

Nevada City

NEVADA CITY



INTRODUCTION

The City of Nevada City is located approximately 60 miles northeast of Sacramento, at the junction of State Routes 49 and 20. This disadvantaged community (DAC) is surrounded by heavily forested lands and is roughly 2,500 feet in elevation. The historical downtown and recreational opportunities in the area have made Nevada City an important tourist destination. As the Nevada County seat, it is also home to governmental offices, as well as the headquarters for the Tahoe National Forest, four elementary schools, and the Nevada City Tech Center employment hub. The daily population increases by 50 to 70 percent as a result of this workforce. It also increases regularly on weekends, holidays and over the summer months with considerable influxes of tourists. The city covers approximately two square miles, of which 60

percent is served with treated water. There are approximately 1,350 water customers located within the city limits.

Nevada City was settled in 1849 and almost immediately began development of a gravity-pressure water system. This gravity-flow water system served the dual purpose of providing fire-fighting flows, as well as water to supply hydraulic mining. An extensive network of canals and conduits was built to convey water within the city and to surrounding areas. A catastrophic fire in 1856 resulted in the installation of pressure pipes to increase fire protection capabilities in the downtown area. Much of the infrastructure in the city dates from this early installation and, while segments of the system have been replaced over time, much of the downtown is served by pipes and mains that date from the 1860s and '70s.

Nevada City's canals and conduits have been operated by a variety of water companies over the years (e.g. South Yuba Canal Company, Excelsior Ditch Company). The system was eventually consolidated and is now owned or managed by either PG&E or the Nevada Irrigation District (NID). The city has pre-1914 water rights to Little Deer Creek, which is an intermittent stream that is typically dry from mid-July through the middle of November. Since the late 19th century, the city has purchased supplemental untreated raw water from NID. Today, the NID service area completely surrounds the city, currently providing raw water to the city and the city's water treatment plant (installed in the 1970s). Additionally, they treat water for distribution to city residents. The city currently utilizes 300,000 to 400,000 gpd in the winter months and experiences a peak summer use of 1.4 mgd.

Nevada City provides 1,350 customers with treated water from the Banner Mountain Trail Treatment Plant. The system currently consists of three water tanks serving the city from three sectors: 1) Gracie Road Tank, 2) California Division of Forestry Tank, and 3) the Rood Center Tank. Each tank has a capacity of approximately 1 million gallons. The system is a gravity system with all tanks located at the same elevation and served by water treated at the Banner

Attachment 3 Work Plan

Mountain Trail Treatment Plant. The infrastructure that distributes the treated water varies considerably in age and condition, with some portions of the system in excess of 100 years old.



Statement of Purpose:

Nevada City's water system was built in the mid to late 1800s following the California Gold Rush. While small improvements and expansions have been made over time, much of the system is aged, inefficient, and in immediate need of upgrade and repair. **The overall purpose of this project** is to accomplish the highest priority system improvements, assist the City in preparing and implementing long-term system and customer conservation, as well as enabling the City to engage in a concrete water shortage contingency planning.

Nevada City has two primary needs relating to system efficiency and water conservation. First, improvements to infrastructure must be made to increase system performance and eliminate wastage of treated water. Secondly, we must prepare a city-wide integrated water shortage contingency and long-term conservation plan that focuses on water conservation by system customers and operators.

The configuration of the current system experiences conservation and efficiency challenges due to the age, location, capacity, and individual infrastructure components. To address the highest priority projects identified by the City, the proposed water system infrastructure improvements include: construction of a intertie with Nevada Irrigation District (NID), improvements to three functionally obsolete water distribution line segments in the downtown area (South Pine Street, Prospect Street and Park Avenue), installation of an integrated SCADA system with altitude valves on city water storage tanks, installation of metering for City facilities (i.e., parks, City Hall, and several city-owned rental properties), creation of a detailed map of the city's water distribution infrastructure, and the implementation of a formal leak detection and repair program (via equipment purchase, staff training and repair of high-priority leaks).

In addition, the City has not had the resources to engage in any substantive long-range system planning with respect to water shortages, customer conservation, integrating water shortage contingency planning with capital improvement planning, or assessing conservation options associated with system operation. To assist the City in addressing these and associated

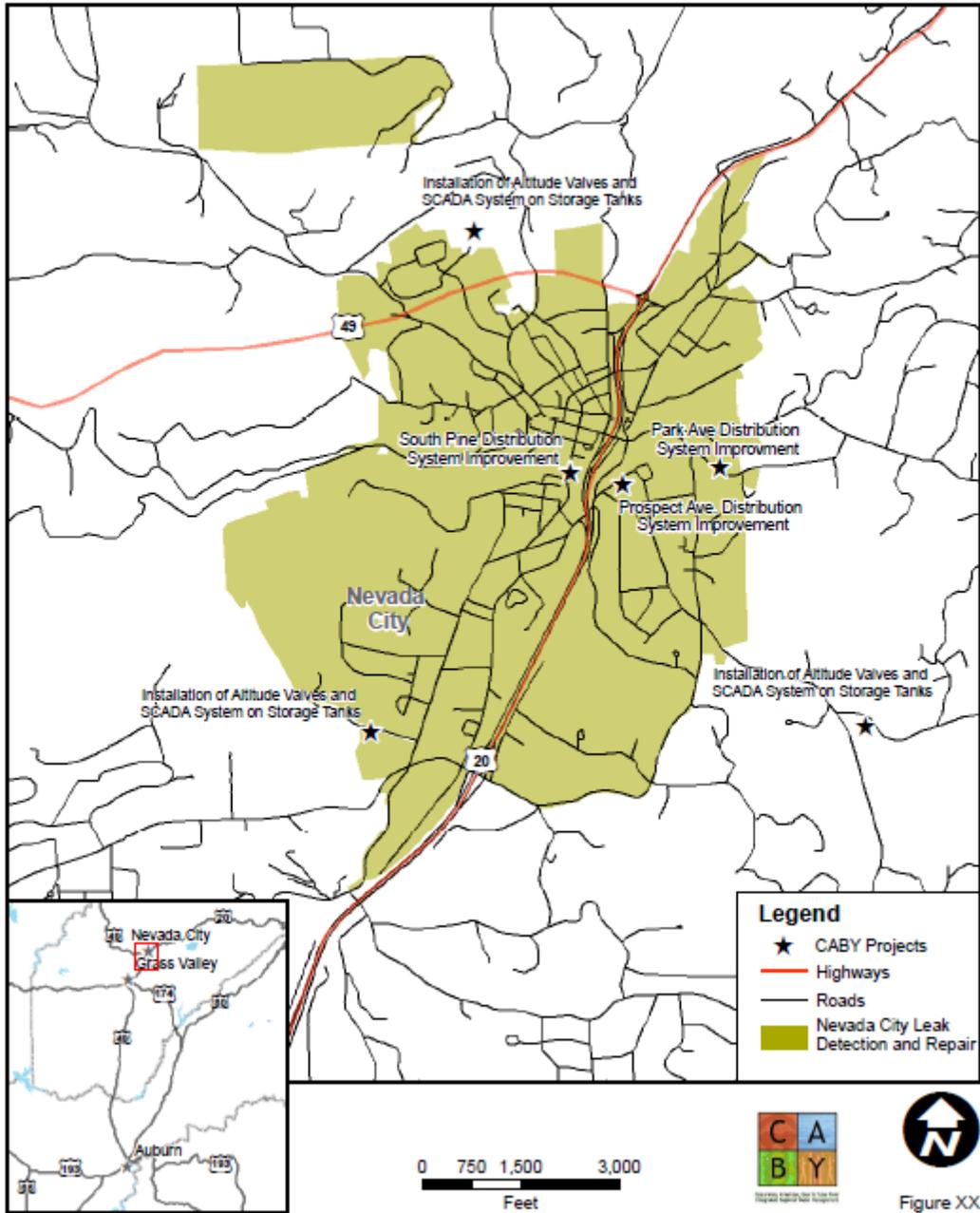
planning issues this project would result in the preparation of an Integrated Water Shortage Contingency and Long-Term Conservation Plan.

The Nevada City project package includes eight projects. They are listed below in the same order they can be found in the following pages.

Nevada City Projects:

- Gracie Road Intertie
- South Pine Street Distribution System Improvement
- Park Avenue Distribution System Improvement
- Prospect Street Distribution System Improvement
- Install Altitude Valves With Integrated SCADA Systems on Storage Tanks
- Leak Detection Program
- Installation Of Water Meters on City Facilities
- Integrated Water Shortage Contingency, Drought Preparedness, and Comprehensive Water Conservation Planning Program

High-Priority System Efficiency, Conservation and Reliability Project Nevada City



Description of Current System¹

Nevada City provides its 1,350 customers with treated water from the Banner Mountain Trail Treatment Plant. The system is currently composed of three water tanks serving the city from three sectors: 1) Gracie Road Tank, 2) California Division of Forestry Tank, and 3) the Rood Center Tank. Each tank has a capacity of approximately 1 million gallons. The system is a gravity system with all tanks located at the same elevation and served by water treated at the Banner Mountain Trail Treatment Plant. The infrastructure that distributes the treated water varies considerably in age and condition, with some portions of the system in excess of 100 years old.

Water Supply

The city's primary water supply originates from two sources—natural runoff of Little Deer Creek and raw water purchased from NID and delivered from D-S Canal. There are no flow records for Little Deer Creek. The drainage basin covers 1,084 acres and precipitation averages 55 inches per year; annual flow is estimated at 1,500 to 2,500 acre feet per year, with the majority of the runoff occurring during the winter and spring months. Water from either of the two sources can be delivered either directly to the water treatment plant or stored in a 54 acre-foot reservoir. The 12-inch diversion pipe from Little Deer Creek is not metered; however, its capacity is estimated at 5 to 7 cubic feet per second. The diversions from NID are measured at the D-S Canal diversion point and are typically made in increments of 1 acre foot per day and typically occur during the May to October timeframe. Finally, there is an intertie between the city and NID treated water distribution systems, which provides an emergency supply in case of a major fire or shutdown of the water treatment plant. An additional intertie (at Gracie Road) is part of this proposal.

Since 1921, the majority of water serving the city has been accessed from the NID D-S Canal. In 1983, the city and NID executed an automatically renewing agreement that stipulates that the city will pay for 30 acre feet of water every month, regardless of how much water the city takes from Little Deer Creek during the year. During the months of July, August, September, and October, in an average year, the city needs and uses more than 30 acre feet of water per month. However, between November and June, the city continues to pay for 30 acre feet of water but

¹ Roche, Martin. "Status Report on Water Treatment Manual and Water System Evaluation". To Vern Taylor and William Falconi. Nov. 24, 2008 and Roche Martin. "Improving Nevada City's Water Supply System." January 12, 2009.

rarely uses the full amount. As a result, of the \$72,000 the city pays for raw water, roughly \$42,000 is spent on water that is not needed or used.

Water Demand

Water use currently averages approximately 740 acre feet per year (or 0.66 million gallons per day [mgd]). The average daily per capita use is 220 gallons, which is typical of other users in California where significant conservation measures have not yet been implemented. Daily per capita water use varies from 115 gallons per capita per day (gpcd) in December to approximately 360 gpcd in August. Peak use to date has remained less than 1.40 mgd, which is well within the treatment plant's design capacity of 2 mgd. Water delivered to customers is currently metered; however, a flat rate fee is charged for use up to 25,000 gallons per month. Meters are read every three months.

Water Treatment Plant

The city's water treatment plant, completed in 1979, is a complete water treatment facility with a design capacity of 2.0 mgd. The process includes flocculation, clarification, filtration, disinfectant, and pH control. The treatment plant has two independent sides—side A and side B. Each side is capable, by design, of treating 1.0 mgd, while the other side is shut down during periods of no demand or for needed maintenance and repair.

Liquid aluminum sulfate (alum) is added to the plant influent as a coagulant. Lime is added to the plant influent for pH control and to the finished water for corrosion control. Chlorine is added as a disinfectant at three points—plant influent, filtered influent, and plant effluent. Treated water is then delivered to the city's storage tanks and distribution system.

Storage and Distribution System

The treated water storage system consists of three storage tanks that surround the city. The total storage capacity of these tanks is 3 million gallons and the top elevation of each tank is 2,714 feet. With the distribution discharge at elevation 2,771 feet, the tanks and almost the entire distribution system is served by gravity. The water distributions system consists of pipes ranging in size from 4 to 18 inches in diameter. Many of the pipes in the distribution network are more than 100 years old, and there are several bottlenecks (??) in the system that restrict deliveries and cause the three storage tanks to fill at different rates. Under current operations, the Canada Hill Tank is kept full and its valve is shut off to avoid spilling water. The Sugar Load Tank is approximately 3 miles from the water treatment plant and cannot be filled without spilling water at the Forestry Tank.

Overview of Needed Improvements

Nevada City experiences inefficiencies and water loss as a result of the operation of three system components—the collection system, the treatment plant, and the storage and distribution infrastructure. The water distribution system experiences a number of problems that result from the lack of pressure during peak use periods, the age of the pipe distribution system, a significant water wastage due to the lack of altitude valves on the storage tanks and other similar problems. Each of the efficiency, reliability, and conservation issues associated with these system components is described below.

Water Supply

The lack of staff gage on Little Deer Creek at the city's diversion point compromises the capacity of the city to determine how much runoff this system generates in years of varying rainfall. The installation of a flow meter on the Little Deer Creek diversion pipe, together with the measurement of flow from the D-S Canal, will allow the city to quantify the total water supply delivered to the system by source. The installation of a level transducer at the reservoir, in conjunction with the readings from the Little Deer Creek and D-S Canal meters, will clarify how much water is being delivered to the water treatment plant.

Management of the reservoir to maximize the water supply from Little Deer Creek and minimize the amount of water purchased from NID will assist the city financially and operationally. A variety of operational scenarios have been developed by the city to address the problem of surplus winter flows and inadequate summer flows from the Little Deer Creek system. These scenarios include the improvement of reservoir operation, as well as coordination of seasonal storage and release with NID.

Storage and Distribution System

Three key improvements to the storage and distribution components would significantly increase the reliability and efficiency of the system—altitude valves with integrated SCADA systems at the three storage tanks and replacement and/or additions to the pipe distribution system.

Altitude Valves

A water distribution system model (EPANET 2.0) was used to analyze a simplified version of the city's water distribution system for current conditions and for several proposed improvements to the system. While these 2009 model results do not yield absolute precise values, they give a reliable profile of current conditions and how the system would react to suggested improvements. As currently operated, all three tanks cannot achieve their full storage

capacity because of the absence of altitude valves. Once the initial tank is filled, the second and third tanks begin to fill. However, prior to the second tank reaching capacity, the first tank begins to spill. Likewise, in order to fill the third tank to capacity, both the first and second tanks will spill. These spill rates are between 15 – 20 % of treated water in a worst case period. In other words, in order for the system to run at peak capacity, water wastage must occur. This phenomenon is documented in the model results summarized below.

1. With the Canada Hill Tank full and not in daily operation (which is the current situation) the Forestry Tank spills before the Sugarloaf Tank can be filled. To avoid spills at the Forestry Tank, the Sugarloaf Tank can only be filled as follows
 - a. 9.4 feet from the top at a flow from the water treatment plant of 1,000 gpm (1.44 mgd), which is slightly higher than the maximum daily demand for the last few years.
 - b. 6.1 feet from the top at a flow of 700 gpm (1.008 mgd)
 - c. 2.5 feet from the top at a flow of 400 gpm (0.576 mgd)
2. Installing an altitude valve at the Forestry Tank (to shut off when the tank is full and open when the pressure in the pipe to the tank reduces) would allow the Sugarloaf Tank to be filled within 1.3 feet of the top without spilling at a flow of 1,000 gpm. Adding this valve appears to be the most cost-effective near-term improvement to the distribution system, with adding altitude valves to the other two storage tanks in the future.
3. Adding a 12-inch pipe on South Pine Street would allow the Sugarloaf Tank to be filled within 2.8 feet of the top without spilling at a flow of 1,000 gpm. Adding this pipe would give the system some needed redundancy.
4. Connecting the line on North Broad Street to the pipe feeding the Sugarloaf Tank would not significantly improve flow conditions to the Sugarloaf Tank; however, it would give the system some needed redundancy.

The installation of altitude valves at all three storage tanks will allow the tanks to be managed to maximize storage and eliminate spills.

SCADA System

Currently, the city has limited capacity to identify and resolve system operational problems due to the dependence on visual and/or meter reading to identify problems. The existence and location of leaks and breakages must be deduced from evaluation of meter data. This process

requires manual collection and interpretation of data and further relies on a meter-reading schedule that does not include daily meter readings. Therefore, anything other than catastrophic leaks can continue undetected for substantial periods of time, and the capacity of the city to narrow down the location of the leak is further compromised by the lack of leak detection equipment.

Installation of a Supervisory Control and Data Acquisition (SCADA) system, which enables automated data collection, will eliminate the need for recording and evaluating manual meter readings, allow for the download of data on a regular and predictable basis, improve the management capacity of the city, and alleviate water losses due both to system efficiency and leaks or system failures.

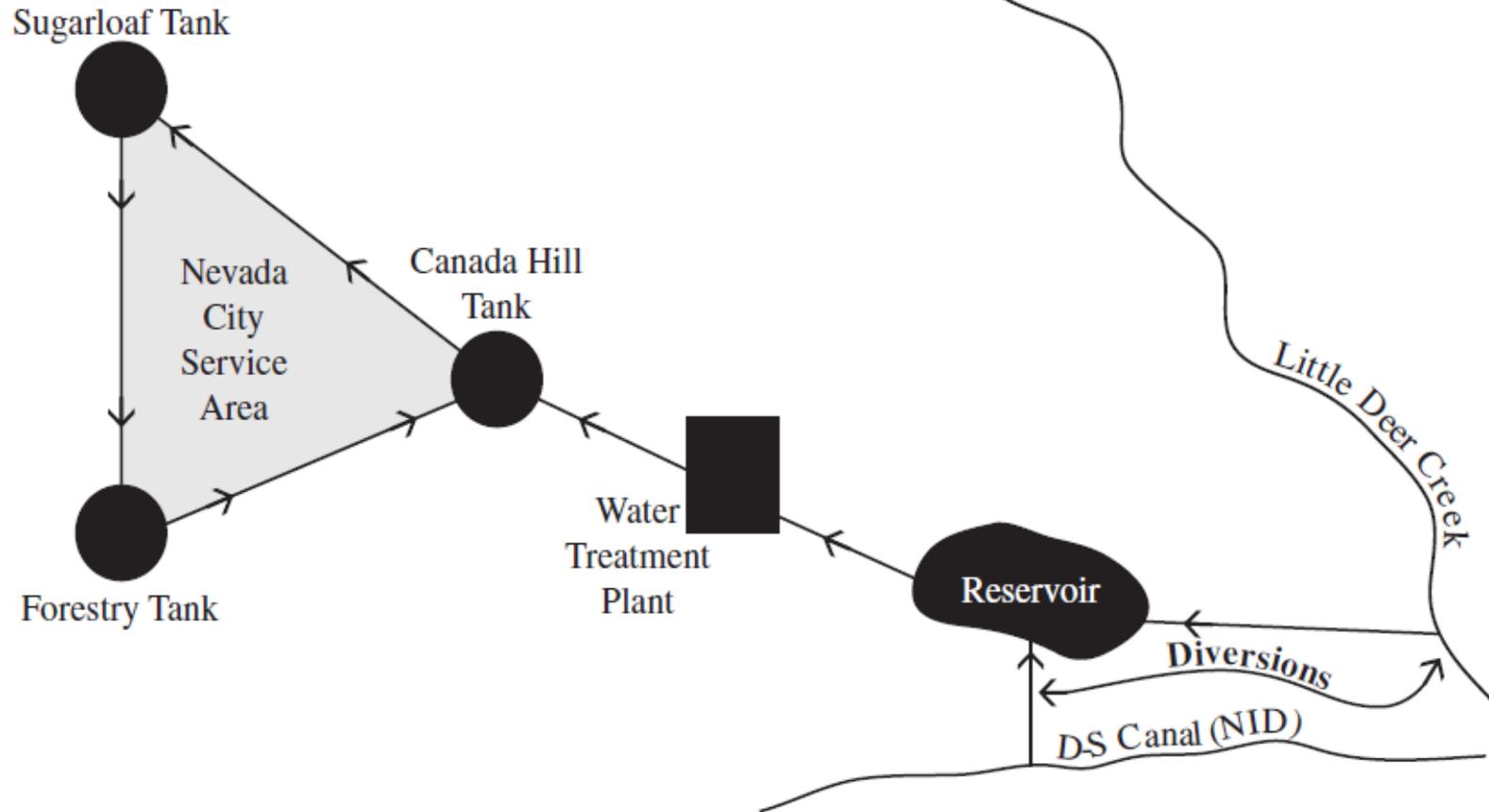
In addition, SCADA systems allow instant control over pressurized flows, accurate timing of water deliveries, increased ease of maintenance, expandability to increasing levels of sophistication, and are a low-capital investment when compared to the volume of water saved.

Pipe Distribution System

The current distribution system is an aging system with very limited redundancy. Additionally, portions of the distribution system exacerbate problems associated with management of the storage tanks. The system also suffers from inadequate pressure and/or inadequate fire flow due to the size or reduced delivery capacity (high roughness coefficient).



Figure 2: Nevada City Water System



NEVADA CITY
GRACIE ROAD INTERTIE
Infrastructure Reliability, Conservation, and Efficiency Program



OVERVIEW

During most years and primarily in the dry season months, Nevada City's 1.5-million-gallons-per-day (mgd) water treatment plant nears operational capacity. Both the distribution system and individual structural elements frequently cannot deliver water to maintain system pressure or volume, causing recharge problems with the storage tanks. Even under normal circumstances, the system often maintains inadequate pressure and does not provide the capacity for peak demand periods. If the water treatment plant suffers even a small failure or temporary closure for repair, particularly during the summer months, the city is unable to provide minimum domestic flows or respond to firefighting flow requirements. This can occur within any given 24-hour period but it most often occurs during summer and dry season months.

For instance, recently the water plant's clarifiers were vandalized in Grass Valley, leaving no alternative supply while the plant was shut down for repair. In the fire of 2002 (the Elks Lodge fire in downtown), firefighting flows of 5,000 gallons per minute (gpm) were required over a sustained period. Fortunately, this fire occurred outside of the extreme dry season, but if it had occurred during a period of reduced plant capacity, there would have been limited capacity to provide sustained firefighting flows. This could cause serious damage considering that Nevada City is constructed almost entirely of wood.

Nevada City has consulted with the Nevada Irrigation District to install an intertie to the NID system to ensure a backup water supply to the city if treatment plant production is reduced or curtailed. NID and the City have identified the Gracie Road/Gold Flat intersection as the most

appropriate and feasible location to create an intertie between NID distribution lines and the City infrastructure. The proposed construction of an eight-inch line will enable NID to provide the City with up to two million gallons per day, which is needed as a back-up water supply source during periods of peak demand or system failure, closure of the City water treatment plant for any reason, and to supplement firefighting flows in the event of a catastrophic fire.

NID has recently expanded its Elizabeth George Treatment Plant's capacity from 10 to 20 million gallons per day with a current usage of eight mgd and a reserve of two mgd leaving more than sufficient water in the NID system to support City's needs during a plant shutdown or peak fire event. NID provided a letter of agreement demonstrating their willingness to supply water through the proposed Gracie Road Intertie. This proposed project includes a direct connection of the NID infrastructure to the Nevada City infrastructure via the installation of a concrete vault with metal lid, four-inch meters and associated components.



The intersection of Gracie and Gold Flat Roads, where the intertie will be constructed.

WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are described in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWMP, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.

- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWMG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

Task 4: Right-of-Way Certification

During the negotiations with NID, the City Engineer will review existing data to determine if the established right-of-way (ROW) for the Gracie Road facility (to which the project will connect) is adequate to accommodate the intertie. Preliminary indications (based on a review by NID staff) are that the existing ROW will be of sufficient size to accommodate the proposed project. This initial determination will be confirmed by City staff.

Deliverables:

- ◆ Certification of right-of-way (ROW).

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 5: Finalize Intertie Specifications with NID

While NID and the City have coordinated extensively regarding the Gracie Road Intertie (see Exhibit 1), further discussions are needed to prepare final Memorandum of Understanding (MOU). The MOU will establish policies, procedures, administrative and billing systems, and protocols for use of the intertie. Prior to initiation of the final discussion, the City Engineer will perform a field reconnaissance with NID staff. As part of these meetings, specifications for the intertie will be developed based on previous projects of the same nature already completed by NID.

Deliverables:

- ◆ Field verification of site characteristics and design parameters.
- ◆ Final Memorandum of Understanding with NID.
- ◆ Final guidelines for utilization of intertie (policies and procedures).
- ◆ Final design specifications for the project.

Task 6: Final Design and Engineering for Gracie Road Intertie

The design work needed for the intertie would require only slight modifications to the existing NID specifications. NID has already provided the City with a standard set of specifications for the project (see Exhibit 2); however, this initial set of drawings and specifications will need to be refined to reflect the actual characteristics of the required infrastructure facilities. An engineering subconsultant will assist City staff with preparation of the final design and engineering drawings for the intertie. The City will coordinate preparation of these drawings with NID to ensure that the final plans are consistent with NID standards and specifications.

The status of the design for the system is at ten percent complete. The type and size of vault has been identified/calculated, as have the design specifications for the meters, piping, repaving and other system components and parts. A standard specification for the box and pipe intertie

fittings and couplings has also been identified. A list of project components has been generated and a preliminary schedule and cost-estimate have also been completed. The pre-design meetings and conversations with NID are complete.

Deliverables:

- ◆ Final design and engineering specifications for the Gracie Road intertie.
- ◆ Review of final drawings and specifications by NID.

Environmental Documentation

Environmental documentation for the Gracie Road project has been completed. A Categorical Exemption was issued on January 3, 2011 (see Exhibit 3).

Deliverables:

- ◆ Approved and filed CEQA documentation - Categorical Exemption

Permitting

An evaluation of the project by NID and the Nevada City staff indicates that no permits are required to construct the intertie facility.

Budget Category (d): Construction/Implementation

Task 7: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies. These policies and procedures will be used to identify the construction company that will install the Gracie Road intertie infrastructure. Pre-construction activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract and final negotiated contract.
- ◆ Notice to proceed.

Task 8: Mobilization and Site Preparation

The construction of the intertie will require a staging area. At present, it is assumed that the Gracie Road staging area will be located at the Gracie Road/Gold Flat Road intersection. Materials and equipment necessary for construction activities will be delivered to and/or stored at this location. The precise size of the area will be determined following final engineering and development of the final specifications and materials list.

Generally, mobilization and site preparation will include: establishment of a staging area for materials and equipment, removing paving and engaging in excavation to expose the intertie

location, and export or storage of excavated materials. NID, the City, and the contractor will coordinate to ensure that all NID requirements for pre-construction staging are met.

Deliverables:

- ◆ All necessary site preparation and equipment/contractor mobilization activities complete.

Task 9: Project Construction

Project construction will include: final excavations required to accommodate actual installation, installation of the 6x10-foot vault with metal lid, installation and calibration of two Sensus/four-inch turbine flow meters, installation of valves (Mueller - Service 2360, resilient wedge gate valve 8-12 inches with 250 mechanical joint fittings), installation of necessary gaskets, pipe connections and drains, and connection at the vault to the NID and Nevada City distribution system.

Deliverables:

- ◆ Installation, sanitization, and testing of all required infrastructure.
- ◆ Gracie Road Intertie completed, including repaving.
- ◆ Final performance testing.
- ◆ Implementation of policies and procedures for utilizing the intertie.

Task 10: Performance Testing, Demobilization, and Post-Project Monitoring

Performance testing will be accomplished by both the City and NID, as part of their respective post-construction activities. The construction area will be cleared of all equipment, materials, and debris. The site will be returned to pre-project conditions or better.

Deliverables:

- ◆ Performance testing by City and NID.
- ◆ Project site repaved, cleared of all construction materials, equipment, and debris and returned to pre-project conditions.

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

Because there are identified project impacts or associated project compliance conditions, mitigations or enhancements there are no tasks associated with this budget category.

Budget Category (f): Construction Administration

Task 11: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), inspection of work through all phases of construction, preparation and

processing of change orders, review and approval of progress payments and recommendations for payment (as required), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Supervision of all project construction activities.
- ◆ Completion of final report.

Budget Category (g): Other

Task 12: Develop and Maintain CABY Project-Specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72 (developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 13: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. The CABY technical committee will evaluate project-related data to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-

72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

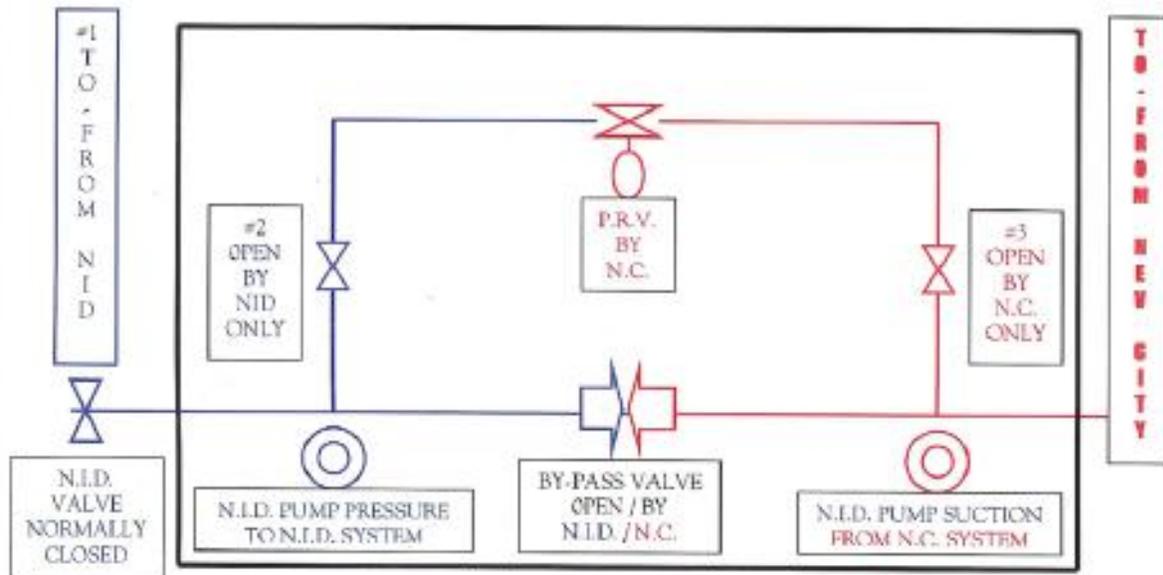
NEVADA CITY
GRACIE ROAD INTERTIE
Infrastructure Reliability, Conservation, and Efficiency Program

EXHIBITS

1. Intertie operating procedure diagram
2. Waterline specifications
3. CEQA documentation (Categorical Exemption)
4. Letter of Support from Nevada Irrigation District

EXHIBIT 1

OPERATING PROCEDURE



INTERTIE SHALL BE OPERATED BY ONE APPROVED OPERATOR FROM EACH AGENCY
(SEE AUTHORIZING PERSONAL LIST ON BACK PAGE)

WATER TO NEVADA CITY FROM N.I.D.

1. N.I.D. OPERATOR TO OPEN VALVE #1 FOLLOWED BY OPENING VALVE #2
2. NEVADA CITY OPERATOR TO OPEN VALVE #3

NOTE; NEVADA CITY OWNS AND OPERATES THE PRESSURE REDUCING VALVE

WATER TO N.I.D. FROM NEVADA CITY

NOTE; THE VALVES FOR THIS PROCEDURE HAVE NOT BEEN INSTALLED AT THIS TIME (05/09/02)

EXHIBIT 3

NOTICE OF EXEMPTION

TO:

County Clerk, County of Nevada
Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959

FROM:

City of Nevada City
City Hall
317 Broad Street
Nevada City, CA 95959

PROJECT TITLE: Underground Infrastructure Improvements to Nevada City and Nevada Irrigation District (NID) Water Inter-tie System

PROJECT LOCATION: City of Nevada City
317 Broad Street
Nevada City (Nevada County), California

PROJECT LOCATION—SPECIFIC Project is at the Nevada Irrigation District (NID) water inter-tie system in two locations: (1) Gracie Road/Gold Flat Road intersection and (2) Searls Avenue and Argall Way intersection. All work is done on City properties, within the City limits of Nevada City, Nevada County, CA

NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The City of Nevada City will improve the underground, NID water inter-tie system at two specific locations. Specific work will result in both systems being able to transfer water in either direction from agency to agency. The work to be done is underground and will benefit the citizens of the City, Nevada County, and the general public.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of Nevada City

NAME OF AGENCY CARRYING OUT PROJECT: City of Nevada City

EXEMPT STATUS: CATEGORICAL EXEMPTION, Section 15301, Existing Facilities (b) existing facilities of publicly-owned utilities used to provide public utility water services.

REASONS WHY PROJECT IS EXEMPT: There will be no impact on the environment as the installation is to existing, underground infrastructure.

LEAD AGENCY CONTACT PERSON: William J. Falconi, City Engineer

TELEPHONE NUMBER: (530) 265-2496

SIGNATURE:  **DATE:** 3 Jan 2011 **TITLE:** City Engineer

EXHIBIT 4



NEVADA IRRIGATION DISTRICT

1036 W. Main Street, Grass Valley, CA 95945-5424 ~ www.nidwater.com
(530) 273-6185 ~ Fax: (530) 477-2646 ~ Toll Free: (800) 222-4102

December 16, 2010

Katie Burdick
CABY Executive Director
1545 Shirland Tract
Auburn, CA 95603

Dear Katie,

NID actively supports the City of Nevada City Gracie Road Intertie project that is a part of the CABY Proposition 84 Implementation Grant Proposal.

NID has been working with the City of Nevada City to improve system reliability and enhance their water supply, including specifically the Gracie Road intertie, for several years. The Gracie Road intertie is a critical component of the water supply reliability of Nevada City; this project will provide a reliable backup supply should their treatment plant or distribution system experience short- or mid-term failure or disruption.

The City and NID have engaged in substantial discussions about the Gracie Road project, including the identification of performance parameters, preliminary engineering and design approaches, and policies and procedures that would guide use of the intertie.

NID wholeheartedly supports this endeavor and stands ready to assist the City in all aspects of implementing this project. NID looks forward to working with Nevada City in the upcoming years to achieve their goals and objectives.

Sincerely,

NEVADA IRRIGATION DISTRICT

Ron Nelson
General Manager

M:\Crough\CABY IRWMP\2010_12_16 NID Letter of Support Gracie Intertie.doc

SERVING PORTIONS OF NEVADA, PLACER & YUBA COUNTIES

NEVADA CITY
South Pine Street Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program



OVERVIEW

The current water distribution infrastructure for Nevada City is aging and outdated with limited resilience. Many of the distribution lines in the historic downtown Nevada City were installed in the 1860s through 1890s and are characterized by eroding and variably sized components, which often create a bottleneck in distribution to the downtown areas. These problems are exacerbated by insufficient management of three storage tanks which are the backbone of the distribution system. The system also suffers from areas of inadequate pressure and/or inadequate firefighting capacity due to the size or reduced delivery capacity (high roughness coefficient). Together these issues result in existing leaks, water loss and other inadequacies throughout the distribution system.

Nevada City experiences a variety of types of leaks, including service line leaks and valve leaks. However, in most cases, the largest portion of unaccounted-for water is lost through leaks in supply and distribution system lines. There are many possible causes of these leaks, and often a combination of factors has contributed to their occurrence. The material, composition, age, and joining methods of the City distribution system components have influenced leak occurrence, as have inadequate corrosion protection, aging or functionally obsolete valves, mechanical damage due to deferred maintenance, geologic and soil characteristics which affect pipeline stability, and other similar attributes. Another related factor is the quality of the initial installation of distribution system components. Water conditions are also a factor, including temperature, velocity, and pressure, as are contact with other structures; upheaval by tree roots and stress from traffic vibrations, frost loads, and freezing soil around a pipe can also contribute to leaks.

Over the years, whenever possible, the City has chosen to replace aging or functionally obsolete lines rather than engage in incremental repairs as a result of detected leaks or improvements

associated with new or updated construction, or replacement of adjacent sewer or utility lines. However, there are a number of distribution lines segments which still date from the mid- to late-1800s, such as the South Pine Street line. As with the other older street line sections in this part of the city, the line at South Pine is a four-inch line. However, due to corrosion and deposition of material, the internal pipe diameter has become severely constricted and has effectively been reduced in capacity to that of a two-inch line.

South Pine Street

Installed in the 1870s, the South Pine Street line currently runs directly underneath six of the houses located on South Pine, making line replacement within the current alignment infeasible. The line running underneath the homes is suspected to experience leakage along its length, both at the lateral connections and through the line itself. Therefore, this project includes improvement of the line to a six-inch diameter (to accommodate firefighting flows and pressure requirements), as well as a realignment of the main. Finally, all residential laterals will be reconfigured to allow supply to the realigned main.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWMP, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.
- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWMP to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

The project does not require the purchase of land or the negotiation of an easement. The relocation of the line from its existing easement under the homes on South Pine will be accomplished within the existing easement which runs from South Pine to Cross Street.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Final Design for South Pine Distribution System Improvement

The location of the start and end points for the South Pine Street line are known and mapped. Therefore, the design attributes of the line to which the South Pine Street realignment and replacement will be connected are known and documented.

The City engineers will prepare design specifications for each infrastructure improvement. As part of this effort, the distance from the ground surface to existing pipe (i.e., "pothole" the line) will be measured to determine the appropriate trench depth. It is anticipated that the line will be laid at the same depth as the existing line. The specifications for the line and the connections to lines at either end of the improvement will use the standards employed by the Nevada Irrigation District. Additionally, the standard technical specifications for infrastructure improvements will also be based on the standards of the Nevada Irrigation District which the city has consistently used over time. All applicable and appropriate water quality, building, and construction standards will be used in implementing the project. These standards are identified initially in the design phase and further documented during final design and engineering. The construction contract documents will contain a detailed explanation of all applicable standards.

While beyond the current financial capacity of the City, projects similar to this have been designed and installed throughout the downtown and surrounding area. Development of a traffic routing and control program will also be part of the design process.

Deliverables:

- ◆ Final construction specifications.
- ◆ Traffic routing and control plan.

Environmental Documentation

Environmental documentation for the South Pine Street Distribution System project has been completed. A Categorical Exemption was issued on January 3, 2011 (see Exhibit 1).

Deliverables:

- ◆ Approved and filed CEQA documentation - Categorical Exemption

Permitting

An evaluation of the project by NID and the Nevada City staff indicates that no permits are required to construct the South Pine Street line realignment and replacement.

Budget Category (d): Construction/Implementation

Task 5: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies. These policies and procedures will be used to identify the construction company that will implement the South Pine Street distribution system improvements. Pre-construction activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/ experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract and final negotiated contract.

Task 6: Mobilization and Site Preparation

As with all such projects within the confines of the downtown area, space is at a premium. As a result, the staging area for the project construction is likely to be in the vicinity of 436 to 432 Sacramento Street. In addition to the designation and preparation of a staging area, mobilization and site preparation activities will include removal of pavement, initial excavation to reveal the join locations for connecting to the existing South Pine Street lines at either end of the project, removal and/or storage of soil and excavated material, and installation of all service (existing and proposed relocation).

Deliverables:

- ◆ All necessary site preparation and equipment/contractor mobilization activities complete.

Task 7: Project Construction

The project construction activities will result in the capping of the abandoned lines and laterals, installation of the new pipelines, bacteriological testing (after superchlorination) of the new line, and pressurizing and activating new service laterals, as well as relocation of water meters.

Deliverables:

- ◆ Installation and testing of all required infrastructure.
- ◆ Pressurizing and activating new laterals
- ◆ Relocated water meters, as necessary

Task 8: Performance Testing, Demobilization, and Post-Project Monitoring

Performance testing and demobilization activities will involve testing of system pressure and running bacteriological testing of the installed line, return of the staging areas to pre-project conditions, removal of all excavated pipe and materials, and removal of any street/traffic management signage or materials.

Deliverables:

- ◆ Constructed infrastructure improvements.
- ◆ Monitor post-installation system performance.
- ◆ “As-built” construction drawings, specifications and documentation
- ◆ Updated GIS system database.
- ◆ Post-project Demobilization Inspection Report (prior to final contractor payment).

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

Because there are identified project impacts or associated project compliance conditions, mitigations, or enhancements there are no tasks associated with this budget category.

Budget Category (f): Construction Administration

Task 9: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), inspection of work through all phases of construction, preparation and processing of change orders,, review and approval of progress payments and recommendations for payment (as required), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Project site cleared of all construction materials, equipment, and debris.

Budget Category (g): Other

Task 10: Develop and Maintain CABY Project-specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72 (developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 11: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested

public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. Project Related Data will be evaluated by the CABY technical committee to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Budget Category (h): Construction /Implementation Contingency

Nevada City uses a 15% contingency factor for all construction projects. This formula will be applied to this contract and it will be the responsibility of the construction manager to identify situations in which the contingency funds may be accessed.

NEVADA CITY
South Pine Street Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program

EXHIBITS

1. CEQA documentation (Categorical Exemption)
2. Water system component specifications

EXHIBIT 1

NOTICE OF EXEMPTION

TO:

County Clerk, County of Nevada
Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959

FROM:

City of Nevada City
City Hall
317 Broad Street
Nevada City, CA 95959

PROJECT TITLE: Water Line Replacement Project on Park Avenue, Prospect Street and South Pine Street

PROJECT LOCATION: City of Nevada City
317 Broad Street
Nevada City (Nevada County), California

PROJECT LOCATION—SPECIFIC Portion of Park Avenue, Prospect and South Pine Streets, within the City limits of Nevada City, Nevada County, CA

NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The City of Nevada City will replace existing underground waterlines along a portion of certain city streets. The project would benefit the citizens of the City, Nevada County, and the general public by providing better water service and higher fire flows to the City

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of Nevada City

NAME OF AGENCY CARRYING OUT PROJECT: City of Nevada City

EXEMPT STATUS: CATEGORICAL EXEMPTION, Section 15301, Existing Facilities (d) Restoration or rehabilitation of deteriorated or damaged facilities to meet current standards of public health and safety.

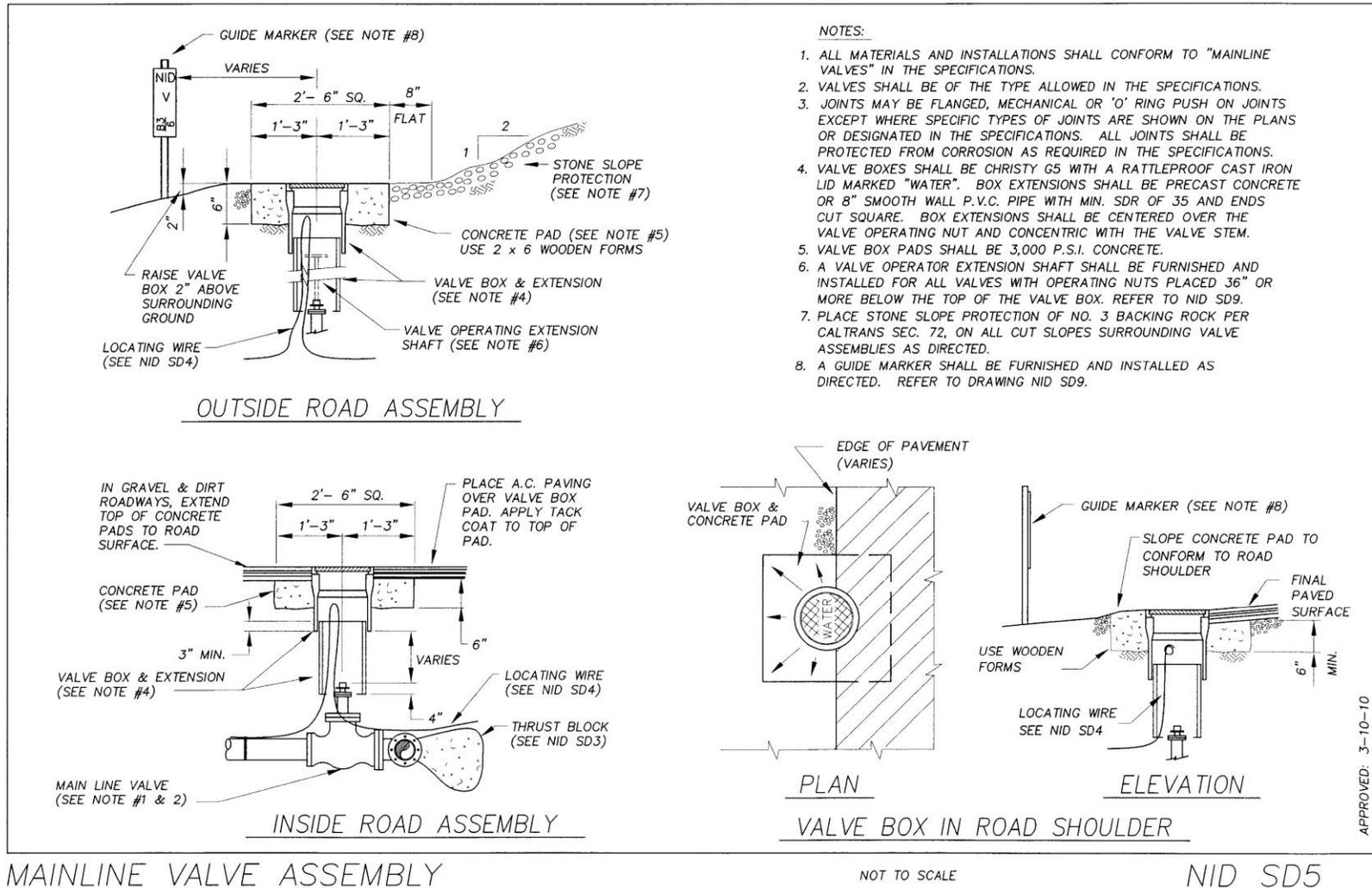
REASONS WHY PROJECT IS EXEMPT: There will be no impact on the environment as the replacement is to existing underground water lines.

LEAD AGENCY CONTACT PERSON: William J. Falconi, City Engineer

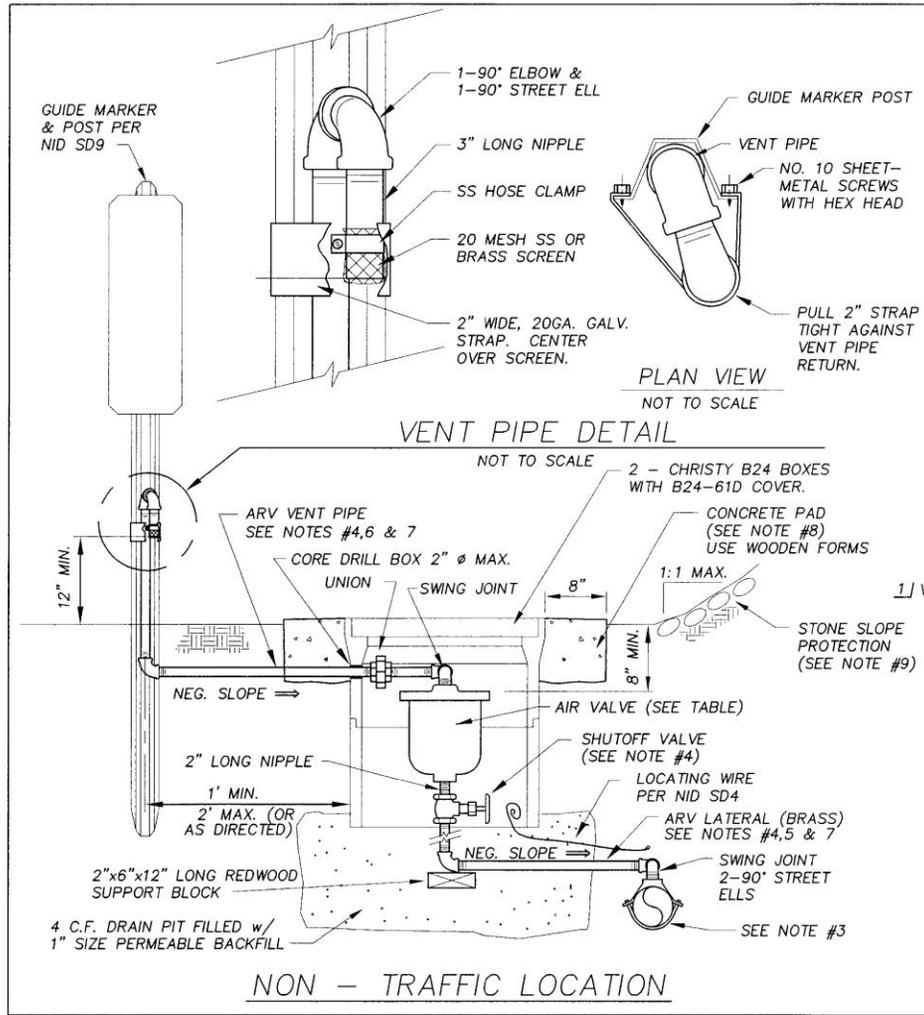
TELEPHONE NUMBER: (530) 265-2496

SIGNATURE:  **DATE:** 3/1/2011 **TITLE:** City Engineer

Exhibit 2



MAINLINE VALVE ASSEMBLY



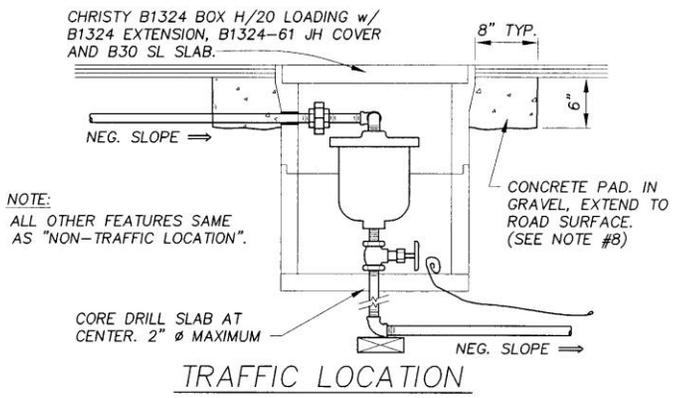
NOTES:

1. ALL MATERIALS AND INSTALLATION SHALL CONFORM TO "AIR RELEASE VALVE ASSEMBLIES" IN THE SPECIFICATIONS.
2. THE SIZE, TYPE AND LOCATION OF ARV ASSEMBLIES SHALL BE AS NOTED ON THE PLANS. LOCATIONS ARE APPROXIMATE AND SHALL BE AS DIRECTED.
3. THE TAP AND SADDLE FOR THE CONNECTION TO THE WATERMAIN SHALL CONFORM TO "WATERMAIN TAPS" IN THE SPECIFICATIONS.
4. LATERAL AND VENT PIPES AND SHUTOFF VALVES SHALL BE THE SAME NOMINAL SIZE AS THE ARV. REFER TO DRAWING NID SD1 FOR TRENCH DETAILS.
5. LATERAL PIPE AND FITTINGS SHALL BE BRASS.
6. VENT PIPE AND FITTINGS SHALL BE GALVANIZED IRON.
7. THE SADDLE AND ALL BURIED LATERAL AND VENT PIPES, INCLUDING THOSE ENCASED IN CONCRETE, SHALL BE PRIMED AND WRAPPED FOR CORROSION PROTECTION AS DESCRIBED IN THE SPECIFICATIONS.
8. CONCRETE FOR VALVE BOX PADS SHALL BE 3000 PSI.
9. PLACE STONE SLOPE PROTECTION OF NO. 3 BACKING ROCK PER CALTRANS SEC. 72, ON ALL CUT SLOPES SURROUNDING ARV ASSEMBLIES, AS DIRECTED.
10. REFER TO DRAWING NID SD1 FOR TRENCH DETAILS.

AIR VALVE TABLE

| VALVE TYPE 1] | VALVE SIZE (IN.) | MAX. ORFICE (IN.) | APCO | CRISPIN |
|-------------------------|------------------|-------------------|-----------------|-----------|
| AIR & VACUUM RELEASE | 1" | | 142 | |
| AIR RELEASE | 3/4" | 1/16" | 65(150 PSI MAX) | M8 MIDGET |
| | 1" | 3/32"-3/16" | 200A | P 10 |
| COMBINATION AIR RELEASE | 1" | 3/32" | 143C | UL 10 |

1] VALVES LISTED ARE RATED FOR 250 PSI WORKING PRESSURE UNLESS OTHERWISE NOTED.

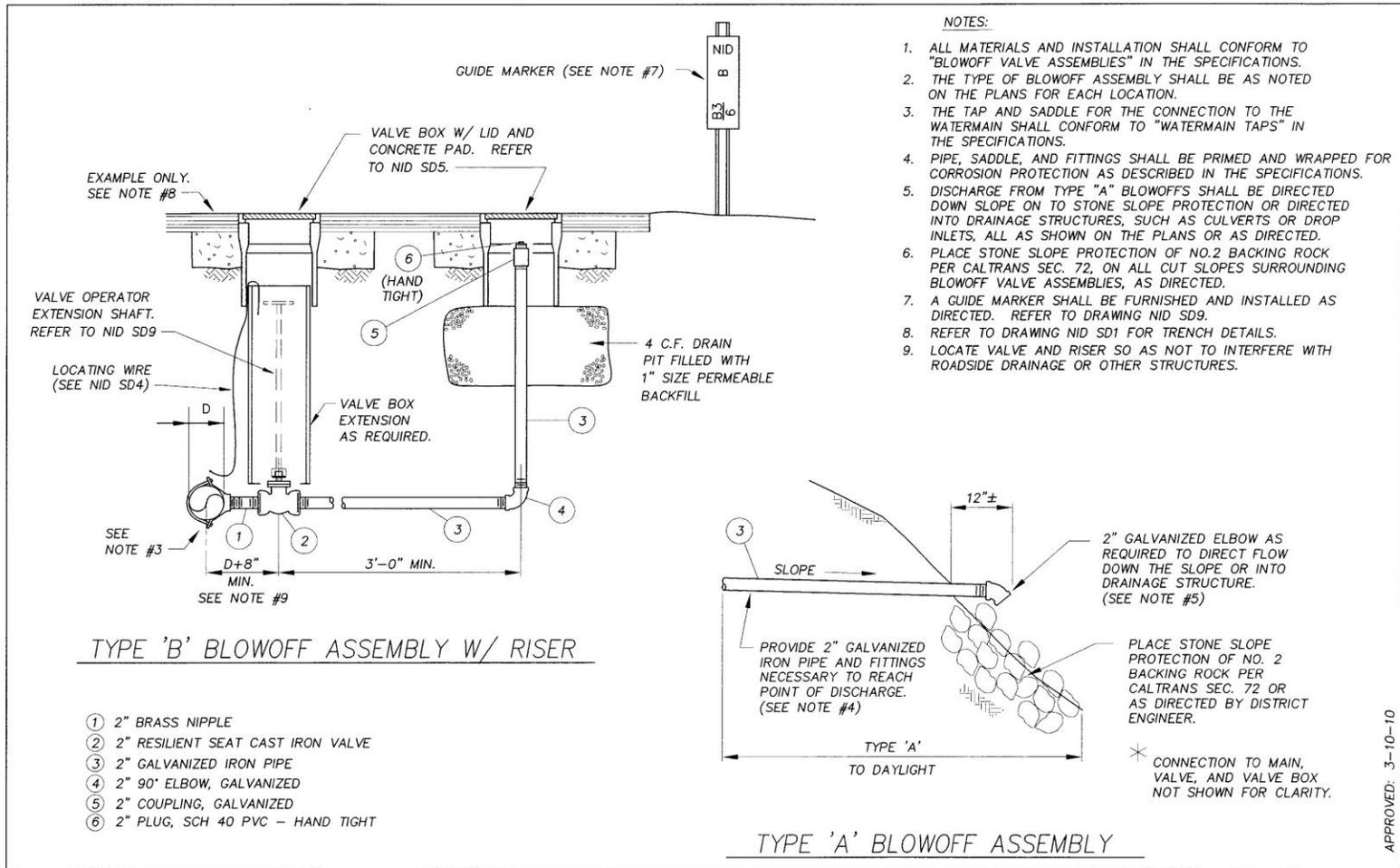


3/4" & 1" AIR RELEASE VALVE ASSEMBLY

NOT TO SCALE

NID SD6

APPROVED: 3-10-10
S. Shore (Waterford) Aug 1, 2010 Standard Details



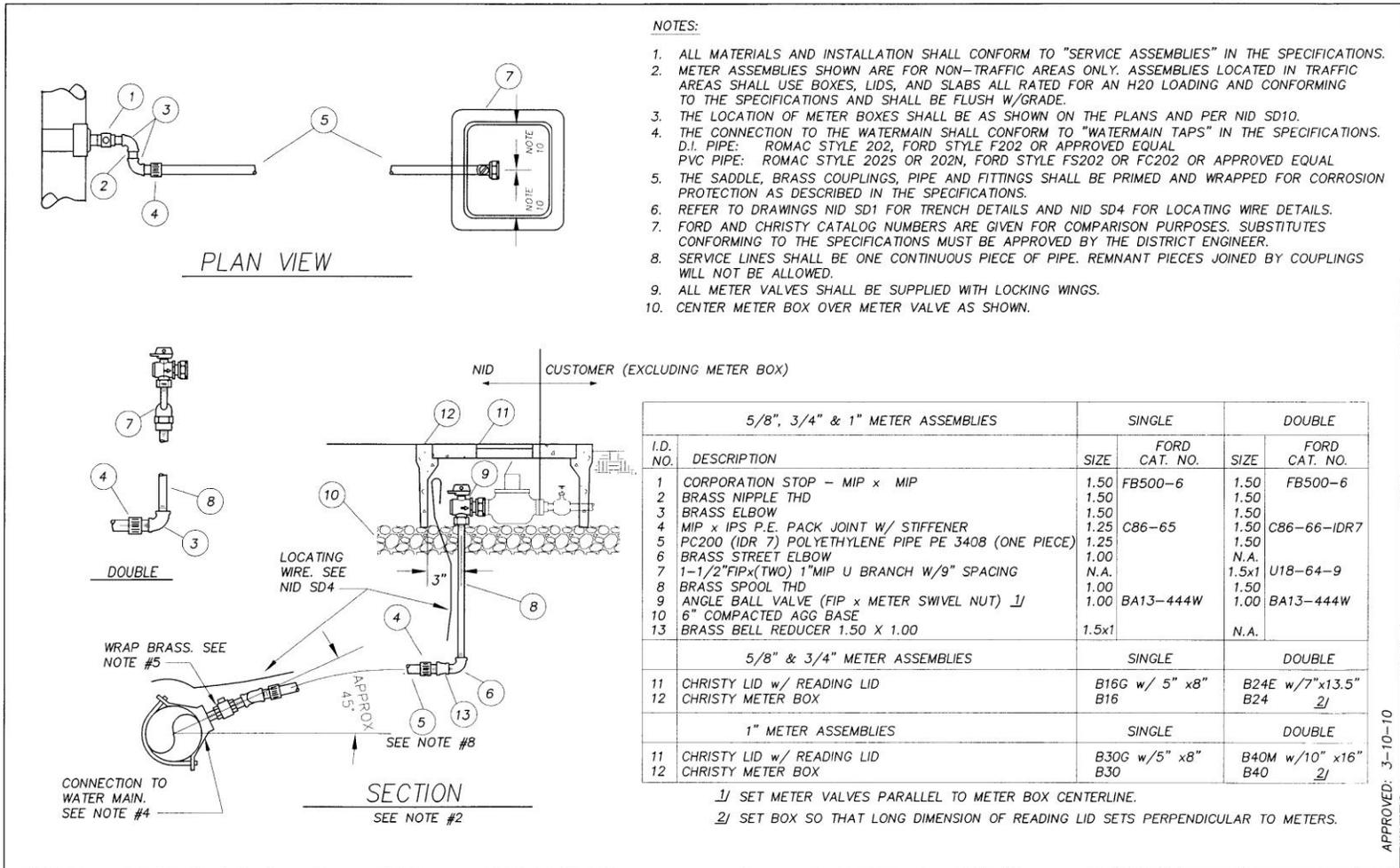
2" BLOWOFF ASSEMBLY – TYPE A & B

NOT TO SCALE

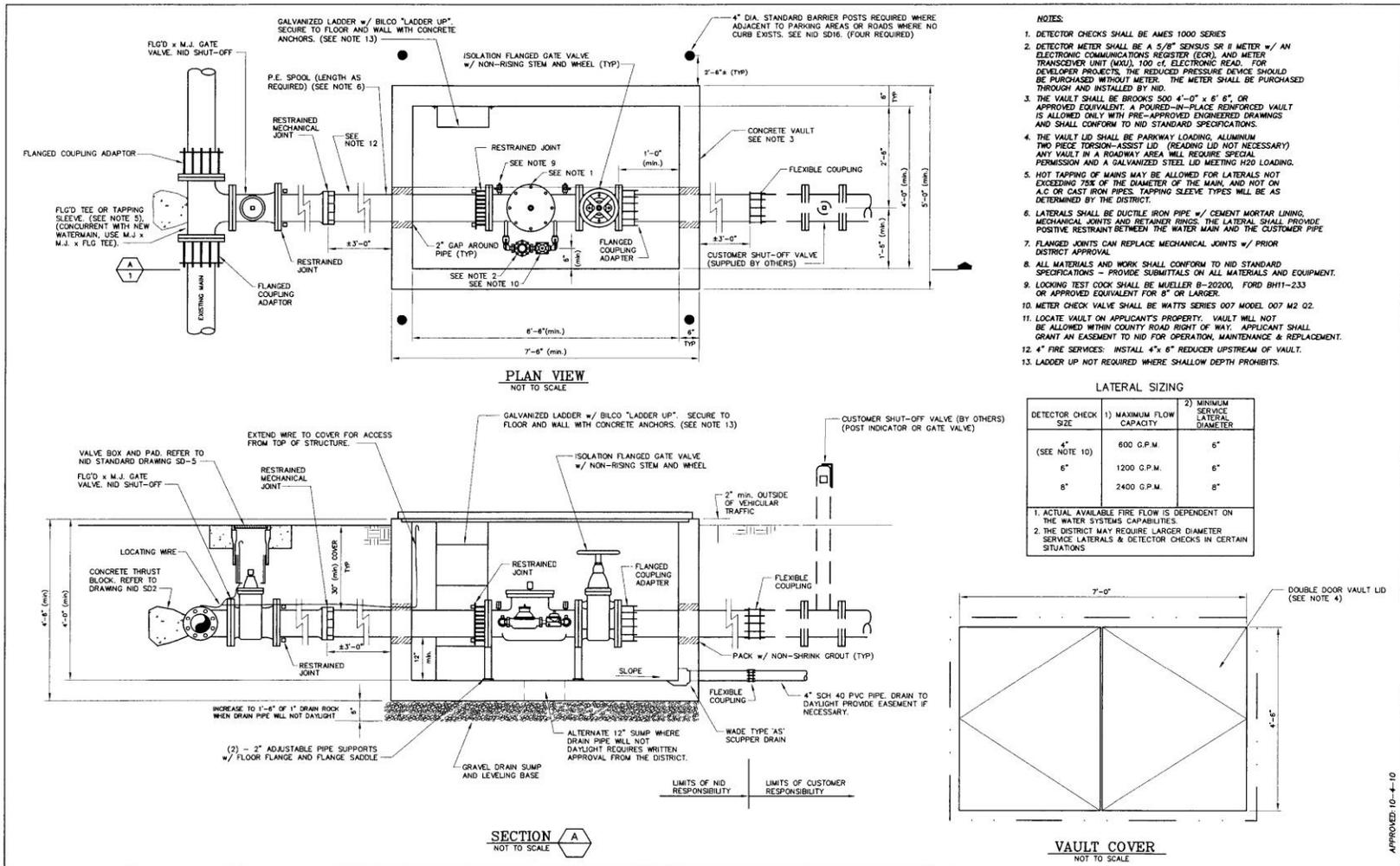
NID SD7

- NOTES:**
1. ALL MATERIALS AND INSTALLATION SHALL CONFORM TO "BLOWOFF VALVE ASSEMBLIES" IN THE SPECIFICATIONS.
 2. THE TYPE OF BLOWOFF ASSEMBLY SHALL BE AS NOTED ON THE PLANS FOR EACH LOCATION.
 3. THE TAP AND SADDLE FOR THE CONNECTION TO THE WATERMAIN SHALL CONFORM TO "WATERMAIN TAPS" IN THE SPECIFICATIONS.
 4. PIPE, SADDLE, AND FITTINGS SHALL BE PRIMED AND WRAPPED FOR CORROSION PROTECTION AS DESCRIBED IN THE SPECIFICATIONS.
 5. DISCHARGE FROM TYPE "A" BLOWOFFS SHALL BE DIRECTED DOWN SLOPE ON TO STONE SLOPE PROTECTION OR DIRECTED INTO DRAINAGE STRUCTURES, SUCH AS CULVERTS OR DROP INLETS, ALL AS SHOWN ON THE PLANS OR AS DIRECTED.
 6. PLACE STONE SLOPE PROTECTION OF NO.2 BACKING ROCK PER CALTRANS SEC. 72, ON ALL CUT SLOPES SURROUNDING BLOWOFF VALVE ASSEMBLIES, AS DIRECTED.
 7. A GUIDE MARKER SHALL BE FURNISHED AND INSTALLED AS DIRECTED. REFER TO DRAWING NID SD9.
 8. REFER TO DRAWING NID SD1 FOR TRENCH DETAILS.
 9. LOCATE VALVE AND RISER SO AS NOT TO INTERFERE WITH ROADSIDE DRAINAGE OR OTHER STRUCTURES.

APPROVED: 3-10-10



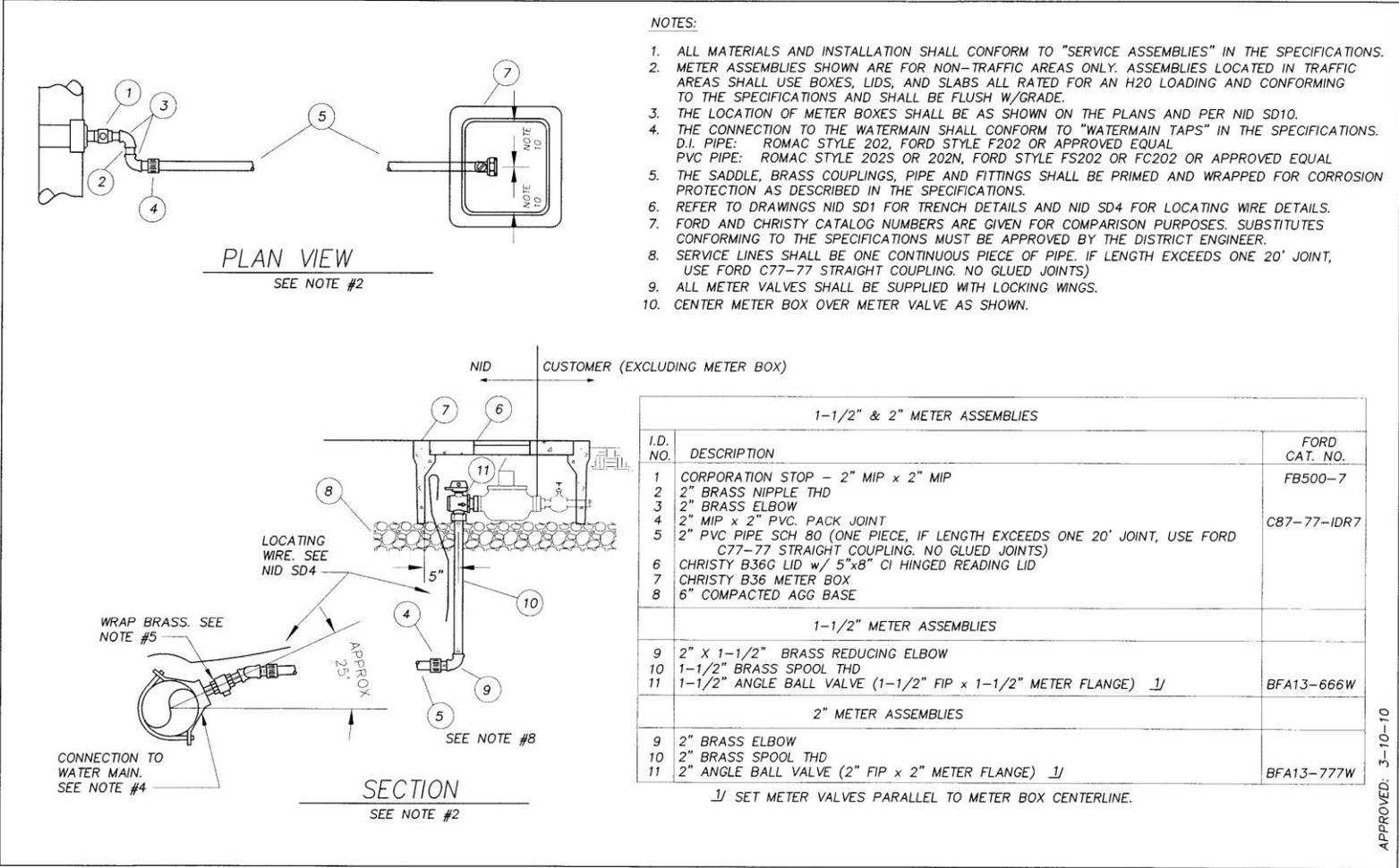
5/8", 3/4" & 1" METER ASSEMBLY - SINGLE & DOUBLE NOT TO SCALE NID SD11



PRIVATE FIRE SERVICE-SINGLE DETECTOR CHECK

NOT TO SCALE

NID SD13



1-1/2" & 2" METER ASSEMBLY

NOT TO SCALE

NID SD15

APPROVED: 3-10-10
S. Shore (Waterline) (Aug 2010) Standards Details

NEVADA CITY
Park Avenue Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program



OVERVIEW

The existing conditions that establish the need for the proposed Park Distribution System Improvements are similar to those for the South Pine Distribution System Improvement project. The Park Avenue line has not been updated since it was first installed. However, a new road (Max Solard Drive) was constructed in the 1980s at the entrance to Pioneer Park (Nimrod Road), and included a six-inch main within the utility easement. This left a 430-foot segment of remnant four-inch line underneath Park Avenue.

The difference in size between the two lines has resulted in a significant pressure differential, which in turn impacts flow for firefighting and residential water pressure. The critical flow requirement for fighting fires is 1,000 gallons per minute, at 20 psi. The line currently provides 336 gallons per minute, occasionally at zero psi. The inadequate flow and pressure has resulted in inadequate capacity to support fire-fighting needs. Additionally, because of its age, the pipe has significant deposition of both rust and captured materials, thereby effectively reducing the line size to two inches. Finally, the pipe is assumed to be leaking at several locations; however, the City has not had sufficient funds to inspect the line, no available equipment to detect specific leak locations, and no real capacity to replace the line due to limited funding.

Residents in the area are accustomed to managing their pressure by adaptive strategies, such as turning off the washing machine in order to take a shower, or turning off outdoor irrigation in order to run their clothes washer. However, in a situation which requires provision of fire flows to the area, there is no available option.

Nevada City recently passed an ordinance requiring all new construction to install interior fire sprinklers. There is inadequate pressure on this reach of Park Avenue main to support the installation of sprinklers in new or remodeled homes.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWVG, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.
- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWVG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

The project does not require the purchase of land or the negotiation of an easement or right-of-way.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Final Design for Park Avenue System Improvement

The location of the start and end points for the South Pine Street line are known and mapped. Therefore, the design attributes of the line to which the South Pine Street realignment and replacement will be connected are known and documented.

The City engineers will prepare design specifications for the infrastructure improvement. As part of this effort, the distance from the ground surface to existing pipe (i.e., “pothole” the line) will be measured to determine the appropriate trench depth. It is anticipated that the line will be laid at the same depth as the existing line. The specifications for the line and the connections to lines at either end of the improvement will use the standards employed by the Nevada Irrigation District. Additionally, the standard technical specifications for infrastructure improvements will also be based on the standards of the Nevada Irrigation District which the city has consistently used over time. All applicable and appropriate water quality, building, and construction standards will be used in implementing the project. These standards are identified initially in the design phase and further documented during final design and engineering. The construction contract documents will contain a detailed explanation of all applicable standards.

While beyond the current financial capacity of the City, projects similar to this have been designed and installed throughout the downtown and surrounding area. Development of a traffic routing and control program will also be part of the design process.

Deliverables:

- ◆ Final construction specifications.
- ◆ Traffic routing and control plan.

Environmental Documentation

Environmental documentation for the Park Avenue project has been completed. A Categorical Exemption was issued on January 3, 2011 (see Exhibit 1).

Deliverables:

- ◆ Approved and filed CEQA documentation - Categorical Exemption

Permitting

No permits are required to construct the Park Avenue line realignment and replacement

Budget Category (d): Construction/Implementation

Task 5: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies. These policies and procedures will be used to identify the construction company that will install the Park Avenue infrastructure. Pre-construction activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract; and final negotiated contract.

Task 6: Mobilization and Site Preparation

As with all such projects within the confines of the downtown area, space is at a premium. As a result, the staging area for the project construction is likely to be in the vicinity of 436 to 432 Sacramento Street. In addition to the designation and preparation of a staging area, mobilization and site preparation activities will include removal of pavement, initial excavation to reveal the join locations for connecting to the existing Park Avenue lines at either end of the project, removal and/or storage of soil and excavated material, and installation of all service (existing and proposed relocation).

Deliverables:

- ◆ All necessary site preparation and equipment/contractor mobilization activities complete.

Task 7: Project Construction

The project construction activities will result in the capping of the abandoned lines and laterals, installation of the new pipelines, bacteriological testing (after superchlorination) of the new line, and pressurizing and activating new service laterals, as well as relocation of water meters.

Deliverables:

- ◆ Installation and testing of all required infrastructure.
- ◆ Pressurizing and activating new laterals
- ◆ Relocated water meters, as necessary

Task 8: Performance Testing, Demobilization, and Post-Project Monitoring

Performance testing and demobilization activities will involve testing of system pressure and running bacteriological testing of the installed line, return of the staging areas to pre-project conditions, removal of all excavated pipe and materials, and removal of any street/traffic management signage or materials.

Deliverables:

- ◆ Constructed infrastructure improvements.
- ◆ Monitor post-installation system performance.
- ◆ “As-built” construction drawings, specifications and documentation
- ◆ Updated GIS system database.
- ◆ Post-project Demobilization Inspection Report (prior to final contractor payment).

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

Because there are identified project impacts or associated project compliance conditions, mitigations, or enhancements there are no tasks associated with this budget category.

Budget Category (f): Construction Administration

Task 9: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), inspection of work through all phases of construction, preparation and processing of change orders,, review and approval of progress payments and recommendations for payment (as required), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Project site repaved, cleared of all construction materials, equipment, and debris and returned to pre-project conditions.

Budget Category (g): Other

Task 10: Develop and Maintain CABY Project-Specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72 (developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 11: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. Project Related Data will be evaluated by the CABY technical committee to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Budget Category (h): Construction /Implementation Contingency

Nevada City uses a 15% contingency factor for all construction projects. This formula will be applied to this contract and it will be the responsibility of the construction manager to identify situations in which the contingency funds may be accessed.

NEVADA CITY
Park Avenue Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program

EXHIBITS

1. CEQA documentation (Categorical Exemption)

NOTE: Specifications for water system components are included on pages 10 through 14 of the South Pine Street Distribution System Improvement Work Plan.

NOTICE OF EXEMPTION

TO:

County Clerk, County of Nevada
Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959

FROM:

City of Nevada City
City Hall
317 Broad Street
Nevada City, CA 95959

PROJECT TITLE: Water Line Replacement Project on Park Avenue, Prospect Street
and South Pine Street

PROJECT LOCATION: City of Nevada City
317 Broad Street
Nevada City (Nevada County), California

PROJECT LOCATION—SPECIFIC Portion of Park Avenue, Prospect and South Pine
Streets, within the City limits of Nevada City, Nevada County, CA

NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The City of Nevada
City will replace existing underground waterlines along a portion of certain city streets.
The project would benefit the citizens of the City, Nevada County, and the general public
by providing better water service and higher fire flows to the City

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of Nevada City

NAME OF AGENCY CARRYING OUT PROJECT: City of Nevada City

EXEMPT STATUS: CATEGORICAL EXEMPTION, Section 15301, Existing
Facilities (d) Restoration or rehabilitation of deteriorated or damaged facilities to meet
current standards of public health and safety.

REASONS WHY PROJECT IS EXEMPT: There will be no impact on the
environment as the replacement is to existing underground water lines.

LEAD AGENCY CONTACT PERSON: William J. Falconi, City Engineer

TELEPHONE NUMBER: (530) 265-2496

SIGNATURE:



DATE: 3/1/2011

TITLE: City Engineer

NEVADA CITY
Prospect Street Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program



OVERVIEW

The existing conditions that establish the need for the proposed Prospect Street Distribution System Improvements are similar to those described for the previous distribution system improvements (i.e., South Pine and Park Avenue). The length of Prospect Street between Adams and Clay Streets is serviced by a four-inch line installed in 1865 and no improvements to this line have been constructed since its original installation. As with the other older street line sections in this part of the City, the functional diameter of the main has been significantly reduced due to calcification. Fire fighting flows on this stretch of Prospect Street range from 168 to 336 gallons per minute, significantly less than the 1,000 gpm considered to be optimal for fire-fighting. Additionally, the residual psi measures at zero, as opposed to the required 20 psi. The 612-foot line would be replaced with a six-inch pipe that would restore both adequate fire flows and residual psi.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWVG, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.
- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWVG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

The project does not require the purchase of land or the negotiation of an easement.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Final Design for Prospect Street Distribution System Improvement

The location of the start and end points for the South Pine Street line are known and mapped. Therefore, the design attributes of the line to which the South Pine Street realignment and replacement will be connected are known and documented.

The City engineers will prepare design specifications for the infrastructure improvement. As part of this effort, the distance from the ground surface to existing pipe (i.e., “pothole” the line) will be measured to determine the appropriate trench depth. It is anticipated that the line will be laid at the same depth as the existing line. The specifications for the line and the connections to lines at either end of the improvement will use the standards employed by the Nevada Irrigation District. Additionally, the standard technical specifications for infrastructure improvements will also be based on the standards of the Nevada Irrigation District which the city has consistently used over time. All applicable and appropriate water quality, building, and construction standards will be used in implementing the project. These standards are identified initially in the design phase and further documented during final design and engineering. The construction contract documents will contain a detailed explanation of all applicable standards.

While beyond the current financial capacity of the City, projects similar to this have been designed and installed throughout the downtown and surrounding area. Development of a traffic routing and control program will also be part of the design process.

Deliverables:

- ◆ Final construction specifications.
- ◆ Traffic routing and control plan.

Environmental Documentation

Environmental documentation for the Prospect Street Distribution System Improvement project has been completed. A Categorical Exemption was issued on January 3, 2011 (see Exhibit 1).

Deliverables:

- ◆ Approved and filed CEQA documentation - Categorical Exemption

Permitting

No permits are required to construct the Prospect Street line realignment and replacement.

Budget Category (d): Construction/Implementation

Task 5: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies.

These policies and procedures will be used to identify the construction company which will install the Prospect Street infrastructure. Pre-construction activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract; and final negotiated contract.

Task 6: Mobilization and Site Preparation

As with all such projects within the confines of the downtown area, space is at a premium. As a result, the staging area for the project construction is likely to be in the vicinity of 436 to 432 Sacramento Street. In addition to the designation and preparation of a staging area, mobilization and site preparation activities will include removal of pavement, initial excavation to reveal the joint locations for connecting to the existing Prospect Street lines at either end of the project, removal and/or storage of soil and excavated material, and installation of all service (existing and proposed relocation).

Deliverables:

- ◆ All necessary site preparation and equipment/contractor mobilization activities complete.

Task 7: Project Construction

The project construction activities will result in the capping of the abandoned lines and laterals, installation of the new pipelines, bacteriological testing (after superchlorination) of the new line, and pressurizing and activating new service laterals, as well as relocation of water meters.

Deliverables:

- ◆ Installation and testing of all required infrastructure.
- ◆ Pressurizing and activating new laterals
- ◆ Relocated water meters, as necessary

Task 8: Performance Testing, Demobilization, and Post-Project Monitoring

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), inspection of work through all phases of construction, preparation and processing of change orders,, review and approval of progress payments and recommendations for payment (as required), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Project site repaved, cleared of all construction materials, equipment, and debris and returned to pre-project conditions.

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

Because there are identified project impacts or associated project compliance conditions, mitigations, or enhancements there are no tasks associated with this budget category.

Budget Category (f): Construction Administration

Task 9: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Project site cleared of all construction materials, equipment, and debris.

Budget Category (g): Other

Task 10: Develop and Maintain CABY Project-specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72 (developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 11: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. Project-related data will be evaluated by the CABY technical committee to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Budget Category (h): Construction /Implementation Contingency

Nevada City uses a 15% contingency factor for all construction projects. This formula will be applied to this contract and it will be the responsibility of the construction manager to identify situations in which the contingency funds may be accessed.

NEVADA CITY
Prospect Street Distribution System Improvement
Infrastructure Reliability, Conservation, and Efficiency Program

EXHIBITS

1. CEQA documentation (Categorical Exemption)

NOTE: Specifications for water system components are included on pages 10 through 14 of the South Pine Street Distribution System Improvement Work Plan.

NOTICE OF EXEMPTION

TO:

County Clerk, County of Nevada
Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959

FROM:

City of Nevada City
City Hall
317 Broad Street
Nevada City, CA 95959

PROJECT TITLE: Water Line Replacement Project on Park Avenue, Prospect Street and South Pine Street

PROJECT LOCATION: City of Nevada City
317 Broad Street
Nevada City (Nevada County), California

PROJECT LOCATION—SPECIFIC Portion of Park Avenue, Prospect and South Pine Streets, within the City limits of Nevada City, Nevada County, CA

NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The City of Nevada City will replace existing underground waterlines along a portion of certain city streets. The project would benefit the citizens of the City, Nevada County, and the general public by providing better water service and higher fire flows to the City

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of Nevada City

NAME OF AGENCY CARRYING OUT PROJECT: City of Nevada City

EXEMPT STATUS: CATEGORICAL EXEMPTION, Section 15301, Existing Facilities (d) Restoration or rehabilitation of deteriorated or damaged facilities to meet current standards of public health and safety.

REASONS WHY PROJECT IS EXEMPT: There will be no impact on the environment as the replacement is to existing underground water lines.

LEAD AGENCY CONTACT PERSON: William J. Falconi, City Engineer

TELEPHONE NUMBER: (530) 265-2496

SIGNATURE:



DATE: 3/20/04

TITLE: City Engineer

NEVADA CITY

Install Altitude Valves with Integrated SCADA Systems on Storage Tanks Infrastructure System Efficiency, Conservation, and Reliability Project

OVERVIEW

Nevada City provides its 1,350 customers with treated water from the Banner Mountain Trail Treatment Plant. The distribution system from the plant is currently composed of three water tanks serving the city from three sectors: 1) Gracie Road Tank, 2) California Division of Forestry Tank, and 3) the Rood Center Tank. Each tank has a capacity of approximately one million gallons. The top elevation of each tank is 2,714 feet. With the distribution discharge at elevation 2,771 feet, the tanks and almost the entire distribution system is served by gravity.



As identified in the 2009 report, *Condition of the City Water Plant and Water System*, by City Engineer William Falcon, and the support materials contained in the reports “*Status Report on Water Treatment Manual and Water System Evaluation, 11/24/08*” and “*Improving Nevada City’s Water Supply System, 1/12/09*” by Martin Roche, consulting engineer, there are a number of identified problems in the water system. In particular, two specific problems were identified: users at the higher elevations of town experience low pressure during peak use periods (due to the gravity feed system) and water is wasted by the storage tanks allowing excess treated water to spill out of the tanks.

These same reports concluded that a single key improvement to the tank storage components would significantly increase the reliability, decrease current water wastage, and enhance the efficiency of the entire Nevada City water distribution system — installation of altitude valves with integrated SCADA systems at the three storage tanks which serve as the primary distribution elements.

Altitude Valves

During preparation of the Roche evaluations (Roche, 2009), a water distribution system model (EPANET 2.0) was used to analyze a simplified version of the city’s water distribution system for current conditions and for several proposed improvements to the system. While these 2009 model results do not yield absolute precise values, they give a reliable profile of current conditions and how the system would react to suggested improvements. As currently operated, all three tanks cannot achieve their full storage capacity because of the absence of altitude valves. Once the initial tank is filled, the second and third tanks begin to fill. However, prior to the second tank reaching capacity, the first tank begins to spill due to pipe size restriction. Likewise, in order to fill the third tank to

capacity, both the first and second tanks will spill. These spill rates are 2,500 gph. In other words, in order for the system as currently configured to run at peak capacity, water wastage must occur. This phenomenon is documented in the model results summarized below.

- 1) With the Canada Hill Tank full and not in daily operation (which is the current situation) the Forestry Tank spills before the Sugarloaf Tank can be filled. To avoid spills at the Forestry Tank, the Sugarloaf Tank can only be filled as follows:
 - a. 9.4 feet from the top at a flow from the water treatment plant of 1,000 gpm (1.44 mgd), which is slightly higher than the maximum daily demand for the last few years.
 - b. 6.1 feet from the top at a flow of 700 gpm (1.008 mgd).
 - c. 2.5 feet from the top at a flow of 400 gpm (0.576 mgd).
- 2) Installing an altitude valve at the Forestry Tank (to shut off when the tank is full and open when the pressure in the pipe to the tank reduces) would allow the Sugarloaf Tank to be filled within 1.3 feet of the top without spilling at a flow of 1,000 gpm. Adding this valve appears to be the most cost-effective, near-term improvement to the distribution system, with adding altitude valves to the other two storage tanks in the future.
- 3) Adding a 12-inch pipe on South Pine Street would allow the Sugarloaf Tank to be filled within 2.8 feet of the top without spilling at a flow of 1,000 gpm. Adding this pipe would give the system some needed redundancy.
- 4) Connecting the line on East Broad Street to the pipe feeding the Sugarloaf Tank would not significantly improve flow conditions to the Sugarloaf Tank; however, it would give the system some needed redundancy.

The installation of altitude valves at all three storage tanks will allow the tanks to be managed to maximize storage and eliminate spills.

SCADA System - Background

The City currently has a SCADA system installed in the waste water treatment plant. This system will be augmented to include monitoring of the water distribution system.

Supervisory Control and Data Acquisition (SCADA) solutions for water systems combined with leak detection and use of Pressure Regulating Valve (PRV) stations will significantly improve the Nevada City situation. According to "Operating Benefits Achieved with SCADA for Water Distribution, Dan Ehrenreich, Motorola, BCWWA Conference, Vancouver, November 28-29, 2005," to achieve full benefit these measures have to be complemented with adapted water conservation programs aimed at minimizing excessive water usage. These initiatives combine to form a "water strategy" for conserving water into the future.

While Nevada City is able to provide estimates of their production, imports, and consumption, they are less able to point to reasons for unaccounted-for water. Water losses can be determined by conducting periodic water balance in defined sections of a water network. This calculation is based on the measurement of water flow, produced and imported quantities compared to exported and consumed quantities. This can be done automatically by the SCADA system and with RTUs, and the

outcome provides a guide to how much water is lost as a result of leakage from the network and how much of the water loss can be attributed to other undetectable reasons.

The objective is that the system's ability has to cope with peak demand days and hours, for the duration of the system's expected life span. In many instances, the water supply system is adjusted to the daily peak demand hours. Pressure reducers, for example, are calibrated to maintain a consistent pressure at the pressure reduction point, such that it will be sufficient to cope with demand during peak hours. In these cases, there are many periods of operation during which the system is working in a state of over-production with excess pressure in the system.

For Nevada City, it is important to differentiate between water losses caused by non-significant but continuous leakages and other factors. A tiny burst in a distribution pipe could go undetected for months and, consequently, such low-rate leakages are usually the most significant component of water losses. In some regions, accumulated meter errors, data collection mistakes, or accounting errors might become significant contributors to unaccounted-for water. The key to implementing a water loss reduction strategy must start with thorough understanding of each of the contributing components and ensure that the related parameters pointing on specific type of loss is measured as accurately as possible. This way, priorities aimed toward reduction of unaccounted-for water can be set via a series of action plans. Some typical measures are:

- ◆ Measure, calculate, and record the supply balance and determine the unaccounted-for water;
- ◆ Conduct a network audit and determine as accurately as possible where losses might occur; and
- ◆ Analyze the network operation and figure out why those losses occur in each segment. Develop constantly running leakage detection practices and appropriate response actions with the aim of reducing water losses and improving overall supply reliability.

SCADA solutions may contribute a great deal toward integration of leak detection means and practices as well as implementing periodically planned repair programs. The following relevant measures and practices can be implemented with use of a SCADA system:

- ◆ Estimating the level of water losses via undetectable small leaks (in unknown locations);
- ◆ Constant monitoring and regulating of the pressure in the network at critical locations;
- ◆ Recording and analyzing sudden changes in flow rates for detecting new leaks and bursts; and
- ◆ Reducing the actual response time to isolate the troubled section (if possible at all.)

Dynamic pressure control that adjusts to changing conditions throughout the day and from season to season is an efficient tool that contributes greatly to several aspects of the system's operation:

Substantial savings will accrue to the City due to elimination of spillage and increased efficiency of existing personnel. The ability to monitor water levels so closely will reduce the need to buy additional treated water from NID.

Reduction of water leakage, resulting in:

- ◆ Efficient use of existing water resources; and

- ◆ Delaying the need to invest in development of new water sources

Reduction in number of pipe bursts (up to 50 percent) resulting in:

- ◆ Reduced water system maintenance costs;
- ◆ Extended life span of system pipes and accessories; and
- ◆ Delaying the need to invest in system renovations.

Increased reliability of water supply, together with higher customer satisfaction.

Optimal match between infrastructure size and water supply demand, with reduced investment in infrastructure.

Reduction in energy consumption for operation of water supply installations.

Altitude Valves - Background

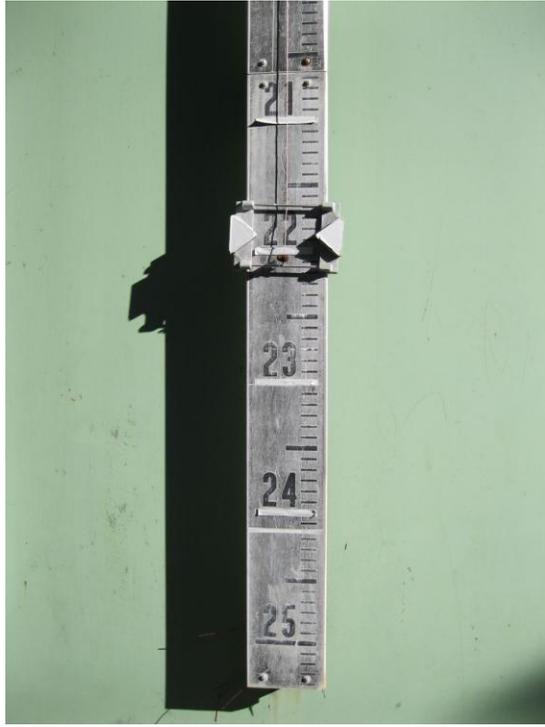
A flow control valve or altitude valve is used to regulate or monitor the flow of a liquid through a system and, in the case of Nevada City, to respond to pressure changes within the supply tank system by opening or closing, thus maintaining a desired water level, depending on individual tank design parameters and peak water needs of the service area. This will equalize pressure in one part of the system to maintain a balance with the other parts of the system. Some flow control valves do not use any other device to open and close. These are called automatic control valves. When pressure drops or rises, it provides enough force to open the valve automatically. That is the case with altitude valves in water tanks. When the water level reaches a certain point, it will automatically close the valve.

SCADA System - Need

Currently, the City has limited capacity to identify and resolve system operational problems due to the dependence on visual and/or meter reading to identify problems. The existence and location of leaks and breakages must be deduced from evaluation of meter data. This process requires manual collection and interpretation of data and further relies on a meter-reading schedule that does not include daily meter readings. Therefore, anything other than catastrophic leaks can continue undetected for substantial periods of time, and the capacity of the City to narrow down the location of the leak is further compromised by the lack of leak detection equipment.

An incident which occurred in 2007 illustrates the vulnerability of the system without automated monitoring capability: in August of 2007, two of the water tanks went dry through a combination of high demand and operator error, without the operator being aware of the situation (as the only way to monitor tank water levels is a visual inspection). When the third tank went off-line, the operator made a visual inspection and discovered that the city was essentially without water. Using the existing, low-capacity intertie with NID, the City was able to refill the tanks over a 24-hour period, during which time the residents operated under a shortage situation.

Installation of a Supervisory Control and Data Acquisition (SCADA) system, which enables automated data collection, will eliminate the need for recording and evaluating manual meter readings, allow for the download of data on a regular and predictable basis, improve the management capacity of the city, and alleviate water losses due both to system efficiency and leaks or system failures.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWMG, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.
- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWMG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

The project does not require the purchase of land or the negotiation of an easement.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation (Planning)

Task 4.1: Evaluate individual tank requirements

While all three water storage tanks have a similar design capacity, each tank has site-specific attributes which will influence the selection of the appropriate altitude valves as well as the SCADA system components.

Task 4.2: Evaluate and select appropriate integrated altitude valve and SCADA system

While the 2009 Roche evaluation clearly identified the need for a SCADA system, it did not specify the particular system that would be appropriate to the needs of the city. There are a variety of available systems and the City will need to evaluate which system is appropriate for the water system components, flow volumes, and other characteristics. This evaluation will address such system capabilities as: capacity to withstand local weather conditions (such as snow), redundant communication ports, presence of a nonvolatile memory to ensure data is retained during a power loss (a frequent occurrence in this foothill community), real-time clocks, watchdog trigger (to ensure successful restart after a power failure), a flexible programmable response to sensor inputs, automatic notification capacity, capacity to update the alarm list, sufficient data display, the capacity to filter nuisance alarms, the security of the system to hackers, and support for multiple protocols and equipment types (to guard against unplanned obsolescence).

Task 4.3: Administrative reporting and SCADA response protocols

The City will need to develop a set of policies and procedures for use in operating and monitoring the SCADA system. These reporting and management policies and procedures will be developed after selection of the appropriate hardware and software, in conjunction with the system provider, based on the attributes of the selected system.

Deliverables:

- ♦ Evaluation and purchase of integrated altitude valve SCADA systems.
- ♦ Development of administrative reporting systems.
- ♦ Adopted SCADA response protocols.

Task 5: Final Design and Engineering for Altitude Valves with Integrated SCADA Systems on Storage Tanks

The City engineer, in conjunction with the SCADA system provider, will develop all of the final specifications to support installation of the altitude valves in the three storage tanks, as well as upgrading the existing SCADA system in use by the waste water treatment plant to accommodate the additional functions associated with the altitude valves.

Deliverables:

- ◆ Completion of project plans and specifications.

Environmental Documentation

None required as the installation of the SCADA equipment and altitude valves will occur in or on existing equipment or facilities.

Permitting

No permits are required to purchase, install, or operate the altitude valves with integrated SCADA systems on the Nevada City storage tanks.

Budget Category (d): Construction/Implementation

Task 6: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies. These policies and procedures will be used to identify the construction company which will install the altitude valves and SCADA system (and components), as well as train City staff in the use and maintenance of the installed system(s).

Pre-construction activities include, but are not limited to: developing final technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract; and final negotiated contract.

Task 7: Mobilization and Site Preparation

Mobilization and site preparation are greatly simplified for this project by the fact that the components are installed in the existing tanks (altitude valves and SCADA in-tank components) or within the existing treatment plant (SCADA hardware and software). For this reason there are no traditional site preparation, clearing or grubbing or excavation activities associated with this project. Instead, the installation and mobilization will be focused on the timing and sequence of installation of the system components and coordinating these activities to ensure that no service interruptions occur. The City properties surrounding the facilities will be adequate for all contractor needs (water, power, and storage).

Deliverables:

- ◆ Identifying the specific staging area for installation of the altitude valves on the tanks
- ◆ Coordination with existing SCADA operators to ensure a seamless integration of the water system software and screens

Task 8: Project Construction

The City property at the water treatment plant has sufficient storage space to support staging for the project. The installation of altitude valves in the tanks requires no site disturbance and the upgrade of the existing SCADA software will occur completely inside the existing facilities with no outside construction required.

Deliverables:

- ◆ Installation of altitude valves
- ◆ Installation of SCADA software and operational components

Task 9: Performance Testing, Demobilization, and Monitoring

The altitude valves and SCADA system will be installed per engineering plans and specifications. The City has determined that a 10 percent retention will be put in place with no final payment to the vendor until the system is determined to be fully operational and accurate. The SCADA system will be monitored on a daily basis throughout its operational life and will be updated and supported by the vendor under agreement to the City.

Deliverables:

- ◆ Calibration of installed system.
- ◆ Monitor post-installation system performance.
- ◆ "As-built" construction drawings, specifications, and documentation.
- ◆ Updated GIS system database.
- ◆ Post-project Demobilization Inspection Report (prior to final contractor payment).

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

N/A

Budget Category (f): Construction Administration

Task 10: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), in-field problem solving during construction in response to unexpected field or system conditions, etc.

Deliverables:

- ◆ Project site cleared of all construction materials, equipment, and debris.

Budget Category (g): Other

Task 11: Develop and Maintain CABY Project-specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project.

Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72 (developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 12: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. The CABY technical committee will evaluate project-related data to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Budget Category (h): Construction /Implementation Contingency

Nevada City uses a 15% contingency factor for all construction projects. This formula will be applied to this contract and it will be the responsibility of the construction manager to identify situations in which the contingency funds may be accessed.

NEVADA CITY
Install Altitude Valves with Integrated SCADA Systems on Storage Tanks
Infrastructure System Efficiency, Conservation, and Reliability Project

EXHIBITS

1. CEQA Documentation --- Categorical Exemption
2. SCADA System Diagram

Exhibit 1

NOTICE OF EXEMPTION

TO:

County Clerk, County of Nevada
Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959

FROM:

City of Nevada City
City Hall
317 Broad Street
Nevada City, CA 95959

PROJECT TITLE: City of Nevada City Water Storage Tank Improvements

PROJECT LOCATION: City of Nevada City
317 Broad Street
Nevada City (Nevada County), California

PROJECT LOCATION—SPECIFIC Existing water tanks located at Banner Mountain Trail, 201 Providence Mine Road, and 950 Maidu Avenue (Government Center), Nevada City, Nevada County, California.

NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: The City of Nevada City will install altitude valves inside three, existing water tank facilities. The valves will be installed inside the tanks and will more efficiently control the water flow. The project would benefit the citizens of the City, Nevada County, and the general public.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of Nevada City

NAME OF AGENCY CARRYING OUT PROJECT: City of Nevada City

EXEMPT STATUS: CATEGORICAL EXEMPTION, Section 15301, Existing Facilities (h) Maintenance of existing water supply reservoirs.

REASONS WHY PROJECT IS EXEMPT: There will be no impact on the environment as the installation is to existing water tanks.

LEAD AGENCY CONTACT PERSON: William J. Falconi, City Engineer

TELEPHONE NUMBER: (530) 265-2496

SIGNATURE:



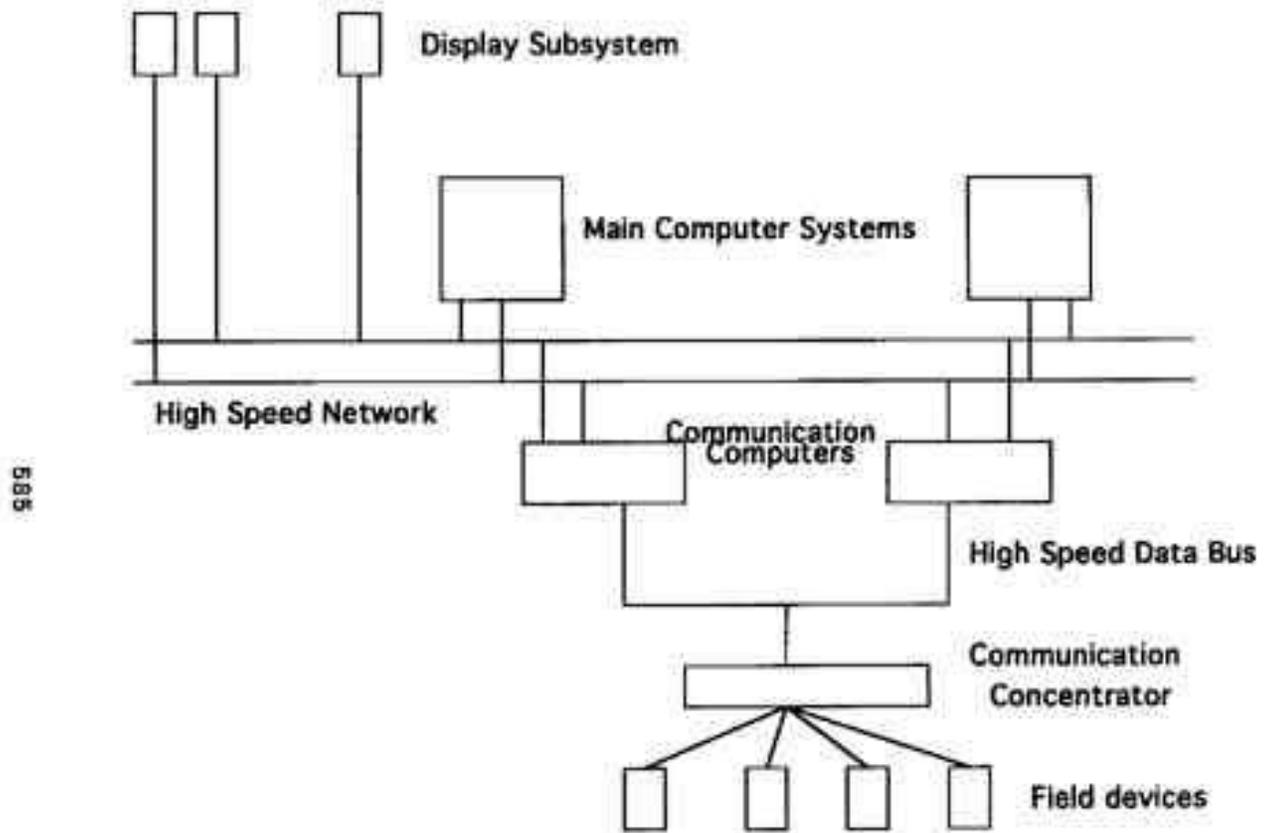
DATE: Jan 2011

TITLE: City Engineer

Exhibit 2

Figure 1

Generalized SCADA system



NEVADA CITY
Leak Detection Program
Infrastructure Reliability, Conservation, and Efficiency Program

OVERVIEW

The City’s water distribution system, much of which dates to the mid to late 1800’s, experiences substantial leaks (15 to 20 percent of total water treated and distributed through the system), many of which go undetected for extended periods of time.

There are a variety of types of leaks which currently occur throughout the City, including service line and valve leaks. However, in most cases, the largest portion of unaccounted-for water is lost through leaks in supply lines. There are many possible causes of leaks, and often a combination of factors leads to their occurrence. The material, composition, age, and joining methods of the City distribution system components have influenced leak occurrence, as have inadequate corrosion protection, aging or functionally obsolete valves, and mechanical damage due to deferred maintenance, geologic and soil characteristics which affect pipeline stability, and other similar attributes. Another related factor is the quality of the initial installation of distribution system components. Water conditions are also a factor, including temperature, velocity, and pressure, as are contact with other structures; and stress from traffic vibrations, frost loads, and freezing soil around a pipe can also contribute to leaks.

The delay in detection time is due to two primary factors: 1) the soils in the area are sufficiently porous that leaks do not immediately surface but, instead, drain through the fractured bedrock; and 2) the inability of the City to correlate metered information and data with projected loss profiles.



An important component of this project is system mapping. Nevada City is currently approximately 65% mapped in SCADA. To enable the City to engage in future planning, to capture the improvements included in the infrastructure projects (see above), and to support ongoing system operations and maintenance, a detailed GIS-based map of the City’s entire water treatment and delivery infrastructure will be prepared. This map will include the locations of all existing and new infrastructure and will be updated as each project component is installed. Particular attention will be given to mapping the locations of individual water meters as a precursor to ongoing focus on and management of the leak detection and repair effort. This map is a necessary precursor to integrating the Water Shortage Contingency Plan with the Capital

Improvement Plan (see below).

In Nevada City, the assumption that all, if not most, leaks rise to the surface and are visible is not a viable assumption – due to the geologic and soils characteristics of the city. Many local leaks continue below the surface for long periods of time and remain undetected. With an aggressive leak detection program, the City will be able to search for and reduce previously undetected leaks. Water lost after treatment and pressurization, but before delivered for the intended use, is water, money, and energy wasted. Accurate location and repair of leaking water pipes in a 100+-year-old supply system will greatly reduce these losses.

Due to their disadvantaged status, the City has been unable to execute a systematic leak detection and repair program, as they have been unable to purchase the necessary equipment. Therefore, the City has been reactive in its leak repair and detection strategy, rather than proactive.

Purchase of leak detection technology will enable the city to institute a systematic program of leak detection and prioritized repair. This task would result in purchase of equipment, training of staff, and an initial increment of detection and repair.

The benefits to the City of minimizing leakage in the water distribution systems include:

- ◆ Improved operational efficiency;
- ◆ Lowered water system operational costs;
- ◆ Reduced potential for contamination;
- ◆ Extended life of facilities;
- ◆ Reduced potential property damage and water system liability; and
- ◆ Reduced water outage events.

Some added benefits of leak detection and repair that are difficult to quantify include:

- ◆ Increased knowledge about the distribution system, which can be used to respond more quickly to emergencies and set priorities for replacement or rehabilitation programs;
- ◆ More efficient use of existing supplies and delayed capacity expansion; and
- ◆ Increased fire-fighting capability.

Preliminary data gathering efforts have shown that the Nevada City is located on Hoda sandy loam soils, which readily absorb water from leaking treated-water lines, typically without any above-ground indications. While the City's metering system allows the agency to observe when water usage trends change, these changes often do not become evident for several months, and some may have been present for years. Once a leak (as evidenced by a change in water usage) is observed, it takes significant labor, survey, and construction costs for the City to identify the actual location of the leak. An additional complication in leak detection is that the utility easements under city streets carry an extensive aggregation of power and communications lines, as well as sewer collection and water distribution lines, further complicating the strategy of "dig until you locate it."

The proposed project will allow the City to identify previously undetected leaks with increased accuracy and decreased labor and materials costs. Using leak survey with a ground microphone and correlators, the City will be able to locate leaks more rapidly and with a much higher degree of accuracy than is currently possible. Because the city is fully developed, there are no surface resources (such as wetlands, creeks, or springs) which will be affected by leak repair. The estimated annual treated water savings associated with this project is 30-75 acre feet per year (1 to 2.5 mgy).

The implementation of this project will have two primary outcomes: 1) reducing water loss, and 2) increased system data. The project will reduce water loss because the equipment will provide the City with an increased ability to detect (and then repair) leaks within a shorter time of occurrence. The project will increase data because the capacity to detect and map leaks will provide additional information on the City water systems, assist in identification of areas of high leak frequency and create a profile (over time) of the specific types of leaks occurring. While leak detection and analysis have been completed in the Sierra previously (within the El Dorado Irrigation District and PCWA service areas), it is seldom, if ever, completed on small urban systems (less than 3,000 acre-feet delivered or less than 3,000 connections). From this project, the suitability of the equipment purchase coupled with systematic training of local staff as a leak detection program on small urban water systems in the Sierra will be assessed and possibly implemented within other service areas with similar challenges of history, topography, and geology.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWVG, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.

- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWVG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

No land purchase or easement confirmation is needed for this project as the improvements will occur within the existing easements and rights-of-way.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Purchase Necessary Equipment and Train City Staff

The City has already evaluated available leak detection equipment and determined the specifications, performance criteria, and brand of equipment which will meet its needs (Exhibit 1).

Task 4.1 Purchase appropriate leak detection equipment

Nevada City has established procedures and protocols for advertising, opening, and evaluating bids for large-scale purchases. These policies and procedures will be used to identify the company selected to for equipment purchase.

Pre-purchase activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to bidder questions (as required), review of submitted materials for completeness, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids.
- ◆ Notes from the pre-bid meeting (if appropriate).
- ◆ Records indicating bid evaluation process.
- ◆ Board meeting notes with contract award records.

Task 4.2 Provide technical training and in-field training on targeted zones within the City

Once the equipment is purchased, the manufacturer will provide direct training to City staff to ensure accurate calibration, use, and documentation of results. The training program will also include in-field activities which will be targeted in the zones of the city which are known (due to metered data and extrapolation) to be experiencing undetected leaks. Leaks detected during this training period will be mapped and prioritized using the criteria developed in Task 5, below. Following this initial training period, staff will implement a detection and repair sequence based on the Leak Detection and Repair Program, as described in Task 5 below.

Deliverables:

- ◆ Leak detection equipment purchased.
- ◆ City staff trained in use of equipment.
- ◆ Preliminary leak detection in targeted zone of city (as part of City staff training activities), with mapping of identified leaks.

Task 5: Develop Leak Prevention, Detection, and Repair Program

The program will include three primary components: prevention, detection, and repair. Concurrent with the purchase and training on the leak detection equipment, the City will engage in the preparation of a Leak Detection, Prevention, and Repair Program. The initial component of the program will be developed using the principles and materials provided by the American Water Works Association (AWWA), particularly the download and use of their AWWA Water Audit Software v.4.0 and the AWA publication "Water Audits and Loss Control Programs." The use of these two resources, in conjunction with the purchased leak detection equipment, will enable the City to significantly increase the sophistication and performance of its leak prevention, detection, and subsequent prioritized repair activities.

Task 5.1: Leak Prevention and Detection

The program will include the following components/considerations: industrial and commercial leak detection and system efficiency requirements, annual distribution system evaluation and leakage total calculations, a general water loss control action plan, strategies for accelerated repair of high-priority leaks, development of criteria for leak prioritization, and evaluation of techniques and methodologies to support proactive leak management (both through detection and through such strategies as pressure management and component analysis).

A description of the software and publication are included as Exhibit 2; however, a brief overview of the two resources is provided below:

Software Capabilities, as stated by AWA: "Although the software is not intended to provide a full and detailed water audit, it allows utilities to quickly compile a preliminary audit in a standardized and transparent manner. The software includes ten worksheets in Microsoft Excel spreadsheet file. Most of the data is entered on the second worksheet, which prompts the user to enter standard water supply information such as supplied water volume, customer consumption, distribution system attributes, and loss quantities. Because many utilities don't typically tabulate all this data, the software allows the user to enter either known or estimated values, then calculates a variety of performance indicators useful for comparisons among utilities... [the software also] includes a "data grading" capability, which provides a basic validation of results... the grading is based upon a scale of 100, and this score can be used as a basic validation for the audit... The auditor can determine the status of the utility's data quality by reviewing the Loss Control Planning Worksheet, which provides planning guidance to the water utility. Utilities with a lower composite grading can focus program efforts on data collection and validation until their overall data quality becomes more reliable. An additional new function is a priority listing of the most important three variables to target to improve the validity of the water audit data."

Water Audits and Loss Control Programs (M36), third edition provides:

- ◆ Step-by-step procedures to conduct a water audit that assesses the efficiency of the water distribution system and water accounting practices;
- ◆ Worksheets and sample calculations for each step of the water audit;

- ◆ Specific techniques to identify, measure, and verify all water consumption and loss;
- ◆ Techniques to identify and control apparent losses in metering and billing operations, and recover missed revenues;
- ◆ Steps to implement a leakage and pressure management program to control real losses, conserve water, and contain costs;
- ◆ Planning steps to assemble the proper resources, information, and equipment to launch a sustained accountability and loss-control program;
- ◆ Approaches for setting short-term and long-term goals and measure return on investment; and
- ◆ Considerations for small water systems.

A critical factor in a leak detection and repair program will be the need for accurate, detailed records that are consistent over time and easy to analyze. Generally, the water system program will emphasize keeping three sets of records: 1) monthly reports on unaccounted-for water; 2) leak repair report forms; and 3) updated maps of the distribution system showing the location, type, and class of each leak.

Utilizing the extensive professional experience of City staff, the additional materials from AWWA, and the support of leak detection experts from within the CABY primary water agencies (particularly PCWA and EID, the City will develop an integrated strategy for operational strategies within the system to reduce overall water loss as well as leaks, timelines and protocols for proactive detection of leaks, a geographic strategy for conducting leak detection and mapping, ongoing evaluation of the benefits or repair over replacement, and the development of specific criteria to prioritize repair of detected leaks, to maximize the limited repair resources of the City.

Task 5.2: Leak Repair

Because the City does not currently have the capacity to detect underground leaks or a program to prioritize leaks as they are discovered, there is not a current list of leak repair locations. Instead, this project would provide a fixed, “not-to-exceed” fund to the City for use in repairing detected and prioritized leaks. The priority ranking of detected leaks for repair would follow a prescribed sequence of tasks to ensure that the highest priority leaks are repaired first and that each and every leak repair effort is fully documented and the costs associated are allocated on a site-specific basis.

The process and forms, as well as the tracking process to support an accountable and documented leak repair program, will be finalized as the initial task of program development. The systems, procedures, and practices associated with the leak repair portion of the program have already been prepared in draft form and will be finalized once the leak prioritization process and materials are completed. These materials include: leak detection report form, prioritized leak repair strategy (including procedures for preparing site-specific drawings or specifications, procedures for notifying contractor and initiating repair (identification of location, severity and characteristics of leak, and methods to refine repair strategies based on field observations and actual leak characteristics), process and forms for Notice to Proceed Work

Order, construction administration requirements, invoicing and cost accounting protocols, and systems, etc.

Deliverables:

- ◆ Leak Detection and Repair Program with criteria for prioritizing leaks and a prioritization of leaks identified during preliminary detection efforts.
- ◆ List of prioritized leaks for repair.
- ◆ Developed strategy for leak prevention and options for system management to reduce water loss due to leaks.
- ◆ Map of identified leaks.
- ◆ Leak repair strategy, both proactive and reactive, using Leak Detection and Repair Program Priorities.

Task 6: Develop Specifications and Procedures for Leak Repair Activities

The City currently uses design specifications and drawings prepared by Nevada Irrigation District to support its system repair and upgrade activities. This strategy will continue. However, the City will prepare a manual that is specific to leak detection and will utilize this manual to guide solicitations of bids for repair activities. A consulting engineer will assist the City is updating and augmenting the available NID specifications to ensure that the majority of repair activities will be able to use existing drawings and specifications, thereby increasing the rapidity of response to individual leaks. The specifications will be prepared based on the detailed experience of the City’s engineer as to the likely types of leaks that will be encountered during repair activities.

Deliverables:

- ◆ Manual of specifications for use in implementing the leak repair program.

Environmental Documentation

It is anticipated that the project will involve minor modifications to existing facilities which meets the CEQA requirements for a categorical exemption.

Permitting

No permits are required to implement the leak detection program in Nevada City.

Budget Category (d): Construction/Implementation

Task 7: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

The City has established procedures and protocols for advertising, opening, and evaluating bids for construction services, as well as for awarding and developing contracts with construction companies. These policies and procedures will be used to identify the construction company which will complete the leak repairs. It is anticipated that the City may advertise for and contract with a contractor who will be “on call” to the City and who will respond to leaks as they are prioritized by the City, if Department of Public Works staff are not available for the project. This approach will greatly

expedite the repair response time as it will not require a separate bid process for each leak repair effort.

Pre-construction activities include, but are not limited to: developing technical specifications to support publication of the bid materials, a pre-bid meeting to respond to contractor questions (as required), review of submitted materials for completeness and qualifications/ experience, and award of the contract in accordance with the applicable Public Contract Codes.

Deliverables:

- ◆ Advertisement for bids.
- ◆ Notes from the pre-bid contractors meeting (if appropriate).
- ◆ Records indicating bid evaluation process.
- ◆ Board meeting notes with contract award records.

Task 8: Mobilization and Site Preparation

Mobilization and site preparation will vary from leak to leak but will generally consist of designating and preparing (as necessary) a staging area, removing pavement and excavating sufficient material to uncover and confirm leak dimensions and characteristics, finalization of repair specifications, determining any traffic control requirements.

Deliverables:

- ◆ Prepared repair site.
- ◆ Identified method of repair for each individual repair effort.

Task 9: Project Construction - Repair of High Priority Detected Leaks

As stated above, the City does not yet have the capacity to identify locations of leaks, nor do they currently have a prioritized list of leaks. The activities in Tasks 4 and 5, above, will result in the identification, mapping, and prioritization of leaks, in addition to the development of materials necessary to support an engineered response to leak repairs, while Task 6 will develop all of the administrative support systems necessary to manage a “not-to-exceed” construction process such as the leak repair program. The project will result in the repair of an as yet unknown number, but fully documented and accounted for set of leaks within the City service area. All repairs will be accomplished using the established standards and specifications already in use by Nevada City. The City has determined that in many instances, due to the age of many of the system lines and fittings, complete replacement rather than repair is often the most cost efficient option. In situations where replacement is the most effective and cost efficient option, line or main replacement will be accomplished to existing City standards and specifications. Each repaired leak will have a documentation report substantiating the leak location, a prioritization evaluation to determine the sequence of leak repair, a negotiated work order, a fully documented cost expenditure report (time, materials) and a Notice of Repaired Leak certification (signed by both the contractor and the City engineer).

Deliverables:

- ◆ A record of all leaks detected, including location, date located, approximate size of leak, and where it is in the priority for repair.
- ◆ Data detailing the cost/benefit analysis and ratio for each leak.
- ◆ Leak repair report template.
- ◆ Repair of high priority detected leaks.
- ◆ A leak repair report for every leak repaired.
- ◆ Spreadsheet listing all leaks repaired, including date, cost, and type of repair.

Task 10: Performance Testing and Demobilization

Performance testing and demobilization activities will involve testing of system pressure and running bacteriological testing of the installed line, return of the staging areas to pre-project conditions, removal of all excavated pipe and materials, and removal of any street/traffic management signage or materials.

Deliverables:

- ◆ Constructed infrastructure improvements.
- ◆ Monitor post-installation system performance, including results from bacteriological and system pressure tests.
- ◆ “As-built” construction drawings, specifications, and documentation.
- ◆ Updated GIS system database.
- ◆ Post-project Demobilization Inspection Report (prior to final contractor payment).

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

Environmental Compliance

This project is anticipated to be categorically exempt, and therefore will not require associated environmental compliance or mitigation measures to be implemented. Because Nevada City cannot know for sure the leaks that will be discovered in the system, if any environmental compliance is found to be necessary for leak repair, it will be completed at that time.

Budget Category (f): Construction Administration

Task 11: Direct Construction Administration

Senior City staff will serve as construction managers for the process, as they have for similar projects successfully completed by the City. Supervision activities will include: on-site observations and inspections, inspection of materials prior to installation, conducting construction progress meetings as required, review of project status (percent complete versus percent spent), and in-field problem solving during construction in response to unexpected field or system conditions.

Deliverables:

- ◆ Schedule of values, meeting minutes, inspection reports, 11- month warranty inspection report.

Budget Category (g): Other

Task 12: Develop and Maintain CABY Project-specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Project webpage hosted on CABY website, updated with all current project information.

Task 13: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. The CABY technical committee will evaluate project-related data to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Task 14: Compile Electronic GIS Database of Water System Infrastructure

This task will involve a review of existing data, drawings and maps and consolidating and organizing the existing data as needed. GIS equipment will be purchased that is compatible with existing Nevada City Autocad files so it can be converted to ArcView and vice-versa, as needed. This task will also collect GPS data of basic water system infrastructure such as distribution lines and water treatment facility using ArcPad software. Data will be manipulated and digitized to create a comprehensive database of the existing infrastructure. The database/maps will be field-verified and updated, as necessary.

Deliverables:

- ◆ Final list of technical needs and requirements for system leak detection.
- ◆ System specs and RFP.
- ◆ Equipment purchase contract.
- ◆ Staff training records and meeting notes.

Budget Category (h): Construction /Implementation Contingency

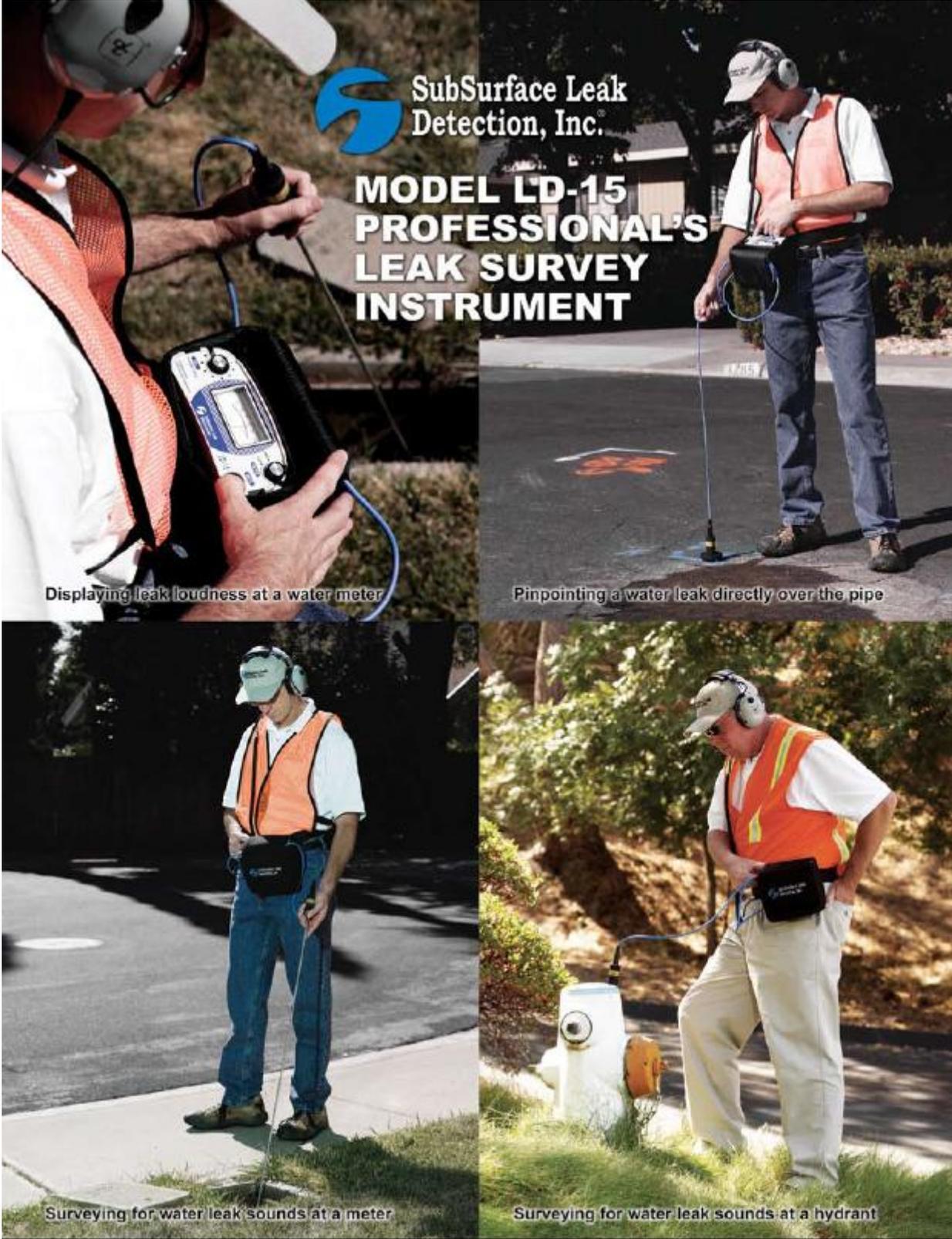
A 15 percent standard contingency is included in the budget and it is calculated based on industry norms.

NEVADA CITY
Leak Detection Program
Infrastructure Reliability, Conservation, and Efficiency Program

EXHIBITS

1. Leak detection equipment information
2. AWWA Water Audit Software details
3. Annual Leak Detection and Repair Project Summary Form
4. Hand-held GPS product description
5. ArcView description

Exhibit 1



LD-15 PROFESSIONAL'S LEAK SURVEY INSTRUMENT



Standard Items

- ① Amplifier with Meter Display and Filter Controls
- ② Padded Case and Standard Belt (40 inches)
- ③ High Sensitivity Sensor and Cable
- ④ Base Plate for Listening on Street Surfaces
- ⑤ Aviation-Grade Stereo Headphones
- ⑥ Heavy-Duty ABS Plastic Carrying Case

Optional Accessories

- ⑦ 40 inches Long Contact Rod (not shown)
- ⑧ 60 inches Long Contact Rod (not shown)
- ⑨ Large Size Belt (50 inches)
- ⑩ Extra Large Size Belt (60 inches)

Features

- High sensitivity sensor with Neodymium magnet (extra strong). Sensor and cable connection completely sealed and water-proof (submersible).
- Amplifier with superior audio quality (very low distortion and superior signal-to-noise ratio) and large meter display. Press the Mute Switch to hear sounds when you are ready.
- "Survey" for water leaks by listening at hydrants and valves with the sensor and magnet. Survey at water meters with a Long Contact Rod (optional).
- "Pinpoint" water leaks in pipes under asphalt or concrete with the base plate attached to the sensor and magnet.
- Use the High filter range for water leak surveying. Use the Low filter range for water leak pinpointing. High frequency leak sounds travel on the pipes, but only low frequencies pass through the soil.



LD-15 sensor with base plate

Specifications

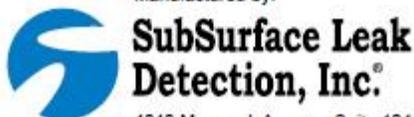
Amplifier

- Amplification : 56 dB
- Filter Ranges : 1) High Range
30 Hz to 5000 Hz
2) Low Range
30 Hz to 800 Hz
3) Notch Filter
150 Hz, 180 Hz
- Power : 4 C dry cell batteries
- Battery Life : 80 hours with alkaline batteries at 68 degrees F
- Weight : 31 ounces (including 4 C batteries)
- Size : 6.4" x 3.0" x 5.7"
(163mm x 76mm x 144mm)

Sensor

- Sensitivity : 10 V/g
- Resonance Frequency : 950 Hz (±150 Hz)
- Weather Protection : IP68 or equivalent
(3 ft under water for 3 hours)
- Cable Length : 9.75 ft

Manufactured by:



**SubSurface Leak
Detection, Inc.®**

4040 Moorpark Avenue, Suite 104
San Jose, CA 95117
(408) 249-4673 (Phone), (408) 249-9653 (Fax)
www.subsurfaceleak.com

Distributed by:

Exhibit 2

Product Detail

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[Bookstore Home](#)

[Product Detail](#)

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M36 WATER AUDITS AND LOSS CONTROL PROGRAMS, THIRD EDITION

List Price: \$119.00
Member Price: \$75.00

In Stock

Qty: 1

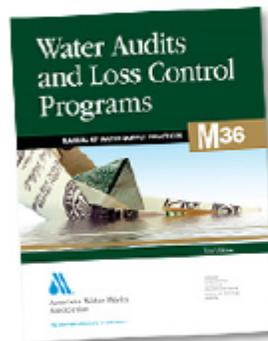
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Need it now? Download it.

AWWA manual M36 provides complete operating guidance on water audits, leak detection, and water loss control programs for drinking water systems.

The third edition is significantly expanded with important new information has been added on a major advancement in water-auditing methodology. Codeveloped by the American Water Works Association and the International Water Association, the method provides true accountability of real losses (leaks) and apparent losses (billing errors, meter inaccuracy), so water utilities may quickly recover lost revenue. Additionally, all chapters have been updated.



Water Audits and Loss Control Programs (M36), third edition provides

- Step-by-step procedures to conduct a water audit that assesses the efficiency of the water distribution system and water accounting practices
- Worksheets and sample calculations for each step of the water audit
- Specific techniques to identify, measure, and verify all water consumption and loss
- Techniques to identify and control apparent losses in metering and billing operations, and recover missed revenues
- Steps to implement a leakage and pressure management program to control real losses, conserve water, and contain costs
- Planning steps to assemble the proper resources, information, and equipment to launch a sustained accountability and loss-control program
- Approaches for setting short-term and long-term goals and measure return on investment
- Considerations for small water systems

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Published By American Water Works Association
Edition: 2009 - Softbound - 285 pp.
ISBN 978-1-58321-631-6 - Catalog No. 30036

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Hydro Gate



Flap Gates



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TECHNOLOGY & PRACTICE

Free AWWA software makes water audits quick and easy

The [AWWA Water Loss Control Committee’s Water Audit Software v.4.0](#) is now [available for free download](#), boasting some big new features.

Although the software is not intended to provide a full and detailed water audit, it allows utilities to quickly compile a preliminary audit in the standardized and transparent manner advocated by AWWA, its creators say.

The software includes ten worksheets in Microsoft Excel spreadsheet file. Most of the data is entered on the second worksheet, which prompts the user to enter standard water supply information such as supplied water volume, customer consumption, distribution system attributes and loss quantities. Because many utilities don’t typically tabulate all this data, the software allows the user to enter either known or estimated values, then calculates a variety of performance indicators useful for comparisons among utilities.

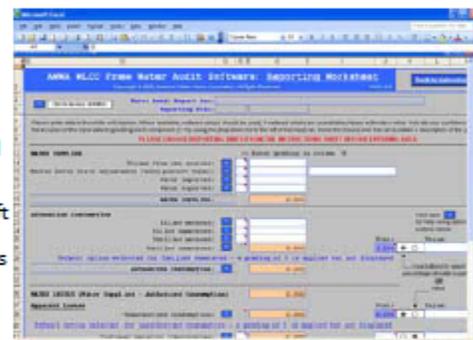
The biggest new feature of Version 4.0 is its “data grading” capability, which provides a basic validation of results. The user can assign a grading value, ranging from 1 to 10, to each piece of information he or she inputs. A 10 represents highly reliable, well validated data, while a grade of 1 reflects very crude data, such as rough estimates. Once all the grading cells have been filled in, a composite grading score is calculated and displayed at the bottom of the worksheet. The grading is based upon a scale of 100, and this score can be used as a basic validation for the audit.

The auditor can determine the status of the utility’s data quality by reviewing the Loss Control Planning Worksheet, which provides planning guidance to the water utility. Utilities with a lower composite grading can focus program efforts on data collection and validation until their overall data quality becomes more reliable.

An additional new function is a priority listing of the most important three variables to target to improve the validity of the water audit data.

The AWWA Water Loss Control Committee’s [Free Water Audit Software Version 4.0](#) is available for download from AWWA’s new Water Loss Control Web pages on AWWA’s [WaterWiser](#) site.

Posted: 05/12/2009



Version 4.0 of AWWA’s free Water Audit Software allows utilities to see which of their data collection efforts need improvement.

Exhibit 3

| ANNUAL LEAK DETECTION AND REPAIR PROJECT SUMMARY | | | | | | | | | | |
|---|--|-------------------------|----------------------|--|-----------------------------|---------|--|-------|--|--|
| | | | | | | | | Year: | | |
| Agency: Placer County Water Agency | | | | | | | | | | |
| Report Prepared By: | | | | | | | | | | |
| | | | | | | | | | | |
| LEAK DETECTION SURVEY | | | | | | | | | | |
| Total Number of Days Leak Surveys Were Conducted: | | | | | | | | | | |
| First Survey Date: | | | | | Last Survey Date: | | | | | |
| | | | | | | | | | | |
| Number of Suspected Leaks: | | | | | Number of Pinpointed Leaks: | | | | | |
| | | | | | | | | | | |
| Survey Time: | | Hours | | | | | | | | |
| Pinpointing Time: | | Hours | | | | | | | | |
| | | | | | | | | | | |
| Total number of visible leaks reported from other sources (not discovered during leak detection survey) | | | | | | | | | | |
| | | | | | | | | | | |
| LEAK REPAIR SUMMARY | | | | | | | | | | |
| First leak repair made: | | | | | Last leak repair made: | | | | | |
| Number of Repairs | | Number of Repairs | | | Total Number of | | | | | |
| Needing Excavation: | | Not Needing Excavation: | | | Repaired Leaks: | | | | | |
| Total Water Losses | | Total Water Losses from | | | Total Water | | | | | |
| From Excavated Leaks: | | gpm | Non-Excavated Leaks: | | gpm | Losses: | | gpm | | |
| | | | | | | | | | | |
| Excavated Leak | | Nonexcavated Leak | | | Total | | | | | |
| Repair Costs | | Repair Costs | | | Repair Costs | | | | | |
| Materials | | Materials | | | Materials | | | | | |
| Labor | | Labor | | | Labor | | | | | |
| Equipment | | Equipment | | | Equipment | | | | | |
| Other | | Other | | | Other | | | | | |
| Subtotal | | Subtotal | | | Total | | | | | |

Exhibit 4

NAUTIZ X7

Ahead of the curve

The Nautiz X7 exemplifies the evolution of handheld computers. Packed with innovative advancements in PDA technology, it surpasses everything else on the market with its mix of power, functionality and ruggedness. The Nautiz X7 can do everything you need to do – and some things you may not have even known you could do.

Performance begins with speed and power, and the Nautiz X7 offers a lively 806 MHz Xscale processor with 128 MB of onboard RAM and a generous 4 GB of Flash storage. And this field-ready workhorse will go all day and more with a 5600 mAh Li-ion battery that will operate up to 12 hours on a single charge. No other PDA provides more storage or longer standard battery life.

The Nautiz X7 also delivers an unprecedented package of capability. It starts with integrated SIRF Star III GPS, Bluetooth 2.0 and 802.11b/g WLAN functionality, plus a built-in 3-megapixel camera with autofocus and an LED flash. And the Nautiz X7 goes above and beyond with innovations such as 3G capability for GSM/UMTS phone and data transmission, an integrated compass and altimeter, and even a g-sensor/accelerometer that can measure speed, vibration and rotation, opening the door to countless application possibilities. The Windows Mobile 6.1 operating system, 3.5-inch VGA touchscreen display and numeric keypad make this handheld as easy to operate as it is groundbreaking.

Of course, a tool with all these features won't do much good if it isn't built tough enough to take virtually anywhere. With an IP67 rating that's unsurpassed among handheld computers, the rugged Nautiz X7 is impervious to both dust and water, and it can withstand repeated drops, vibration, and operating temperatures from -22 °F to 140 °F. It weighs in at just 17 ounces, and it's compact enough to operate in one hand.

With a combination of features and rugged performance you can't find in any other handheld, the Nautiz X7 is leading the way in mobile computing.

www.nautiz.com

| | |
|-----------------------------------|---|
| Size | 7" (179 mm) x 3.8" (97 mm) x 1.5" (37 mm) |
| Weight | 17 ounces (490 g) including rechargeable battery |
| Environment | |
| Operating: | -22 °F to 140 °F (-30 °C to 60 °C) MIL-STD 810G, Method 501.4, Procedure II, Method 502.4, Procedure I, II & III |
| Storage Temp Shock Drop: | -40 °F to 158 °F (-40 °C to 70 °C) MIL-STD-810G, Method 503.4, Procedure I (-40 °F/158 °F) 26 drops from 4 ft (1.22 m) 6 additional drops at -22°F (-30 °C), 6 additional drops at 140 °F (60 °C) |
| Vibration Sand & Dust: | MIL-STD-810G, Method 514.5 Procedure I IP67, IEC-529 Dust: MIL-STD-810G, Method 516.5, Procedure IV |
| Water: | IP67, IEC 529 MIL-STD-810G, Method 512.4, Procedure I, Water Jet 12.5 mm dia. @ 2.5 – 3m, 100 Liter/min. |
| Humidity: | MIL-STD-810G, Method 507.4, 90% RH temp cycle 30–60 °C |
| Altitude: | 15,000 ft (4572 m), MIL-STD-810G, Method 500.4, Procedures I, II & III |
| Processor/memory | Processor: Marvell PXA310 806 MHz Memory: 128 MB SDRAM |
| Data Storage | 4 GB INAND Flash |
| Operating System | Microsoft Windows® Mobile 6.1 Classic (NOK-8) Microsoft Windows® Mobile 6.1 Professional (NOK-W) |
| Screen | 480x640 pixel Anti-glare 3.5" VGA resolution, touchscreen, sunlight readable 262K colors (18 bit), TMR Technology with LED backlight |
| Keypad | Numeric keypad with backlighting, on-screen QWERTY keyboard |
| Battery | 5600 mAh Li-ion battery pack |
| Connections | 1 x USB host and client (Mini AB USB OTG, 1.2 host, 2.0 client) Power jack 1 x SDIO slot 9-pin serial RS-232 connector |
| Communication | PAN: Bluetooth 2.0 + EDR WLAN: Integrated 802.11 b/g GSM/UMTS (HSDPA/EDGE) Integrated speaker & microphone with noise cancellation |
| Navigation | Integrated GPS SIRF Star III chipset with WAAS/EGNOS support Integrated E-Compass and G-Sensor Integrated Altimeter |
| Camera | Integrated 3 megapixel camera with autofocus and LED Flash |
| Barcode Scanner | Integrated laser 1D barcode scanner Optional 2D Imager |
| Options | <ul style="list-style-type: none"> • RFID • Barcode scanner • Kenaz DGPS |

HHCS Handheld USA, Inc. (Handheld US) is a North American supplier of rugged PDAs and handheld computers. Handheld US and its partners deliver complete mobility solutions to businesses in industries such as logistics, forestry, public transportation, construction, military, and security. Handheld US is a subsidiary of Handheld Group AB in Sweden.

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Info@handheld-us.com
www.handheld-us.com

Exhibit 5

ArcView is geographic information system (GIS) software for visualizing, managing, creating, and analyzing geographic data. Using ArcView, you can understand the geographic context of your data, allowing you to see relationships and identify patterns in new ways.

With ArcView, you can

- **Author maps** and interact with your data by generating **reports** and **charts** and printing and embedding your maps in other documents and applications.
- **Save time** using map **templates** to create consistent style in your maps.
- Build process models, scripts, and workflows to **visualize** and **analyze** your data.
- Read, import, and manage more than **70 different data types** and formats including demographics, facilities, CAD drawings, imagery, Web services, multimedia, and metadata.
- **Communicate** more efficiently by printing, publishing, and **sharing** your GIS data and dynamic content with others.
- Use tools such as Find, Identify, Measure, and Hyperlink to **discover information** not available when working with static paper maps.
- Make better decisions and **solve problems** faster.

ArcPad is mobile field mapping and data collection software designed for GIS professionals. It includes advanced GIS and GPS capabilities for capturing, editing, and displaying geographic information quickly and efficiently. Critical data can be checked in and out of a multi-user or personal geodatabase and shared across your organization.

ArcPad is part of an enterprise GIS solution and integrates directly with ArcGIS Desktop and ArcGIS Server.

With ArcPad, You Can

- Perform reliable field data collection and inspection projects.
- Share enterprise data for rapid decision making.
- Integrate external GPS, range finders, and digital cameras.
- Increase the accuracy and validity of your GIS database.
- Improve the productivity of your field staff.

SYSTEM REQUIREMENTS

ArcPad is supported on the following platforms:

Mobile Devices

- Windows Mobile 5.0
- Windows Mobile 6.0
- Windows Mobile 6.1
- Windows Mobile 6.5

PC Intel

- Windows Vista
- Windows XP
- Windows 7

NEVADA CITY
Installation of Water Meters on City Facilities
Infrastructure Reliability, Conservation, and Efficiency Program



OVERVIEW

Nevada City became fully metered in 1979. However, at the time of meter installation, the focus was on residential and commercial meters. Meters were never installed on several of the City facilities and City-owned properties. These currently unmetered locations include:

- ◆ Pioneer Park: 425 Nimrod Street
- ◆ Calanan Park: 200 Broad Street
- ◆ City Hall: 317 Broad Street
- ◆ Firehouse 1: 214 Main Street
- ◆ Firehouse 2: 422 Broad Street
- ◆ Assay Office: 130 & 132 Main Street
- ◆ Robinson Plaza: 130 Main Street
 - ◇ (Includes public bathrooms)
- ◆ Corporation Yard: 255 Boulder Street
- ◆ Old Corporation Yard: 775 Zion Street
 - ◇ (Includes a building rented to a plumbing supply company)
- ◆ Commercial Street Parking Lot: 412 Commercial Street
 - ◇ (Includes a building rented to community organization, public bathrooms, and landscaping)

The City has procured the meters , but has not had the resources to install them on the aforementioned properties. Through the Nevada City Integrated Water Shortage Contingency, Drought Preparedness, and Comprehensive Water Conservation Planning Program, a variety of conservation opportunities will be developed with respect to water consumption, irrigation

efficiency, and other similar means that the City will want to implement. The City will then be able to monitor the effectiveness of the installed improvements and/or strategies.



WORK PLAN TASKS

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The objective of this task is to keep the project on time and within budget, keep all participants informed of project progress and status of deliverables, establish and maintain reliable and accurate billing and recordkeeping, ensure that all requirements of the agreement with the DWR are met, and generally ensure smooth project implementation. The tasks for this budget category will comprise all non-construction project administration activities performed by Nevada City and CABY staff throughout the duration of the project and will include: development and completion of contractual paperwork, maintenance and reporting of expense documentation, oversight of project scheduling and contract/agreement compliance, preparation of monthly invoices, and completion of the final invoice.

Deliverables:

- ◆ Preparation of invoices and other deliverables as required.
- ◆ Accurate and accessible records

Task 2: Labor Compliance Program

The City will enter into a contract with North Valley Labor Compliance Services (Identification #2005.00466) to provide labor compliance consulting services for all Proposal project sponsors and relevant projects. The provided services are itemized in detail in the Introduction to the CABY Program.

Deliverables:

- ◆ Adherence to requirements of Labor Code Compliance Program including, but not limited to: review of certified payroll records, site monitoring, receipt of claims/complaints by workers, investigation of irregularities or claims, post-compliant audits (if necessary), reporting to DWR via the CABY monthly status reports, and any required withholding of contract payments.

Task 3: Reporting

The tasks for this budget category will include all activities necessary to support quarterly reporting, monthly invoicing and associated status reports, quarterly status reporting to the Nevada City Council (as project applicant) and the CABY IRWMP-RWVG, and submittal of the final report. These activities will include: tracking of the specific status of each project task, documentation of task status in an easy-to-understand and track format, creation of quarterly financial reports for the project (including percent complete of project activities), and preparation of all necessary reports (including the final report) per the format stipulated in the DWR Grant Agreement.

Deliverables:

- ◆ Submission of quarterly, annual, and final reports as specified in the Grant Agreement.
- ◆ Submission of quarterly reports to Nevada City and to the CABY-RWVG to enable their tracking of project status.

Budget Category (b): Land Purchase/Easement

The project does not require the purchase of land or the negotiation of an easement.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Task 4: Develop Meter Installation Plan

Prior to meter installation, the City engineers will consider the existing water distribution system facility locations to confirm the suitability of the previously identified meter installation site. Based on this final evaluation, the metering sites will be confirmed and a pre-installation meter plan will be prepared by staff to direct installation activities.

Deliverables:

- ◆ City facilities evaluated.
- ◆ Evaluate current water distribution systems and appropriate meter locations at City facilities.

Environmental Documentation

No environmental documentation is necessary for this project.

Permitting

No permits are required to implement the placement of meters on City facilities program.

Budget Category (d): Construction/Implementation

Task 5: Pre-Construction Contracting - Request for Proposal through Notice to Proceed

City staff has determined that there will be no need to contract out installation of the meters. However, the same materials that would otherwise be used for this task will be developed internally for use as a template to guide installation.

Deliverables:

- ◆ Advertisement for bids; pre-bid contractors meeting; evaluation of bids; award contract; and final negotiated contract.

Task 6: Mobilization and Site Preparation

City staff has the necessary equipment and expertise to install the available meters. However, they have not had sufficient funds to support this relatively simple process. In each case, the location for meter installation has already been identified and flagged. Therefore, site preparation will simply consist of exposing the pipe where the meter is to be installed.

Deliverables:

- ◆ Preparation of each individual meter location

Task 7: Project Construction -- Installation

City staff has installed meters in the past, and has determined that connecting the meter to the distribution line requires a standard level of effort.

Deliverables:

- ◆ Installation of 10 water meters

Task 8: Performance Testing and Demobilization

City staff will return the construction area to pre-project conditions. The meter locations were specifically selected to ensure minimal site disturbance. Therefore, demobilization will occur concurrently with the completion of construction.

Deliverables:

- ◆ Post-construction performance testing .
- ◆ “As-built” construction drawings, specifications, and documentation.
- ◆ Updated GIS system database.
- ◆ Post-project Demobilization Inspection Report (prior to final contractor payment).

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

N/A

Budget Category (f): Construction Administration

Task 9: Direct Construction Administration

The City expects to expend four hours in construction administration to support installation of the water meters.

Deliverables:

- ◆ Management oversight during installation of meters

Budget Category (g): Other

Task 10: Develop and Maintain CABY Project-specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status updates, and other similar materials will be posted or linked to this webpage. The webpages will be designed and brought online (activated within the first month after contract agreement). The page will be updated monthly.

Deliverables:

- ◆ Project webpage hosted on CABY website, updated with all current project information.

Task 11: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state databases as well as CABY members and the interested public using data management and monitoring deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). In this case, the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not. Data will be made available to all CABY members and the general public through the existing CABY SWIM Database. Material will be uploaded as it becomes available, however most of the data will be posted upon completion of the primary project activities. The CABY technical committee will evaluate project-related data to determine its appropriateness for upload to relevant state databases.

Deliverables:

- ◆ Development, activation, and maintenance of project-specific webpage within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69–72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Post-project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69-72, developed in response to the IRWM Program Data Management Guidelines/August 2010, pages 22 and 56-57).

Nevada City

Integrated Water Shortage Contingency, Drought Preparedness, and Comprehensive Water Conservation Planning Program

As discussed in the introduction and sponsor description, Nevada City is a small community in Nevada County with aging infrastructure dating from the gold rush. This infrastructure, in many cases, is functionally obsolete.

Integrated Water Shortage Contingency and Conservation Planning

Residents of the Sierra Nevada generally depend on surface water from the watersheds of the mountain range for their water supply. Typically, precipitation in the form of snow is the primary source of water, as the Sierra snowpack serves as natural storage for most of the region's annual precipitation. The Sierra watersheds experience wide variations in annual precipitation and therefore in annual water supply. The region has experienced significant droughts in the past and climate change predictions indicate a potential for wide variability in the future. Population growth in the region will serve to amplify the severity of drought impacts. Without careful planning, small, rural, and disadvantaged water purveyors will be unable to respond to future precipitation variability.



Strategic use of conservation can help extend the value and life of infrastructure assets used in water supply (and wastewater treatment), while also extending the beneficial investment of public and ratepayer funds. Small and disadvantaged water systems can benefit from efficiency and conservation as well as larger systems. In fact, the potential for eliminating, downsizing, or postponing capital improvement projects through strategic supply and demand management may be more important for smaller systems given their unique financial and capacity constraints. At the same time, small systems' ability to devote resources to conservation and efficiency planning may be limited. The demand management component of this project is essential for allowing Nevada City the flexibility necessary to deal with realities of climate change and water supply constraints.

The Integrated Water Shortage Contingency and Conservation Plan components include:

- 1) preparation of water shortage action plans with prioritized actions and clear implementation strategies, 2) integrating water shortage preparedness with capital improvement planning, and 3) enhancing customer conservation options and behavior. It is the goal of the project management team that the planning activities will be nested, and seek to provide Nevada City

with the capacity to use adaptive management strategies for future water-year scenarios. That is, the Customer Water Use Efficiency Plan, wherein customers work with water agency staff and the project management team to identify best practices to emphasize in the community into the future, will feed priorities into the Water Shortage Contingency Plan. The Water Shortage Contingency Plan, wherein City priorities for managing water scarcity from climate- or infrastructure-induced shortages are identified and described, will feed into the Capital Improvement Plan (CIP). The CIP is the document that will examine the multi-year, higher-cost projects for water supply management.

The integrated nature of these plans emphasize conservation, customer involvement, reducing vulnerability to climate change, and providing clear and prioritized steps to mitigate the impacts of drought. Successful conservation efforts can also curb peak system demand, deferring the need for construction of new treatment, storage, and conveyance facilities, as well as reducing energy costs and usage and wastewater infrastructure demands, allowing districts to focus on replacement or rehabilitation of older existing infrastructure. System mapping represents an essential precursor to integrating this Water Shortage Contingency Plan with the Capital Improvement Plan (see below). Mapping is further discussed in the Leak Detection work plan for Nevada City.

Water Shortage Contingency Plan

In 2007, El Dorado County Water Agency (EDCWA) facilitated the coordinated preparation of drought action plans for the several water agencies within their service area, including Grizzly Flats Community Services District (GFCSD). In Phase I, the drought action plans evaluated the needs and objectives of each agency, reviewed the drought history over the last hundred years, projected future climate change vulnerabilities, and assessed future water supply and demand scenarios. In Phase II, and using stakeholder input, a drought plan based on the Phase I activities was developed. The drought plan included drought indicators and trigger levels, drought response, drought impact avoidance measures, and specific activities associated with plan implementation. Because this action plan was prepared with a specific focus on a small, rural, and relatively low-income community, the methodology, approach, and plan are relevant to similar jurisdictions across the CABY region. The 2006 Grizzly Flats CSD Drought Action Plan will serve as a model and template for the preparation of a similar action plan for Nevada City. In addition, PCWA has also prepared a drought response plan for its service area, of which Alta and Colfax are a part. The methodologies and approaches used by PCWA that would augment the breadth, depth, or quality of the Nevada City Water Shortage Contingency Plan (Plan) will be integrated as appropriate.

The Plan is intended to address multiple objectives:

1. Defining a common understanding of drought susceptibility, monitoring, communication, response, and opportunities for drought avoidance;
2. Informing future drought planning through consideration of most recent water demand projections, water conservation efforts, diverse public outreach, and the potential impacts of climate change;
3. Defining drought indicators and trigger levels that declare droughts accurately and proactively;

4. Defining water demand curtailments that can reasonably be accomplished in drought conditions, are financially sustainable, administratively appropriate, and user-friendly, which will perform equitably for all customers and stakeholders; and
5. Providing a framework for drought plan implementation that focuses continuing efforts on activities that will monitor for the onset of drought, minimize drought impact on customers, and implement projects and other measures to reduce the need to declare drought.

During the preparation of the Grizzly Flats CSD Drought Action Plan, extensive interaction with El Dorado Irrigation District (EID), a larger water utility in the same area, served to ensure that future system needs and water supply availability was thoroughly examined. Similarly, NID provides water to both Nevada City and Washington County Water District through an extensive network of raw and treated water delivery systems. For this reason, NID will be an important participant in the development of the water shortage contingency plans. See Attachment A for a sample table of contents and set of drought recommendations from the Grizzly Flat CSD Drought Action Plan.

Capital Improvement Plan

Nevada City currently has a very short-term, limited Capital Improvement Plan (CIP). It has limited capability to develop and update a future CIP due to insufficient organizational capacity. One of the collateral benefits of the CABY outreach process was the development by Nevada City of a list of all of the projects contained in the infrastructure efficiency component of the work plan (above). This helped in identifying the need for creating an expanded City CIP, refined in the context of the Water Shortage Contingency Plan. Augmenting the traditional CIP strategy of addressing improvements as they relate to efficiency and system aging, with anticipation of future water shortage-related system impacts, will enable Nevada City to proactively plan for dry water years. As a result of the Phase I needs assessment and evaluation, Nevada City will develop its CIP to include specific elements aimed at creating maximum flexibility during periods of low water availability. This may result in the identification of conservation-related infrastructure or updating/upgrading existing infrastructure to accommodate periods of low flow.

Annual updates to Nevada City's CIP will occur with staff input, and based on the success of this project.

Customer Water Use Efficiency Initiative

Though it is not an Urban Water District, the Nevada City Council has determined that meeting the 20% \times 2020 goals, as well as those articulated in AB 1420 (demand management measures corresponding with the Best Management Practices (BMPs) in the CUWCC) is a desirable and appropriate goal for the City, within its fiscal constraints. To achieve this goal, the City has determined that the preparation of a Water Use Efficiency Plan is a critical activity. The Customer Water Use Efficiency Initiative (Initiative) will include public outreach, education and workshop activities, distribution of retrofit kits, and preparation of an action plan to guide implementation of ongoing conservation activities.

Public Outreach

The Capital Improvement Plans (above) will focus on creating a nexus between conservation, drought response, and infrastructure planning. The Conservation Plans will focus on demand management by reducing water consumption through education and outreach in the local communities. The California Urban Water Conservation Council (CUWCC) foundational Best Management Practices (BMPs), while designed for implementation by urban water providers, provide reasonable targets for smaller jurisdictions based on their individual context and resources. The goal of this program would be to reduce water consumption on a per capita basis through the provision of information shared with the public to encourage the conservation of the shared resource as a habit, as well as in response to identified drought stages (as defined in the drought action plan above). Effective conservation outreach efforts focus on bridging the gap between thought and action to induce adoption of new behaviors. The American Water Works Association has produced an excellent *Water Conservation Communications Guide* to help water agencies in communicating the conservation message with customers. It is available online:

(<http://www.awwa.org/Resources/Waterwiser.cfm?ItemNumber=55474&navItemNumber=55644>), along with print resources for mailing information, news article writing, and examples of other successful programs around the nation (AWWA, 2010). See Exhibit 1.

This task will include, at a minimum, the dispersal of print materials in customer bills, available at grocery stores and other high-traffic community gathering places, and the production and dispersal of at least two news releases on the Nevada City water conservation effort.

Education and Workshop Activities

A series of workshops will be provided to the customers of Nevada City. These workshops will include topics such as irrigation efficiency, options for water conservation in the home, and the proper maintenance and installation of distributed plumbing fixtures. Options such as turf removal, car and driveway washing disincentives, use of smart irrigation controllers, and general options for conservation will all be considered as part of the local outreach. The AWWA has developed an extensive set of materials in support of conservation. These materials, in the *Water Conservation Communication Guide* (AWWA, 2010), will be used in support of a concerted outreach campaign.

NID has delivered irrigation efficiency workshops throughout their service area since 2008. These materials will be refined to respond to the needs of the Nevada City service area and customers. The goal of this consumer outreach is to measurably reduce summer irrigation water use and year-round residential water consumption through a series of at least three irrigation and indoor water use efficiency workshops, as well as the offering of lectures, customer-focused Board meetings, and the involvement of customers in planning water use efficiency activities.

Distribution of Retrofit Kits

Within the Nevada City service area, over 90 percent of the residences are more than 50 years old. Given the nature of the community, upgrades to original plumbing fixtures usually occur only upon actual failure as opposed to ongoing fixture malfunction (e.g., drips and leaks). There are current State and national standards for plumbing fixtures that result in increased water savings when compared to older fixtures, even when applied/installed in older homes. Water agencies throughout the state often have the dispersal of “retrofit kits” as a component of their water conservation education/outreach efforts. This is even a component of the CUWCC’s Best Management Practices (for more information, see the CUWCC website, programmatic BMP 3 [residential]: <http://www.cuwcc.org/mou/bmp3-residential.aspx>). Nevada City has not done this type of outreach, and therefore has a large capacity for indoor residential water conservation. The table below shows what items will be included in a retrofit kit, and what savings are associated with those items.

Table 1: Retrofit Kit items and savings estimates.

| Conservation Measure | Savings Effect (gallons per day per household) |
|--|--|
| Low-flow showerheads | 5.8 |
| Information regarding how to displace toilet reservoir water | 4.2 |
| Faucet aerators (2-3) | 1.5 |
| Toilet leak detection tablets | 7.8 |

* Information taken from Chesnutt, T.W. et al, 1996

A side benefit of these water conservation fixtures is that their installation and use also results in corresponding energy savings from decreased water treatment, conveyance, and heating (Osann and Young, 1998).

The management team for this project will work with Nevada City to develop the specific methods for kit and information distribution. Best methods will be identified in collaboration with the community through the Public Outreach Program.

Water Use Efficiency Implementation Plan

The goal of this plan is to provide demand-based strategies, methods, and options and City policies and practices for ongoing and durable conservation. The project team will be working with the City Council and the customer base to identify the desired water conservation strategies most appropriate for Nevada City to implement over time.

The successes of the activities described above (i.e., public outreach, workshops and education efforts, and the distribution of retrofit kits), will be tracked as they are implemented. The observed and quantified outcomes of these efforts will be integrated with water conservation methods and strategies selected by the City Council and customer base in Nevada City for inclusion in the Water Use Efficiency Implementation Plan. The product of this work effort will be a concise, readily implementable

description of appropriate policies and implementation actions. The implementation actions will be provided in a format that supports easy, low-cost, and reliable implementation.



| | Drought Action Plan | Capital Improvement Plan | Customer Conservation | Organizational Audit | Comment |
|-----------------|----------------------------|---------------------------------|------------------------------|-----------------------------|--|
| Nevada City | X | X | X | | Nevada City currently has no formal drought response policies or plan. Existing CIP addresses ongoing infrastructure improvement, but does not consider drought preparedness. No formal customer conservation, education, or fixture program currently exists. |
| WCWD | X | X | X | X | No drought action planning has been undertaken. The District does not currently have a CIP. No formal customer conservation, education, or fixture program currently exists. Evaluation of the sustainability and long-term viability of the District to provide adequate service to Washington residents is required. Evaluation will include possible rate structures, revised financial management policies, assessment of operational status of system infrastructure, evaluation of administrative and management systems, etc. |
| Grizzly Flats | | X | X | | The Grizzly Flats Drought Action Plan will serve as a model for Nevada City and WCWD. No additional planning is required. Existing CIP addresses ongoing infrastructure improvement, but does not consider drought preparedness. No formal customer conservation, education, or fixture program currently exists. |
| Alta and Colfax | | | X | | PCWA has included Alta and Colfax in their long-term drought preparedness planning, so no additional planning is required. Likewise, PCWA has integrated CIP and drought response planning. However, no formal customer conservation and education programs currently exist. |

Nevada City
Integrated Drought and Conservation Planning Project

Budget Category (a): Direct Project Administration Costs

Task 1: Administration and Management

The goal of this task is to keep the project on-time and on-budget, keep all staff members and project participants informed of the billing procedure and timeline, and generally ensure smooth project implementation. Administrative tasks will include monthly billings to DWR, gathering appropriate documentation and support materials as required by DWR invoicing procedures, monitoring percent spent versus percent complete for each project task, and ensuring compliance with other requirements identified in the grant agreement.

Deliverables:

- ◆ Preparation of invoices and other deliverables, as required

Task 2: Labor Compliance Program

Because there is no construction activity associated with this project, there is no requirement for a Labor Compliance Program.

Task 3: Reporting

In order to track the project's implementation and achievement of performance measures, reports will be prepared to provide DWR with details regarding the project's progress. The content and schedule for these reports will be identified and agreed upon with DWR through the grant agreement. The information compiled as part of the monthly invoice process will be consolidated and augmented as necessary during preparation of the quarterly reports. The final report for this project will be prepared based on the administrative record and the deliverables identified below. The final report will also include any components identified in the grant agreement.

Deliverables:

- ◆ Quarterly and final reports

Budget Category (b): Land Purchase/Easement

This category is not applicable to this project.

Budget Category (c): Planning/Design/Engineering/Environmental Documentation

Because of the nature of this project, tasks implementing this project are listed under Budget Category (g): Other Costs, to maintain the programmatic integrity of budget and timeline.

Environmental Documentation

No environmental documentation is required for this project.

Permitting

No permits are required to implement this project.

Budget Category (d): Construction/Implementation

Budget Category (e): Environmental Compliance/Mitigation/Enhancement

This category is not applicable to this project.

Budget Category (f): Construction Administration

Because the project will not result in construction activities, there is no need for construction administration.

Budget Category (g): Other Costs

A key component of the CABY strategy in outreach to rural and disadvantaged communities has been the provision of technical assistance and capacity building to each project sponsor. The goal of this assistance is to ensure that each of the project sponsors has a developed capacity to plan for chronic water shortages; to integrate water shortage contingency priorities into their long-term infrastructure planning; to provide customer-based conservation, and outreach and education, all resulting in measurable conservation outcomes. The tasks have intentionally been developed to progressively identify and refine an integrated, long-term water conservation and water shortage contingency planning capacity.

Task 4: Water Shortage Response Feasibility Study and Action Plan

The goal of this task is to gather all necessary data, perform all necessary analysis, gather and integrate public input, and develop preliminary policy language to support preparation of a drought action plan. This task will include evaluation of drought history, calculation of future climate change scenarios, identification of water supply and demand, development of drought management policy, and preliminary identification of drought indicators, trigger levels, response, and impact-avoidance options. The tasks will also include public information and outreach and inter-agency drought coordination.

Deliverables:

- ◆ Drought history documented.
- ◆ Climate change scenarios.
- ◆ Future water supply and demand calculations.
- ◆ Identification of drought stages including indicators, trigger levels, and response actions.
- ◆ Drought impact-avoidance options identified.
- ◆ Public involvement.
- ◆ Inter-agency coordination.
- ◆ Preliminary policy development.
- ◆ Draft drought action plan.

Task 5: Integrated Capital Improvement Plan

The goal of this task is to integrate the outcomes of the drought action plan into short- and long-term infrastructure planning. The tasks involved in preparing this element include refinement of the current CIP, identification of specific infrastructure and operational requirements resulting from the Water Shortage Contingency Plan including infrastructure components as described in the work plan introduction, identification of preliminary costs and phasing associated with each identified improvement.

Deliverables:

- ◆ Draft CIP

Task 6: Integrated Customer Water Use Efficiency Initiative

Nevada City has determined that meeting the 20% \times 2020 goals, as well as those articulated in AB 1420 (demand management measures corresponding with the Best Management Practices (BMPs) in the CUWCC) is a desirable and appropriate goal for the District within the fiscal constraints of the City. To achieve this goal, the City has determined that the preparation of a Water Use Efficiency Plan is a critical activity. The Customer Water Use Efficiency Initiative (Initiative) will include public outreach, education and workshop activities, distribution of retrofit kits, and preparation of an action plan to guide implementation of ongoing conservation activities.

Task 6.1: Public Outreach

The goal of this task is to create a meaningful avenue of communication between Nevada City water customers, the City Council, and project management team. This task will include the handout of printed educational materials, as well as providing a venue to receive public comments and questions. Because the Nevada City community is so small, it is possible to conduct “town hall” style meeting events in key locations throughout the City. The focus of these meetings will be to provide a conceptual understanding of the various project components, to gather opinions and insights from City customers, to form an advisory committee to assist in completing the various plans and recommendations, and to provide a venue for big-picture water conservation and system operation strategies.

Deliverables:

- ◆ Handouts and printed materials.
- ◆ Two community “town hall” style meetings.
- ◆ Memoranda summarizing public questions and input.

Task 6.2: Education and Workshop Activities

This task is aimed at developing the customer conservation program components including the educational workshops and the water conserving fixture program. The goal of this task will be to deliver a series of workshops addressing irrigation efficiency and opportunities for residential water conservation.

Deliverables:

- ◆ Workshop agendas, materials, scheduling, logistics, and advertising materials.
- ◆ Post-workshop surveys.
- ◆ Three water conservation workshops.

Task 6.3: Distribution of Retrofit Kits

The goal of this task is to distribute retrofit kits, which will include: low-flow showerheads, toilet leak tablets, two or three faucet aerators, and information on how to displace toilet reservoir water. The management team for this project will work with Nevada City to develop the specific methods for kit and information distribution. Best methods will be identified in collaboration with the community through the Public Outreach Program.

Deliverables:

- ◆ 3000 plumbing fixture retrofit kits purchased and distributed (one for each residence plus extra for larger homes).

Task 6.4: Comprehensive Drought Action Plan

The goal of this plan is to provide demand-based strategies, methods, and options and City policies and practices for ongoing and durable conservation. The project team will be working with the City Council and the customer base to identify the desired water conservation strategies most appropriate for Nevada City to implement over time.

Deliverables:

- ◆ Draft Water Use Efficiency Implementation Plan.
- ◆ Town hall meeting to discuss the Plan with notes summarizing meeting outcome.
- ◆ Final Water Use Efficiency Implementation Plan, including a specific process for implementing the Water Use Efficiency Implementation Plan.

Task 7: Develop and Maintain CABY Project-Specific Webpage

The goal of this task is to ensure that all CABY members and members of the public have access to updated and thorough information about the implementation and characteristics of the project. Every CABY project implemented will be integrated into the CABY website through the creation of a project-specific webpage. Project plans, specifications, progress photographs, reports, status update and other similar materials will be posted or linked to this webpage.

Deliverables:

- ◆ Project webpage hosted on CABY website, updated with all current project information.

Task 8: Data Management

The goal of this task is to ensure that all data gathered and developed as a result of the project is made available to state data bases as well as CABY members and the interested public using Data Management and Monitoring Deliverables that are consistent with the IRWM Plan Standards and Guidance (as stipulated in the August 2010 IRWM Guidelines, page 20). IN this case the appropriate approach is identified in the CABY Planning Grant submittal which will direct the IRWMP data collection efforts, regardless of whether the planning grant is funded or not.

Deliverables:

- ◆ Development, activation and maintenance of project-specific web page within the CABY website (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69 – 72, developed in response to the IRWM Program Guidelines/August 2010, pages 22 and 56-57)
- ◆ Post project information through the existing CABY SWIM Database (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69 - 72, developed in response to the IRWM Program Guidelines/August 2010, pages 22 and 56-57)
- ◆ Submittal of project-specific data to the CABY Technical Advisory Committee tasked with screening project-specific data for submittal to and inclusion in state databases (as stipulated by the CABY Planning Grant Application submittal 9/28/10, pages 69 - 72, developed in response to the IRWM Program Guidelines/August 2010, pages 22 and 56 - 57)

Budget Category (h): Construction /Implementation Contingency

This budget category is not applicable to this project.

Attachment A

Sample Drought Plan Implementation Actions and Table of Contents taken from Grizzly Flats CSD Drought Action Plan.

This will serve as the basis for the WCWD Water Shortage Contingency Plan.

Ongoing Drought Plan Implementation Actions

Ongoing Drought Plan implementation actions will be completed both during periods of non-drought and drought periods. These activities can be characterized as proactive actions that prepare for drought through monitoring, public outreach, and resource management practices.

Policy and Regulation

1. Review and update Drought Plan every five years or as needed based on new gauge data, new supply, operational changes, or change in expected water demand.
2. Continue water loss management procedures (leak identification).
3. Enforce Prohibition of Wasted Water (see Appendix F).
4. Continue conservation policies and water-efficient plumbing codes.
5. Review and refine rate stabilization policy relating to drought impacts every five years.
6. Understand and comply with legal and regulatory requirements for drought management.

Monitoring

1. Monitor trigger plan quarterly to assess drought status:
 - ◆ Check GFCSD storage reservoir levels at the end of July;
 - ◆ If storage is less than 22 acre-feet, enter a Stage 1 drought;
 - ◆ If the reservoir levels are below 20 acre-feet, enter Stage 2 drought;
 - ◆ If the levels at the end of July or August are below 12 acre-feet, go directly into a Stage 3 drought;
 - ◆ For every subsequent month keep the August drought stage through November unless storage levels rise above 12 acre-feet; and
 - ◆ If the reservoir levels are above 12 acre-feet in August then reduce the drought stage by one stage each month until no drought is called.
2. Monitor system demands.
3. Install and monitor additional stream gauges (solicit USGS and DWR for support).

Public Outreach

1. Develop and maintain drought awareness and public education materials, tools, and protocol.

Resource Management

1. Pursue drought impact avoidance activities:
 - ◆ Existing well;
 - ◆ Reduce leakage in existing reservoir; and
 - ◆ Off-stream storage alternative

2. Pursue study of underground flows on Big Canyon diversion; investigate the feasibility of the installation of a drought curtain.
3. Maintain interagency coordination annually as shown in Figure 1. Figure 1 depicts the type and frequency of interagency coordination activities that will be pursued by the Drought Interagency Coordination Committee (DICCC).
4. Confirm and maintain commitment of Drought Advisory Committee (DAC) members as shown in Figure 2. Figure 2 depicts the suggested interagency organizational structure.
5. Consider establishing trucking contracts for water hauling (annually).
6. Pursue land trade for off-stream storage reservoir site.
7. Establish procedure by which residents within GFCSD on wells apply for emergency relief.

SAMPLE DROUGHT ACTION PLAN

Table of Contents

Ongoing Drought Plan Implementation Actions

 Drought Stage 1 Actions

 Drought Stage 2 Actions

 Drought Stage 3 Actions

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 1.2 El Dorado County Drought Planning Overview

 1.3 Drought History

 1.4 Climate Change

 1.5 GFCSD Water Supply and Demand

 1.5.1 Water Supplies

 1.5.2 Water Demands

 1.6 GFCSD Drought Management Policy

 1.6.1 Existing GFCSD Policy and Procedures

 1.6.2 Regulatory Guidance

 1.6.3 Water Supply Reliability Status

 1.7 Stakeholder Involvement

 1.8 Drought Plan Approach

 1.9 Drought Plan Content

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 2.2 Drought Indicators and Trigger Levels

 2.2.1 No Plan/Current Plan

 2.2.2 Experimental Trigger Plan

 2.2.3 Supply Remaining Index Trigger Plan

 2.2.4 Trigger Plan Selection

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 2.3.1 Stage Zero - Normal Conditions and Ongoing Conservation

 2.3.2 Stage 1 - Introductory

 2.3.3 Stage 2 - Voluntary Reductions

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 3.2 Interagency Drought Coordination

 3.3 Reconciliation with Existing GFCSD Policy

 3.4 Initial Actions

 3.5 Ongoing Actions

 3.6 Drought Stage 1 Actions

 3.7 Drought Stage 2 Actions

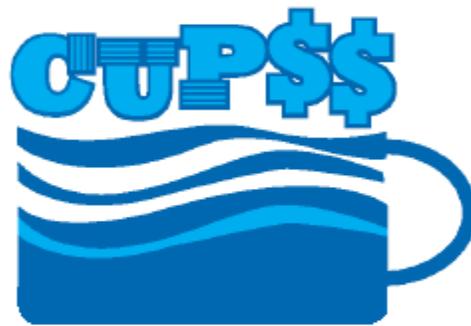
 3.8 Drought Stage 3 Actions

Nevada City
Integrated Water Shortage Contingency, Drought Preparedness, and
Comprehensive Water Conservation Planning Program

EXHIBITS

1. Examples of AWWA and EPA resources available to Nevada City

User's Guide



Check Up Program for Small Systems

Release 1.3.5

February 2010



EPA 816-R-010-003
February 2010
Office of Water (4606M)
epa.gov/safewater



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TECHNOLOGY & PRACTICE

Free AWWA software makes water audits quick and easy

The [AWWA Water Loss Control Committee's Water Audit Software v.4.0](#) is now [available for free download](#), boasting some big new features.

Although the software is not intended to provide a full and detailed water audit, it allows utilities to quickly compile a preliminary audit in the standardized and transparent manner advocated by AWWA, its creators say.

The software includes ten worksheets in Microsoft Excel spreadsheet file. Most of the data is entered on the second worksheet, which prompts the user to enter standard water supply information such as supplied water volume, customer consumption, distribution system attributes and loss quantities. Because many utilities don't typically tabulate all this data, the software allows the user to enter either known or estimated values, then calculates a variety of performance indicators useful for comparisons among utilities.

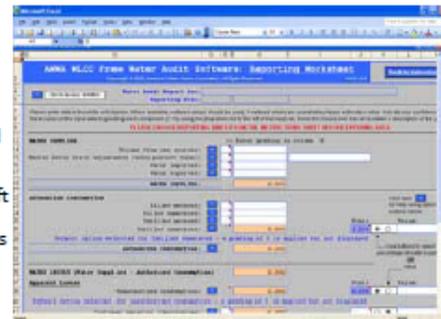
The biggest new feature of Version 4.0 is its "data grading" capability, which provides a basic validation of results. The user can assign a grading value, ranging from 1 to 10, to each piece of information he or she inputs. A 10 represents highly reliable, well validated data, while a grade of 1 reflects very crude data, such as rough estimates. Once all the grading cells have been filled in, a composite grading score is calculated and displayed at the bottom of the worksheet. The grading is based upon a scale of 100, and this score can be used as a basic validation for the audit.

The auditor can determine the status of the utility's data quality by reviewing the Loss Control Planning Worksheet, which provides planning guidance to the water utility. Utilities with a lower composite grading can focus program efforts on data collection and validation until their overall data quality becomes more reliable.

An additional new function is a priority listing of the most important three variables to target to improve the validity of the water audit data.

The AWWA Water Loss Control Committee's [Free Water Audit Software Version 4.0](#) is available for download from AWWA's new Water Loss Control Web pages on AWWA's [WaterWiser](#) site.

Posted: 05/12/2009



Version 4.0 of AWWA's free Water Audit Software allows utilities to see which of their data collection efforts need improvement.

M36, Third Edition (2009)

Unlock the Secrets of Water Loss Control with AWWA's M36 Water Audits and Loss Control Programs, Third Edition

AWWA is proud to release the much anticipated Third Edition of its popular M36 guidance manual on conducting water audits and implementing proactive water loss control programs.

Water Loss Control Links

[WLC Basics](#)
[WLC Terms Defined](#)
[Apparent & Real Losses](#)
[Water Audit Method](#)
[Free Water Audit Software](#)

What does M36, Third Edition provide?

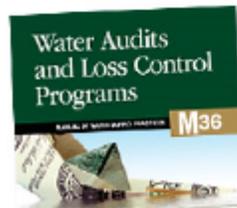
- Clear steps to compile the water audit according to the [new standard method](#) co-developed by the International Water Association (IWA) and the American Water Works Association (AWWA)
- [Rational terms, definitions](#) and performance indicators that give water utilities objective ways to assess their water loss standing and reliably plan loss control activities
- Worksheets, sample calculations and references to [AWWA's Free Water Audit Software](#)
- Techniques to capture more revenue by controlling [apparent losses](#) in customer metering and billing operations, as well as unauthorized consumption
- Innovative technologies to move from reactive, "break and fix" leakage response to proactive leakage management featuring component analysis, pressure management, leak noise logging and other advanced technologies: successful approaches to minimize unnecessary source water withdrawals and excessive water production costs
- Structured guidance on planning the loss control program
- Considerations for small water utilities
- Case study accounts from small, medium and large water utilities

Why do water utilities need M36, Third Edition?

- High quality source water supplies are dwindling while populations are expanding and shifting
- Every day in the United States over six billion

gallons of water withdrawn from rivers, lakes and wells never reaches a billed customer!

- Over 250,000 water main ruptures occur in the United States every year
- Worldwide the value of lost water and revenue is \$15 billion annually
- Water utilities continually need to find ways to supply safe, efficient water and manage costs
- The Third Edition of the M36 is the first publication in North America to provide detailed and comprehensive instructions on the IWA/AWWA Water Audit Method
- Regulatory agencies have begun to focus on water utility efficiency in addition to water conservation by consumers
- Customers deserve value for their money; high losses compromise service and indirectly inflate water rates



[Order your copy from the AWWA Bookstore](#)

Who wrote M36, Third Edition?

- AWWA's [Water Loss Control Committee](#) is responsible to maintain the M36 publication and rewrote the Third Edition
- The Committee has many active members who are involved in water auditing, leakage management and revenue protection programs for water utilities across the world