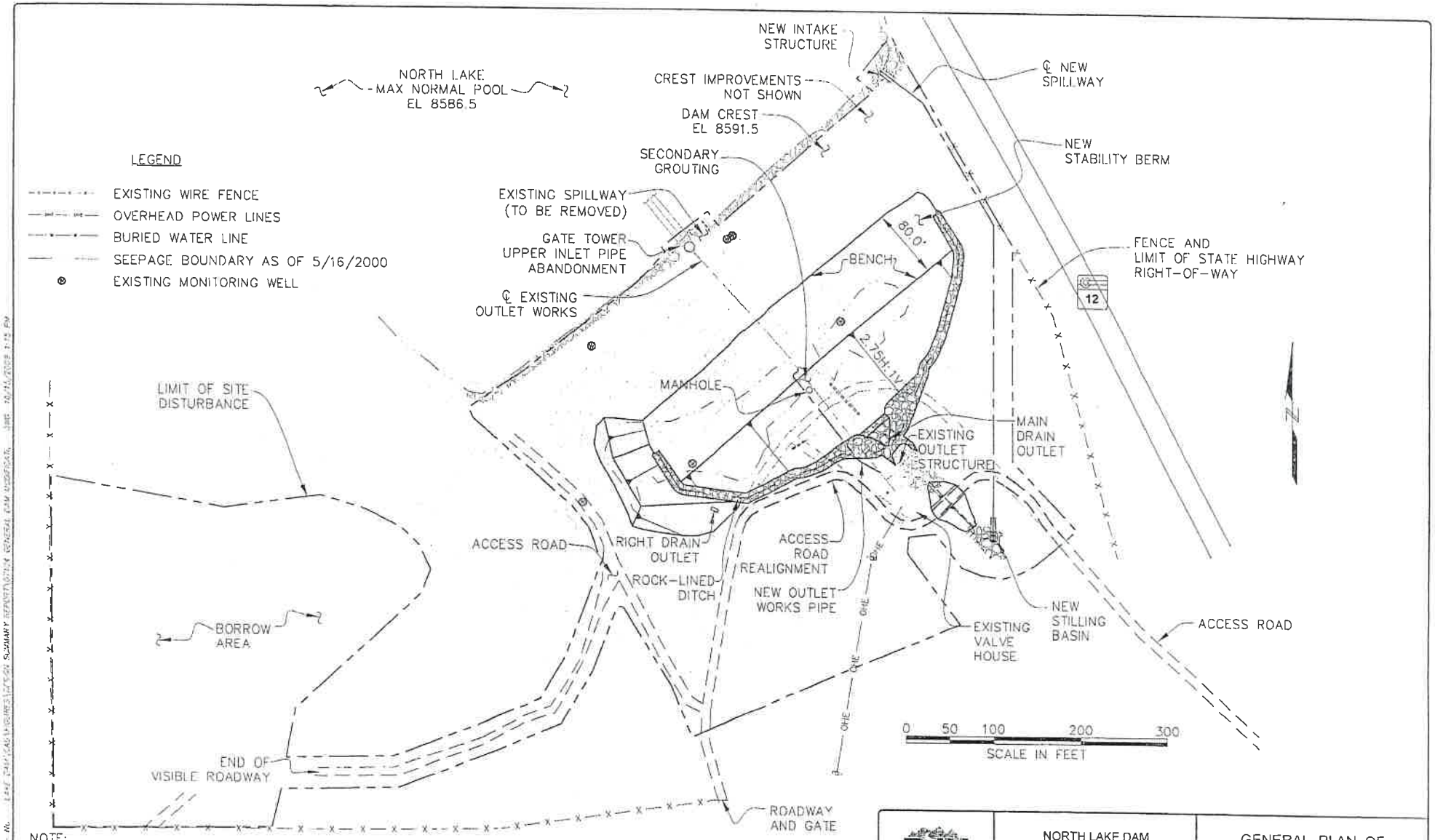


NOTE:

1. TOPOGRAPHIC SURVEYING WAS PERFORMED BY TERRY LAND SURVEYING, INC. IN MAY, 2000 AND JULY, 2007. COORDINATES WERE OBTAINED BY GPS AND PROJECTED TO A LOCAL COORDINATE SYSTEM.

RJH CONSULTANTS, INC.

NORTH LAKE DAM REHABILITATION PROJECT		GENERAL PLAN OF EXISTING CONDITIONS
PROJECT NO. 07104	October 2009	Figure 2.1



NOTE:

1. TOPOGRAPHIC SURVEYING WAS PERFORMED BY TERRY LAND SURVEYING, INC. IN MAY, 2000 AND JULY, 2007. COORDINATES WERE OBTAINED BY GPS AND PROJECTED TO A LOCAL COORDINATE SYSTEM.

RJH CONSULTANTS, INC.

NORTH LAKE DAM REHABILITATION PROJECT	GENERAL PLAN OF MODIFICATIONS
PROJECT NO. 07104	October 2009 Figure 2.2

Colorado, United States, North America

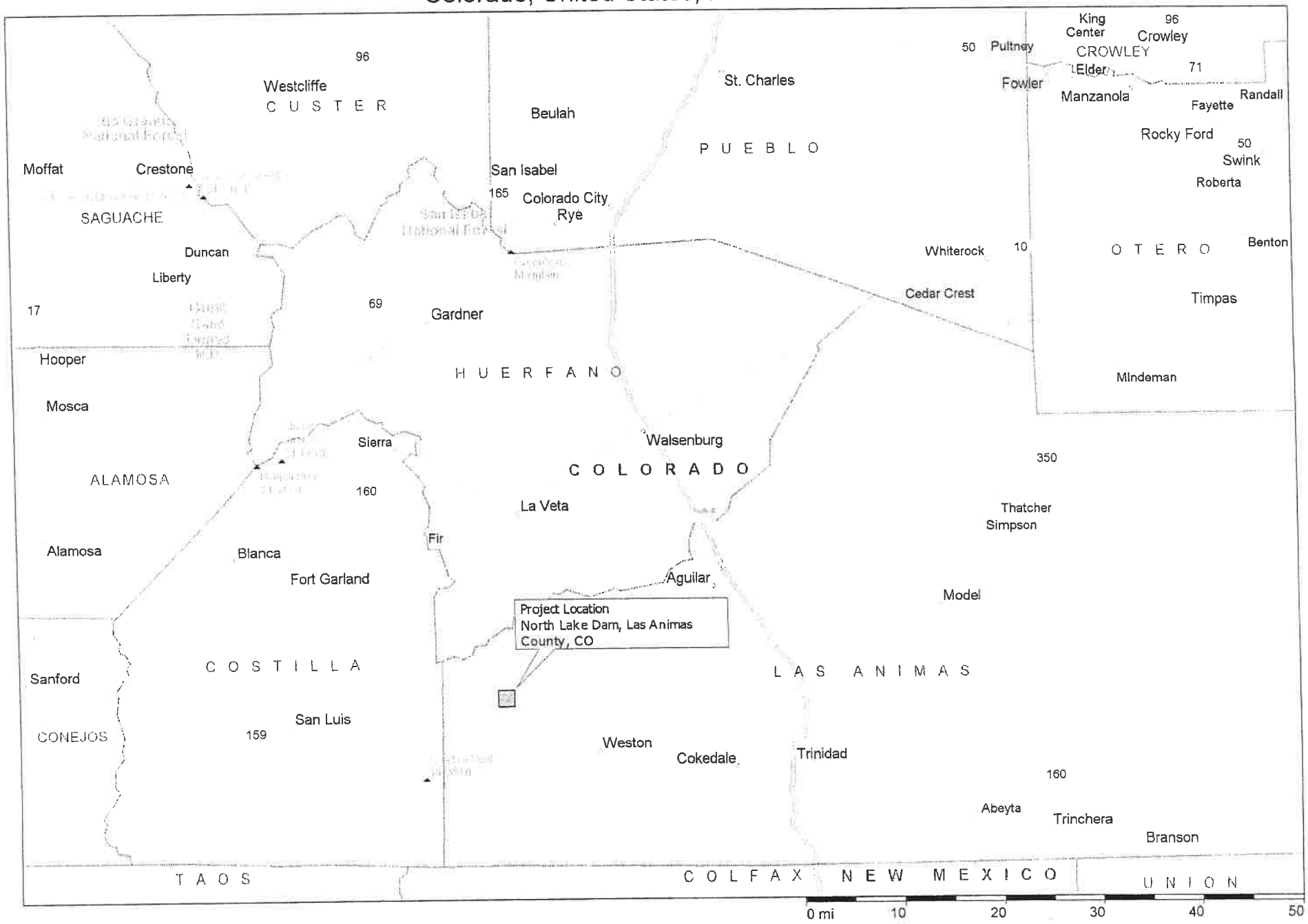


EXHIBIT “B”

RJH CONSULTANTS, INC.

June 28, 2010
Project 07104

Mr. Jim Fernandez
City of Trinidad
P.O. Box 880
Trinidad, CO 81082

Re: North Lake Dam Rehabilitation Project
Opinion of Probable Construction Costs

Dear Jim:

RJH Consultants, Inc. (RJH) developed an Opinion of Probable Construction Cost (OPCC) to implement the modifications described in the SEO Submittal design drawings and technical specifications for the North Lake Dam Rehabilitation Project.

This OPCC is based on professional opinion. Actual costs would be affected by a number of factors beyond current control, such as supply and demand for the types of construction required at the time of bidding and in the project vicinity; changes in material supplier costs; changes in labor rates; the competitiveness of contractors and suppliers; changes in applicable regulatory requirements; and changes in design standards. Therefore, conditions and factors that arise as project development proceeds through bidding and construction may result in construction costs that differ from the estimate provided in this letter.

The lump sum item costs are based on qualitative estimates of the summation of the various activities required for a particular item of work. Quantities for unit price items are based on the drawings. The line items in the attached cost opinion correspond to the items in the bid tabulation that will be used for bidding. Estimated unit prices and costs of the listed work items were derived from the following sources:

- Published and non-published bid price data for similar work from similar projects.
- R.S. Mean Heavy Construction Cost Data for 2009.
- Manufacturer's budgetary price quotes.
- Engineering News Record (ENR).

9800 Mt. Pyramid Court, Suite 330
Englewood, CO 80112
www.rjhconsultants.com

303-225-4611 – phone
303-225-4615 – fax
866-900-1930 – toll free

- RJH's experience on similar construction work and engineering judgment.

The sum of the bid items is defined for this study as the "Direct Construction Subtotal" (DCS). We anticipate the DCS would represent a contractors' "bid price." We have included allowances to the DCS to account for other project costs. These allowances include the following:

- 15 percent of the DCS to account for construction contingencies. This allowance is intended to cover unanticipated items and issues that may arise during construction.
- 3 percent of the DCS for City administration.
- Approximately 20 percent of the DCS for construction engineering.
- Approximately 3 percent of the DCS for materials testing during construction.

The Opinion of Probable Construction Costs (OPCC) is the sum of the DSC and the above allowances. A summary of our OPCC for this project is presented in the following table.

OPINION OF PROBABLE CONSTRUCTION COST

Item	Quantity	Unit	Unit Price ($)	Total Cost ($)
1 – Mobilization	1	LS	75,000.00	75,000.00
2 – Erosion Protection and Sediment Control	1	LS	20,000.00	20,000.00
3 – Clearing and Grubbing	9	Acre	2,500.00	22,500.00
4 – Reservoir Control	1	LS	55,000.00	55,000.00
5 – Dewatering	1	LS	70,000.00	70,000.00
6 – Site Access Road Improvements	1	LS	12,500.00	12,500.00
7 – Crest Earthwork	1	LS	7,500.00	7,500.00
8 – New Spillway Structure	1	LS	60,000.00	60,000.00
9 – Spillway Pipe	536	LF	200.00	107,200.00
10 – Removal of Existing Spillway	1	LS	25,000.00	25,000.00
11 – Secondary Pipe Grouting	1	LS	5,000.00	5,000.00
12 – Gate Tower Repair	1	LS	15,000.00	15,000.00
13 – Outlet Works Disposal	1	LS	30,000.00	30,000.00
14 – Furnishing and Placing Low-Permeability Fill	210	CY	12.50	2,625.00
15 – Furnishing and Placing Berm Fill	32,000	CY	3.00	96,000.00
16 – Furnishing and Placing Filter Sand	3,700	CY	50.00	185,000.00
17 – Furnishing and Placing Drain Gravel	1,550	CY	50.00	77,500.00
18 – Topsoil	7,300	CY	5.50	40,150.00
19 – Type M Riprap	220	CY	70.00	15,400.00
20 – Type L Modified Riprap	410	CY	170.00	69,700.00
21 – Riprap Bedding	85	CY	60.00	5,100.00
22 – Outlet Works Pipe	1	LS	120,000.00	120,000.00
23 – Manhole	1	LS	15,000.00	15,000.00
24 – Toe Drain Pipe	525	LF	100.00	52,500.00
25 – Instrumentation	1	LS	15,000.00	15,000.00
26 – Seeding	9	Acre	2,500.00	22,500.00
27 – All Other Work Not Listed Separately	1	LS	95,000.00	95,000.00
Direct Construction Subtotal (DCS)				1,316,175.00
Construction Engineering and Administration				260,000.00
Materials Testing				35,000.00
City Administration at 3 Percent of DCS				39,485.00
Construction Contingencies at 15 Percent of DCS				197,426.00
Opinion of Probable Construction Cost (OPCC, 2010)				**$1,848,086.00**

Please call if you have any questions or require additional information.

Sincerely,

RJH CONSULTANTS, INC.

Robert J. Huzjak, P.E.
Project Manager

RJH/jmm

EXHIBIT “C”

Jm 4

EXPENSE CHECK REGISTER REPORT
EIAF #4120 Trinidad North Lake Dam

EIAf Grant	300,000
City Share	550,000
Total Budget	850,000

Vendor	Date Paid	Check No.	EXPENSE INCURRED (Budget Line Item) Repair & Replace Piping	Enbankment Stablization	Spillway Repair	Subtotal	Monument Lake Stabilization	Total Project Expense
GEI Consultants, Inc.	06-30-00	4028	9,458.44	882.50		10,340.94		10,340.94
Engineering Serv	06-30-00	4028	20,544.12	10,172.50		30,716.62		30,716.62
" "	07-31-00	4262	9,097.66	380.00		9,477.66		9,477.66
" "	08-31-00	4510	9,623.00	1,420.00		11,043.00		11,043.00
" "	09-15-00	4650	6,209.86	0.00		6,209.86		6,209.86
" "	10-31-00	5018	37,862.35	37,168.00		75,030.35		75,030.35
" "	11-15-00	5153	97,777.28	2,141.75		99,919.03		99,919.03
" "	12-31-00	5488	33,410.71	0.00		33,410.71		33,410.71
" "	01-31-01	5665	11,104.18	3,488.50		14,592.68		14,592.68
" "	01-15-01	6110	52,908.49	0.00		52,908.49		52,908.49
" "	03-31-01	6225	2,795.42	3,009.50		5,804.92		5,804.92
" "	05-31-01	6699	68,850.08	3,435.47		72,285.55		72,285.55
" "	06-15-01	6856	89,885.76	502.50		90,388.26		90,388.26
" "	06-15-01	6856	34,274.46	0.00		34,274.46		34,274.46
" "	07-31-01	7227	4,205.58	0.00		4,205.58		4,205.58
" "	09-30-01	7740	444.50	0.00		444.50		444.50
" "	10-31-01	7978	370.00	0.00		370.00		370.00
" "	10-31-01	7978	1,064.00	0.00		1,064.00		1,064.00
COSTS INCURRED 6-30-00 THRU 10-31-01)			**489,885.89**	**62,600.72**	**0.00**	**552,486.61**		**552,486.61**
GEI Consultants, Inc.	12-31-01	8452	2,718.18	0.00		2,718.18		2,718.18
Engineering Serv	01-31-02	8752	1,533.76	0.00		1,533.76		1,533.76
" "	01-31-02	8752	2,766.95	0.00		2,766.95		2,766.95
" "	03-15-02	9070	7,237.51	0.00		7,237.51	4,289.22	11,526.73
" "	04-15-02	9269	1,861.45	0.00		1,861.45	36,295.04	38,156.49
" "	04-30-02	9385	940.50	0.00		940.50	2,548.10	3,488.60
" "	05-31-02	9631	260.00	0.00		260.00	520.35	780.35
" "	06-30-02	9875	989.01	0.00		989.01	1,468.69	2,457.70
" "	07-31-02	10102		8,800.95		8,800.95	1,641.37	10,442.32
" "	08-15-02	10252		8,375.89		8,375.89	30,587.96	38,963.85
" "	09-30-02	10595		12,859.71		12,859.71	5,374.50	18,234.21
" "	10-31-02	10845		51,971.41		51,971.41		51,971.41
" "	12-31-02	11294		6,679.25		6,679.25	96,298.37	102,977.62
" "	12-31-02	11294		18,121.01		18,121.01	7,155.52	25,276.53
" "	01-15-03	11408		3,397.39		3,397.39		3,397.39
" "	02-28-03	11832	1,785.00		2,024.43	3,809.43	4,278.56	8,087.99
" "	03-31-03	12073	410.40		1,317.72	1,728.12	8,850.00	10,578.12
" "	04-30-03	12317				0.00	1,656.94	1,656.94
" "	05-15-03	12470		2,781.46	2,770.97	5,552.43		5,552.43
" "	06-30-03	12865		4,325.00	4,820.91	9,145.91	3,365.70	12,511.61
" "	07-31-03	13124		3,047.50		3,047.50	27,153.63	30,201.13
" "	08-31-03	13396		3,220.15		3,220.15	18,144.50	21,364.65
" "	09-30-03	13642		2,492.00	5,766.13	8,258.13	742.80	9,000.93
" "	11-15-03	14059		408.50	220.44	628.94		628.94
" "	12-15-03	14305		2,814.09	2,353.80	5,167.89		5,167.89
" "	12-31-03	14401		8,568.46	4,841.82	13,410.28	1,104.50	14,514.78
" "	03-31-04	15155				0.00	2,962.10	2,962.10
" "	04-30-04	15421				0.00	1,165.04	1,165.04
" "	04-30-04	15421		978.61		978.61	39,768.51	40,747.12
" "	05-31-04	15669				525.00	525.00	1,050.00
	06-30-04	15944				12,915.62	12,915.62	25,831.24
" "	07-31-04	16228					827.14	827.14
	08-15-04						17,709.50	17,709.50
Schrepfer Industries	10-15-01	7904			20,000.00	20,000.00		20,000.00
" "	12-15-01	8379			27,746.00	27,746.00		27,746.00
" "	01-31-02	8755			21,746.80	21,746.80		21,746.80
" "	03-15-02	9113			8,999.20	8,999.20		8,999.20
	06-30-02	9907			19,353.00	19,353.00		19,353.00
COSTS INCURRED 11-02-02 THRU 06-30-04			**20,502.76**	**138,841.38**	**121,961.22**	**294,745.98**	**327,348.66**	**622,094.64**
TOTAL PROJECT EXPENDITURES			510,388.65	201,442.10	121,961.22	847,232.59	327,348.66	**1,174,581.25**
				LESS: ADVANCE PAYMENT				**(30,000.00)**
				GRANT REQUEST				**300,000.00**
				CITY SHARE TO-DATE		552,486.61		874,581.25

EXHIBIT “D”

Las Animas County

Board of County Commissioners

Gary D. Hill	Jim D. Montoya	James Vigil
Chairman Pro Tem	Chairman	Commissioner

June 28, 2010

Ms. Susan Kirkpatrick, Executive Director
Colorado Department of Local Affairs
1313 Sherman Street, Suite 500
Denver, CO 80203

Dear Executive Director Kirkpatrick,

We, the Board of County Commissioners of Las Animas County, wish to express our support for the Energy Impact Assistance Fund grant application submitted by the City of Trinidad, seeking funding support for its project to repair the dam at its North Lake Reservoir.

The North Lake Reservoir holds the City of Trinidad's primary supply of raw water which is then processed and delivered to the City and throughout the Purgatoire River Valley, serving the majority of residents within Las Animas County.

Please take notice that Las Animas County is not submitting an application seeking Energy Impact Assistance Funds so as not to compete with the City of Trinidad and to demonstrate our support for its application.

We respectfully request your favorable consideration of the EIAF application submitted by the City of Trinidad for its North Lake Reservoir.

Sincerely,

Jim D. Montoya, Chairman

Gary D. Hill, Chairman Pro Tem

James Vigil, Commissioner

200 E. First St. Room 110, Trinidad, Colorado 81082 Phone (719)845-2568 Fax (719) 845-2598
Email: lasanimascounty@sensonics.org

PIONEER
NATURAL RESOURCES

Pioneer Natural Resources USA, Inc.
1401 17th Street, Suite 1200
Denver, Colorado 80202
Tel: (303) 298-8100 Fax: (303) 298-7800

July 19, 2010

Lee Merkel
Department of Local Affairs
132 West "B" Street, Suite 260
Pueblo, CO 81003

Dear Mr. Merkel:

Please accept this letter as an indication of Pioneer's support for the application of the City of Trinidad in their submission of a grant to the Department of Local Affairs Energy and Mineral Impact Assistance Program Tier II funding program.

The City of Trinidad is submitting a grant request to provide funding for the North Lake Dam Rehabilitation Project. Additional funding would be provided through a 25% cash match out of the City of Trinidad Water Fund if the grant is approved.

As the largest energy operator and severance tax revenue generator in Las Animas County, we support the city's request that part of the $23 million in severance tax revenues generated in 2009 for Las Animas County be directed to the City of Trinidad project.

We understand that the project is a response to the State Water Engineer's requirement that the City construct a new spillway and earthen reinforcement for the North Lake reservoir/dam, and that if the project is not completed, the State Water Engineer will require the City to significantly lower the level and volume of water held in the reservoir, which would adversely impact system users throughout Las Animas County.

Discussion with the applicant yielded that the City of Trinidad is unable to borrow money at this time due to restrictions on indebtedness by municipal governments. With limited abilities to borrow, it is critical that the City be able to secure DOLA funds to support the repairs and ensure continued access to adequate volumes of water.

Further, it was explained that this particular project is part of the Water Fund, which is set up as an enterprise fund. It is funded by the utility fees and charges that the Water Department collects. Sales and property taxes fund other programs, and cannot be used for enterprise fund programs.

PIONEER
NATURAL RESOURCES

Pioneer Natural Resources USA, Inc.
1401 17th Street, Suite 1200
Denver, Colorado 80202
Tel: (303) 298-8100 Fax: (303) 298-7800

Additionally, monies that might normally have come back to the County from various energy related taxes are much lower this year due to the fact that the State has retained nearly all of the Las Animas County and City of Trinidad portions in an effort to get closer to balancing its own budget.

The City has looked at raising rates and determined that such a rate increase at this time is unwarranted. Despite the impact of energy jobs paying well above the state average, the average Las Animas County resident earns below average wages and would be significantly impacted by a rate increase of the magnitude needed to complete this project – possibly putting some ratepayers in financial distress.

In reviewing the Seven Principles of Sustainability, this grant falls squarely within the "Supporting Existing Communities" and will strategically optimize goal driven infrastructure funding to maximize investment, support long term viability and revitalize this community.

From April 2000 to July 2007, the population in Trinidad, Las Animas County and the unincorporated areas increased (4.3%, 9% and 18% respectively.) These increases were due, in part, to impacts from energy development as energy operators responded to increasing gas prices and development opportunities. As activity increased, more employees, contractors, and vendors moved to Las Animas County and the surrounding areas. In addition, many contractors and vendors also filled the local hotels for short to long term stays. This increased activity and part-time to permanent population put extra demands on the City of Trinidad to ensure that basic necessities such as water are available.

As energy operators respond to moderating and increasing gas prices and lower contractor and vendor costs, activity is slowly picking up again in Trinidad. It is critical that the City have adequate and reliable supplies of water for the existing population and be prepared to again address increases in population due to increasing energy development – which includes adequate sources of water. We support this request and urge that the requested funding be made available.

Sincerely,

Pioneer Natural Resources USA, Inc.

By: _____
Thomas D. Sheffield
Vice President-Rockies Asset Team

EXHIBIT “E”

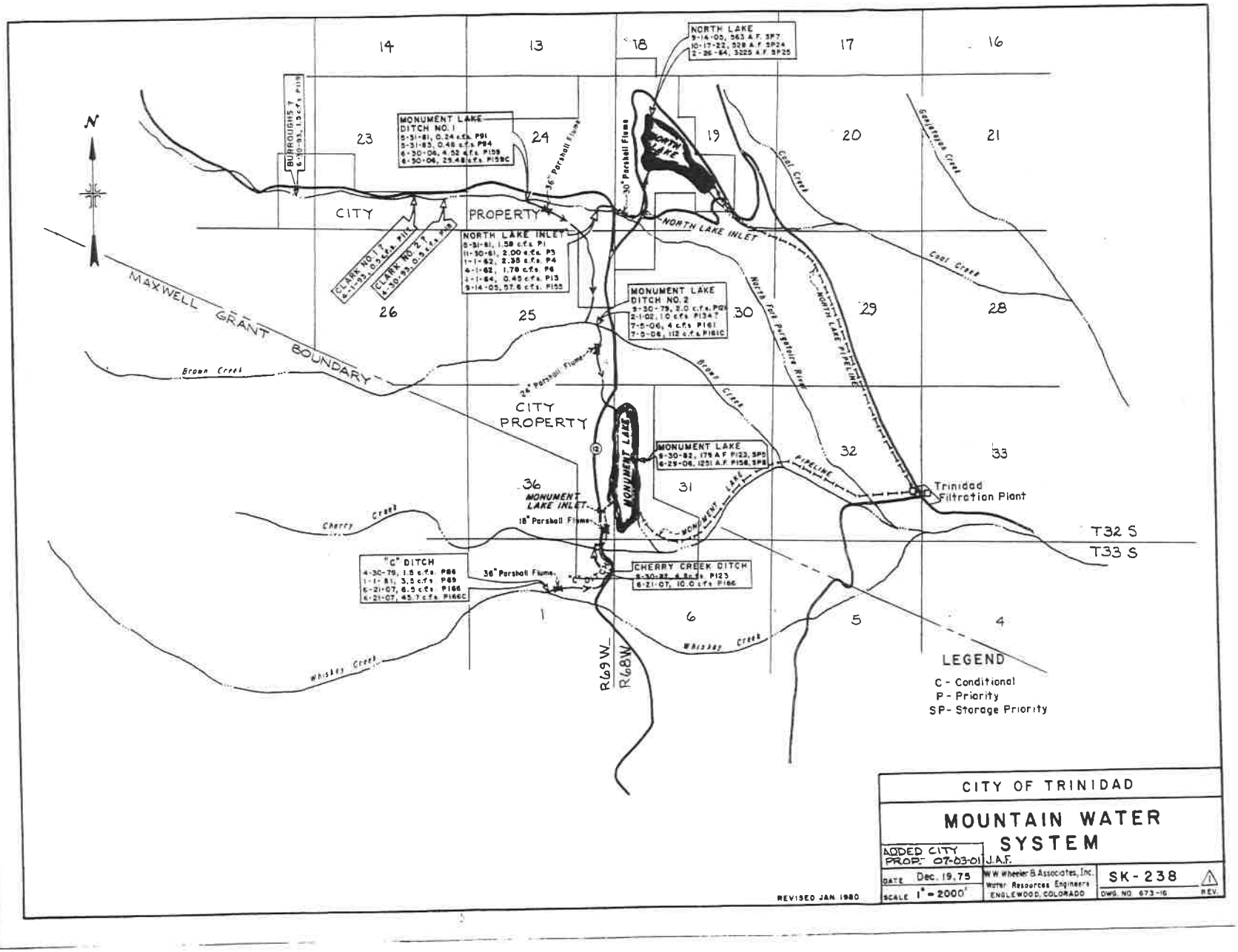
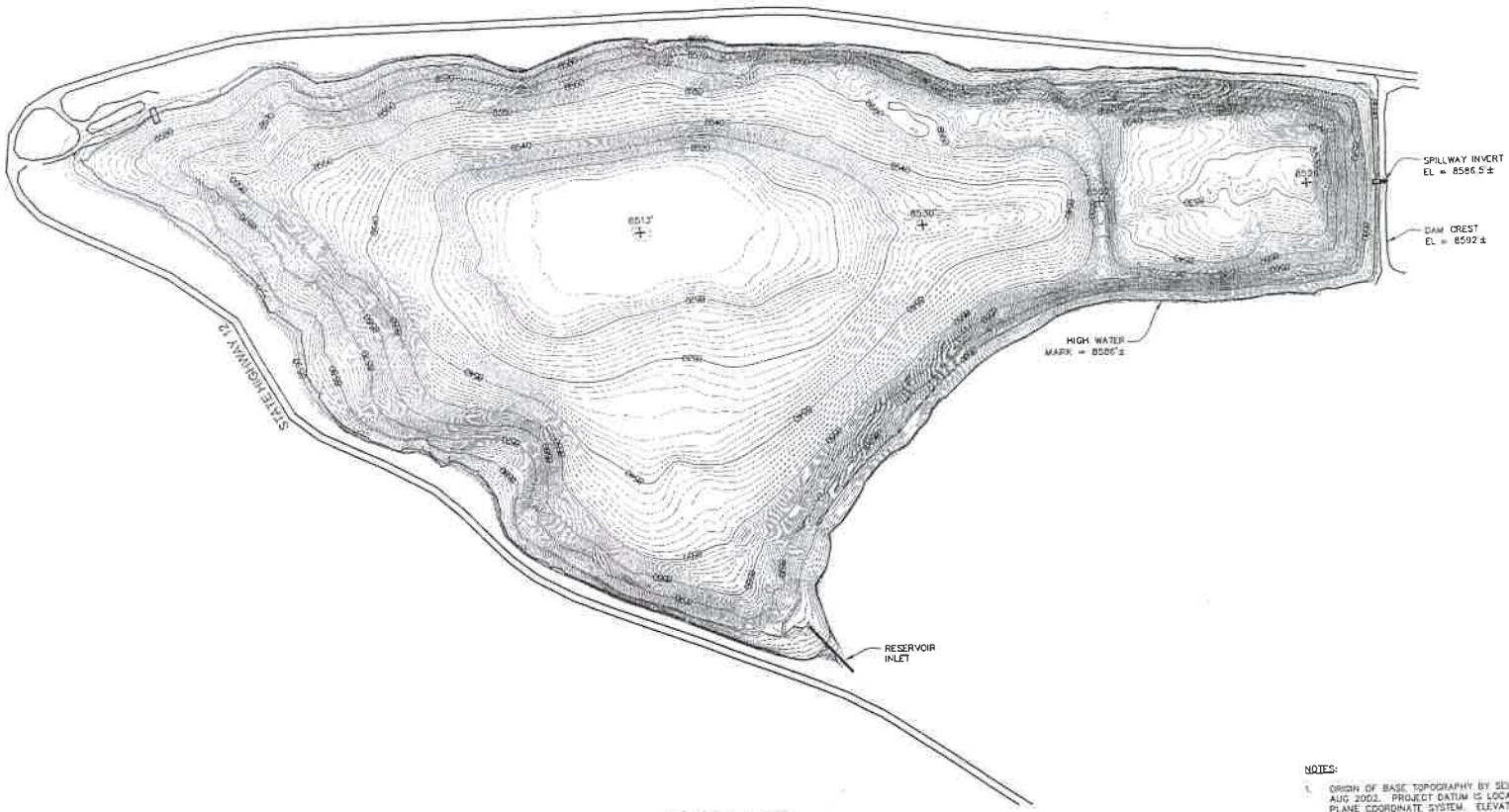

NORTH LAKE
9-14-05, 363 A.F. 3P7
10-17-22, 328 A.F. SP24
2-26-84, 3225 A.F. SP25
MONUMENT LAKE DITCH NO. 1
5-31-81, 0.24 c.f.s. P91
5-31-83, 0.48 c.f.s. P84
6-30-06, 4.52 c.f.s. P159
6-30-06, 25.48 c.f.s. P159C
BURROUGHS 7
6-10-93, 1.5 c.f.s. P119
CLARK NO. 1
6-17-93, 0.5 c.f.s. P119
CLARK NO. 2
6-30-93, 0.5 c.f.s. P120
NORTH LAKE INLET
5-31-81, 1.58 c.f.s. P1
11-30-61, 2.00 c.f.s. P3
1-1-62, 2.38 c.f.s. P4
6-1-62, 1.78 c.f.s. P6
1-1-64, 0.45 c.f.s. P13
9-14-05, 57.6 c.f.s. P155
MONUMENT LAKE DITCH NO. 2
5-30-79, 2.0 c.f.s. P126
2-1-02, 1.0 c.f.s. P134.7
7-5-06, 4 c.f.s. P161
7-5-06, 112 c.f.s. P161C
MONUMENT LAKE
5-30-82, 175 A.F. P123, SP5
6-29-06, 1251 A.F. P158, SP8
"C" DITCH
4-30-79, 1.8 c.f.s. P86
1-1-81, 3.5 c.f.s. P69
6-21-07, 6.5 c.f.s. P166
6-21-07, 45.7 c.f.s. P166C
CHERRY CREEK DITCH
5-30-82, 4.5 c.f.s. P123
6-21-07, 10.0 c.f.s. P166
MAXWELL GRANT BOUNDARY
CITY PROPERTY
CITY PROPERTY
NORTH LAKE
MONUMENT LAKE
MONUMENT LAKE INLET
NORTH LAKE INLET
16" Parshall Flume
30" Parshall Flume
24" Parshall Flume
18" Parshall Flume
36" Parshall Flume
C-DIT
Brown Creek
Cherry Creek
Whiskey Creek
Coal Creek
Goodnight Creek
North Fork Purgatoire River
NORTH LAKE PIPELINE
MONUMENT LAKE PIPELINE
Trinidad Filtration Plant
T32 S
T33 S
R69W
R68W
LEGEND
C - Conditional
P - Priority
SP- Storage Priority
REVISED JAN. 1980
CITY OF TRINIDAD
MOUNTAIN WATER SYSTEM
ADDED CITY PROP. 07-03-01 J.A.F.
DATE Dec. 19,75
SCALE 1" = 2000'
W.W. Wheeler & Associates, Inc.
Water Resources Engineers
ENGLEWOOD, COLORADO
SK-238
DWG. NO. 673-16
REV.

EXHIBIT “F”



NORTH LAKE

0 100 200 400 800
SCALE IN FEET

NOTES:

1. ORIGIN OF BASE TOPOGRAPHY BY SELLARDS & CRIGG, INC, AUG 2002. PROJECT DATUM IS LOCAL MODIFIED STATE PLANE COORDINATE SYSTEM. ELEVATIONS CORRESPOND TO MEAN SEA LEVEL (MSL) AS DEFINED BY THE NATIONAL GEODETIC VERTICAL DATUM OF 1988 (NAVD-88).
2. BLACKHAWK GEOSCIENCES PERFORMED THE UNDERWATER SURVEY.

CITY OF TRINIDAD	NORTH LAKE	PROJECT MAP	
GEI Consultants, Inc.	PROJECT NO. 00128	NOV 2002	FIGURE 3.2

P:\PROJECTS\00128\MONUMENT LAKE\FIGURE 3.2.DWG 11/02

EXHIBIT "G"

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RESOURCES

John W. Hickenlooper, Governor

Mike King
Executive Director

Dick Wolfe, P.E.
Director and
State Engineer

June 13, 2011

Office of Received
JUN 22 2011
Utilities Superintendent

Mr. James Fernandez
Utilities Superintendent
City of Trinidad
135 N. Animas Street
Trinidad, CO 81082

CERTIFIED NO.: 7004 0550 0001 0703 6938

When replying please refer to:
NORTH LAKE DAM
Water Division 2, DAMID 190116

RE: Reservoir Restriction Order 5 feet Below Emergency Spillway Crest

Dear Mr. Fernandez:

I understand that you have had several recent meetings with my staff to discuss our on-going safety concerns with North Lake Dam. I also understand that the City of Trinidad is trying to obtain grant money to construct the safety modifications to the dam that your engineer has designed. We applaud this effort and hope you are successful. However, in the meantime we believe artesian pressures in the dam's foundation create an unsafe condition when the reservoir is full, such as has been documented in a geotechnical report by your engineer. We believe you have had adequate time to attempt to fix the problem and that the time has come where we must act to restrict the reservoir level. We are also concerned about seismic activity in the area of the dam and the elevated risk it creates for potential failure modes associated with your dam.

In light of these events and in order to increase the safety of the dam, **the reservoir is hereby restricted to a level 5.0 feet below the emergency spillway crest or gage height 60.0 feet.** As my staff has discussed with you, the reservoir shall be drawn down slowly, at a rate of approximately 1 foot per month, during which time the reservoir and piezometric levels shall be monitored and recorded at least one time per week. Please provide the data to my office on a monthly basis. During this period the dam shall be monitored visually on a daily basis with particular attention to cracking of soils at the downstream toe of the dam and any new seepage or change in the rate or increase in turbidity of the existing seepage or for any other new or unusual conditions. We recommend that you cut herbaceous vegetation and remove large vegetation at the toe and groins of the dam in order to facilitate close visual

inspection. Please notify the Dam Safety Branch when the full 5 foot reservoir restriction has been attained. At that time, the reduction in the piezometric level in the foundation will be evaluated to determine if additional restrictions are needed to achieve a significant drop in pressure.

I also understand that there is a historical slide area along Colorado Highway 12 on the north rim of the reservoir that could be re-activated if the reservoir is dropped quickly. Please contact your local CDOT staff in charge of monitoring the slide area and inform them of the planned drawdown of the reservoir.

By copy of this letter the Division Engineer is directed to enforce the restriction; however, the primary responsibility rests with you as the dam owner. This restriction is the minimum action you can take to improve the safety of your dam. Additional actions may be necessary based upon the recommendations of your engineer. You are reminded that, as owner, you are liable for the safety of this structure and these minimum requirements do not relieve you of that liability.

Failure to comply with this order will result in our office initiating legal action in accordance with Colorado Revised Statute 37-87-114. Court action could result in the imposition of a fine of not less than $500 per day, and a District Court Order requiring the breach of the dam.

We appreciate your cooperation in this matter. Should you have any questions, please contact Mark Perry at 719-542-3368, ext 2109.

Sincerely,

Dick Wolfe, P.E.
Director and State Engineer

xc: Steve J. Witte, Division 2 Division Engineer
Mark Haynes, Chief, Safety of Dams Program
Mark Perry, Division 2 Dam Safety Engineer
Jeff Montoya, Division 2 W.D. 19 Water Commissioner
Robert Huzjak, RJH Consultants Inc.

TABLE 4.2
RESERVOIR CAPACITY TABLE – NORTH LAKE

Elevation (ft)	Dead Storage		Active Storage		Total Storage (ac-ft)
	Surface Area (acre)	Accumulated Storage (ac-ft)	Surface Area (acre)	Accumulated Storage (ac-ft)	
8512	0	0			0
8513	0	0			0
8514	6	3			3
8515	8	10			10
8516	9	18			18
8517	10	27			27
8518	11	37			37
8519	11	49			49
8520	12	60			60
8521	13	73			73
8522	14	86			86
8523	14	100			100
8524	15	115			115
8525	16	131			131
8526	17	148	0	0	148
8527	18	165	0	0	165
8528	19	184	0	0	184
8529	20	204	1	1	204
8530	22	225	1	2	227
8531	23	247	2	4	250
8532	24	270	3	6	276
8533	26	295	3	9	304
8534	28	322	4	12	335
8535	30	351	4	16	367
8536	31	381	5	21	402
8537	33	413	5	26	439
8538	34	446	6	32	478
8539	36	481	6	38	519
8540	37	518	7	44	562
8541	39	556	7	51	607
8542	40	595	7	58	653
8543	42	637	7	65	702
8544	44	680	8	73	753
8545	46	725	8	81	806
8546	48	773	8	89	861
8547	50	822.	8	97	919
8548	52	873	8	105	979
8549	54	926	9	114	1,040
8550	55	981	9	123	1,103
8551	57	1,037	9	131	1,168
8552			67	198	1,235
8553			69	266	1,303
8554			70	335	1,372
8555			71	406	1,443
8556			73	478	1,515

Elevation (ft)	Dead Storage		Active Storage		Total Storage (ac-ft)
	Surface Area (acre)	Accumulated Storage (ac-ft)	Surface Area (acre)	Accumulated Storage (ac-ft)	
8557			74	552	1,588
8558			75	626	1,663
8559			76	702	1,739
8560			77	779	1,816
8561			78	857	1,894
8562			79	936	1,973
8563			80	1,016	2,052
8564			81	1,097	2,133
8565			82	1,178	2,215
8566			83	1,261	2,298
8567			84	1,345	2,382
8568			85	1,430	2,466
8569			86	1,515	2,552
8570			87	1,602	2,638
8571			88	1,689	2,726
8572			89	1,777	2,814
8573			90	1,866	2,903
8574			91	1,956	2,993
8575			92	2,047	3,084
8576			93	2,139	3,176
8577			94	2,233	3,269
8578			95	2,327	3,364
8579			96	2,422	3,459
8580			97	2,518	3,555
8581			98	2,616	3,653
8582			99	2,714	3,751
8583			101	2,814	3,851
8584			102	2,916	3,953
8585			104	3,019	4,056
8586			106	3,124	4,161
8586.5			106	3,177	4,214
8587			107	3,230	4,267
8588			107	3,337	4,374
8589			108	3,445	4,481
8590			109	3,553	4,590
8591			109	3,662	4,699
8592			110	3,772	4,808