Village of Cimarron, New Mexico
Municipal Water System Improvements
Preliminary Engineering Report

Prepared for the
Village of Cimarron, New Mexico

Prepared by Nolte Associates, Inc.
Colorado Springs, CO
Revised February 8, 2008

NOLTE
BEYOND ENGINEERING

Table of Contents

List of Appendices

Signature Page

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For and on behalf of Nolte Associates, Inc. Thomas R. Repp, P.E. No. 18084

This revision supersedes all other addendums or issued reports.

I. GENERAL

The purpose of this Preliminary Engineering Report is to identify, provide background on and estimate construction costs for the needed facility improvements for the Village of Cimarron municipal water treatment, storage and distribution system. This water report is a broad look and will be used as an outline for future detailed studies to obtain funding for required improvements.

II. PROJECT PLANNING AREA

A. Location

The Village of Cimarron is located adjacent to the Cimarron River in Colfax County, New Mexico. See attached photos of the area in Appendix A and Vicinity Map in Appendix B.

B. Environmental Resources Present

ACG Engineering was contracted to conduct a preliminary environmental investigation during the Abeyta Engineering, Inc. design of the water supply transmission line replacement and concrete diversion. Based on ACG Engineering's preliminary environmental report, there do not appear to be any critical environmental impacts in the areas studied. See the Environmental Documentation for the Water Systems Improvements Projects prepared by ACG Engineering as submitted to the USDA in August of 2000 for additional environmental documentation

C. Growth Areas and Population Trends

From information gathered in A Comprehensive Plan for Colfax County, the Village of Cimarron is a small rural community encompassing approximately 1,200 acres with development inside the Village limits of approximately 45%. According to the Village of Cimarron 40-Year Water Plan, the existing population is approximately 917 people with a temporary peak tourist population of approximately 20,000 people between mid-May and mid-September, although this peak does not appear to increase the volume of water demand (please see Appendix C for water demands). Most of this influx is due to the close proximity of the Philmont Boy Scout Ranch.

The Village growth rate has historically been low, and the majority of current development has taken place within the Lambert Heights Subdivision on the north side of the Village. Birth rates for the Village are decreasing and the retirement population is increasing.

The economy of Cimarron is based on ranching, tourism, forest products, and the Philmont Boy Scout Ranch. The area's major sources of revenue include retail trade, manufacturing, construction, and lodging. Large employers include the Philmont Boy Scout Ranch, the school district, and the tourist businesses. Forest thinning for the National Forest in Colfax County could be a large employer if

federal funding is approved. Recent impacts on the Village's economy include the loss of the Tricon Timber lumber mill in 2001 and the shut-down of the York Canyon Mine in 2002. This description of the economy coincides with the land uses within the Village limits which include residential, commercial, municipal, recreational, and industrial. Lastly, the Village is land locked by the Philmont Boy Scout Ranch, the Vermejo Ranch, and the UU Bar Ranch.

According to A Comprehensive Plan for Colfax County, the Village of Cimarron is expected to encounter very little growth and the population is projected to remain stable.

III. EXISTING FACILITIES

A. Location Map

The current water treatment facility is located less than one mile east of Cimarron in Section 8, T26N, R19E, Colfax County at the coordinates 36°30'06"N 104°56'28"W.

See Water Vicinity Map in Appendix B.

B. History

A thorough history of the Village of Cimarron's water supply and treatment dating to the early 1900's can be found in the preliminary engineering report generated by Abeyta Engineering, Inc. and submitted to the State of New Mexico in March, 2002.

Today, water is collected from two sources, the Cimarroncito Reservoir and the Cimarron River. This water is stored in a raw water storage tank before treatment. During treatment water from the raw water storage tank passes through the large clarifier before receiving polymer and liquid alum (coagulation) or lime (pH control) when needed. After these initial chemical additions, the water passes through the media in the concrete filter basins. The water is then chlorinated, measured for turbidity, and sent into the clear well, which provides the necessary chlorine contact time. From here, the water moves to the two storage tanks (Cimarron Main Tank and Lambert Heights Tank) and enters the distribution network. Backwash waste from the filters and sludge discharge from the large clarifier are discharged to the backwash pond. See Appendix B for a schematic drawing of the complete process.

The most recent survey of the Village's water operation, including sources, treatment, storage, and distribution, was conducted by The New Mexico Environmental Department (NMED) Drinking Water Bureau on November 15, 2005. From the information gathered during this survey, the Drinking Water Bureau submitted various improvements required of the Village. Many of these improvements have already been completed and the Drinking Water Bureau notified. Items that have not been fully addressed can be found below in the

"Need for Project" Section of this report. For further information regarding the State's requested improvements, please see the Sanitary Survey Report in Appendix D.

The most recent survey of the reservoirs was conducted by The New Mexico State Engineer, which also generated a list of required improvements. On August 27, 2007, the Village of Cimarron submitted a letter informing the State Engineer that all, except one, requested improvements had been carried out with the proper corrective action taken. The one corrective action pending relates to the required flood routing analysis, which the Village is in the process of hiring a dam engineer to complete. See Appendix D for details.

The most recent survey and cleaning of the Cimarron Main Tank and the Lambert Heights Storage Tank was conducted by Inland Marine Services, Inc. on May 6, 2007. This survey found both tanks to be in "Good" condition, which means the tanks have only cosmetic problems and could be improved if the Village wishes to maintenance them.

C. CONDITION OF FACILITIES

1. Present Conditions

The water treatment plant's filtration was the main focus of this Preliminary Engineering Report. The existing water distribution infrastructure was not fully evaluated, although interviews with Village staff and field visits generated a list of possible failure sites within the distribution system that would require making repairs. This list is described with more detail in the following "Existing Central Facilities" Section of this report.

The water system serves a population of 917 and consists of the Cimarroncito Reservoir; raw water storage tank; two domestic potable water storage tanks; a treatment plant that consists of two clarifiers, two rapid sand filters, and a single gas chlorination system; and a transmission/distribution network of pipes.

2. Suitability for Continued Use

According to the Sanitary Survey Report generated by the Drinking Water Bureau, the Village of Cimarron's water system is adequately operated and maintained.

More water can be processed through the existing facilities than the Village demands as can be seen in the production chart located in Appendix C. Excess water fills the raw water storage tank until reaching the overflow height, at which point the excess is wasted to the backwash pond. This wasting sometimes occurs because of the difficulty accessing the water treatment plant experienced by the Village operators during adverse weather conditions. At such times, it is difficult to manually open and close valves

when necessary. The Raw Water Automation project currently in the design phase addresses these concerns with means for reducing the volume of water wasted.

The existing Tonka filter is not in a functioning condition, rendering it unsuitable for use. Having the Tonka filter inoperable eliminates the availability of a redundant filter, which is not a suitable situation for the Village. This concern is discussed in further detail in the "Need for Project" Section below.

The lime injector used for pH control is leaking and also requires attention.

The chlorine room is in need of improvements as indicated in the Drinking Water Bureau Sanitary Survey Report.

3. Adequacy of Water Supply

The Village currently has two main water supply sources:

The first is comprised of water rights to 724 acre-feet per year from the Cimarroncito Creek with a 1 cubic foot per second diversion rate approved through State Engineer Permit No. 60 on July 27, 1907. These water rights therefore have a 1907 priority date. Downstream water right owners having pre-1907 priority dates could, during droughts, subject the Village to priority calls and possible water shortages.

The second is comprised of water rights to 43 acre-feet per year from the Cimarron River. The Village obtained these water rights from H.R.S.K. Partnership. Transfer of these water rights to the Village was approved on March 30, 1998 with the Village owning 21.5 acre-feet and having the right to lease an additional 21.5 acre-feet for a total of 43 acre-feet. These water rights have an 1880 priority date. Through Priority 1, the Village of Cimarron purchased an additional 100 acre-feet of water rights from the Cimarron River with senior rights and Eagle Nest Lake storage for assurance during the dry seasons.

4. Existing Central Facilities-Treatment, Storage, and Distribution

a. Treatment Facilities

The existing water treatment plant consists of the following main components:

1. Water Clarifier – A 24' diameter clarifier, installed in 1974, is currently not in use. A 500-gpm clarifier was installed in 1995 to work in conjunction with the first clarifier.

2. Filters - A concrete filter, installed in 1974 in the maintenance building, received new filter media in 1995. A Tonka filter was installed in 1995 to

work in conjunction with the first filter. Presently the Tonka filter is inoperable and in need of rehabilitation.

3. Chlorinating System - Chlorine gas, in 150lb tanks, is used for disinfection purposes. These tanks are stored in the Chlorine Room.

4. Other – The treatment facility also consists of a chemical storage room, an air scour room with blowers, a backwash containment pond, and a small office.

The Village is currently in the process of ordering and installing a new chlorine residual analyzer, a new turbidimeter, and a new pH probe.

b. Storage Facilities

The Cimarroncito Reservoir has a storage capacity of 92.43 acre-feet. The current estimated reservoir capacity is 70 acre-feet based on a siltation rate of 1 acre-foot per year starting from full storage capacity in 1985, when it was dredged to restore the original capacity.

The three storage tanks in the system are: 90,000 gallon Raw Water Tank, 150,000 gallon Lambert Heights Tank, and a 250,000 gallon Cimarron Main Tank, bringing the total to 400,000 gallons of domestic potable storage. According to the Village, these tanks provide enough water to meet the requirements for fire protection and peak flow demands. Although it is not recommended, these peak demands have been met during rare occasions through bypassing the water treatment works and feeding the distribution system directly from the raw water tank in addition to the potable water tanks. Under these conditions the Village must issue a mandatory boil water requirement.

c. Reservoir Headworks

The existing raw water transmission line headworks are located approximately 800 lineal feet below the Cimarroncito Reservoir. Water exits the reservoir through an 8-inch outlet and flows in an open concrete ditch to a headwall at the entrance to the 6-inch raw water transmission line. An 8-inch diameter stainless steel well screen, approximately 14 feet long and lying within the open concrete ditch, is coupled to the 6-inch transmission line. This device acts as a screening system to remove debris prior to the water entering the transmission line.

d. Raw Water Transmission Line

Water is transferred from the Cimarroncito Reservoir to the water treatment plant by gravity flow through the raw water transmission line, which is comprised of 1.5 miles of recently installed 6” C-900 PVC and 4.38 miles of 5” steel pipe installed in 1947. Because of its age, the 5” steel line is considered to be well past its useful life and is possibly contributing to system

water losses due to leakage through corroded pipes. The replacement of the raw water transmission line was outlined in Priorities 2 through 4 of the Abeyta Engineering, Inc. Preliminary Engineering Report submitted to the U.S. Department of Agriculture Rural Utility Services in March of 2002.

f. Water Transmission and Distribution Lines

Water is conveyed to the Cimarron Main and Lambert Heights storage tanks by gravity through a 10" line consisting of ductile iron and CL 160 PVC piping. Distribution mains consist of 6" ductile and cast iron lines in the older portion of the system and 6" to 8" C-900 PVC in the newer portion of the system.

The distribution system currently serves 453 metered residential water connections and 17 metered commercial water connections.

Many areas of the distribution network are failing and in need of repair. Currently, the Village is interested in replacing the following segments of pipe:

A Waterline replacement on Collinson Ave. from 11th Street north across Highway 64 to 9th Street, as well as between the High School entrance and 7th Street. The repair will remediate approximately 900 feet including appurtenances and service lines.

B Waterline replacement on Lafayette Ave. from 9th Street to 7th Street. The repair will remediate approximately 850 feet including appurtenances and service lines.

C Waterline replacement on 9th Street from Washington Ave. to Lafayette Ave. The repair will remediate approximately 2,000 feet including appurtenances and service lines.

D New distribution loop and waterline replacement on Euclid Ave. from Highway 64 south to 11th Street, then east on 11th Street to Jefferson Ave., then north on Jefferson to tie into an existing main at Jefferson Ave. and Highway 64. The repair will remediate approximately 2,300 feet including appurtenances and service lines.

See Priority 6 later in this report for more detail.

g. Pumping Stations

The Village of Cimarron operates two pumping stations in its drinking water system; the Cimarron River pump station and the Lambert Heights booster pump station.

The Cimarron River pump station supplies water from the Cimarron River diversion area to the raw water tank. This pump station utilizes two pumps operating at 300gpm at 225 feet of total dynamic head.

The Lambert Heights booster pump provides water to the areas in the Lambert Heights Subdivision located at higher elevations. This pump station utilizes three pumps: two operate at 375gpm and the third operates at 50gpm.

D. FINANCIAL STATUS OF ANY OPERATING CENTRAL FACILITIES

The Village of Cimarron has recently increased its water rates to accommodate current and future infrastructure repairs and improvements. The current 2007 water rate schedule can be found in Appendix E and is summarized in the table below:

Table 1 – Water Rates

Water	Base Charge 0-2,000gal	Step 2 2,001-5,000 Per 1,000gal	Step 3 5,001-8,000 Per 1,000gal	Step 4 8,001-10,000 Per 1,000gal	Step 5 10,001-12,000 Per 1,000gal	Step 6 Over 12,001 Per 1,000gal
Residential	16.55	3.77	4.34	4.99	5.74	6.60
Large Commercial (over 120,000 gal./yr.)	70.75	4.46	4.46	4.46	4.46	4.46
Small Commercial	16.55	4.46	4.46	4.46	4.46	4.46

The expected yearly revenue generated from the water operations according to the 2007/2008 budget is $165,964.

The yearly expenditure of the Village for water operations according to the 2007/2008 budget is $147,007. This includes salary and benefits for the Village employees, as well as system maintenance.

Financial details applicable to the water operations for the Village can be found in Appendix E.

1. Debt Repayments

The Village has two outstanding debts that were taken on in order to build utility infrastructure. The first loan, which the Village accepted in 1985, had a loan amount of $152,000, and will reach maturity in 2025. As of June 30, 2007, the total outstanding amount for this loan was $117,000. The second loan, which the Village availed itself of in 2004, had a loan amount of $180,932, and will reach maturity in the year 2044. As of June 30, 2007, the total outstanding amount for this loan was $136,790.

2. Debt Service Reserve

The Village annually reserves 12% of the total anticipated expenditures to repay debt in the event that funds generated by operations are insufficient.

3. Short-Lived Asset Reserve

The water treatment plant has a short-lived asset reserve of $20,000 for pumps, paint and small equipment.

IV. NEED FOR PROJECT

A. Health and Safety, Sanitation, and Security

1. Tonka Filter

The 13-year old circular steel gravity filter has not been in operation for many years. With this filter out of service, there is no redundancy to ensure water treatment in the event that the concrete filter should fail. If this filter were to fail, the raw water storage tank can supply untreated water to the distribution system through emergency bypass piping, at which point the Village must issue a boil water alert.

The plant operator has not been able to fully drain the steel filter, which prohibited examination of the current media during an inspection conducted by Siemens personnel in the summer of 2007. The media has not been replaced since it was installed in 1995 and is probably in need of replacement. Additionally, a Siemens representative voiced concern that this filter, although appearing to be in good structural condition, is showing areas of paint failure and signs of surface corrosion and rust.

2. Concrete Filter

The older, concrete gravity filter, installed in the 1970s, was outfitted with new media during the installation of the steel filter mentioned above. During the Siemens representative's inspection, the filter was in service, so no media or underdrain inspection could be performed. There are minor leaks from various pipe penetrations into the filter, but none appear to be causing significant problems.

Currently, the filter is operated by manual control only, which requires the operators to be present at the plant to backwash or to make any adjustments. Since there are only two water operators for the Village, there is a limited amount of time available to fine-tune the water plant operation or make repairs.

3. Chlorine Room

During the Sanitary Survey completed by the Drinking Water Bureau (DWB), the inspectors observed there were no devices capable of shutting down the chlorine gas tanks in the event of a gas release. DWB recommends installation of a shut-off wrench to be permanently attached to the chlorine tank. At the time of the inspection, in November 2005, the Village did not have a written evacuation plan in the event of a chlorine gas leak, which the DWB recommends. They also observed that the chlorine room does not have

a panic bar on the door for easy escape, which is an OSHA violation. Additionally, the DWB suggests the installation of an alarm capable of informing the operator when there is an interruption in chlorine feed.

4. **Raw Water Automation**
   Currently the Village is wasting more than 1,000,000 gallons every month on average. This high volume of wasting is due to the lack of automation for shutting off the flow from the Cimarroncito Reservoir to the raw water storage tank and leaks in the water transmission and distribution system.

5. **Clarifiers**
   Clarifiers 1 and 2 show signs of residual buildup and appear to be in need of cleaning.

6. **Controls**
   The filter controls for the treatment plant are in need of replacement. Through conversations with the plant operators, a Siemens representative determined that most backwash functions are being controlled manually by physically disconnecting and reconnecting the air control lines from the existing PLC control panel. It would be preferable to have these operations controlled automatically by the PLC and solenoid valves.

7. **Storage Tanks**
   The raw water storage tank presently has no automatic shut off when full and no overflow splash pad below the overflow discharge pipe to prevent erosion of the backwash pond area. The Lambert Heights storage tank does not have a reliable means of measuring the water level.

8. **Miscellaneous Items**
   Additional recommendations from the NMED Drinking Water Bureau Sanitary Survey Report include the following:

   a. The Village of Cimarron water system management should maintain or establish the following:
      a. Maintain the Water System's 20-Year Master Plan
      b. Implement a Water Conservation Plan based on the recent extensive drought periods affecting the entire State
      c. The final as-built water system schematic (continue updating as required)
      d. Keep water system records

   b. A Source Water Protection Plan should be developed to assist in protecting the water source from contamination and developing a plan for bringing an alternate water supply on-line, should the existing supply become contaminated.

B. System O & M

The Village of Cimarron developed a written, formal Operations and Maintenance (O & M) Plan. This was completed by the Plant Operator and is included in Appendix C.

1. Operation

According to the Village, the water treatment plant produces an average of 3,500,000 gallons every month, with an average sale of 1,800,000 gallons. The Village has a standing storage volume of 600,000 gallons and on average loses slightly more than 1,000,000 gallons every month. Please see the Monthly Report and Yearly Water Production and Usage graph in Appendix C for more detailed information.

One means of lessening this problem would revolve around manual operation of the raw water tank connection with the Cimarroncito Reservoir. The raw water automation project currently in progress should resolve some of the water losses at the raw water tank overflow.

The plant operators have also mentioned the increased need to backwash the filters, indicating a degradation of filter media.

Every month the water treatment plant uses approximately 165 gallons of liquid alum, 66 pounds of chlorine gas, lime when needed to regulate the pH, and polymer on occasion for water coagulation.

The operators have investigated the cost and opportunity to use Sodium Hypochlorite for disinfection rather than chlorine gas, but the costs and ordering time are greater. Currently, the Village obtains chlorine gas from Raton, NM, which is less than an hour away and from a supplier who is able to deliver the chlorine quickly and cost effectively. Sodium hypochlorite could be supplied from Albuquerque, which is three hours away and require multiple weeks of lead time before the chemical transport could be delivered. Using sodium hypochlorite provides improved safety conditions for the operators compared to chlorine gas.

2. Maintenance

With the low amount of revenue generated by the water fees, funds for proper maintenance are difficult to accumulate. Maintenance issues that need to be addressed are the inoperable Tonka filter, rust and corrosion issues in the Tonka filter, the failing PLC and pneumatic solenoid valves, the leaking lime injector, and the increased frequency of backwashing.

According to the NMED Water Quality Bureau, a thorough structural and coating inspection is needed for all tanks every five years. This service should be performed by National Association of Corrosion Engineers (NACE) certified

inspectors. An annual inspection should also be carried out by the operator. Regular inspection of tanks can alert operators to potential problems and help prevent unexpected failure of the tank.

C. Growth

As mentioned above in the "Growth Areas and Population Trends" Section, A Comprehensive Plan for Colfax County projects very little growth for the Village of Cimarron and that the population will be stable. Because of this, the Village does not require an extensive increase in treatment capacity at this time. Further determination of funding opportunities will reveal the level of possible water rate increases.

V. LIST OF PRIORITIES (ALTERNATIVES)

The following priorities, described in greater detail below, are recommended to address the concerns mentioned above. The priorities are not listed in the order that they should be completed. These priorities are:

1. Bring Second Filter Online
   a. Replace Existing Steel Filter
   b. Repair Existing Steel Tonka Filter
2. Investigate Conditions in Concrete Filter
3. Chlorine Room Improvements
4. Raw Water Automation
5. Install Remote Capable SCADA System
6. Repair Existing Distribution Network
7. Miscellaneous Projects
8. As-Built Survey and Water Model
9. Develop Water System 20-Year Master Plan
10. Develop Water System 40-Year Master Plan
11. Develop Water Conservation Plan
12. Develop Source Water Protection Plan
13. Conduct Water Audit

1. Priority 1 - Bring Second Filter Online

Alternative A: Replace Existing Steel Filter

A. Description

To eliminate many of the problems identified with the existing Tonka filter, the Village could completely remove the filter tank and replace it. Replacement of the entire filter involves removing a portion of the treatment facility roof as well as dismantling and removing the existing filter from the building. The new filter would be installed, connected to the system, at which point it would become the primary treatment filter.

To address the failing pneumatic actuators, solenoid valves, and PLC controller, the Village should install a new PLC with automation capabilities.

B. Environmental Impacts
There are no environmental impacts identified for this alternative

C. Land Requirement
No additional land is needed for this alternative

D. Construction Problems
The complete replacement of the filter has one major construction concern. In order to move the new filter into place, the roof of the treatment building would need to be temporarily removed.

E. Cost Estimates

1. Construction
The estimated construction cost for a new filter replacement is $241,000. Please see Appendix F for a detailed breakdown of these estimated costs.

2. Non-Construction
Non-construction costs, including engineering design coordination fees and construction management, are estimated to be $105,000. Please see Appendix F for a detailed breakdown of these estimated costs.

3. Annual Operations and Maintenance
Annual operation and maintenance costs are estimated to remain the same.

G. Advantages / Disadvantages
A new filter may allow the Village to put off addressing maintenance problems until sometime in the future.

Alternative B: Repair Existing Steel Tonka Filter

A. Description
To bring the existing Tonka filter back online, the water and existing media will need to be removed and the inside and outside of the filter sandblasted to "Near White Metal" condition. This will alleviate the rust and corrosion that is currently evident. After sandblasting, the entire tank needs to be epoxy coated to all applicable AWWA standards. New air wash grids, media retaining nozzles, and media should be installed and the tank brought to operational condition. After the preparation work has been completed, the tank will be brought online as the primary treatment filter.

To address the failing pneumatic actuating solenoid valves and PLC controller, the Village should install a new PLC with automation capabilities.

B. Environmental Impacts
There are no environmental impacts identified for this alternative

C. Land Requirement
No additional land is needed for this alternative

D. Construction Problems
A challenge for the construction of this alternative lies in the limited space available for sandblasting and painting the filter in place.

E. Cost Estimates

1. Construction
The estimated construction cost for the Tonka filter repair is $70,000. Please see Appendix F for a detailed breakdown of these estimated costs.

2. Non-Construction
Non-construction costs, including engineering design fees and construction management, are estimated to be $29,000. Please see Appendix F for a detailed breakdown of these estimated costs.

3. Annual Operations and Maintenance
Annual operation and maintenance costs are estimated to remain the same.

F. Advantages / Disadvantages
The advantage of this option is the lower cost although filter replacement in the future may need to occur sooner than if the filter were brand new.

2. Priority 2 – Investigate Conditions in Concrete Filter

A. Description
Because the concrete filter is the only operational filter in service, proper examination, which requires removing it from service, is impractical. Once the steel filter is either replaced or repaired and fully operational, the concrete filter must be evaluated.

The media within the filter is one specific item that needs to be examined. Based on the increasing need for backwashing, the media is suspected of being degraded and in need of replacement. The leaking pipe penetrations should also be evaluated even though they do not appear to be causing significant problems at this time.

After a thorough investigation and analysis of the filter's condition, the Village will be better informed regarding decisions on the need for maintenance, repairs, or removal and replacement.

B. Cost Estimates

1. Construction

Construction costs were not evaluated, since proper investigation requires the filter to be shut down. This can occur after Priority 1 is completed. After the investigation, an evaluation report should be completed along with a construction cost estimate.

2. Non-Construction

Non-construction costs are estimated to be $25,000 for civil engineering-related services and preparation of a report.

3. Priority 3 - Chlorine Room Improvements

A. Description

The Village needs to come into compliance with the Drinking Water Bureau by installing a wrench on any chlorine gas cylinders that are used for disinfection. The chlorine room also requires a panic bar installed on the door for quick and easy escape in the event of a gas release. The Village should also install an alarm to inform the operator of an interruption of chlorine feed. The Village also needs to develop a written emergency evacuation plan in the event of a gas release.

B. Cost Estimate

This priority has an estimated capital cost of $5,000. The Village should contact the NMED Drinking Water Bureau for approval after installation of required equipment is complete.

4. Priority 4 - Raw Water Automation

A. Description

To address the high volume of water wasted from the raw water tank, the Village has begun work on a raw water automation system that will introduce valving to the raw water transmission lines capable of shutting down flow from the Cimarroncito Reservoir to the raw water storage tank when water production is not required. These efforts will allow the Village to maintain higher volumes of water in the reservoir and lower the volume of wasted water.

B. Cost Estimates

1. Construction

Construction costs are in progress.

2. Non-Construction

Non-construction costs are estimated to be $27,000 for civil engineering-related services and the preparation of related reports.

5. Priority 5 – Install Remote Capable SCADA System

A. Description

In addition to the NMED Drinking Water Bureau Sanitary Survey Report recommendations, the water treatment plant needs to be automated to meet the specifications of the Environmental Information Document, state, and federal agency requirements, according to the Village.

A SCADA system should be installed to allow remote and automatic control of the essential functions of the water treatment process.

B. Cost Estimate

This priority has an estimated cost of $125,000.

6. Priority 6 – Repair Existing Distribution Network

A. Description

Repair failing segments of the water distribution network as described above in the "Existing Central Facilities" Section of this report.

B. Cost Estimate

This priority has a total estimated cost of $1,347,000 for repairs A through D plus engineering and miscellaneous fees. Refer to Appendix F for cost breakdown of individual repairs.

7. Priority 7 – Miscellaneous Projects

A. Description

1. Lime Injector

The existing lime injector needs to be replaced due to chemical leakage.

This project has an estimated cost of $1,500.

2. Floor Grate

The existing floor grate in the water treatment building has become unstable in certain areas and poses a safety concern. A new 152"x49" floor grate for the filter room could solve this concern.

This project has an estimated cost of $3,000.

3. Installing Roof Vents

Both the pump house at the Cimarron River and the pump house at the Lambert Heights storage tank are without roof venting. Vents should be installed.

This project has an estimated cost of $1,000.

4. Chain-link Fencing

Other needs for the water treatment system include 750 feet of chain link fence with gate for the water treatment plant (this length needs to be confirmed with survey) and 100' x 100' chain link fence with gate around the Cimarron Main domestic potable tank.

This project has an estimated cost of $35,000.

8. Priority 8 – As-Built Survey and Water Model

A. Description

8-1: To provide the Village with a comprehensive set of as-built drawings and water system model, the Village should conduct an as-built survey of all existing water distribution system items, including inspection of the existing clarifiers and clarifier equipment.

8-2: Upon completion of 8-1, a water system model analysis should be completed. This model could be used for many future infrastructure evaluations, including, but not limited to, determining the adequacy of fire flow storage, potable water storage, distribution, and booster pumping requirements for the current and 20-year service populations.

B. Cost Estimate

8-1 has an estimated cost of $43,427 and 8-2 has an estimated cost of $44,090, both seen in Appendix F.

9. Priority 9 – Develop Water System 20-Year Master Plan

A. Description

To provide for future planning based on the water infrastructure model, the Village should develop a Water System 20-Year Master Plan that identifies water demands, future growth, existing water distribution system shortcomings, and suggest future infrastructure improvements.

B. Cost Estimate

This priority has an estimated cost of approximately $47,774 seen in Appendix F.

10. Priority 10 – Develop Water System 40-Year Master Plan

A. Description

The Village should evaluate the adequacy of the Village of Cimarron 40-Year Water Plan prepared by Daniel B. Stephens & Associates in 1998. If inadequate, preparation of a new Water System 40-Year Master Plan would allow the village to consider the findings of the as-built survey, water model analysis, and to review current and future water rights issues.

B. Cost Estimate
This priority has an estimated cost of approximately $49,400 seen in Appendix F.

11. Priority 11 – Develop Water Conservation Plan

A. Description
To provide for future planning, the Village should develop a Water Conservation Plan to generate strategies for reducing the use of water, including the development of incentive strategies for resident's reduction of water use, implementing strategies to reduce the volume of water wasted by the Village, and develop goals for public education on the importance of water conservation.

B. Cost Estimate
This priority has an estimated cost of approximately $36,742 seen in Appendix F.

12. Priority 12 – Develop Source Water Protection Plan

A. Description
To provide for future planning, the Village should develop a Source Water Protection Plan to protect the Cimarroncito Reservoir and the Cimarron River from potential degradation as a water supply. This task involves investigating potential sources of contamination, collaborating on effective protection against such pollutants with local entities, and educating the public on simple ways to protect the water supply.

B. Cost Estimate
This priority has an estimated cost of approximately $39,486 seen in Appendix F.

13. Priority 13 – Conduct Water Audit

A. Description
To account for the Village's high water loss, which was mentioned above in the Need for Project section of this report, the Village should conduct a water audit in accordance with the New Mexico Water Use Auditing Manual found on the New Mexico Environmental Department – Construction Programs Bureau's website.

B. Cost Estimate
This priority has an estimated cost of approximately $15,040 seen in Appendix F.

VI. SELECTION OF AN ALTERNATIVE FOR PRIORITY 1

A. Present Worth (Life Cycle) Cost Analysis

The following cost analysis presents the total estimated capital cost required to design and construct the two alternatives considered in this preliminary engineering report. In addition, the estimated annual operation and maintenance costs have been tabulated for the two alternatives. A 20-year life cycle was considered for this analysis and total present worth of operation and maintenance costs over this period can be found in the following Table 2:

Table 2 – Cost Analysis

Project Alternative	Capital Cost	Annual O&M Cost	Present Worth of Annual O&M Costs Over 20yrs*	Total Present Worth (20year) Cost
Replace Filter	$397,900	$147,000	$4,041,331	$4,439,231
Repair Filter	$113,900	$147,000	$4,041,331	$4,155,231

*Cost calculated using "Real" federal discount rate from Appendix C of OMB Circular A-94

From Table 2, the cost effective solution appears to be repairing the existing Tonka filter in place. Recommendations on how to proceed with this alternative can be found below.

VII. PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

A. Total Project Cost Estimate

Engineering, design, construction, and all other capital costs required for the various priorities as well as operation costs are presented in Table 2. Detailed breakdowns of these costs can be found in Appendix F.

B. Annual Operating Budget

1. Income

The Village of Cimarron's proposed water rate schedule for 2007 can be found in Appendix E.

The expected yearly revenue generated by water operations according to the 2007/2008 budget is $165,964.

There are only 26 buildable lots left in the Village. At a rate of $789 per new water connection, only a one-time revenue amount of $20,514 and an additional yearly infusion of $1,260 could be expected if all of these available lots were developed.

2. Operations and Maintenance (O & M) Costs

The anticipated yearly expenditure of the Village for water operations as per the 2007/2008 budget is $147,007, which is expected to remain the same after

Priority 1 is complete. This includes salary and benefits for the Village employees, as well as system maintenance.

3. Debt Repayments

The Village has two outstanding debts that were taken on in order to build utility infrastructure. The first loan, which the Village accepted in 1985, had a loan amount of $152,000, and will reach maturity in 2025. As of June 30, 2007, the total outstanding amount for this loan was $117,000. The second loan, which the Village availed itself of in 2004, had a loan amount of $180,932, and will reach maturity in the year 2044. As of June 30, 2007, the total outstanding amount for this loan was $136,790.

4. Reserves

The Village annually reserves 12% of the total anticipated expenditures to repay debt in the event that cash generated by operations is insufficient. The water treatment plant has a short-lived asset reserve of $20,000 for pumps, paint and small equipment.

5. Budget Summary

For the 2007/2008 fiscal year, the projected yearly revenue is $165,964 (after water rate increases) with expenses of $147,007 as well as $17,640 for reserves. This would provide the Village with a surplus of $1,317 for 2007/2008. Based on this financial information, a funding analysis is recommended for the capital improvements suggested in this report. For more details, please see Cimarron Budget FY 2007/2008 in Appendix E.

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Recommendation

Based on the information contained in this report, the Village of Cimarron should proceed with the refurbishment of the existing Tonka filter and bring it to a fully operational condition. The Village should then proceed with the other priorities as soon as reasonably feasible.

The Village should also consult with the State of New Mexico and additional programs for funding opportunities and financial assistance.

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LIST OF APPENDICES

APPENDIX A
Photographs

Figure 1 - Cimarroncito Reservoir

Figure 2 – Cimarroncito Dam

Figure 3 – Cimarron River Diversion Area

Figure 4 - Cimarron River Pump Station

Figure 5 - Raw Water Tank

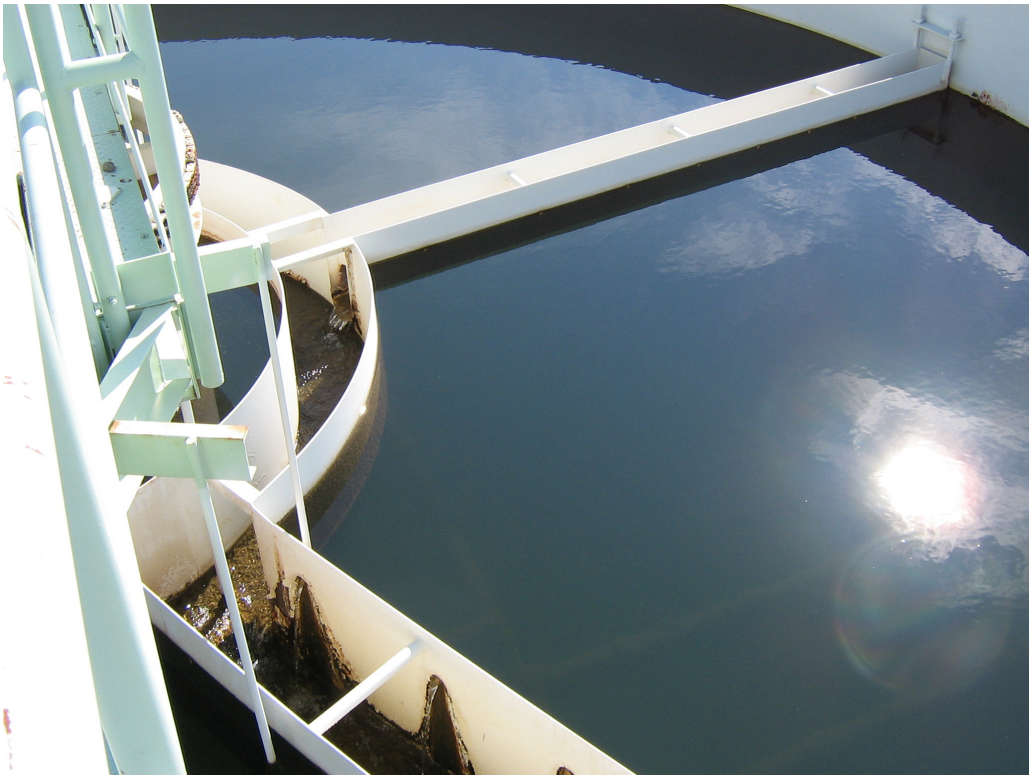


Figure 6 – Large Clarifier

Figure 7 – Treatment Building

Figure 8 – Lime Injector

Figure 9 – Tubidimeter

Figure 10 – Chlorine Gas Tank

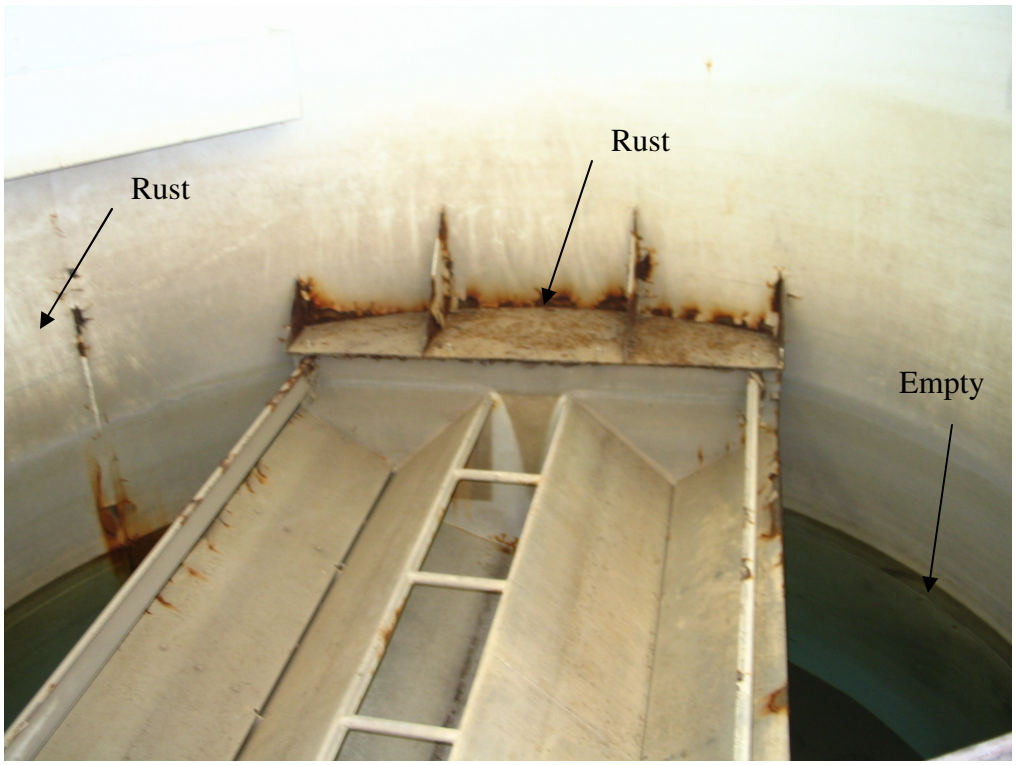


Figure 11 – Steel Filter

Figure 12 – Steel Filter Detail

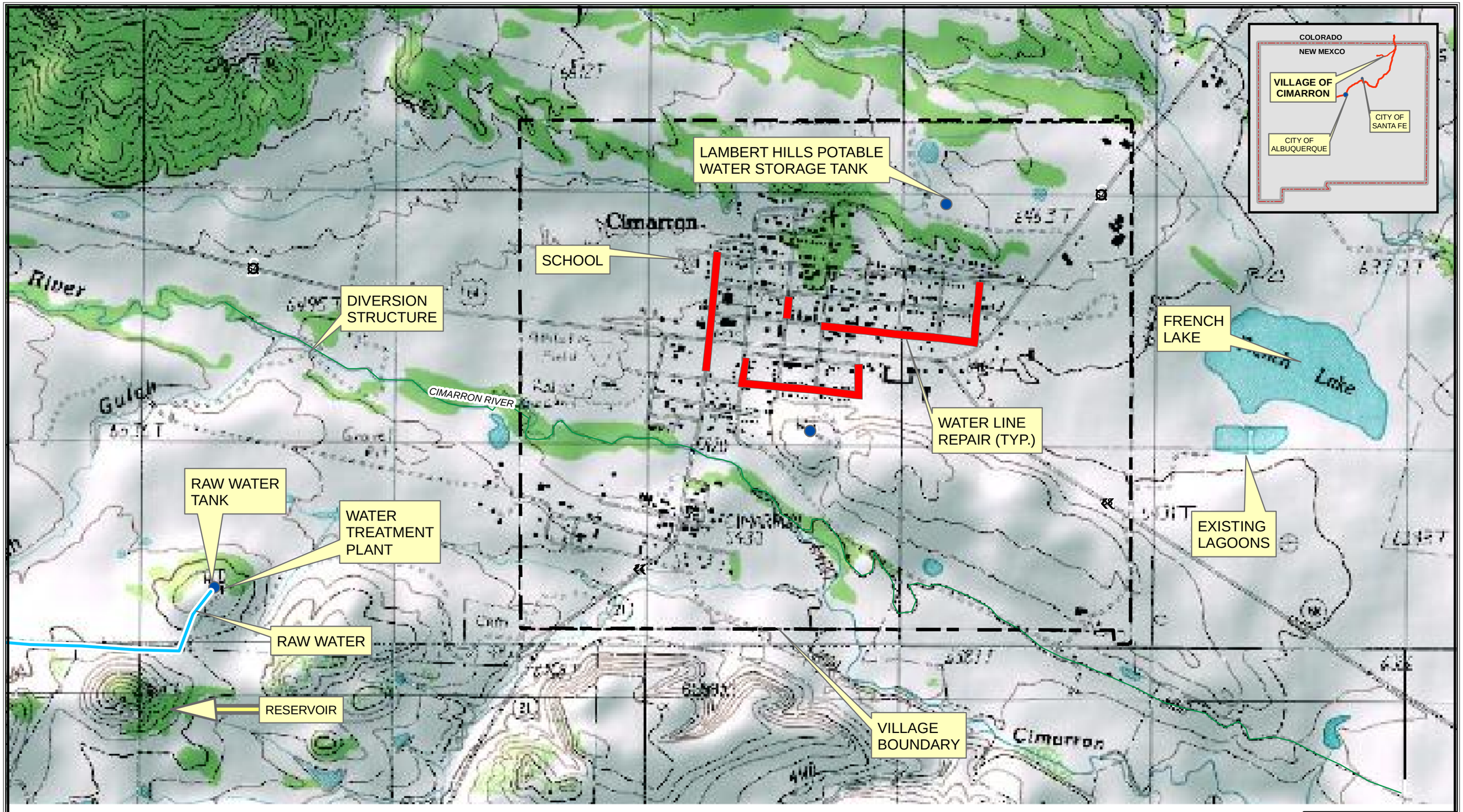
Figure 13 - Cimarron Main Potable Water Storage Tank

Figure 14 – Lambert Heights Potable Water Storage Tank

Figure 15 – Lambert Heights Pump Station

Figure 16 – Damage Caused by Water Main Failure

APPENDIX B
Maps and Drawings



WATER VICINITY MAP

Legend

Water Line Repair

DATE: 8/20/07

VILLAGE OF CIMARRON
CIMARRON, NEW MEXICO

WATER ENGINEERING REPORT

SERVICE AREA MAP
Sheet 2 of 2

Nolte Associates, Inc.

CHECKED: TRR	DATE: 8/16/07	ENGR'S. FILE NO.	SHEET NO.
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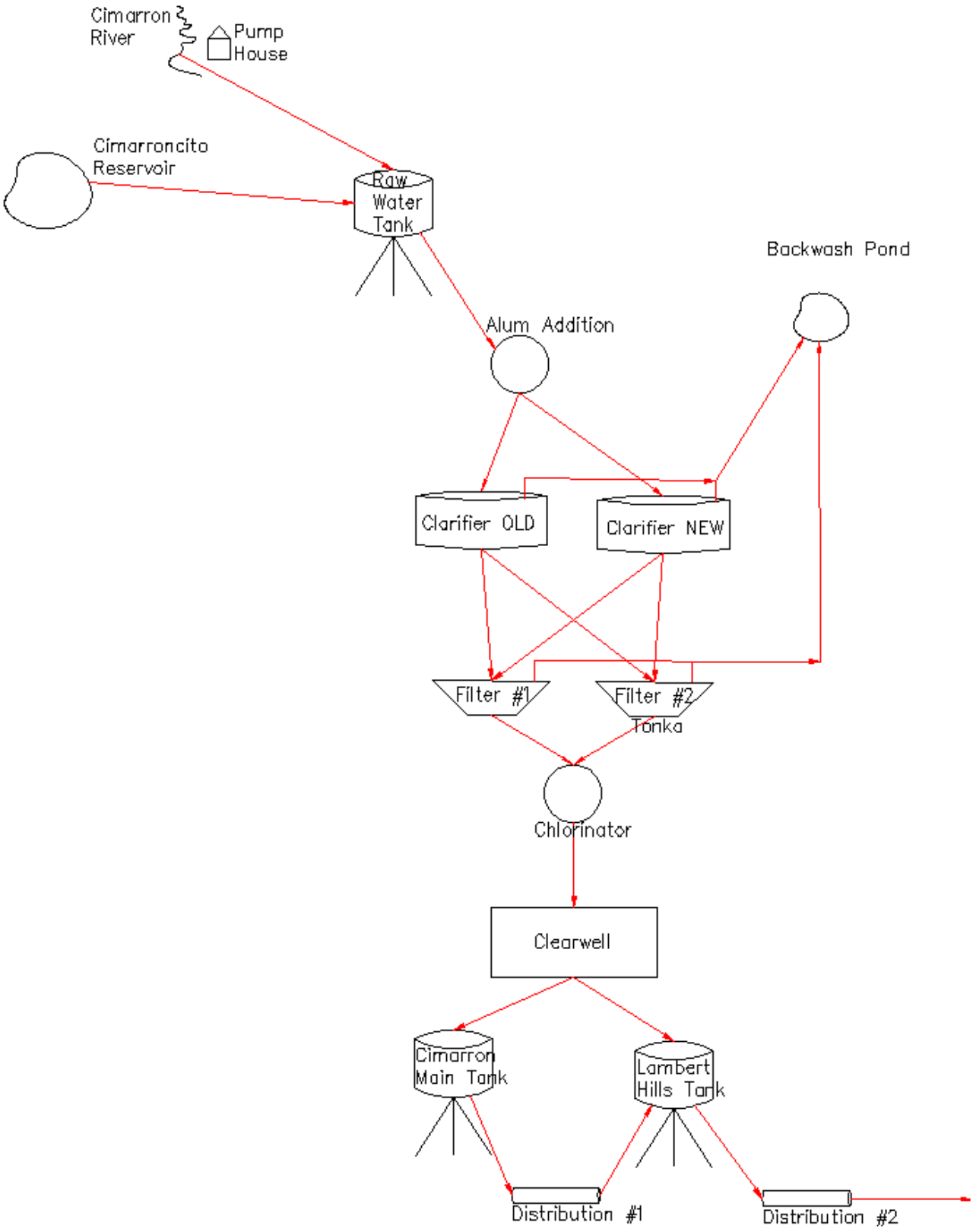
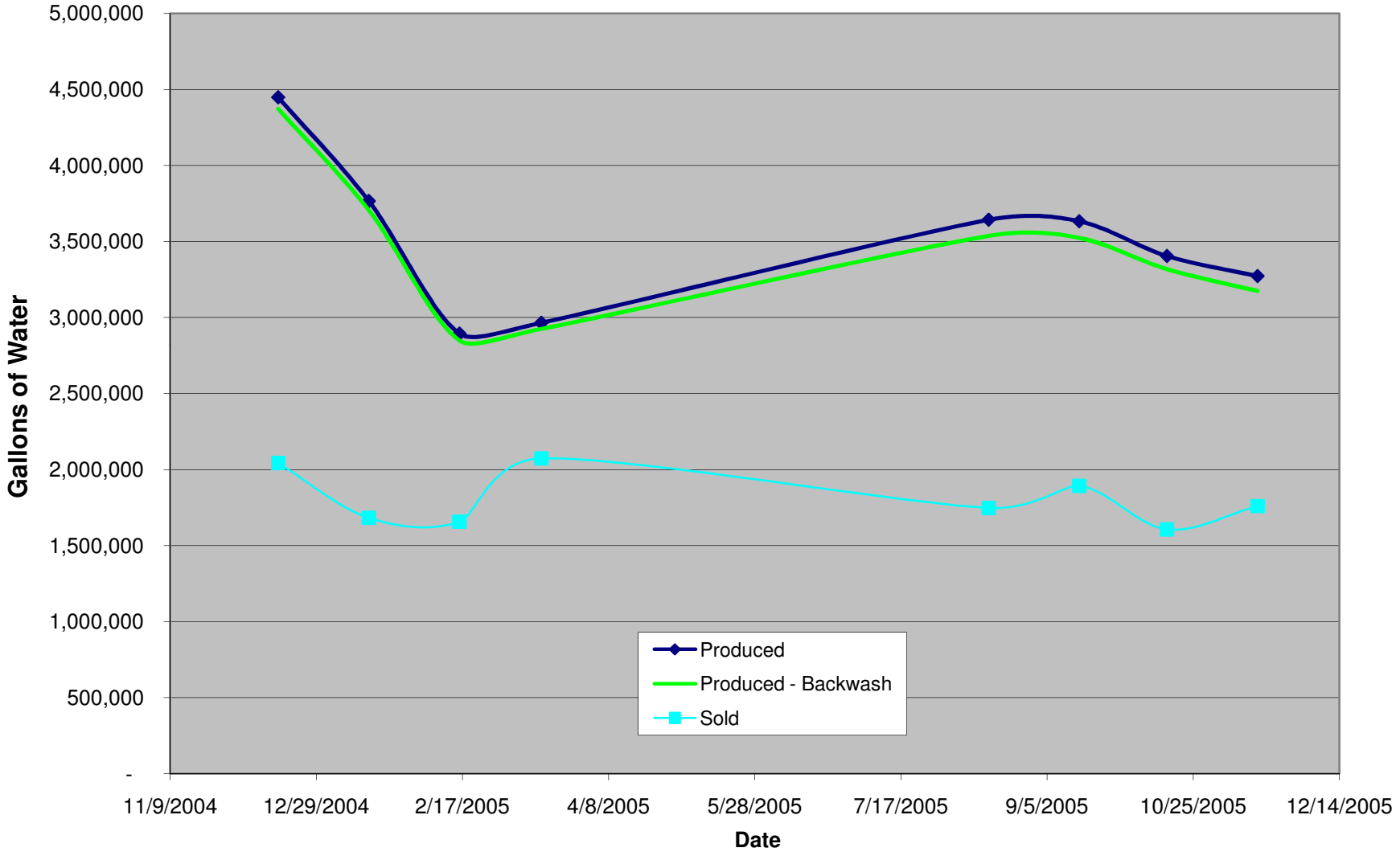

Cimarron River
Pump House
Cimarroncito Reservoir
Raw Water Tank
Backwash Pond
Alum Addition
Clarifier OLD
Clarifier NEW
Filter #1
Filter #2
Tonka
Chlorinator
Clearwell
Cimarron Main Tank
Lambert Hills Tank
Distribution #1
Distribution #2

APPENDIX C
Water Operations

Cimarron, New Mexico
Water Treatment Plant

Yearly Water Production and Usage



Village of Cimarron, New Mexico
Water Treatment Plant

Dates		Flow Data							
Start	End	Gal. Produced	Gal. Sold	Gal. Standing	Gal. Lost	Percent Lost	Gal. Backwashed	No. of Backwashes	Produced - Backwash
12/16/2004	1/15/2005	4,447,000	2,042,344	600,000	1,698,580	38%	76,000	8	4,371,000
1/16/2005	2/15/2005	3,765,000	1,682,124	600,000	1,422,876	38%	60,000	6	3,705,000
2/16/2005	3/15/2005	2,894,000	1,656,676	600,000	592,324	20%	45,000	5	2,849,000
3/16/2005	4/15/2005	2,965,000	2,073,640	600,000	266,860	13%	40,000	4	2,925,000
8/16/2005	9/15/2005	3,642,000	1,747,340	600,000	1,188,660	33%	106,000	10	3,536,000
9/16/2005	10/15/2005	3,632,000	1,892,930	600,000	1,030,070	28%	109,000	10	3,523,000
10/16/2005	11/15/2005	3,404,000	1,606,316	600,000	1,111,684	33%	86,000	9	3,318,000
11/16/2005	12/15/2005	3,272,000	1,759,544	600,000	814,456	33%	98,000	10	3,174,000
	Averages	3,502,625	1,807,614	600,000	1,015,689	30%	77,500	8	3,425,125

Dates		Chemical Usage				Laboratory Control							
Start	End	Gal. of Alum	Lbs. of Activated Carbon	Lbs. Cl	Other Chem. Used	No. of Cl Tests at Plant	Avg. Cl Conc. at Plant	No. of Cl Residual Tests	Avg. Cl Residual Conc. In System	No. of Turbidity Tests	Avg. Turbidity	No. of pH Tests	Avg. pH
12/16/2004	1/15/2005	55	0	84	0	62	1.60	31	1.00	31	0.04	31	7.40
1/16/2005	2/15/2005	110	0	72	0	62	1.60	31	1.00	31	0.05	31	7.80
2/16/2005	3/15/2005	55	0	61	0	56	2.30	28	1.10	28	0.03	28	7.90
3/16/2005	4/15/2005	165	0	65	0	61	1.70	31	1.10	31	0.03	31	7.90
8/16/2005	9/15/2005	275	0	67	0	62	2.60	31	1.00	31	0.05	31	7.90
9/16/2005	10/15/2005	220	0	68	0	60	1.50	29	0.90	29	0.03	29	7.50
10/16/2005	11/15/2005	275	0	56	0	62	1.50	31	0.79	31	0.03	30	7.80
11/16/2005	12/15/2005	165	0	54	0	60	1.50	30	0.68	30	0.02	30	7.80
	Averages	165	0	66	0	61	1.79	30	0.95	30	0.04	30	7.75

WATER PLANT OPERATING PROCEDURES

Last Updated: June 2007

WATER OPERATING PLANT

1. CHECK TANKS (See separate storage tank instructions below)
    a. Cimarron Hill storage tank.
    b. Lambert Heights storage tank.

2. DRAW WATER SAMPLE FROM **VILLAGE**.
    Draw water sample frequency (**DAILY**)
    Draw sample from residence or business does not matter. Let water run for approximately two-three minutes not more than five to ensure that the water is coming from the water main and not the customer's line. Fill sample water bottle and cap immediately to eliminate any possibility of contamination. This sample is drawn for free chlorine residual testing (see instruction at step 9d). This sample is taken to the water operating plant for testing and if test is good, the water in the sample bottle can be returned to the system. The testing residual number is recorded on the Cimarron Water Plant Daily Log. The residual at any point in the system can not be below .2 or above 4.0 in value. If residual is too high or low it is adjusted by the chlorination weigh in.

3. CHECK AND TAKE METER READING FOR DAILY FLOW REPORTING.
    Check and meter reading frequency (**TWICE DAILY**)
    Meter is on the water plant road. (Need to install lid for security and safety.) Record meter reading and time on Cimarron Water Plant Daily Log and water operator notebook. There should always be a reading when the water plant is in operation.

4. CHECK CHEMICAL ROOM FOR CHEMICAL USAGE.
    Check usage frequency (**DAILY**)
    Chemical room contains Alum and polymer. Check chemical level in barrel to ensure proper pumping and chemical feed. Adjust when necessary.

5. CHECK WEIGHT OF Cl^2 POUND USAGE.
    Check usage frequency (**TWICE DAILY**)
    a. Have two people present when the CL^2 bottle is being changed out.
    b. Put on PPE SCBA. (Personnel Protective Equipment Self Contained Breathing Apparatus.)
    c. Open chlorine storage room door ***SLOWLY*** to allow vent fan to clear and vapors from a leak out of the room. (Need to look into possible chemical change out or improved safety equipment and procedures and disaster procedures.)
    d. Check for possible leaks with ammonia. Hold the open ammonia bottle by all fittings, hoses and connections. If there is a leak there will be white smoke (like cigarette smoke) rising from the leak in the chlorine system. Leave the room immediately and turn off the chlorine gas supply in the filter (1) room. Repair leak and turn chlorine gas supply back on. (Repeat step d until the leak has been repaired and the room is safe.)
    e. Weigh the chlorine bottle and record weight on the Cimarron Water Plant Daily Log the weight is only recorded once daily.

6. CHECK SAND FILTERS ONE AND TWO.
   Check of filter frequency (**TWICE DAILY**)
   a. Check sand filter one for head loss, run time in excess of one week and high turbidity. If any of these conditions exist backwash is needed. Also, check for filter damage and possible media replacement. (Media is required to be measured twice a year for loss and should be replaced according to filter specifications.) Prior to performing a backwash all tests from samples must be completed and recorded.
      Backwash procedure. Shut off water inlet from clarifiers. Proceed to filter room 2, turn on air valves to filter number 1 and 2. Adjust backwash and simulwash timer. Push backwash button for filter that is in need of the backwash. Allow system to backwash till cycle is completed. Turn off air valves to sand filter 1 and 2. Check all valves for proper open/close position, if unsure call supervisor. Read backwash meter and record to the Cimarron Water Plant Daily Log. Subtract current backwash reading from previous backwash reading to determine water use in backwash.
   b. Check sand filter two for head loss, run time in excess of one week and high turbidity. If any of these conditions exist backwash is needed. Also, check for filter damage and possible media replacement. (Media is required to be measured twice a year for loss and should be replaced according to filter specifications.) Prior to performing a backwash all tests from samples must be completed and recorded.
      Backwash procedure. Shut off water inlet from clarifiers. Proceed to filter room 2, turn on air valves to filter number 1 and 2. Adjust backwash and simulwash timer. Push backwash button for filter that is in need of the backwash. Allow system to backwash till cycle is completed. Turn off air valves to sand filter 1 and 2. Check all valves for proper open/close position, if unsure call supervisor. Read backwash meter and record to the Cimarron Water Plant Daily Log. Subtract current backwash reading from previous backwash reading to determine water use in backwash.
   c. Calibrate the turbidity meter at a minimum of once a month.

7. CHECK CLARIFIER IN OPERATION.
   a. Check for flocculation. Adjust with alum or polymer as needed by running jar test.
      Jar Test Procedure. Make up the alum solution one part (milliliter) alum to 1000 parts (milliliters) distilled water. Get a five gallon raw water draw from the raw water inlet valve. Fill six jars with 500 milliliters of the raw water. Place on gang stirrer and add one magnetic to each jar. The solution is added to the jars as follows: jar one 30 milliliters, jar two 35 milliliters, jar three 40 milliliters, jar four 45 milliliters, jar five 50 milliliters and jar six 55 milliliters. Set gang stirrer timer to thirty minutes slow mix. Observe flocculation for the best chemical dosage results. Once the gang stirrer has turned off observe the jars for the best sedimentation settlement. (More than one jar may appear to have good results.)

Perform another series of jar test experiments to simulate the conditions in the treatment plant and determine the optimum coagulant dosage needed for the prevailing water quality conditions. Remember, the jar test is an indication of what's happening in your plant. YOU MUST OBSERVE the actual coagulation, flocculation and setting in your plant in order to determine the optimum chemical dosage.

b. Check stages of water density (this is performed every thirty days) from the faucet valves on the large clarifier.
Turn on the faucet on the face of the clarifier one at a time and draw a sample from each. Observe sample density to determine if sludge draw down is needed.
Sludge draw down procedure. Go to the north side of the clarifier open the four inch valve and release the raw water for thirty minutes to and hour depending on the density test.
When testing is complete clean all equipment and store for next required test.

8. DRAW WATER SAMPLES FROM CLEAR WELL AND RAW WATER.
The clearwell is located underneath the water treatment plant. The manhole to clearwell is in the water plant chemical room. Take one 500 milliliter sample. The raw water supply faucet is located on the six inch raw water inlet pipe. Take one 500 milliliter sample. (These samples will be utilized in the step 9.)

9. SAMPLE TESTING
a. TURBIDITY frequency (**TWICE DAILY**)
RAW - take 500 milliliter sample and pour into raw water turbidly sample bottle up to the middle of the diamond on the bottle. Hold bottle by lid. Wipe the bottle with lint free cloth. Put a drop or two of silicone oil on the sample bottle. Wipe again to ensure coverage of silicone on entire bottle to help with an improved test results. Open lid to portable turbidity meter and place bottle in to the turbidity meter with the diamond on the bottle centered with the notch by the hole holding the sample bottle. Close the lid and turn the power on and wait for the turbidly meter number to show and push the read button to run the test. After the test is concluded record the results on the operator notebook.
When test is complete clean all equipment and store for next required test.
CLEARWELL - take 500 milliliter sample and pour into clearwell water turbidly sample bottle up to the middle of the diamond on the bottle. Hold bottle by lid. Wipe the bottle with lint free cloth. Put a drop or two of silicone oil on the sample bottle. Wipe again to ensure coverage of silicone on entire bottle to help with an improved test results. Open lid to portable turbidity meter and place bottle in to the turbidity meter with the diamond on the bottle centered with the notch by the hole holding the sample bottle. Close the lid and turn the power on and wait for the turbidly meter number to show and push the read button to run the test. After the test is concluded record the results in the operator notebook and on the Water Plant Daily Log (this number is utilized for the monthly reports to the EID.).
When test is complete clean all equipment and store for next required test.

b. PH & TEMPERATURE frequency (**TWICE DAILY**)

RAW - take 500 milliliter sample and drop the PH and temperature tester into jar. Swirl to mix for ten seconds. Turn on the tester and leave in the jar till the indicator registers and locks in. Record the results of the PH and temperature on the Water Plant Daily Log. PH scale goes from 0 to 14 with 7 being neutral. For surface water the range is 6.5 to 8.5. If PH adjustment is required use lime or caustic soda to adjust the PH back into correct range. See the supervisor for adjustment and chemical feed procedure.

When test is complete clean all equipment and store for next required test.

CLEARWELL - take 500 milliliter sample and drop the PH and temperature tester into jar. Swirl to mix for ten seconds. Turn on the tester and leave in the jar till the indicator registers and locks in. Record the results of the PH and temperature on the Water Plant Daily Log. PH scale goes from 0 to 14 with 7 being neutral. For surface water the range is 6.5 to 8.5. If PH adjustment is required use lime or caustic soda to adjust the PH back into correct range. See the supervisor for adjustment and chemical feed procedure.

When test is complete clean all equipment and store for next required test.

c. ALKALINITY frequency (**MONTHLY**)

RAW - take 500 milliliter sample and dip alkalinity strip into jar. Pull strip out and compare to color chart. Record the results in operator notebook. This test is performed monthly and this number is utilized for the monthly reports to the EID.)

When test is complete clean all equipment and store for next required test.

d. CHLORINE (This test is measure by ppm)

DRAW WATER SAMPLE FROM **VILLAGE** frequency (**DAILY**)

Draw sample from residence or business does not matter. Let water run for approximately two-three minutes not more than five to ensure that the water is coming from the water main and not the customer's line. Fill sample water bottle and cap immediately to eliminate any possibility of contamination. This sample is taken to the water operating plant for chlorine testing.

Chlorine Test Procedure. File the chlorine test tube to line with part of the **Village** water sample draw. File an additional test tube with normal faucet water. Get a DPD pouch and pour into the sample draw test tube. Mix thoroughly the water should turn pink (if not throw out the sample test and start over again). Place sample draw test tube and normal faucet water test tube into the DPD color metric method tester. Observe color till it matches. Record the number off of the DPD tester to the Cimarron Water Plant Daily Log.

DRAW WATER SAMPLE FROM **WATER OPERATING PLANT** frequency (**TWICE DAILY**)

Chlorine Test Procedure. File the chlorine test tube to line with part of the 500 milliliter **water operating plant** sample draw. File an additional test tube with normal faucet water. Get a DPD pouch and pour into the sample draw test tube. Mix thoroughly the water should turn pink (if not throw out the sample test and

start over again). Place sample draw test tube and normal faucet water test tube into the DPD color metric method tester. Observe color till it matches. Record the number off of the DPD tester to the Cimarron Water Plant Daily Log.

Subtract the Village sample test residual from the Water operating plant sample test residual to get the free chlorine residual result. Record this number on the Cimarron Water Plant Daily Log.
The residual at any point in the system can not be below .2 or above 4.0 in value. If residual is too high or low it is adjusted by the chlorinator.

STORAGE TANK (1) - Cimarron Hill

1. Check float to ensure proper level and possible maintenance.
2. Check to make sure the overflow screen is in place.
3. Check for possible vandalism.
4. **Need to install security fencing.

STORAGE TANK (2) - Lambert Heights

1. Check float to ensure proper level and possible maintenance.
2. Check to make sure the safety flap on overflow pipe is secure. (On the south side of the tank outside the fence.)
3. Check all (three) pumps for correct pressure levels.
    e. Pump one will go up to 120 psi and then shuts off and turns back on at 60psi.
    f. Pump two auxiliary back up for pump one if pump one can not keep up with the pressure and volume requirements.
    g. Pump three is auxiliary back up for pump two if pump two can not keep up with the pressure and volume requirements.
4. Check pressure bladder for correct pressure level. (The correct pressure is 20psi.)
5. Check for leaks on the pumps and on all fittings.
6. Log in the pump hours on the pump operating log form.

GLOSSARY

SLD
State Laboratory Department

Turbidity
Turbidity is clay, silt or mud in the water. Although turbidity does not represent a health risk by itself, it can shield harmful bacteria from disinfection processes. Turbidity is measured in Nephelometric Turbidity Units (NTU). The device used to measure NTU's is called a nephelometer or turbidimeter.

PH
A measure of acidity and alkalinity of a solution that is a number on a scale on which a value of 7 represents neutrality and lower numbers indicate increasing acidity and higher numbers increasing in alkalinity and on which each unit of change represent a tenfold change in acidity or alkalinity and that is the negative logarithm of the effective hydrogenion concentration or hydrogenion activity in gram equivalents per liter of the solution.

Microbiological

Waterborne Pathogens
Water systems must strive to keep their drinking water free of disease causing organisms known as pathogens. There are five waterborne pathogens that can be found in all water supplies and two that are only found in surface water supplies. The protozoa that are found only in surface water supplies (Giardia and Cryptosporidium) form cysts and spores that protect them from cold temperatures. Because of this protection, they are much more difficult to kill with disinfectant chemicals.

Diseases caused by Waterborne Pathogens
All Water Sources: **Typhoid** **Paratyphoid (Types A & B)** **Cholera** **Dysentery** **Hepatitis**
Surface Water Only: **Cryptosporidium** **Giardia**

All of these diseases are caused by pathogenic bacteria except hepatitis, which is a virus. It is very difficult to identify anyone particular pathogen by laboratory testing. To make testing more reliable and economical, the lab tests are designed to identify a large family of bacteria that are related to the disease causing bacteria, rather than identifying each type of pathogen.

Coliform Group of Bacteria
Coliform bacteria are enteric bacteria. This means that they are found in the intestinal tract of warm blooded animals, including humans. These bacteria do not cause disease

but are necessary for the digestion of food. The waterborne pathogens are also enteric organisms. Some of the bacterial pathogens are part of the coliform family.

ORGANIC CONTAMINANTS

Contaminant	MCL (mg/L)	Contaminant	MCL (mg/L)
Acrylamide	TT1	Glyphosate	0.7
Alachor	0.002	Heptachlor	0.0004
Atrazine	0.003	Heptachlor epoxide	0.0002
Benzene	0.005	Hexachlorobenzene	0.001
Benzo(a)pyrene	0.0002	Hexachlorocyclopentadiene	0.050
Carbofuran	0.04	Lindane	0.0002
Carbon Tetrachloride	0.005	Methoxychlor	0.04
Chlordane	0.002	Oxamyl (Vydate)	0.2
Chlorobenzene	0.1	Polychlorinated byphenyls (PCBs)	0.0005
2,4-0	0.07	Pentechlorophenol	0.001
Dalapon	0.2	Picloram	0.5
DBCP	0.0002	Simazine	0.004
O-Dichlorobenzene	0.6	. Styrene	0.1
p-Dichlorobenzene	0.075	Tetrachloroethylene	0.005
1,2- Dichloroethane	0.005	Toluene	1
1,I-Dichloroethylene	0.007	Toxaphene	0.003
Cis-l,2-Dichloroethylene	0.07	Trichloroethylene	0.005
Trans-l,2-Dichloroethylene	0.1	2,4,5- TP (Silvex)	0.05
Dichlormethane	0.005	1,2,4- Trichlorobenzene	0.07
1,2- Dichloropropane	0.005	1,1,1- Trichloroethane	0.2
Di(2-ethvlhexvl)adipate	0.4	1,1,2- Trichloroethane	0.005
Di(2-ethylhexyl) phthalate	0.006	Vinyl chloride	0.002
Dinoseb	0.007	Xylenes (total)	10
Dioxin	0.00000003		
Diquat	0.02	1 _ TT refers to approved Treatment Technology rather than MCL	
Endothall	0.1		
Epichlorohvdrin	TT1		
Ethylbenzene	0.7		
Ethylene dibromide	0.00005		

MONTHLY WATER SAMPLING REQUIREMENTS

It is the responsibility of the system operator to collect samples for microbiological ("Bac-T") testing. It is very important to make sure samples are collected and tested and results reported properly. If a sample becomes contaminated due to poor sampling procedures or is not sent to the testing laboratory at the proper time, the system may technically be in violation of the drinking water regulations. This may result in the system having to notify the public of violations when the water is actually safe.

The NMED Drinking Water Regulations regarding microbiological sampling schedules set the minimum number of samples a water system must submit at one per month. As the size of the system increases so does the number of samples required each month (maximum of 480).

Microbiological Sampling. There are four sampling sites and each site has its own four sampling sites. These samples are taken to Raton for laboratory processing.

- **Preparing to collect the sample**

  The first consideration in collecting a "Bac- T" sample is the sample bottle. These bottles are provided by the laboratory. They are sterilized prior to being distributed. They should be stored in a cool, dry place until they are needed for a sample. Sodium thiosulphate is added to the bottle before it is sterilized. It may be in the form of a clear liquid, a white powder, or a white tablet in the bottom of the bottle. The purpose of the sodium thiosulphate is to neutralize any chlorine residual that is present in the sample. Things to remember when preparing to collect microbiological samples:

  1. Don't forget the chlorine residual test kit. If the system disinfects, a free chlorine residual needs to be present prior to sample collection. The residual must be recorded on the sample request form.
  2. A cooler and blue ice packs (or regular ice) will be needed for sample preservation. If ice is used, plastic bags will be needed to keep the sample bottles and forms dry.
  3. Use alcohol, soap, or latex gloves to prevent contamination due to dirty hands.
  4. A pen should be used to fill out forms. Use tape and a permanent marker to label sample bottles.
  5. Always take extra bottles and sample request forms. Repeat samples will also require red evidentiary seal tape.
  6. Never wash out a bottle or even open it until you are ready to take the sample.
  7. If a sample bottle has any dirt or junk in it or in the lid, DON'T USE it. It is better to get a new bottle than to take a bad sample. See item 5.

- **Sample Collection**

  The location of the sample should be determined by referring to the sampling plan. Once the site has been selected, the next consideration is the collection of a valid sample. The procedure for collecting the sample is given below. These instructions should be carefully followed to prevent accidental contamination of the sample.

  1. Select a sampling point. Always keep sanitary conditions in mind when selecting a sampling point. Never use a kitchen sink faucet that swivels or an outdoor faucet that drips. Any hoses, vacuum breakers or other attachments must also be removed. The least used faucet at the site is preferred because there is less chance of contamination of the faucet. If an indoor faucet is selected, make sure the sink and faucet are clean. Never collect a sample from a hot water faucet. Remove the

aerator screen (it might be contaminated). If the sample tap is located in an open area, clean brush and other vegetation for 3-5 feet away from the sample site. Disinfect the faucet with alcohol if necessary. Avoid using bleach to clean the faucet. It doesn't evaporate as quickly and spills are a bigger problem to clean up. And finally, wash your hands or put on latex gloves before collecting the sample.

2. Flush the line. Open the tap and let the water run for 3-5 minutes or until the temperature changes. This will insure that the water being sampled is from the main and has not been standing in the customer's plumbing.
3. Take a chlorine residual reading. Once the line is properly flushed, throttle the flow down to an unaerated stream. Run a chlorine residual analysis and record the free chlorine residual. It must be included on the sample request form.
4. Collect the sample. Remove the cap, making sure that you do not touch the inside of the cap or the top of the sample bottle. Don't aerate the sample or allow it to splash on the outside of the bottle. Don't touch the inside of the cap or bottle. Don't blow or breathe into the sample bottle. Hold the bottle at a 45 degree angle while filling it. Fill the bottle carefully to the "fill line" or within about 1" of the top. This guarantees that there is at least 100ml of sample in the bottle. Do not fill it all the way. Never pour excess water out of the bottle. If you overfill it, draw another sample with on of those extra bottles you brought. An air space is needed to agitate the sample before it is tested at the lab. Never set the cap down or leave it off longer than it takes to collect the sample. Hold the cap so that it is facing down to avoid having debris settle in it. Replace the cap and make sure it tight.
5. Mark the bottles for identification. Mark the disposable bottles directly and use a piece of tape or other suitable label to mark and identify the reusable Nalgene bottles. The information on the label should include the address, date and time. If records are being data based, the computer reference number should also be included.
6. Refrigerate the sample. The sample must be refrigerated to lower the temperature to 39° F or 4° C until tested. Always place the sample and the form in a plastic bag if ice is being used to refrigerate the sample. This is a good practice even if blue ice is being used because condensation can occur. If the samples are wet, the lab may reject them because they can't be sure the sample didn't leak.

- **Reporting and shipping considerations**

The final consideration for microbiological sampling is the proper completion of the sample form and delivery to the lab. The following information must be included on the sample form:

Microbiological Sample Request Form Data

1. System name, address and identification number.
2. Location of sampling site.
3. Date and time sample was taken.
4. Type of water sampled:
    a. Routine Sample - compliance
    b. Repeat Sample
    c. Special sample - Line break/raw water

d. NMED monitor sample - Requested by NMED

5. Chlorine residual
6. Reference number (if it's a repeat sample)
7. Name of operator taking sample and Operator ID# or Water Sampler Technician ID Number

There are times when water systems need to collect microbiological samples for reasons other than monitoring compliance. New water lines and lines that have been repaired should be tested. Wells that have been disinfected should be tested. These samples must be identified as something other than a routine or compliance sample so they will not count as a violation against the system if they are found to be positive. This is done by checking "Special Sample" on the form.

There are certain requirements regarding the age of a microbiological sample. New Mexico Drinking Water Regulations state that the sample must be tested within 30 hours after it is taken. If a sample does not arrive at the lab within this time period it will not be tested. Most labs require that the sample arrive at the lab within 24 hours of collection so the testing can be done before it is 30 hours old.

Some labs, including SLD, do not accept samples on Fridays, since they are not open on Saturday to read the results. This means that it is important to take compliance samples on a Monday. If positive results are received on Wednesday, the repeats can be run on Thursday. Remember that repeat samples must be taken with 24 hours of notification. If you receive notification of a positive sample on Friday and the repeat can't be run until the following Monday a violation has occurred.

- **Repeat Samples**

Anytime a microbiological sample result comes back positive, indicating the presence of total or fecal coliform/*E. coli*, repeat samples must be taken. Three repeats are usually required. One must be taken at the site of the positive sample. The two samples must be taken upstream and downstream of the original site (within five service connections). These repeat samples must be taken within 24 hours of notification of positive results. They must be identified as a "Repeat Sample" on the sample form. Repeat samples must be sealed with a red evidentiary seal tape. The tape must cover the cap and extend down the sides of the bottle. The sample forms must also include the reference number for the positive sample.

There is an important exception to the three repeat samples rule. The regulations also state that when repeats are taken the minimum number of samples is raised to five for the month.

A system that collects just one sample a month must collect four repeat samples, when the sample is positive, in order to have five samples as required.

Whenever a system has to take repeat samples, a minimum of five routine samples must also be submitted the <u>following</u> month. This is only an issue for systems that normally turn in four or fewer samples each month. If the five samples are negative the system can return to its normal sampling schedule the next month.

Small systems that have fewer than four sampling sites have a problem complying with the "upstream and downstream" aspects of the repeat sampling requirements. In this case, samples should be taken at as many separate sites as possible and then wait a

minimum of 2 hours before re-sampling enough sites to get the required number of samples.

- **Violations**

When repeat samples come back positive, the system is usually in violation of the microbiological standards (unless 40 or more samples are taken, then no more than 5% of the samples can be positive). If all the positive samples were total coliform, it is a Tier 2 violation. If the MCL is exceeded and fecal coliform or *E. Coli* positives occur in either the routine samples or the repeats, it becomes a Tier 1 violation requiring immediate public notification. In either case the NMED must be notified within 24 hours of any positive sample results. The water system is responsible for any public notification that may be required.

- **Filling out the microbiological sample request form - SLD**

NMDOH uses a one-page form for microbiological samples. It is printed in red to aid SLD in tracking originals separate from the copies that are made. The form is constructed in rows of blocks. Instructions for completing the form are listed below (starting from the top):

Row1

Time and Date of Receipt: do not fill in the left box. It is for the time and date stamp at SLD.

User Code: Samples taken by water systems for regulatory compliance will be 62000 (SDWA). When NMED employees, not a water system, collect samples, check 55420 (NMED Monitor). Private samples, domestic wells and systems NOT required to pay the Water Conservation Fee should check 64000 (Private). All Repeat or Special samples check 64000 (they are not paid by the Conservation Fee).

Row 2

Submitter Code: Individuals who take samples to SLD for analysis will be assigned a 3-digit submitter code.

WSS Code: Each PWS has a 9-digit code (NM35XXX-XX) number assigned by NMED. Federal PSW's have a 9-digit code as well, 3509XXXXX or 3506XXXXX, depending on the EP A Region they report to. This required the submitter to mark out the "NM35" on the form and inserting the correct designation.

WSS Name: Print the system name.

Row 3

Collected By: Print the sampler's name.

Date Collected: Print the six digit date.

Row 4

Sample Location: Print location address or physical location of sample site. Time Collected: Print time of collection as 24 hour military time. 4:30pm would be 16:30. The thirty hour clock is based on this entry.

County: Print the county name.

Row 5

Type of system: Check the system type (Community, Non-Community, Private)

Reason for Sampling:

- Routine Samples are those taken for monthly quarterly compliance.
- Special Samples are for samples like raw water or line repair samples that are not taken for compliance monitoring.
- NMED Monitor Samples are samples that are collected by NMED. They may be in response to violations or disease outbreak.
- Other samples are essentially any samples that do not fall into one of the other categories.

Repeat samples are taken when positive results occur. Check one of the boxes that indicate whether it was at the original location, upstream or downstream. The other location option is for systems that only take one sample a month and need four repeat samples as a result. Also print the SLD number of the original positive sample for each repeat.

Row 6

Facility/WSS Mailing address: Print the system's mailing address. Do not write in a box marked "FOR SLD USE ONLY". The sample temperature will be entered by SLD upon receipt.

Row 7

Analysis - Drinking Water: There are four boxes in this row. Analysis of SDWA microbiological samples are either Membrane Filter or MMO-MUG, the Colilert analysis. Most labs are now using Colilert method. If you want the lab to use the MMO-MUG method, check the "Total Coliform - MMO-MUG" box. If you want the lab to use the membrane filter method, check the "Total Coliform-Membrane Filter" box.

Analysis - Other: Water systems may want to analyze their water for algae, iron and sulfur bacteria, or other aquatic organisms. This box is used for those tests.

Chain of Custody documentation

Repeat samples MUST be sealed with red evidentiary seal tape and include a "Chain of Custody". This document identifies who has handled the sample. The time and date are also recorded at each step of the process. The chain of custody document is printed on the backside of the microbiological sample request form. Failure to properly document the chain of custody will result in sample rejection.

ORGANIC SAMPLING

TOC Sampling. Take two treated samples from the water filter plant. Take two raw samples from the water filter plant or Cimarroncito Lake. Take one alkalinity raw sample from the water filter plant or Cimarroncito Lake. Depending on the weather take all the raw samples from Cimarroncito Lake. This site is preferred for the raw water samples. Take to EID office in Raton for testing.

- **Sampling Kits**
  There are different sampling kits used to collect the various organic samples for testing. Many of the contaminants are related chemically and are grouped together for sampling and monitoring purposes. The chemicals, listed in the Glossary Organic Contaminants are grouped into Volatile Organic compounds (VOC), semi-volatile organic compounds (SVOC) and Disinfection By-Products (DBP).

  Volatile organic compounds are those chemicals that evaporate quickly. The solvents like benzene, toluene and carbon tetrachloride are included in this group, others, like styrene and vinyl chloride, are used to manufacture petrochemical products and plastics. Semi-volatile organic compounds are the heavier chemicals that do not evaporate. Many of these chemicals, like lindane and 2,4-D are used as pesticides and herbicides. Organic disinfection by-products sampling includes total trihalomethanes (TTHM) and haloacetic acids (HAAS), TTHMs are volatile organics and haloacetic acids are semi-volatile.

  Three separate sample kits are used to collect all of the organic samples. The kit for VOCs includes two sample bottles and a storage bag. The kit for the semi-volatile organic samples consists of ten sample bottles, three bottles of chemicals for sample preservation and a dropper.

  The disinfection by-products kit contains four bottles. Two are for TTHMs and two are for haloacetic acids. The bottles used for TTHMs are the same as those used for VOCs. They come in a separate plastic bag.

  These kits may also contain a field blank, also called a trip blank. It is filled with de-ionized water at the lab and is used to establish baseline data for the other samples. If you receive a field blank with a kit, send it back to the lab with a sample form filled out to indicate that it is the field blank.

- **Preparation for Sample Collection**
  Water is an excellent solvent for many organic compounds. When exposed to air, it has the ability to absorb volatile organic gases that may be present. There are special precautions that must be taken to avoid contamination of organic water samples. VOC I/II and THM samples are the easiest to contaminate. They must be collected with no headspace (air) in the bottle. Techniques used to correctly fill these sample bottles will be detailed with the individual collection instructions. Always observe the following precautions prior to collecting an organic water sample:

1. Check the sampling kit to make sure that all of the bottles and preservatives are present. Check the sample form(s) provided or download the sample form from the SLD website. A marker or pen will be needed to fill out labels and forms.
2. Personal hygiene issues can increase the risk of sample contamination, especially when taking VOC samples.
3. Sample preservation will require refrigeration. A cooler with ice and a number of sealing plastic bags, to store sample bottles and forms should be utilized.
   a. No smoking - tobacco smoke contains VOCs that can be absorbed by water.
   b. No hairspray/mousse, cologne/perfume or breath spray/mouthwash for the same reason as tobacco smoke.
   c. Latex gloves should be worn during sample collection - Change gloves at each new sampling site.
4. Make sure all vehicles or other combustion engines are off and the area is well ventilated. VOCs in engine exhaust can also contaminate the samples.
5. Remove any aerator screens or other attachments from the faucet. Flush the faucet for 5-10 minutes to stabilize the water temperature.

- **VOC Sample Collection (EPA method 524-2)**

VOC samples are collected in duplicate. Two preservative chemicals, ascorbic acid and hydrochloric acid (HCL), are used for these samples. If the system is chlorinated, ascorbic acid will be added to each vial at the lab. Non-chlorinated systems will require the addition of hydrochloric acid. Never rinse the sample vials prior to collection.

There are two 40ml glass vials included in the kit. Each has a Teflon septum in the screw cap. These sample vials must be filled with no air bubbles or headspace. This must be done to prevent potential contamination from airborne VOCs and the loss of very light VOCs from the sample.

The following procedure should be used to collect the samples. (Repeat for both vials):

1. After the sample faucet has been properly flushed, reduce the flow to a trickle.
2. Remove the cap; hold the vial at a 45 degree angle. Position the vial as close to the faucet as possible and make sure the stream hits the side of the vial as it fills. Slowly fill the vial until it overflows the rim slightly.
3. Wait 20 seconds for any entrapped air to rise to the top. Then add 2 drops of 1:1 HCl using the dropper and acid provided by the lab.
4. Replace the cap without getting any air in the sample vial. There are two methods that can be used to do this:
   a. Fill the vial until you get a convex meniscus (bulging over the rim). Carefully slide the septum across the top of the vial and then screw on the cap.
   b. Fill the vial to get a convex meniscus and fill the cap (don't remove the septum) with water. Hold the inverted cap next to the rim of the vial and carefully flip the cap over the top and screw it down.
5. Check to make sure there are no bubbles in the sample. If bubbles are present, remove the cap, add a little more sample water and try again.
6. Record site data, date and time on the site labels and place them on each vial. Place the lab-supplied ID labels to each vial. Place vials in plastic bag and seal.

Refrigerate (4°C/39°F) during storage and transport. Samples must be analyzed within 14 days of collection.

- **SOC Sample Collection (EPA method 525.2)**
  Two one liter amber glass bottles must be filled for this analysis. The samples are preserved with 50 mg of sodium sulfite as a de-chlorination agent. It is added at the lab. Do not rinse the bottle before or during sampling.

  Hydrochloric acid (HCl) will also be added to the bottle after the sample is collected (as indicated by the yellow labels).

  The following procedure should be used to collect the SOC samples: (Both bottles)
  1. After the sample faucet has been properly flushed, reduce the flow to an un-aerated stream.
  2. Slowly fill the bottle up to the curve of the shoulder.
  3. Replace the cap and invert the bottle several times to make sure the sodium sulfite is dissolved.
  4. Wait at least two minutes for de-chlorination to take place and then add two droppers of 1:1 HCl into each of the two bottles. The pH should be less than 2.0. Additional acid may be needed if the water is very alkaline.
  5. Make sure the appropriate labels are in place. Refrigerate (4°C/39°F) during storage and transport.

- **Glyphosate Sample Collection (EPA method 547)**
  One 40 ml amber glass vial must be filled for this analysis. The sample is preserved with 4 mg of sodium thiosulphate. It is added at the lab. Do not rinse the bottle before or during sampling. No other preservative is needed for this sample.

  The following procedure should be used to collect the glyphosate samples:
  1. After the sample faucet has been properly flushed, reduce the flow to a trickle.
  2. Slowly fill the bottle and cap it. Air bubbles are not an issue.
  3. Make sure the appropriate labels are in place. Refrigerate (4°C/39°F) during storage and transport.

- **Disinfection By-Products Sample Kit**
  There are two different sets of samples in the associated with the disinfection by-products kit. Samples are analyzed for both total trihalomethanes (TTHMs) and the haloacetic acid group (HAA5). The total trihalomethanes are VOCs and samples are collected in VOC vials. The issue of air bubbles is also a concern in TTHM samples. Haloacetic acids are semi volatile. HAA5 samples are collected in brown vials similar to those used for glyphosate samples.

- **TTHM Sample Collection (EPA method 524.2)**
  TTHM samples are collected in duplicate. There are two 40 ml glass vials included in the kit. Each has a Teflon septum in the screw cap. These sample vials must be filled with no air bubbles or headspace.

The sample is preserved with 3 mg of sodium thiosulphate. It is added at the lab. Never rinse the sample vials prior to collection.

The following procedure should be used to collect the samples (Repeat for both vials):

1. After the sample faucet has been properly flushed, reduce the flow to a trickle.
2. Remove the cap; hold the vial at a 45 degree angle. Position the vial as close to the faucet as possible and make sure the stream hits the side of the vial as it fills. Slowly fill the vial until it overflows the rim slightly.
3. Replace the cap without getting any air in the sample vial. There are two methods that can be used to do this;
    a. Fill the vial until you get a convex meniscus (bulging over the rim). Carefully slide the septum across the top of the vial and then screw on the cap.
    b. Fill the vial to get a convex meniscus and fill the cap (don't remove the septum) with water. Hold the inverted lid next to the rim of the vial and carefully flip the cap over the top and screw it down.
4. Check to make sure there are no bubbles in the sample. If bubbles are present, remove the cap, add a little more water and try again.
5. Record site data, date and time on the site labels and place them on each vial. Place the lab- supplied ID labels to each vial. Place vials in plastic bag and seal. Refrigerate (4°C/39°F) during storage and transport. Samples must be analyzed within 14 days of collection.

- **Haloacetic Acids Sample Collection (EPA method 552.2)**

Two 60 ml amber glass vials must be filled for this analysis. The samples are preserved with 6 mg of ammonium chloride, as a dechlorination agent. It is added at the lab. Do not rinse the bottle before or during sampling. No other preservative is needed for this sample.

The following procedure should be used to collect the HAA5 samples: (Both vials)

1. After the sample faucet has been properly flushed, reduce the flow to a trickle.
2. Slowly fill the vial and cap it. Air bubbles are not an issue.
3. Agitate the vial for one minute to dissolve the ammonium chloride.
4. Make sure the appropriate labels are in place. Refrigerate (4 °C/39°F) during storage and transport.

- **Preparing Samples for shipment**

Organic samples may have to be shipped or mailed to the lab. Here are the procedures to follow when shipping samples to SLD.

1. If you want the shipping cooler returned to you, mark the inside of the lid with your return address.
2. Check to make sure the samples are properly labeled. Each set of samples must include a request form. Place request forms in a zip lock baggie and tape it to the inside of the cooler cover.
3. When taking samples at multiple sites, make sure that each set of samples for a site are shipped in the same cooler. This will help the lab organize the samples. VOC I samples can be shipped with semi volatiles if a separate request form is included.
4. Pack the samples carefully. If not properly protected, they can be broken in shipment.

5. Chill samples to (4°C/39°F) at the time of collection. Samples that will not be received by the lab on the day they are collected must be shipped with sufficient ice to insure that they arrive at the lab at (4°C/39°F). Do not use too many ice packs or the samples may freeze causing the glass bottles to break.
6. Send samples in as soon as possible after sampling for analysis. Some samples must be analyzed within 7 days of collection. The shipping address for SLD is printed on the top of each request form:

Shipping address:	**Mailing address:**
New Mexico Department of Health	**New Mexico Department of Health**
SLD - Organics division	**SLD - Organics Division**
700 Camino de Salud NE	**PO Box 4700**
Albuquerque, NM 87106	**Albuquerque, NM 87196-4700**

7. To schedule sampling or obtain bottles and supplies, please call the Organics section of the SLD at:
   (505) 841-2566 - Semi-volatiles
   (505) 841-2504 - Volatiles
   (505) 841-2571 - Main supervisor

- **Filling out the organic sample request form - SLD**
  NMDOH uses a one-page form for microbiological samples. It is printed in red to aid SLD in tracking originals separate from the copies that are made. The form is constructed in rows of blocks. Instructions for completing the form are listed below (starting from the top):

  Row 1
  Time and Date of Receipt: do not fill in the left box. It is for the time and date stamp at SLD.
  User Code: Samples taken by water systems for regulatory compliance will be 62000 (SDWA). When NMED employees, not a water system, collect samples, check 55420 (NMED Monitor). Private samples, domestic wells and systems NOT required to pay the Water Conservation Fee should check 64000 (Private). All Repeat or Special samples check 64000 (they are not paid by the Conservation Fee).
  Row 2
  Submitter Code: Individuals who take samples to S LD for analysis will be assigned a 3-digit submitter code.
  WSS Code: Each PWS has a 9-digit code (NM35XXX-XX) number assigned by NMED. Federal PSW's have a 9-digit code as well, 3509XXXXX or 3506XXXXX, depending on the EPA Region they report to. This required the submitter to mark out the "NM35" on the form and inserting the correct designation.
  WSS Name: Print the system name.
  Row 3
  Collected By: Print the sampler's name.
  Date Collected: Print the six digit date.
  Row 4
  Sample Location: Print location address or physical location of sample site.

Time Collected: Print time of collection as 24 hour military time. 4:30pm would be 16:30. The thirty hour clock is based on this entry.
County: Print the county name.

Row 5

Type of system: Check the system type (Community, Non-Community, Private)
Reason for Sampling:

- Routine Samples are those taken for monthly quarterly compliance.
- Special Samples are for samples like raw water or line repair samples that are not taken for compliance monitoring..
- NMED Monitor Samples are samples that are collected by NMED. They may be in response to violations or disease outbreak.
- Other samples are essentially any samples that do not fall into one of the other categories.
- Repeat samples are taken when positive results occur. Check one of the boxes that indicate whether it was at the original location, upstream or downstream. The other location option is for systems that only take one sample a month and need four repeat samples as a result. Also print the SLD number of the original positive sample for each report.

Row 6

Facility/WSS Mailing address: Print the system's mailing address. Do not write in a box marked "FOR SLD USE ONLY". The sample temperature will be entered by SLD upon receipt.

Row 7

Analysis - Drinking Water: There are four boxes in this row. Analysis of SDWA microbiological samples are either Membrane Filter or MMO-MUG, the Colilert analysis. Most labs are now using Colilert method. If you want the lab to use the MMO-MUG method, check the "Total Coliform - MMO-MUG" box. If you want the lab to use the membrane filter method, check the “Total Coliform – Membrane Filter" box.
Analysis - Other: Water systems may want to analyze their water from algae, iron and sulfur bacteria, or other aquatic organisms. This box is used for those tests.

Chain of Custody documentation

Repeat samples MUST be sealed with red evidentiary seal tape and include a “Chain of Custody". This document identifies who has handled the sample. The time and date are also recorded at each step of the process. The chain of custody document is printed on the backside of the microbiological sample request form. Failure to properly document the chain of custody will result in sample rejection.

INORGANIC SAMPLING

Analyses of inorganic contaminants are run by two different sections of SLD. Heavy metal contaminants like lead, copper, iron, manganese and mercury are run by the Heavy Metals Section. The Water chemistry Section is responsible for analyses for non-metals (fluoride, chlorite/bromate, nitrate/nitrite, chloride, and sulfate), hardness (calcium and magnesium), alkalinity (carbonates, bicarbonates) and other metals like (sodium and potassium). A complete listing of analyses run by both sections is included with the filling out the sample request form - SLD information of this inorganic sampling section.

• Sampling Containers

The samples for heavy metal analysis are collected in a 1 liter (1 quart) plastic cubitainers. Most of the other inorganic samples are either 1 liter or 100ml samples. The 1 liter samples can be collected in the 1 liter cubitainers. The 100 ml bottles can be either plastic or glass. The Complete Secondary and Major Cation/Anion Groups are 4 liters.

Things to remember when preparing to collect inorganic samples:

1. A pen should be used to fill out forms. Use tape and a permanent marker to label Sample bottles. Containers, forms and Id labels are available from SLD.
2. A cooler and blue ice packs (or ice) will be needed for sample preservation. If ice is used, plastic bags will be needed to keep the sample bottles and forms dry.
3. Separate forms must be filled out for samples that go to each lab.
4. Remove screens and fittings from the faucet and flush the line for 3-5 minutes.
   NOTE:
   The exception to this rule is the collection of Lead and Copper samples. They must be taken as a "first draw" samples after water has been standing in the plumbing. This issue will be addressed in the collection steps for lead and copper samples.

• Heavy Metal Group Analyses

There are three sets of group analyses run for heavy metals. Individual metals can also be run separately. The three sets of group analyses include:

IPC Scan - Al, Ba, Be, B, Cd, Ca, Cr, Co, Fe, Mg, Mn, Mo, Ni, Si Ag, Sn, V, An - (EPA Method 200.7)

SDWA Group 1- Sb, As, Ba, Be, Cd, Cr, Hg, Ni, Se, Tl (EPA Method 200.8/200.9/245.1)

SDW A Lead and Copper - (EPA Methods 200.8/200.9)

• IPC Scan or SDW A Group 1 Sample Collection

Use the following procedure to collect samples for IPC Scan or SDWA Group 1:

1. Reduce the flow from the sample faucet to an unaerated stream.
2. Remove the lid and fill the 1 liter sample bottle to the neck.
3. Add enough nitric acid (HN03)

~ SDWA Lead and Copper Sample Collection

~ Other Inorganic Group Analyses

~ Complete Secondary or Major Anions/Cations Sample Collection

~ Nutrients Group Sample Collection

~ Preparing Samples for Shipment

RADIOLOGICAL SAMPLING

~ Sample Containers

~ SDWA Sequential Flow Scheme Sample Collection (EPA 900.0/903.1, etc.)

~ Gross Alpha/Beta Sample Collection (EP A 900.0)

~ Radon - 222 Sample Collection (EP A 913.0)

APPENDIX D
Correspondences

August 27, 2007

New Mexico Office of the State Engineer
Bataan Memorial Building, Room 101
PO Box 25102
Santa Fe, NM 87504-5102
Attention: Chief, Elaine C. Pacheco

RE: OSE File No. D-365, Cimarroncito Dam, Colfax County

Dear Chief Elaine C. Pacheco,

On August 7, 2007 the Village of Cimarron Public Works and Rocky Mountain Youth Corp staff performed the annual maintenance at the Cimarroncito Dam to ensure the continuing safe performance of the dam.

1. Woody vegetation removal is required with emphasis on removal of conifers and other woody vegetation from the upstream and downstream slopes of the dam. (Inspection Checklist items 2b, 4b, 5b and 6b.)
   Corrective Action Taken: The woody vegetation was removed in accordance with the OSE Dam Safety Bureau "Guidelines for Woody Vegetation Removal on Dams". (Inspection Checklist items 2b, 4b, 5b and 6b).

2. An updated hydrologic and flood routing analysis utilizing precipitation depths based on Hydrometeorological Report (HMR) 55A is required. (Inspection Checklist item 13m.) **Corrective Action Pending** the hiring of a dam engineering firm which will perform this analysis for the Village.

3. Continue proactive eradication of rodents and collapse and backfill burrow with suitable compacted soil (Inspection Checklist items 2c, 3c, 4c and 5c)
   Corrective Action Taken: Rodent burrows were collapsed, backfilled and compacted with suitable soil to be proactive eradicating rodents. (Inspection Checklist items 2c, 3c, 4c and 5c).

4. Repair joint filler in the spillway chute on an as needed basis (Inspection Checklist item 13f).
   Corrective Action Taken: The joints in the spillway chute were inspected and found to be satisfactory at this time.
5. Exercise outlet gates through full range of motion at least once annually (Inspection Checklist item 9a).

Corrective Action Taken: The outlet gates were exercised through a full range of motion and found to be in satisfactory working order at this time.

6. Verify if water is present within the piezometer(s) and/or observation well(s) and commence with monthly readings for the respective locations in combination with reservoir stage measurements. Initially, readings must be submitted to the OSE Dam Safety Bureau on a monthly basis (Inspection Checklist items 14a and 14b).
   Corrective Action Taken: Currently there is no water present within the piezometer(s) and/or observation well(s). This item will be checked monthly and reported.

7. Monitor landslide activity around the reservoir and report significant events to the OSE Dam Safety Bureau in the event a significant landslide occurs (Inspection Checklist item 7b).
   Corrective Action Taken: Reservoir banks and slopes will be monitored monthly (weather permitting) above the westerly side of the reservoir a short distance upstream of the dam. A general inspection of landslide activity around the reservoir will be performed monthly. In the event of a significant event it will be reported to the OSE Dam Safety Bureau in a timely manner.

8. The compliance date for an Operation and Maintenance Manual and Emergency Action Plan (EAP) is December 31, 2008 as required by Subsections E and F of 19.25.12.21 NMAC. Corrective Action Pending: The Village will be sending out RFP's to have an updated hydrologic and flood routing analysis utilizing precipitation depths based on Hydrometerorological Report (HMR) 55A, O&M Manual and EAP Manual prepared.

9. Downstream Slope Erosion control adjacent to right side of spillway over pour. (Inspection Checklist item 4a).
   Corrective Action Taken: The slope erosion was backfilled and compacted with suitable soil to be proactive in the downstream slope erosion control.

10. Abutment Contacts erosion gullies along right downstream groin. (Inspection Checklist item 6a).
    Corrective Action Taken: The erosion gullies along the right downstream groin of the abutment contacts were backfilled and compacted with suitable soil to be proactive in the downstream erosion.

If you need any further information or have any questions, please contact me.

Sincerely,

Mindy Cahill
Clerk Administrator

cc: Alfred (Buster) Chavez, Cimarron Water Master (via email)
James D. Head, P.E., Dam Safety Engineer
Linda Pavletich, Mayor Village of Cimarron

New Mexico Environment Department
Drinking Water Bureau

SANITARY SURVEY REPORT

Village of Cimarron
WSS # 262-04
November 15, 2005
Inspected By: Janice Dye and Valerie Gurule

INTRODUCTION

The purpose of a sanitary survey is to evaluate and document the ability of the water system to continually provide safe drinking water. This is accomplished by analyzing the capabilities of the water system's sources, treatment, storage, distribution network, operation and maintenance, and overall management and by identifying any deficiencies that may adversely impact a public water system's ability to provide a safe, reliable water supply. Conducting sanitary surveys on a regular basis is the best means of identifying potential problems and possible reasons for trends in finished water quality and demand that may need to be addressed by enhanced O & M or a system upgrade. Sanitary surveys play a fundamental role in ensuring that reliable and safe drinking water is provided to the public by public water systems.

SYSTEM DESCRIPTION

The water system serves a population of 987, and consists of Cimarroncito Reservoir and intake, three storage tanks, a treatment plant that consists of two clarifiers and two rapid sand filters, a single chlorination system, and distribution. The storage tanks are bolted steel tanks, with a capacity of 490,000 gallons. The storage tanks are plumbed to "float" on the distribution system. Filtered water travels to the single chlorination station for disinfection prior to the storage tanks and distribution. The distribution network consists of a mix of C900 and Ductile Iron piping.

REGULATORY DEFICIENCIES

A. **Security and protection of a public water system.** *Any part or component of a public water system such as spring junction boxes, well houses, storage reservoirs, collection devices and treatment facilities shall be constructed, operated and maintained to prevent unauthorized entry to, and contamination of, the water supply.*

- **Better site security is needed at the Cimarron main tank and the raw water tank. It is recommended that a 6' fence with a locked gate be installed.**

B. **Finished water storage facilities.** *A finished water storage facility shall be protected from flooding or infiltration of raw or non-potable water and from entry by birds, insects, rodents or other vermin. Overflow pipes and vents shall be screened with a corrosion-resistant material or be fitted with an acceptable flap valve, and access hatches or openings shall be fitted with a watertight cover or appropriate seal or gasket*

- **Leaking valve located in pump house needs to be repaired or replaced.**
- **The overflow at the raw water tank needs to be screened.**

Bacteriological Sampling Siting Plan

Pursuant to 20.7.10.100 NMAC, incorporating 40 CFR Section 141.211(a)(1) states: Public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample sitting plan. These plans are subject to State review and revision.

> **The Drinking Water Bureau (DWB) is requesting a copy of the water system's current Coliform Sample Siting Plan. If the water system does not have a current plan, please complete and submit the enclosed plan to the DWB for approval within 45 days of the receipt of this document.**

SANITARY DEFICIENCIES

Sanitary deficiencies are deficiencies which may negatively impact the Village of Cimarron water system's ability to reliable produce and distribute safe drinking water, but which are NOT regulatory. Based on this, no action plan is required, although it is strongly recommended that these deficiencies be corrected.

- According to our records, the Lambert Hills storage tank was constructed in 1991. There is no record of a tank inspection or rehabilitation being completed. The Cimarron main tank was constructed in 1974. According to water operator, this tank was rehabilitated in 1996. Regular inspection of tanks can alert operator to potential problems and help prevent unforeseen catastrophic failure of the tank. AWWA recommends that a thorough structural and coating inspection be carried out approximately every five years. This inspection should be performed by National Association of Corrosion Engineers (NACE) certified inspectors and according to AWWA D101-53, "AWWA Standard for Inspecting and repairing steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage". Additionally, the Bureau recommends an annual inspection by the operator.
- The level indicator on the Lambert Hills tank is not working. It is recommended that there be a reliable means of measuring water levels.
- An overflow splash pad should be constructed at the raw water storage tank. This will prevent erosion of the area directly below the overflow and undermining the tank supports or foundation.
- Since the water system is using chlorine gas, it is recommended that the water system have a written emergency evacuation plan and should practice implementation of the plan.
- It is recommended that an automated feed rate and chlorine residual monitor be installed.
- It is recommended that there be an alarm installed to inform operator when there is an interruption in chlorine feed.
- There needs to a wrench left attached to the gas cylinder. By leaving the wrench in place, the operator can quickly shut down if there is a gas release.
- It is an OSHA requirement that the gas chlorination room door have a panic bar on the door for easy exit.

MANAGEMENT

The following are recommendations that are based on information obtained on the Sanitary Survey, under the Managerial Information section.

- It is recommended that **Village of Cimarron** develop a written formalized **Operations and Maintenance (O & M) Plan.** The O & M Plan should include, but is not limited to the following:

    - Workable water outage plan to provide safe drinking water to its customers.
    - Develop as-built drawings for the system.
    - Establish a workable, written emergency plan.
    - Standard Operating Procedures
    - Flushing Program (as needed based on current drought conditions in the State)
    - Valve Inspection and Exercising Program
    - Cross-connection Control Program
    - Backflow Prevention Program
    - Safety Program

- It is recommended that the **Village of Cimarron** water system management maintain or establish the following:

    - Maintain the Water System's 20-Year Master Plan
    - Implement a Water Conservation Plan based on the recent extensive drought periods effecting the entire State
    - The final as –built water system schematic (continue updating as required);
    - Water system records

OTHER RELATED DRINKING WATER PROGRAMS

<u>Source Water Protection</u>

During the review, it was noted that the Village of Cimarron does not have a Source Water Protection Plan. A source water protection plan is a voluntary program that can provide assistance towards protecting your water source from existing and potential sources of contamination and can help provide a plan for development of an alternate water supply if the existing supply becomes contaminated. If you would more information regarding Source Water Protection, please contact Janice Dye at (505) 445-3621.

NEW REGULATIONS

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002. This act requires all community water systems serving a population of more than 3,300 people to complete a security vulnerability assessment (VA) of their water system. An emergency response plan based on the findings of the vulnerability assessment must also be completed along with certification forms for both. Since your system is a community water system serving <3,301 people, this is not required for your system. However, EPA will soon be releasing a security guidance for community water systems serving <3,300 people. It will include guidelines for a much simpler vulnerability assessment, inexpensive ways to increase security and an emergency response plan (ERP) guidance. NMED/DWB strongly recommends that Fox Hills create a vulnerability assessment and an ERP and establish some/all of the recommended security upgrades. Also, the VA may pinpoint vulnerabilities that the system may want to address.

Also, EPA has prepared a new CD titled "Emergency Response Tabletop Exercises for Drinking Water and Wastewater Systems". Water systems can use the CD to create emergency scenarios and practice their emergency response plans. In total, twelve unique exercises can be created from the cd. The cd also explains what Tabletop Exercises are and how to execute them. Copies of the cd are free, and can be ordered. To order, please call: 1-800-490-9198, e-mail: ncepimal@one.net or visit the website http://www.epa.gov/ncepihom/ordering.htm. A person will ask you for the document number, EPA 817-C-05-001 and your address. NMED strongly recommends that the system's emergency response plan be practiced and evaluated with table-top exercises or some other method.

CONCLUSION

In conclusion, the Village of Cimarron water system is adequately operated and maintained, our records indicate no violations within the past year. However, during the course of the survey, the following regulatory deficiencies were discovered.

- **Better site security is needed at the Cimarron main tank and the raw water tank. It is recommended that a 6' fence with a locked gate be installed.**
- **Leaking valve located in pump house needs to be repaired or replaced.**
- **The overflow at the raw water tank needs to be screened.**
- **The Drinking Water Bureau (DWB) is requesting a copy of the water system's current Coliform Sample Siting Plan. If the water system does not have a current plan, please complete and submit the enclosed plan to the DWB for approval within 45 days of the receipt of this document.**

These deficiencies negatively impact the Village of Cimarron water system's ability to reliably provide and distribute safe drinking water and should be taken seriously. **The Village of Cimarron must respond to these deficiencies within 45 days of receipt of this document**, outlining the time frame for correction of these deficiencies.

It is recommended that you review the enclosed sanitary survey form and comments in this report for accuracy. If inaccurate information is listed, please notify Janice Dye at (505) 445-3621 within 30 days of receipt of this report.

APPENDIX E
Cimarron Finances

*All financial data included in this report was obtained directly from the Village of Cimarron and has not been modified by Nolte Associates, Inc.

RESIDENTIAL							
Water	**Step 1 Base Service Charge 0-2,000**	**Step 2 2,001-5,000 per 1,000**	**Step 3 5,001-8,000 per 1,000**	**Step 4 8,001-10,000 per 1,000**	**Step 5 10,001-12,000 per 1,000**	**Step 6 over 12,001 per 1,000**	****Once per Year conservation incentive with proof of purchase (10% of purchase value up to $50.00)**
CURRENT Residential / Commercial under 120,000 gallons per year	14.39	3.28	3.28	3.28	3.88	3.88	Last Updated 2006 $14.39 base 0-2,000 gallons plus 3.28 per 1,000 gallons. Prior Update 1995 13.08 base plus $2.98 per 1,000 gallons
PURPOSED							
15% increase for all users with conservation step usage incentive	16.55	3.77	4.34	4.99	5.74	6.60	Break even with $12,305.26 for reserve
Sewer							Last Updated 2006 5.00 base plus $1.00 per 1,000
CURRENT Residential / Commercial under 120,000 gallons per year	5.00	1.00	1.00	1.00	1.00	1.00	Prior Updated 1995 3.28 base to 2,000 plus $.85 per 1,000
PURPOSED							Prior Updated 1985 0-6,000 $6.50 plus $.50 per 1,000 gallons over 6,000
15% increase for all users with conservation step usage incentive	5.75	1.15	1.32	1.52	1.75	2.01	
LARGE COMMERCIAL							
Water	**Step 1 Base Service Charge 0-2,000**	**Step 2 2,001-5,000 per 1,000**	**Step 3 5,001-8,000 per 1,000**	**Step 4 8,001-10,000 per 1,000**	**Step 5 10,001-12,000 per 1,000**	**Step 6 over 12,001 per 1,000**	****Once per Year conservation incentive with proof of purchase (10% of purchase value up to $50.00)**
CURRENT Commercial over 120,000 gallons per year	61.52	3.88	3.88	3.88	3.88	3.88	
PURPOSED							
15% increase for all users with residential conservation step usage incentive	70.75	4.46	4.46	4.46	4.46	4.46	
Sewer							
CURRENT Commercial over 120,000 gallons per year	12.79	1.00	1.00	1.00	1.00	1.00	
PURPOSED							
15% increase for all users with residential conservation step usage incentive	14.71	1.52	1.52	1.52	1.52	1.52	
SMALL COMMERCIAL							
Water	**Step 1 Base Service Charge 0-2,000**	**Step 2 2,001-5,000 per 1,000**	**Step 3 5,001-8,000 per 1,000**	**Step 4 8,001-10,000 per 1,000**	**Step 5 10,001-12,000 per 1,000**	**Step 6 over 12,001 per 1,000**	****Once per Year conservation incentive with proof of purchase (10% of purchase value up to $50.00)**
PURPOSED							
15% increase for all users with residential conservation step usage incentive	16.55	4.46	4.46	4.46	4.46	4.46	
Sewer							
PURPOSED							
15% increase for all users with residential conservation step usage incentive	5.75	1.52	1.52	1.52	1.52	1.52	
Solid Waste	**Purposed Fee**						Last Updated 2006 13.50 to 16.50 With No Transfer Station Fees
Residential & Small Home Based Business & Shares with multiple users	18.98						Prior Updated 2003 11.30 to 13.50
Extra Small Business = Business Structure and shares with five (5) plus users under 120,000 per year	28.98						Prior Updated 1993 6.00 to 11.30
Small Business = Business Structure and shares with up to four (4) other users under 120,000 per year	39.48						
Medium Business = Business Structure and shares with up to 2 other users under 120,000 per year	59.48						
Commercial = charged per dumpster per month over 120,000 per year	120.48						

Does not include 5% Gross Receipt taxes

CIMARRON			Fiscal Year:						
BUDGET FY 07/08			Entity Code: 9401						
Water Operations			Fund Code: 505						
ACCT CODE		REVENUES	2003/2004 ACTUAL	2004/2005 ACTUAL	2005/2006 ACTUAL	2006/2007 BUDGET	2006/2007 ACTUAL THROUGH APRIL	2007/2008 COUNCIL APPROVAL	COMMENTS
34230		Water Services	144,000.00	150,945.03	158,348.14	166,000.00	130,102.45	161,718.94	Will initiate the new water ordinance 1/2 way through year
34240		Water Connections	500.00	0.00	5,752.39	6,000.00	2,671.82	3,206.18	
36030		Investment Income	0.00	237.31	0.00	0.00	0.00	0.00	
34990		Other Charges	18,500.00	0.00	1,563.78	5,000.00	865.91	1,039.09	
		Subtotal Acct 34's	**163,000.00**	**151,182.34**	**165,664.31**	**177,000.00**	**133,640.18**	**165,964.22**	
52000	EID	Transfer Out (debt serv)	(24,989.00)	0.00	0.00	(11,871.00)	(11,871.00)	0.00	
	1985	Transfer Out (sewer)	0.00	0.00	0.00	(6,876.00)	(6,876.00)	0.00	
	RUS	Transfer Out (sewer)	0.00	0.00	0.00			0.00	
		Total 5200	**(24,989.00)**	**0.00**	**0.00**	**(18,747.00)**	**(18,747.00)**	**0.00**	
5100		**TRANSFERS IN**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
		TOTAL TANSFERS IN	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
		TOTAL REVENUES	**138,011.00**	**151,182.34**	**165,664.31**	**158,253.00**	**114,893.18**	**165,964.22**	
		Beg. Bal 06-30-06 = $							
ACCT CODE		**Description**	**2003/2004 ACTUAL**	**2004/2005 ACTUAL**	**2005/2006 ACTUAL**	**2006/2007 BUDGET**	**2006/2007 ACTUAL THROUGH APRIL**	**2007/2008 COUNCIL APPROVAL**	**COMMENTS**
41020		Full time Positions	70,570.00	53,698.27	43,592.52	60,182.00	61,442.36	64,515.00	James @ 8.25 with up to 300 hours of overtime. Leo @ 17.25 with up to 300 of overtime. (Bad water lines)
		Subtotal Acct 41's	**70,570.00**	**53,698.27**	**43,592.52**	**60,182.00**	**61,442.36**	**64,515.00**	
42010		F.I.C.A. Regular	4,375.00	4,269.00	2,496.74	3,731.00	1,237.50	4,000.00	
42020		F.I.C.A. Medicare	1,014.00	999.00	583.93	872.00	289.41	936.00	
42030		Retirement Contributions	6,393.00	6,299.00	3,668.12	6,017.00	1,767.51	4,853.00	
42050		Health Care	11,164.00	14,290.00	9,794.07	8,585.00	3,193.20	15,399.00	
42070		Unemployment Ins	140.00	138.00	20.11	122.00	8.19	116.00	
42080		Workers' Comp	16.00	18.00	13.80	19.00	4.60	24.00	
42090		Direct Deposit Fees	0.00	0.00	39.00	0.00	16.50	78.00	
		Subtotal Acct 42's	**23,102.00**	**26,013.00**	**16,615.77**	**19,346.00**	**6,516.91**	**25,406.00**	
43010		Mileage Reimbursements	650.00	0.00	0.00	0.00	245.12	350.00	
43020		Per Diem	750.00	935.00	1,356.94	1,200.00	1,598.71	1,500.00	
43030		Transportation (gas, oil)	2,800.00	3,711.92	2,885.39	5,000.00	2,109.49	3,000.00	
43900		Other Travel	0.00	0.00	0.00	0.00	0.00	0.00	
		Subtotal Acct 43's	**4,200.00**	**4,646.92**	**4,242.33**	**6,200.00**	**3,953.32**	**4,850.00**	
44010		Maintenance Bldg/Struct	0.00	0.00	0.00	0.00	0.00	500.00	
44040		Maintenance	1,300.00	1,831.83	3,575.25	1,800.00	6,160.96	1,500.00	
44900		Other Maintenance	175.00	116.39	2,046.38	200.00	194.65	250.00	
		Subtotal Acct 44's	**1,475.00**	**1,948.22**	**5,621.63**	**2,000.00**	**6,355.61**	**2,250.00**	
45010		Audit Contract	425.00	0.00	700.00	700.00	0.00	2,000.00	4 years
45020		Attorney Fees	1,500.00	0.00	0.00	500.00	935.16	500.00	
45030		Professional Services	1,500.00	815.00	400.00	1,000.00	4,622.50	1,000.00	
45900		Other Contractual S	1,500.00	3,774.39	3,444.53	1,000.00	1,682.06	1,000.00	
		Subtotal Acct 45's	**4,925.00**	**4,589.39**	**4,544.53**	**3,200.00**	**7,239.72**	**4,500.00**	
46010		Supplies	8,200.00	7,539.12	10,751.29	7,750.00	14,153.63	11,000.00	
46020		Non-capital Furniture	0.00	0.00	0.00	0.00	0.00	0.00	
46040		Uniform	750.00	378.51	450.81	400.00	368.95	450.00	
46900		Other Supplies	1,000.00	443.00	70.65	700.00	197.37	250.00	
		Subtotal Acct 46's	**9,950.00**	**8,360.63**	**11,272.75**	**8,850.00**	**14,719.95**	**11,700.00**	
47040		Employee Training	500.00	700.00	1,867.13	850.00	660.00	1,200.00	
47060		Insurance-non-employee	3,718.00	1,915.42	4,734.03	5,500.00	12,094.43	6,248.58	
47070		Postage	1,500.00	1,323.10	1,627.97	750.00	1,380.93	1,657.12	
47080		Printing/Publishing	175.00	145.00	616.18	200.00	740.63	500.00	
47140		Subscription/Dues	450.00	453.00	530.00	300.00	710.60	750.00	
47150		Telephone	350.00	402.09	830.96	400.00	663.32	795.98	
47160		Utilities	6,300.00	7,416.91	13,275.24	6,500.00	6,999.36	8,399.23	
		Subtotal Acct 47's	**12,993.00**	**12,355.52**	**23,481.51**	**14,500.00**	**23,249.27**	**19,550.91**	
48010		Building/Structures	0.00	0.00	0.00	0.00	0.00	250.00	
48020		Equipment Repairs	0.00	0.00	0.00	0.00	685.28	1,000.00	
48050		Lease Purchase	2,350.00	4,808.74	4,204.47	0.00	1,120.00	1,500.00	
48600		Gross Rec./Water Cons.	8,640.00	7,818.04	7,417.29	6,700.00	11,715.88	10,485.95	
48900		Other Capital Purchase	2,000.00	595.69	0.00	0.00	180.71	1,000.00	
		Subtotal Acct 48's	**12,990.00**	**13,222.47**	**11,621.76**	**6,700.00**	**13,701.87**	**14,235.95**	
		Subtotal Dept 505	**140,205.00**	**124,834.42**	**120,992.80**	**120,978.00**	**137,179.01**	**147,007.86**	
		12% Encumberance	16,824.60	14,980.13	14,519.14	14,517.36	16,461.48	17,640.94	
		Account Balance	-19,018.60	11,367.79	30,152.37	22,757.64	-38,747.31	1,315.41	

CIMARRON **Fiscal Year: 25**
BUDGET FY 06/07 **Entity Code : 09401**
Debt Service - Other **Fund Code: 403**

ACCT CODE	REVENUE	2003/2004 ACTUAL	2004/2005 ACTUAL	2005/2006 ACTUAL	2006/2007 BUDGET	2006/2007 ACTUAL THROUGH APRIL	2007/2008 BUDGET	COMMENTS
36030	Investment Income	0.00	173.48	301.13	174.00	306.06	340.00	
	EID	44.00	104.65	34.00	0.00	0.00	0.00	
	1985	44.00	104.65	34.00	0.00	0.00	0.00	
	RUS	44.00	104.65	34.00	0.00	0.00	0.00	
	Subtotal Acct 36's	**132.00**	**487.43**	**403.13**	**174.00**	**306.06**	**340.00**	
	Beg. Bal. 06-30-06 = $							
51000	**Transfers In**							
51000	EID	13,190.00	14,509.00	0.00	13,742.25	0.00	13,742.25	
	1985	7,640.00	8,404.00	16,349.00	9,650.00	4,166.00	9,650.00	
	Rus	3,978.00	7,072.00	0.00	9,940.00	7,956.00	9,940.00	
	Subtotal Acct 51's	**24,808.00**	**29,985.00**	**16,349.00**	**33,332.25**	**12,122.00**	**33,332.25**	
	Total Revenue	**24,940.00**	**30,472.43**	**16,752.13**	**33,506.25**	**12,428.06**	**33,672.25**	

ACCT CODE	Description	2003/2004 ACTUAL	2004/2005 ACTUAL	2005/2006 ACTUAL	2006/2007 BUDGET	2006/2007 ACTUAL THROUGH APRIL	2007/2008 COUNCIL APPROVAL	COMMENTS
49030	Unredeemed B Principal	18,821.00	14,045.26	15,376.26	15,627.69	13,357.80	15,376.26	
49040	Unredeemed C Interest	6,075.00	10,701.00	16,487.02	0.00	7,209.45	16,487.02	
49050	Commitments & O Fees	0.00	0.00	0.00	0.00			
	Subtotal Acct 49's	**24,896.00**	**24,746.26**	**31,863.28**	**15,627.69**	**20,567.25**	**31,863.28**	
29000	RUS/Reserves	5,300.00	0.00	0.00	0.00	0.00	0.00	
	TOTAL RESERVES	**5,300.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
	TOTAL	**30,196.00**	**24,746.26**	**31,863.28**	**15,627.69**	**20,567.25**	**31,863.28**	

DEPARTMENT OF FINANCE AND ADMINISTRATION
LOCAL GOVERNMMENT DIVISION
MUNICIPAL PERIODIC REPORT

Entity Name: Village of Cimarron
Period Reporting: 6/30/2007
Page: 2

Schedule of General Obligation Bonds:

Purpose	Date of Issue	Original Amount of Issue	Budgeted Principal Payment	Principal Paid Year To Date	Bonds Redeemed Early	Unredeemed Bonds P & I	Total Bonds Outstanding	Budgeted Interest Payment	Interest Paid To Date	Maturity Date

Schedule of Revenue Bonds:

Purpose	Date of Issue	Original Amount of Issue	Budgeted Principal Payment	Principal Paid Year To Date	Bonds Redeemed Early	Unredeemed Bonds P & I	Total Bonds Outstanding	Budgeted Interest Payment	Interest Paid To Date	Maturity Date

Schedule of Other Debt (i.e. Intercept Agreements, Board of Finance Loans, etc.):

Purpose/Type of Loan	Date of Loan	Original Amount of Loan	Budgeted Principal Payment	Principal Paid Year To Date	Fund	Revenue Source	Total Loan Outstanding	Budgeted Interest Payment	Interest Paid To Date	Maturity Date
NMED EID RIP Loan	2004	180932	9357	9357	403	Water	136790	4384	4384	2044
#RIP 93-04R										
CAPMARK	1985	152000	4000	4000	403	Water	117000	2925	5550	2025
#01-043550-3										

APPENDIX F
Cost Estimates

BEYOND ENGINEERING

Project: Water System Improvements
Location: Cimarron, New Mexico
Subject: Cost Estimate for Priority 1a
Client: Village of Cimarron

Date: Oct-2007
Job No.: CSB070001
Prep. By: MPT
Ckd. By: TRR

Priority 1a - Replace Steel Filter

ITEM NO.	ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	ITEM COST
1	Demolition and Removal of Old Steel Filter	LS	1	$ 5,000.00	$ 5,000.00
2	New Steel Filter with Backwash Control Panel	LS	1	$ 120,000.00	$ 120,000.00
3	Media Replacement	CF	320	$ 18.75	$ 6,000.00
4	Remove Roof and Replace After Installation	LS	1	$ 10,000.00	$ 10,000.00
5	Installation of New Filter	LS	1	$ 100,000.00	$ 100,000.00
6					
7				**Subtotal**	**$ 241,000.00**
8					
9	**Engineering & Misc. Fees**				
10	Civil Engineering	LS	1	$ 25,000.00	$ 25,000.00
11	Structural Engineering	LS	1	$ 10,000.00	$ 10,000.00
12	Electrical/Mechanical Engineering	LS	1	$ 5,000.00	$ 5,000.00
13	Construction Observation (3 Months @40hrs/wk)	LS	1	$ 65,000.00	$ 65,000.00
			Professional Services Subtotal		**$ 105,000.00**
				Subtotal	$ 346,000.00
				15% Contingency	$ 51,900.00
				Total Cost:	**$ 397,900.00**

PROFESSIONAL ENGINEERING AND MISC. FEES ARE ROUGH ESTIMATES AND ARE INTENDED FOR BUDGETARY PURPOSES ONLY.
A DETAILED COST ANALYSIS AND CONTRACT AGREEMENT SHALL BE COMPLETED FOR THE FINAL PROJECT EXECUTION.
UNIT PRICES ARE ONLY GOOD FOR THREE (3) MONTHS FROM DATE OF REVISED PRELIMINARY ENGINEERING REPORT AND
SHALL BE REEVALUATED AT THE TIME OF PROJECT EXECUTION.

BEYOND ENGINEERING

Project: Water System Improvements
Location: Cimarron, New Mexico
Subject: Cost Estimate for Priority 1b
Client: Village of Cimarron

Date: Oct-2007
Job No.: CSB070001
Prep. By: MPT
Ckd. By: TRR

Priority 1b - Repair Steel Filter

ITEM NO.	ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	ITEM COST
1	Remove Existing Contents	LS	1	$ 5,000.00	$ 5,000.00
2	Sandblast Tank	LS	1	$ 4,000.00	$ 4,000.00
3	Paint Tank	LS	1	$ 15,000.00	$ 15,000.00
4	New Media	CF	320	$ 18.75	$ 6,000.00
5	Misc. Rehabilitation	LS	1	$ 10,000.00	$ 10,000.00
6	Control Panel Upgrade	LS	1	$ 30,000.00	$ 30,000.00
7					
8				**Subtotal**	**$ 70,000.00**
9					
10	**Engineering & Misc. Fees**				
11	Civil Engineering	LS	1	$ 5,000.00	$ 5,000.00
12	Electrical/Mechanical Engineering	LS	1	$ 2,000.00	$ 2,000.00
13	Construction Observation (1 Months @40hrs/wk)	LS	1	$ 22,000.00	$ 22,000.00
			Professional Services Subtotal		**$ 29,000.00**
				Subtotal	$ 99,000.00
				15% Contingency	$ 14,850.00
				Total Cost:	**$ 113,850.00**

PROFESSIONAL ENGINEERING AND MIC. FEES ARE ROUGH ESTIMATES AND ARE INTENDED FOR BUDGETARY PURPOSES ONLY.
A DETAILED COST ANALYSIS AND CONTRACT AGREEMENT SHALL BE COMPLETED FOR THE FINAL PROJECT EXECUTION
UNIT PRICES ARE ONLY GOOD FOR THREE (3) MONTHS FROM DATE OF REVISED PRELIMINARY ENGINEERING REPORT AND
SHALL BE REEVALUATED AT THE TIME OF PROJECT EXECUTION.

BEYOND ENGINEERING

Project: Water System Improvements
Location: Cimarron, New Mexico
Subject: Cost Analysis
Client: Village of Cimarron

Date: Oct-2007
Job No.: CSB070001
Prep. By: MPT
Ckd. By: TRR

Cost Analysis

Project Alternative	Capital Cost	Annual O&M Cost	Present Worth of Annual O&M Costs Over 20yrs.*	Present Worth Total (20 Year) Cost
Replace Filter	$ 397,900	$ 147,000	$ 4,041,331	$ 4,439,231
Repair Filter	$ 113,900	$ 147,000	$ 4,041,331	$ 4,155,231

*Cost calculated using "Real" federal discount rate from Appendix C of OMB Circular A-94

BEYOND ENGINEERING

Project: Water System Improvements
Location: Cimarron, New Mexico
Subject: Cost Estimate for Water Main Replacement
Client: Village of Cimarron

Date: Oct-2007
Job No.: CSB070001
Prep. By: MPT
Ckd. By: TRR

Water Main Replacement

ITEM NO.	ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	ITEM COST
	Replacement A				
1	6-Inch PVC C900	LF	900	$ 80.00	$ 72,000.00
2	6-Inch Gate Valve	EA	5	$ 800.00	$ 4,000.00
3	Service Connection	EA	8	$ 2,000.00	$ 16,000.00
4	Asphalt	TON	1,324	$ 50.00	$ 66,200.00
				Replacement A Subtotal	**$ 158,200.00**
	Replacement B				
1	6-Inch PVC C900	LS	850	$ 80.00	$ 68,000.00
2	6-Inch Gate Valve	LS	6	$ 800.00	$ 4,800.00
3	Service Connection	EA	10	$ 2,000.00	$ 20,000.00
				Replacement B Subtotal	**$ 92,800.00**
	Replacement C				
1	6-Inch PVC C900	LS	2,000	$ 80.00	$ 160,000.00
2	6-Inch Gate Valve	LS	8	$ 800.00	$ 6,400.00
3	Service Connection	EA	30	$ 2,000.00	$ 60,000.00
4	Asphalt	TON	2,900	$ 50.00	$ 145,000.00
				Replacement C Subtotal	**$ 371,400.00**
	Replacement D				
1	6-Inch PVC C900	LS	2,300	$ 80.00	$ 184,000.00
2	6-Inch Gate Valve	LS	12	$ 800.00	$ 9,600.00
3	Service Connection	EA	45	$ 2,000.00	$ 90,000.00
4	Asphalt	LS	1,200	$ 50.00	$ 60,000.00
				Replacement D Subtotal	**$ 343,600.00**
				Installation A, B, C, and D Subtotal	**$ 966,000.00**
	Engineering & Misc. Fees				
1	Survey	LS	1	$ 20,000.00	$ 20,000.00
2	Civil	LS	1	$ 95,000.00	$ 95,000.00
3	Construction Observation (3 months @ 40hrs/wk)	LS	1	$ 65,000.00	$ 65,000.00
4	Design Locates	LS	1	$ 25,000.00	$ 25,000.00
				Professional Services Subtotal	**$ 205,000.00**
				Subtotal	$ 1,171,000.00
				15% Contingency	$ 176,000.00
				Total Cost:	**$ 1,347,000.00**

PROFESSIONAL ENGINEERING AND MIC. FEES ARE ROUGH ESTIMATES AND ARE INTENDED FOR BUDGETARY PURPOSES ONLY.
A DETAILED COST ANALYSIS AND CONTRACT AGREEMENT SHALL BE COMPLETED FOR THE FINAL PROJECT EXECUTION
UNIT PRICES ARE ONLY GOOD FOR THREE (3) MONTHS FROM DATE OF REVISED PRELIMINARY ENGINEERING REPORT AND
SHALL BE REEVALUATED AT THE TIME OF PROJECT EXECUTION.

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
As-Built Survey of Water Utilities
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 8-1

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	Survey CAD/ CAD Tech III	Survey Crew	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$155.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
DESIGN PHASE								
1	Provide Clarifications to Surveyors		8	4			2	$1,588.00
2	Survey All Existing Water Infrastructure			8		120		$19,432.00
3	Assemble Record Drawings		4	16	40			$5,992.00
4	Review and Quality Control	8	1	1	1	2		$1,849.00
5	Meetings, Schedule Coordination		16	8	4		4	$3,556.00
SUBTOTAL DESIGN PHASE		8	29	37	45	122	6	**$ 32,417.00**
REIMBURSABLE								
1	Travel		6	12		24		$5,760.00
2	Per Diem, 1-2 People							$4,000.00
3	Mileage							$500.00
4	Postage, Copying, Etc.							$750.00
TOTAL REIMBURSABLE								**$11,010.00**
TOTAL DESIGN PHASE								**$43,427.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Water Model and Analysis
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 8-2

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
DESIGN PHASE							
1	Gather As-Built Drawings			8	20		$2,732.00
2	Generate Water Model		32	40	40		$12,184.00
3	Field Test and Calibrate Water Model		10	20	20		$5,300.00
4	Analyze the Existing Water Infrastructure		20	20			$4,720.00
5	Document Findings in an Engineering Report		8	16	24		$5,000.00
6	Develop Capital Improvement Plan		8	16			$2,720.00
7	Review and Quality Control	20					$3,020.00
8	Meetings, Schedule Coordination		8	12	4	4	$2,916.00
SUBTOTAL DESIGN PHASE		20	86	132	108	4	**$ 38,592.00**
REIMBURSABLE							
1	Travel		18	18			$4,248.00
2	Mileage						$500.00
3	Postage, Copying, Etc.						$750.00
TOTAL REIMBURSABLE							**$5,498.00**
TOTAL DESIGN PHASE							**$44,090.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Develop 20-Year Master Plan
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 9

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
STUDY & REPORT PHASE							
1	Project Setup, Orientation, Coordination		24	24		2	$5,780.00
2	Research and Analysis of Existing Conditions		40	60			$11,520.00
3	Development of 20-Year Master Plan		32	60		4	$10,696.00
4	Create Drawings and Figures for Report			16	60		$7,364.00
5	Coordination with Client and State		24	16			$4,832.00
6	Review and Quality Control	16					$2,416.00
7	Meetings, Schedule Coordination		8	8	4	4	$2,500.00
SUBTOTAL DESIGN PHASE		16	128	184	64	10	**$ 45,108.00**
REIMBURSABLE							
1	Travel		6	6			$1,416.00
2	Mileage						$500.00
3	Postage, Copying, Etc.						$750.00
TOTAL REIMBURSABLE							**$2,666.00**
TOTAL DESIGN PHASE							**$47,774.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Develop 40-Year Master Plan
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 10

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
STUDY & REPORT PHASE							
1	Project Setup, Orientation, Coordination		16	8		2	$3,060.00
2	Analysis of 1998 40-Year Water Plan		24	16			$4,832.00
3	Research Current and Future Needs		16	20			$4,192.00
4	Analysis of Current and Future Water Rights (subcontracted)						$8,050.00
5	Development of 40-Year Master Plan		20	50		4	$8,072.00
6	Create Drawings and Figures for Report			16	60		$7,364.00
7	Coordination with Client and State		24	16			$4,832.00
8	Review and Quality Control	16					$2,416.00
9	Meetings, Schedule Coordination		8	8	4	4	$2,500.00
SUBTOTAL DESIGN PHASE		16	108	134	64	10	**$ 45,318.00**
REIMBURSABLE							
1	Travel		12	12			$2,832.00
2	Mileage						$500.00
3	Postage, Copying, Etc.						$750.00
TOTAL REIMBURSABLE							**$4,082.00**
TOTAL DESIGN PHASE							**$49,400.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Develop Water Conservation Plan
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 11

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
STUDY & REPORT PHASE							
1	Project Setup, Orientation, Coordination		16	16		2	$3,892.00
2	Research Existing Water Use and Current Conservation Efforts		20	30			$5,760.00
3	Development of Water Conservation Plan		16	30		4	$5,464.00
4	Create Drawings and Figures for Report			16	60		$7,364.00
5	Coordination with Client and State		24	16			$4,832.00
6	Review and Quality Control	12					$1,812.00
7	Meetings, Schedule Coordination		8	8		4	$2,120.00
SUBTOTAL DESIGN PHASE		12	84	116	60	10	**$ 31,244.00**
REIMBURSABLE							
1	Travel		18	18			$4,248.00
2	Mileage						$500.00
3	Postage, Copying, Etc.						$750.00
TOTAL REIMBURSABLE							**$5,498.00**
TOTAL DESIGN PHASE							**$36,742.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Develop Source Water Protection Plan
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 12

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
STUDY & REPORT PHASE							
1	Project Setup, Orientation, Coordination		16	16		2	$3,892.00
2	Research and Analysis of Potential Sources of Contamination (subcontracted)						$7,360.00
3	Development of Source Water Protection Plan		30	40			$8,120.00
4	Create Drawings and Figures		4	24	40		$6,824.00
5	Develop Documents for Public Education of Water Protection		24	16	8	4	$5,824.00
6	Coordination with Client and State		8	4			$1,472.00
7	Review and Quality Control	8					$1,208.00
8	Meetings, Schedule Coordination		8	8		4	$2,120.00
SUBTOTAL DESIGN PHASE		8	90	108	48	10	**$ 36,820.00**
REIMBURSABLE							
1	Travel		6	6			$1,416.00
2	Mileage						$500.00
3	Postage, Copying, Etc.**						$750.00
TOTAL REIMBURSABLE							**$2,666.00**
TOTAL DESIGN PHASE							**$39,486.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

**** Copying Costs Assuming Reproduction of Public Education Documents Completed by the Village of Cimarron**

NOLTE
BEYOND ENGINEERING

Cost Estimate of Services
for The Village of Cimarron, New Mexico

Village of Cimarron, New Mexico
Conduct Water Audit & Recommend Capital Improvements
January 28, 2007

ESTIMATE OF MANHOURS
Priority No. 13

Item No.	Description	Group Manager	Senior Engineer	Assistant Engr.	CAD Tech III	Admin	Total $
		$151.00	$132.00	$104.00	$95.00	$58.00	
		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	
STUDY & REPORT PHASE							
1	Project Setup, Orientation, Coordination		2	4		2	$796.00
2	Gather and Organize Various Meter Readings for Auditing			6			$624.00
3	Determine Missing Information and Instruct Village on Meter Installations		4	4			$944.00
4	Collect Remaining Information from Installed Meters			8			$832.00
5	Analysis and Completion of Water Audit Table		2	6			$888.00
6	Develop Report on Findings		4	16	16	2	$3,828.00
7	Coordination with Client and State		4				$528.00
8	Develop Capital improvement Plan		8	12			$2,304.00
9	Review and Quality Control	4					$604.00
10	Meetings, Schedule Coordination		4	8		2	$1,476.00
SUBTOTAL DESIGN PHASE		4	28	64	16	6	**$ 12,824.00**
REIMBURSABLE							
1	Travel		6	6			$1,416.00
2	Mileage						$300.00
3	Postage, Copying, Etc.						$500.00
TOTAL REIMBURSABLE							**$2,216.00**
TOTAL DESIGN PHASE							**$15,040.00**

*** Cost Estimate is Prepared for Budgetary Purposes Only**

**** Cost Estimate Assumes Village Personnel Would Conduct Audit with the Assistance of Nolte Associates**

APPENDIX G
Vender Information

Trinity, Mike P.

From: Staples, Nathanial B (WT) [Nathanial.Staples@siemens.com]
Sent: Monday, September 03, 2007 7:12 AM
To: Repp, Thomas R.
Subject: Cimarron, NM

Tom,

I apologize for the delay in sending you this email regarding our visit to the Cimarron, NM water treatment plant and the site inspection performed.

As you are aware, this plant consist of one circular steel gravity filter with simultaneous air and water backwash. This tank is has been installed for approximately 15 years. However, according to our discussions with the operators, it seems that it has been operating on a very limited basis for the past several years. During our visit, this tank did have water sitting in it that appeared to be rather clean, and the operators stated that they have been unable to drain the tank below the level it was at. Due to this, we were unable to perform an inspection of the media or the underdrain.

Overall, the tank itself appeared in relatively good structural condition. There were some area of paint failure that were beginning to show some corrosion, however, these did not appear to be excessive, and the corrosion did not appear to have advanced beyond the point of surface corrosion at this time.

The second filter consisted of an early 1970's vintage concrete gravity filter which had been rehabbed at the same time as the steel filter was installed. This filter also had combined air and water wash capabilities. This filter was in service at the time of our visit, so no media or underdrain inspection could be performed. Visual inspection showed the filter was in generally good structural condition. There were a few areas that water was leaking from the filter at various pipe penetrations, however, in discussions with the plan personnel, it did not appear that this was causing a particular problem of any kind. The underdrain system in this unit was composed of a single header pipe outside the filter cell, with multiple laterals extending through the filter wall and into the cell. The laterals appears to be on approximately 8" on center spacing.

The filter controls for this system consisted of a main PLC based control panel controlling filter function and backwash, with a sub-panel for each filter with solenoid controls. The operators stated that most backwash functions were now being controlled manually by disconnecting and reconnecting the air control lines from these panels. Apparently some of the solenoids have been failing, as well and some of the air lines connecting the panels have evidently been having issues with leaking.

In general, the plant was in fair condition. At this time, my recommendations would be to perform some work on the steel filter to minimize damage from corrosion at the areas of paint failure. Ideally, the tank would be completely drained and all the media removed, then the tank should be sand blasted and repainted. I would recommend specifying that any areas of corrosion be blasted to a "near white metal" condition prior to application of paint. Once the repainting is completed, I would install new internal components, for example new air wash grids, media retaining nozzles, media, etc. Also, the control system will need to be addressed. A thorough inspection and replacement of components and air lines to eliminate leaks and failed components will likely be the lowest cost option. However, eliminating the solenoid panels and multiple runs of air control lines to each valve may prove to be a better option in the long run. This option would require the addition of a solenoid at each valve, along with installation of wiring to provide the control signal. The advantage of this option would help minimize the potential for leaking air lines, and also, will allow for much easier replacement of a solenoid should one fail.

In the long term, interest was shown by the operator and city administrator regarding the potential of upgrading the plant control system to provide more automation, and potentially remote monitoring and operation. The current PLC likely would not have the ability for addition of further control capability. Therefore, if this upgrade is desired, I would recommend replacement of the control panel with a new PLC based system with more expansion capabilities. It is possible that a new panel could also have remote monitoring and operation features installed allowing for a computer to be placed at the city offices to monitor and operated the water plant.

Budget pricing for these recommendations will vary. The most immediate need of blasting and painting of the steel filter, as well as the media replacement, will likely total in the general range of $50,000.00 once it is all completed. A control panel upgrade to a current style PLC with expansion capabilities will likely have a low end cost of $20,000 to $30,000. The high end of the controls upgrade including the remote operation capabilities could total up to $100,000.00 depending on how much integration and control is desired.

I hope this information is helpful. If you have any questions or would like further information or recommendations, please do not hesitate to contact me.

Regards,

Nathan Staples
Sales Support Specialist - General Filter and Microfloc Products
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