Item # 11B

City of Carson City
Agenda Report

Date Submitted: August 12, 2008 **Agenda Date Requested:** August 21, 2008
Time Requested: 10 Minutes

To: Mayor and Supervisors
From: Public Works Department

Subject Title: Action to approve Contract No 0809-100 with Black and Veatch Corporation in the amount $869,818.00, with funding from the USEPA in the amount of $478,400.00 and $391,418.00 from Carson City Water Fund, to provide Carson City with a calibrated Water Model and an Integrated Water Supply Plan.

Staff Summary: If approved, this contract will utilize $478,400.00 of USEPA funding from two grants and a total of $391,418 from Water Capital to accomplish two critical tasks. The first is a properly calibrated hydraulic water model and the second is the development of an Integrated Water Supply Plan.

Type of Action Requested: (check one)
(____) Resolution (____) Ordinance
(XXX) Formal Action/Motion (____) Other

Does This Action Require A Business Impact Statement: (___) Yes (XXX) No

Recommended Board Action: I move to approve Contract No 0809-100 with Black and Veatch Corporation in the amount $869,818.00, with funding from the USEPA in the amount of $478,400.00 and $391,418.00 from Carson City Water Fund, to provide Carson City with a calibrated Water Model and an Integrated Water Supply Plan.

Explanation for Recommended Board Action: Carson City has been awarded two grants by the USEPA in the amount of $478,400.00 and $391,418.00 from Carson City Water Fund to help the City fund studies on its water system. This scope of work is broken down into the two work plans presented to USEPA to fund this project:

Work plan for USEPA Grant 1 (Grant No. XP-98975301) - Hydraulic Modeling Services:

The purpose of this work plan is to provide the City with a hydraulic model properly documented and calibrated for static and extended period simulations. This model, in conjunction with the hydraulic analyses described in this work plan, will be used by the City to:

• Optimize the hydraulic performance of the conveyance, storage, and distribution facilities of its potable water system.
• Produce energy savings by optimizing pumping schedules to meet diurnal demands.
• Provide hydraulic analysis for the planning and design of water system facilities.
• Simulate blending scenarios to mitigate contaminants of concern (Arsenic and Uranium).
• Provide facility analysis to specify treatment/blending, conveyance and distribution requirements to meet water demand conditions for the Base Year (2007), Intermediate Year (2020), and Build-Out Year (2030) demands. The fee for the activities and deliverables included in this work plan is $ 520,000

Work plan for USEPA Grant 2 (Grant No. XP-96939101) - Integrated Water Supply and Facility Plan:

The goal or objective of this work plan is to provide the City with an Integrated Water Supply and Facility Plan (IWSFP). This Plan will provide the City with an integrated approach to reliably meet projected build-out water demands. Specifically, this IWSFP will:

1. Integrate identified potable and recycled water supplies to reliably meet future demands in a cost effective manner. This includes approaches such as the treatment of Carson River water obtained from water reclamation augmentation credits. Black & Veatch will coordinate reclaimed water considerations with the Cities wastewater consultant, BHC.

2. Provide a strategy to meet water quality regulatory requirements. In particular, this IWSFP will refine the recommendations produced in previous work for the optimum combination of blending/treatment to mitigate arsenic and uranium impacted zones.

3. Provide a system-wide strategy that will optimize the use of the individual water supply components between wet and dry climatic cycles. This IWSFP will also provide recommendations on how to efficiently manage the system to minimize energy costs.

4. Provide a phasing plan and planning opinion of costs to serve as the basis for a Capital Improvement Program for the City's water system. The fee for the activities and deliverables included in this work plan is $ 349,818. The detailed work plans for both USEPA Grant 1 and USEPA Grant 2 are enclosed and are an integral part of this scope of work. The total fee for the activities and deliverables included in both work plans is $ 869,818.

These two work plans will also satisfy the requirement by the State Engineer's Office to develop a comprehensive conservation plan, identify the source of water to meet future demands for Carson City and meet NDEP's requirements to have and integrated, dynamic water model for the City.

Applicable Statue, Code, Policy, Rule or Regulation: NRS 625.530

Fiscal Impact: If approved, $391,418.00 from Water Capital and $478,400.00 from EPA grants.

Explanation of Impact: Combined funding of $869,818.00.

Funding Source: Funding from Water Capital

Alternatives: Do not approve and direct staff otherwise.

Supporting Material: Copy of Contract, Black and Veatch Sope of Work and two EPA grants.

Prepared By: Ken Arnold, Deputy Public Works Director

Reviewed By: _____ Date: 8/12/08
(Public Works)

_____ Date: 8/12/08
(City Manager)

_____ Date: 8-12-08
(District Attorney)

_____ Date: 8-12-08
(Finance Director)

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay
2) _____ _____
_____
_____
_____
_____

_____
(Vote Recorded By)

CONTRACT FOR SERVICES OF INDEPENDENT CONTRACTOR
Contract No. 0809-100

THIS CONTRACT, made and entered into this 21st day of August, 2008, by and between the City and County of Carson City, a political subdivision of the State of Nevada, hereinafter referred to as the **"CITY"**, and Black and Veatch Corporation hereinafter referred to as the **"CONSULTANT"**.

W I T N E S S E T H:

WHEREAS, the Purchasing & Contracts Director for the City and County of Carson City is authorized, pursuant to Nevada Revised Statutes Chapter 332 and Carson City Purchasing Resolution #1990-R71, to approve and accept this Contract as set forth in and by the following provisions; and

WHEREAS, it is deemed that the services of **CONSULTANT** for **CONTRACT No. 0809-100 Calibrated Water Model and Integrated Water Supply Plan** are both necessary and in the best interests of **CITY**; and

NOW, THEREFORE, in consideration of the aforesaid premises, the parties mutually agree as follows:

1 **REQUIRED APPROVAL:**

1.1 This Contract shall not become effective until and unless approved by the Carson City Board of Supervisors.

2 **CONTRACT TERM:**

2.1 This Contract shall be effective from August 21, 2008 subject to Carson City Board of Supervisors' approval (anticipated to be August 21, 2008) to August 21, 2009, unless sooner terminated by either party as specified in **Section 7 Contract Termination**.

3 **NOTICE:**

3.1 Unless otherwise specified, termination shall not be effective until thirty (30) calendar days after a party has served written notice of default, or without cause upon the other party. All notices or other communications required or permitted to be given under this Contract shall be in writing and shall be deemed to have been duly given if delivered personally in hand, by e-mail with simultaneous regular mail, by telephonic facsimile with simultaneous regular mail, or by certified mail, return receipt requested, postage prepaid on the date posted, and addressed to the other party at the address specified below.

For P&C Use Only	
CCBL expires	_____
GL expires	_____
AL expires	_____
PL expires	_____
WC expires	_____

3.1.1 Notice to **CONSULTANT** shall be addressed to:

Ira Rackley, P.E./Associate Vice President
Black and Veatch Corporation
503 North Division Street
Carson City, Nevada 89703
775-720-0410/FAX 775-283-0494
rackleyis@bv.com

3.1.2 Notice to **CITY** shall be addressed to:

Carson City Purchasing & Contracts
Sandy Scott, Purchasing & Contracts Management Assistant
201 North Carson Street Suite 11
Carson City, NV 89701
775-887-2133 extension 30137 / FAX 775-887-2107
SScott@ci.carson-city.nv.us

4 **SCOPE OF WORK:**

4.1 **CONSULTANT** shall provide and perform the services contained in **Exhibit A** for and on behalf of **CITY** hereinafter referred to as the **"SERVICES"**.

4.2 **CONSULTANT** represents that it is duly licensed by Carson City for the purposes of performing the **SERVICES**.

4.3 **CONSULTANT** represents that it is duly qualified and licensed in the State of Nevada for the purposes of performing the **SERVICES**.

4.4 **CONSULTANT** represents that it and/or the persons it may employ possess all skills and training necessary to perform the **SERVICES** described herein and required hereunder. **CONSULTANT** shall perform the **SERVICES** faithfully, diligently, in a timely and professional manner, to the best of its ability, and in such a manner as is customarily performed by a person who is in the business of providing such services in similar circumstances. **CONSULTANT** shall be responsible for the professional quality and technical accuracy of all **SERVICES** furnished by **CONSULTANT** to **CITY**.

4.5 **CONSULTANT** represents that neither the execution of this Contract nor the rendering of services by **CONSULTANT** hereunder will violate the provisions of or constitute a default under any other contract or agreement to which **CONSULTANT** is a party or by which

CONSULTANT is bound, or which would preclude **CONSULTANT** from performing the **SERVICES** required of **CONSULTANT** hereunder, or which would impose any liability or obligation upon **CITY** for accepting such **SERVICES**.

4.6 Before commencing with the performance of any work under this Contract, **CONSULTANT** shall obtain all necessary permits and licenses as may be necessary. Before and during the progress of work under this Contract, **CONSULTANT** shall give all notice and comply with all the laws, ordinances, rules and regulations of every kind and nature now or hereafter in effect promulgated by any Federal, State, County, or other Governmental Authority, relating to the performance of work under this Contract. If **CONSULTANT** performs any work that is contrary to any such law, ordinance, rule or regulation, he shall bear all the costs arising therefrom.

4.7 **Special Terms and Conditions for Engineers, Architects, and Land Surveyors:**

4.7.1 Use of **CONSULTANT'S** Drawings, Specifications & Other Documents:

4.7.1.1 The drawing, specifications and other documents prepared by **CONSULTANT** for this Contract are instruments of **CONSULTANT'S** service for use solely with respect to this Contract and, unless otherwise provided, **CONSULTANT** shall be deemed the author of these documents and shall retain all common law statutory and other reserved rights, including the copyright.

4.7.1.2 **CITY** shall be permitted to retain copies, including reproducible copies, of **CONSULTANT'S** drawings, specifications, and other documents for information and reference in connection with this Contract.

4.7.1.3 **CONSULTANT'S** drawings, specifications and other documents shall not be used by **CITY** or others without expressed permission of **CONSULTANT**.

4.7.2 Cost Accounting and Audits:

4.7.2.1 If required by **CITY, CONSULTANT** agrees to make available to **CITY** within two (2) years after the completion of the **SERVICES** under this Contract, such books, records, receipts, vouchers, or other data as may be deemed necessary by **CITY** to enable it to arrive at appropriate cost figures for the purpose of establishing depreciation rates for the various materials and other elements which may have been incorporated into the **SERVICES** performed under this Contract.

4.8 **CITY Responsibilities:**

4.8.1 **CITY** shall make available to **CONSULTANT** all technical data that is in **CITY'S** possession, reasonably required by **CONSULTANT** relating to the **SERVICES**.

4.8.2 **CITY** shall provide access to and make all provisions for **CONSULTANT** to enter upon public and private lands, to the fullest extent permitted by law, as reasonably required for **CONSULTANT** to perform the **SERVICES**.

4.8.3 **CITY** shall examine all reports, correspondence, and other documents presented by **CONSULTANT** upon request of **CITY**, and render, in writing, decisions pertaining thereto within a reasonable time so as not to delay the work of **CONSULTANT**.

4.8.4 It is expressly understood and agreed that all work done by **CONSULTANT** shall be subject to inspection and acceptance by **CITY** and approval of **SERVICES** shall not forfeit the right of **CITY** to require correction, and nothing contained herein shall relieve **CONSULTANT** of the responsibility of the **SERVICES** required under the terms of this Contract until all **SERVICES** have been completed and accepted by **CITY**.

5 CONSIDERATION:

5.1 The parties agree that **CONSULTANT** will provide the **SERVICES** specified in **Section 4 Scope of Work** and **CITY** agrees to pay **CONSULTANT** the **CONTRACT SUM** based upon time & materials and the attached fee schedule for a not to exceed maximum amount of Eight Hundred Sixty Nine Thousand, Eight Hundred Eighteen Dollars and No Cents ($868,818.00).

5.2 **CONTRACT SUM** represents full and adequate compensation for the completed **WORK**, and includes the furnishing of all materials; all labor, equipment, tools, and appliances; and all expenses, direct or indirect, connected with the proper execution of the **WORK**.

5.3 **CITY** has provided a sample invoice and **CONSULTANT** shall submit its request for payment using said sample invoice.

5.4 Payment by **CITY** for the **SERVICES** rendered by **CONSULTANT** shall be due within thirty (30) calendar days from the date **CITY** acknowledges that the performance meets the requirements of this Contract or from the date the correct, complete, and descriptive invoice is received by **CITY** employee designated on the sample invoice, whichever is the latter date.

5.5 **CITY** does not agree to reimburse **CONSULTANT** for expenses unless otherwise specified.

6 TIMELINESS OF BILLING SUBMISSION:

6.1 The parties agree that timeliness of billing is of the essence to this Contract and recognize that **CITY** is on a fiscal year which is defined as the period beginning July 1 and ending June 30 of the following year. All billings for dates of service prior to July 1 must be submitted to **CITY** no later than the first Friday in August of the same year. A billing submitted after the first Friday in August will subject **CONSULTANT** to an administrative fee not to exceed $100.00. The parties hereby agree this is a reasonable estimate of the additional costs

to **CITY** of processing the billing as a stale claim and that this amount will be deducted from the stale claim payment due to **CONSULTANT**.

7 CONTRACT TERMINATION:

7.1 Termination Without Cause:

7.1.1 Any discretionary or vested right of renewal notwithstanding, this Contract may be terminated upon written notice by mutual consent of both parties or unilaterally by either party without cause.

7.2 Termination for Nonappropriation:

7.2.1 The continuation of this Contract beyond June 30, 2009 is subject to and contingent upon sufficient funds being appropriated, budgeted, and otherwise made available by the Carson City Board of Supervisors and the United State Environmental Protection Agency. **CITY** may terminate this Contract, and **CONSULTANT** waives any and all claim(s) for damages, effective immediately upon receipt of written notice (or any date specified therein) if for any reason the funding is not appropriated or is withdrawn, limited, or impaired.

7.3 Cause Termination for Default or Breach:

7.3.1 A default or breach may be declared with or without termination.

7.3.2 This Contract may be terminated by either party upon written notice of default or breach to the other party as follows:

7.3.2.1 If **CONSULTANT** fails to provide or satisfactorily perform any of the conditions, work, deliverables, goods, or services called for by this Contract within the time requirements specified in this Contract or within any granted extension of those time requirements; or

7.3.2.2 If any state, county, city or federal license, authorization, waiver, permit, qualification or certification required by statute, ordinance, law, or regulation to be held by **CONSULTANT** to provide the goods or services required by this Contract is for any reason denied, revoked, debarred, excluded, terminated, suspended, lapsed, or not renewed; or

7.3.2.3 If **CONSULTANT** becomes insolvent, subject to receivership, or becomes voluntarily or involuntarily subject to the jurisdiction of the bankruptcy court; or

7.3.2.4 If **CITY** materially breaches any material duty under this Contract and any such breach impairs **CONSULTANT'S** ability to perform; or

7.3.2.5 If it is found by **CITY** that any quid pro quo or gratuities in the form of money, services, entertainment, gifts, or otherwise were offered or given by **CONSULTANT**, or any agent or representative of **CONSULTANT**, to any officer or employee of **CITY** with a view

toward securing a contract or securing favorable treatment with respect to awarding, extending, amending, or making any determination with respect to the performing of such contract; or

7.3.2.6 If it is found by **CITY** that **CONSULTANT** has failed to disclose any material conflict of interest relative to the performance of this Contract.

7.4 **Time to Correct:**

7.4.1 Termination upon a declared default or breach may be exercised only after service of formal written notice as specified in **Section 3 Notice**, and the subsequent failure of the defaulting party within fifteen (15) calendar days of that notice to provide evidence, satisfactory to the aggrieved party, showing that the declared default or breach has been corrected.

7.5 **Winding Up Affairs Upon Termination:**

7.5.1 In the event of termination of this Contract for any reason, the parties agree that the provisions of this paragraph survive termination:

7.5.1.1 The parties shall account for and properly present to each other all claims for fees and expenses and pay those which are undisputed and otherwise not subject to set off under this Contract. Neither party may withhold performance of winding up provisions solely based on nonpayment of fees or expenses accrued up to the time of termination;

7.5.1.2 **CONSULTANT** shall satisfactorily complete work in progress at the agreed rate (or a pro rata basis if necessary) if so requested by **CITY**;

7.5.1.3 **CONSULTANT** shall execute any documents and take any actions necessary to effectuate an assignment of this Contract if so requested by **CITY**;

7.5.1.4 **CONSULTANT** shall preserve, protect, and promptly deliver into **CITY** possession all proprietary information in accordance with **Section 23 City Ownership of Proprietary Information**.

8 **REMEDIES:**

8.1 Except as otherwise provided for by law or this Contract, the rights and remedies of the parties shall not be exclusive and are in addition to any other rights and remedies provided by law or equity, including, without limitation, actual damages, and to a prevailing party reasonable attorneys' fees and costs. The parties agree that, in the event a lawsuit is filed and a party is awarded attorney's fees by the court, for any reason, the amount of recoverable attorney's fees shall not exceed the rate of $125 per hour. **CITY** may set off consideration against any unpaid obligation of **CONSULTANT** to **CITY**.

9 **LIMITED LIABILITY:**

9.1 **CITY** will not waive and intends to assert available Nevada Revised Statutes Chapter 41 liability limitations in all cases. Contract liability of both parties shall not be subject to punitive damages. Liquidated damages shall not apply unless otherwise specified in the incorporated attachments. Damages for any **CITY** breach shall never exceed the amount of funds appropriated for payment under this Contract, but not yet paid to **CONSULTANT**, for the fiscal year budget in existence at the time of the breach. **CONSULTANT'S** tort liability shall not be limited.

10 **FORCE MAJEURE:**

10.1 Neither party shall be deemed to be in violation of this Contract if it is prevented from performing any of its obligations hereunder due to strikes, failure of public transportation, civil or military authority, act of public enemy, accidents, fires, explosions, or acts of God, including, without limitation, earthquakes, floods, winds, or storms. In such an event the intervening cause must not be through the fault of the party asserting such an excuse, and the excused party is obligated to promptly perform in accordance with the terms of this Contract after the intervening cause ceases.

11 **INDEMNIFICATION:**

11.1 To the extent permitted by law, including, but not limited to, the provisions of Nevada Revised Statutes Chapter 41, each party shall indemnify, hold harmless and defend, not excluding the other's right to participate, the other party from and against all liability, claims, actions, damages, losses, and expenses, including but not limited to reasonable attorney's fees and costs, arising out of any alleged negligent or willful acts or omissions of the indemnifying party, its officers, employees and agents. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of the indemnity which would otherwise exist as to any party or person described in this paragraph.

11.2 Except as otherwise provided in Subsection 11.4 below, the indemnifying party shall not be obligated to provide a legal defense to the indemnified party, nor reimburse the indemnified party for the same, for any period occurring before the indemnified party provides written notice of the pending claim(s) or cause(s) of action to the indemnifying party, along with:

11.2.1 a written request for a legal defense for such pending claim(s) or cause(s) of action; and

11.2.2 a detailed explanation of the basis upon which the indemnified party believes that the claim or cause of action asserted against the indemnified party implicates the culpable conduct of the indemnifying party, its officers, employees, and/or agents.

11.3 After the indemnifying party has begun to provide a legal defense for the indemnified party, the indemnifying party shall not be obligated to fund or reimburse any fees or costs provided by any additional counsel for the indemnified party, including counsel through which the indemnified party might voluntarily choose to participate in its defense of the same matter.

11.4 After the indemnifying party has begun to provide a legal defense for the indemnified party, the indemnifying party shall be obligated to reimburse the reasonable attorney's fees and costs incurred by the indemnified party during the initial thirty (30) day period of the claim or cause of action, if any, incurred by separate counsel.

12 INDEPENDENT CONTRACTOR:

12.1 An independent contractor is a natural person, firm or corporation who agrees to perform services for a fixed price according to his or its own methods and without subjection to the supervision or control of the other contracting party, except as to the results of the work, and not as to the means by which the services are accomplished.

12.2 It is mutually agreed that **CONSULTANT** is associated with **CITY** only for the purposes and to the extent specified in this Contract, and in respect to performance of the contracted services pursuant to this Contract. **CONSULTANT** is and shall be an independent contractor and, subject only to the terms of this Contract, shall have the sole right to supervise, manage, operate, control, and direct performance of the details incident to its duties under this Contract.

12.3 Nothing contained in this Contract shall be deemed or construed to create a partnership or joint venture, to create relationships of an employer-employee or principal-agent, or to otherwise create any liability for **CITY** whatsoever with respect to the indebtedness, liabilities, and obligations of **CONSULTANT** or any other party.

12.4 **CONSULTANT** shall indemnify and hold **CITY** harmless from, and defend **CITY** against, any and all losses, damages, claims, costs, penalties, liabilities, expenses arising out of or incurred in any way because of, but not limited to, **CONSULTANT'S** obligations or legal duties regarding any taxes, fees, assessments, benefits, entitlements, notice of benefits, employee's eligibility to work, to any third party, subcontractor, employee, state, local or federal governmental entity.

12.5 Neither **CONSULTANT** nor its employees, agents, or representatives shall be considered employees, agents, or representatives of **CITY**.

13 INSURANCE REQUIREMENTS:

13.1 **CONSULTANT**, as an independent contractor and not an employee of **CITY**, must carry policies of insurance in amounts specified and pay all taxes and fees incident hereunto. **CITY** shall have no liability except as specifically provided in this Contract.

13.2 **CONSULTANT** shall not commence work before: (1) **CONSULTANT** has provided the required evidence of insurance to Carson City Purchasing & Contracts, and (2) **CITY** has approved the insurance policies provided by **CONSULTANT**.

13.3 Prior approval of the insurance policies by **CITY** shall be a condition precedent to any payment of consideration under this Contract and **CITY'S** approval of any changes to insurance coverage during the course of performance shall constitute an ongoing condition subsequent this Contract. Any failure of **CITY** to timely approve shall not constitute a waiver of the condition.

13.4 **Insurance Coverage:**

13.4.1 **CONSULTANT** shall, at **CONSULTANT'S** sole expense, procure, maintain and keep in force for the duration of this Contract the following insurance conforming to the minimum requirements specified below. Unless specifically specified herein or otherwise agreed to by **CITY**, the required insurance shall be in effect prior to the commencement of work by **CONSULTANT** and shall continue in force as appropriate until the latter of:

13.4.1.1 Final acceptance by **CITY** of the completion of this Contract; or

13.4.1.2 Such time as the insurance is no longer required by **CITY** under the terms of this Contract.

13.4.2 Any insurance or self-insurance available to **CITY** shall be in excess of and non-contributing with any insurance required from **CONSULTANT. CONSULTANT'S** insurance policies shall apply on a primary basis. Until such time as the insurance is no longer required by **CITY, CONSULTANT** shall provide **CITY** with renewal or replacement evidence of insurance no less than thirty (30) calendar days before the expiration or replacement of the required insurance. If at any time during the period when insurance is required by this Contract, an insurer or surety shall fail to comply with the requirements of this Contract, as soon as **CONSULTANT** has knowledge of any such failure, **CONSULTANT** shall immediately notify **CITY** and immediately replace such insurance or bond with an insurer meeting the requirements.

13.5 **General Requirements:**

13.5.1 **Certificate Holder:** Each liability insurance policy shall list Carson City c/o Carson City Purchasing & Contracts, 201 N. Carson Street Suite 11, Carson City, NV 89701 as a certificate holder.

13.5.2 **Additional Insured:** By endorsement to the general liability insurance policy evidenced by **CONSULTANT**, The City and County of Carson City, Nevada, its officers, employees and immune contractors shall be named as additional insureds for all liability arising from this Contract.

13.5.3 **Waiver of Subrogation**: Each liability insurance policy shall provide for a waiver of subrogation as to additional insureds.

13.5.4 **Cross-Liability**: All required liability policies shall provide cross-liability coverage as would be achieved under the standard ISO separation of insureds clause.

13.5.5 **Deductibles and Self-Insured Retentions**: Insurance maintained by **CONSULTANT** shall apply on a first dollar basis without application of a deductible or self-insured retention unless otherwise specifically agreed to by **CITY**. Such approval shall not relieve **CONSULTANT** from the obligation to pay any deductible or self-insured retention. Any deductible or self-insured retention shall not exceed $5,000 per occurrence, unless otherwise approved by **CITY**.

13.5.6 **Policy Cancellation**: Except for ten (10) calendar days notice for non-payment of premium, each insurance policy shall be endorsed to state that; without thirty (30) calendar days prior written notice to Carson City Purchasing & Contracts, the policy shall not be canceled, non-renewed or coverage and /or limits reduced or materially altered, and shall provide that notices required by this paragraph shall be sent by certified mail to Carson City Purchasing & Contracts, 201 N. Carson Street Suite 11, Carson City, NV 89701.

13.5.7 **Approved Insurer**: Each insurance policy shall be issued by insurance companies authorized to do business in the State of Nevada or eligible surplus lines insurers acceptable to the State and having agents in Nevada upon whom service of process may be made, and currently rated by A.M. Best as "A-VII" or better.

13.5.8 **Evidence of Insurance:** Prior to commencement of work, **CONSULTANT** must provide the following documents to Carson City Purchasing & Contracts, 201 North Carson Street Suite 11, Carson City, NV 89701:

13.5.8.1 **Certificate of Insurance:** The Acord 25 Certificate of Insurance form or a form substantially similar must be submitted to Carson City Purchasing & Contracts to evidence the insurance policies and coverages required of **CONSULTANT**.

13.5.8.2 **Additional Insured Endorsement:** An Additional Insured Endorsement (CG20 10 or C20 26), signed by an authorized insurance company representative, must be submitted to Carson City Purchasing & Contracts to evidence the endorsement of **CITY** as an additional insured per Subsection 13.5.2.

13.5.8.3 **Schedule of Underlying Insurance Policies:** If Umbrella or Excess policy is evidenced to comply with minimum limits, a copy of the Underlyer Schedule from the Umbrella or Excess insurance policy may be required.

13.5.9 **Review and Approval:** Documents specified above must be submitted for review and approval by Carson City Purchasing & Contracts prior to the commencement of work by **CONSULTANT**. Neither approval by **CITY** nor failure to disapprove the insurance furnished by

CONSULTANT shall relieve **CONSULTANT** of **CONSULTANT'S** full responsibility to provide the insurance required by this Contract. Compliance with the insurance requirements of this Contract shall not limit the liability of **CONSULTANT** or its sub-contractors, employees or agents to **CITY** or others, and shall be in addition to and not in lieu of any other remedy available to **CITY** under this Contract or otherwise. **CITY** reserves the right to request and review a copy of any required insurance policy or endorsement to assure compliance with these requirements.

14 **COMMERCIAL GENERAL LIABILITY INSURANCE:**

14.1 Minimum Limits required:

14.1.1 Two Million Dollars ($2,000,000.00) - General Aggregate

14.1.2 Two Million Dollars ($2,000,000.00) - Products & Completed Operations Aggregate

14.1.3 One Million Dollars ($1,000,000.00) - Each Occurrence

14.2 Coverage shall be on an occurrence basis and shall be at least as broad as ISO 1996 form CG 00 01 (or a substitute form providing equivalent coverage); and shall cover liability arising from premises, operations, independent contractors, completed operations, personal injury, products, civil lawsuits, Title VII actions and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

15 **BUSINESS AUTOMOBILE LIABILITY INSURANCE:**

15.1 Minimum Limit required:

15.1.1 One Million Dollars ($1,000,000) per occurrence for bodily injury and property damage

15.2 Coverage shall be for "any auto", including owned, non-owned and hired vehicles. The policy shall be written on ISO form CA 00 01 or a substitute providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage.

16 **PROFESSIONAL LIABILITY INSURANCE:**

16.1 Minimum Limit required: One Million Dollars ($1,000,000.00)

16.2 Retroactive date: Prior to commencement of the performance of this Contract

16.3 Discovery period: Three (3) years after termination date of this Contract.

16.4 A certified copy of this policy may be required.

17 **WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE:**

17.1 **CONSULTANT** shall provide workers' compensation insurance as required by Nevada Revised Statutes Chapters 616A through 616D inclusive and Employer's Liability insurance with a minimum limit of $500,000 each employee per accident for bodily injury by accident or disease.

17.2 **CONSULTANT** may, in lieu of furnishing a certificate of an insurer, provide an affidavit indicating that **CONSULTANT** is a sole proprietor; that **CONSULTANT** will not use the services of any employees in the performance of this Contract; that **CONSULTANT** has elected to not be included in the terms, conditions, and provisions of Nevada Revised Statutes Chapters 616A-616D, inclusive; and that **CONSULTANT** is otherwise in compliance with the terms, conditions, and provisions of Nevada Revised Statutes Chapters 616A-616D, inclusive.

18 **BUSINESS LICENSE:**

18.1 **CONSULTANT** shall not commence work before **CONSULTANT** has provided a copy of his Carson City business license to Carson City Purchasing & Contracts.

18.2 The Carson City business license shall continue in force until the latter of: (1) final acceptance by **CITY** of the completion of this Contract; or (2) such time as the Carson City business license is no longer required by **CITY** under the terms of this Contract.

19 **COMPLIANCE WITH LEGAL OBLIGATIONS:**

19.1 **CONSULTANT** shall procure and maintain for the duration of this Contract any state, county, city, or federal license, authorization, waiver, permit, qualification or certification required by statute, ordinance, law, or regulation to be held by **CONSULTANT** to provide the goods or services of this Contract. **CONSULTANT** will be responsible to pay all taxes, assessments, fees, premiums, permits, and licenses required by law. Real property and personal property taxes are the responsibility of **CONSULTANT** in accordance with Nevada Revised Statutes 361.157 and 361.159. **CONSULTANT** agrees to be responsible for payment of any such government obligations not paid by its subcontractors during performance of this Contract. **CITY** may set-off against consideration due any delinquent government obligation.

20 **WAIVER OF BREACH:**

20.1 Failure to declare a breach or the actual waiver of any particular breach of this Contract or its material or nonmaterial terms by either party shall not operate as a waiver by such party of any of its rights or remedies as to any other breach.

21 **SEVERABILITY:**

21.1 If any provision contained in this Contract is held to be unenforceable by a court of law or equity, this Contract shall be construed as if such provision did not exist and the nonenforceability of such provision shall not be held to render any other provision or provisions of this Contract unenforceable.

22 ASSIGNMENT/DELEGATION:

22.1 To the extent that any assignment of any right under this Contract changes the duty of either party, increases the burden or risk involved, impairs the chances of obtaining the performance of this Contract, attempts to operate as a novation, or includes a waiver or abrogation of any defense to payment by **CITY,** such offending portion of the assignment shall be void, and shall be a breach of this Contract. **CONSULTANT** shall neither assign, transfer nor delegate any rights, obligations or duties under this Contract without the prior written approval of **CITY**.

23 CITY OWNERSHIP OF PROPRIETARY INFORMATION:

23.1 Any files, reports, histories, studies, tests, manuals, instructions, photographs, negatives, blue prints, plans, maps, data, system designs, computer programs, computer codes, and computer records (which are intended to be consideration under this Contract), or any other documents or drawings, prepared or in the course of preparation by **CONSULTANT** (or its subcontractors) in performance of its obligations under this Contract shall be the exclusive property of **CITY** and all such materials shall be delivered into **CITY** possession by **CONSULTANT** upon completion, termination, or cancellation of this Contract. **CONSULTANT** shall not use, willingly allow, or cause to have such materials used for any purpose other than performance of **CONSULTANT'S** obligations under this Contract without the prior written consent of **CITY**. Notwithstanding the foregoing, **CITY** shall have no proprietary interest in any materials licensed for use by **CITY** that are subject to patent, trademark or copyright protection.

23.2 **CITY** shall be permitted to retain copies, including reproducible copies, of **CONSULTANT'S** drawings, specifications, and other documents for information and reference in connection with this Contract.

23.3 **CONSULTANT'S** drawings, specifications and other documents shall not be used by **CITY** or others without expressed permission of **CONSULTANT**.

24 PUBLIC RECORDS:

24.1 Pursuant to Nevada Revised Statute 239.010, information or documents received from **CONSULTANT** may be open to public inspection and copying. **CITY** will have the duty to disclose unless a particular record is made confidential by law or a common law balancing of interests. **CONSULTANT** may clearly label specific parts of an individual document as a "trade

secret" or "confidential" in accordance with Nevada Revised Statute 332.061, provided that **CONSULTANT** thereby agrees to indemnify and defend **CITY** for honoring such a designation. The failure to so label any document that is released by **CITY** shall constitute a complete waiver of any and all claims for damages caused by any release of the records.

25 **CONFIDENTIALITY:**

25.1 **CONSULTANT** shall keep confidential all information, in whatever form, produced, prepared, observed or received by **CONSULTANT** to the extent that such information is confidential by law or otherwise required by this Contract.

26 **FEDERAL FUNDING:**

26.1 In the event federal funds are used for payment of all or part of this Contract:

26.1.1 **CONSULTANT** certifies, by signing this Contract, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency. This certification is made pursuant to the regulations implementing Executive Order 12549, Debarment and Suspension, 28 C.F.R. pt. 67, § 67.510, as published as pt. VII of the May 26, 1988, Federal Register (pp. 19160-19211), and any relevant program-specific regulations. This provision shall be required of every subcontractor receiving any payment in whole or in part from federal funds.

26.1.2 **CONSULTANT** and its subcontractors shall comply with all terms, conditions, and requirements of the Americans with Disabilities Act of 1990 (P.L. 101-136), 42 U.S.C. 12101, as amended, and regulations adopted thereunder contained in 28 C.F.R. 26.101-36.999, inclusive, and any relevant program-specific regulations.

26.1.3 **CONSULTANT** and its subcontractors shall comply with the requirements of the Civil Rights Act of 1964, as amended, the Rehabilitation Act of 1973, P.L. 93-112, as amended, and any relevant program-specific regulations, and shall not discriminate against any employee or offeror for employment because of race, national origin, creed, color, sex, religion, age, disability or handicap condition (including AIDS and AIDS-related conditions).

27 **LOBBYING:**

27.1 The parties agree, whether expressly prohibited by federal law, or otherwise, that no funding associated with this Contract will be used for any purpose associated with or related to lobbying or influencing or attempting to lobby or influence for any purpose the following:

27.1.1 Any federal, state, county or local agency, legislature, commission, counsel or board;

27.1.2 Any federal, state, county or local legislator, commission member, counsel member, board member, or other elected official; or

27.1.3 Any officer or employee of any federal, state, county or local agency; legislature, commission, counsel or board.

28 GENERAL WARRANTY:

28.1 **CONSULTANT** warrants that all services, deliverables, and/or work product under this Contract shall be completed in a workmanlike manner consistent with standards in the trade, profession, or industry; shall conform to or exceed the specifications as set forth in the incorporated attachments; and shall be fit for ordinary use, of good quality, with no material defects.

29 PROPER AUTHORITY:

29.1 The parties hereto represent and warrant that the person executing this Contract on behalf of each party has full power and authority to enter into this Contract. **CONSULTANT** acknowledges that this Contract is effective only after approval by the Carson City Board of Supervisors and only for the period of time specified in this Contract. Any services performed by **CONSULTANT** before this Contract is effective or after it ceases to be effective are performed at the sole risk of **CONSULTANT**.

30 ARBITRATION:

30.1 Any controversy of claims arising out of or relating to this Contract, or the breach thereof, provided both parties agree, may be settled by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association and judgment upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

31 GOVERNING LAW; JURISDICTION:

31.1 This Contract and the rights and obligations of the parties hereto shall be governed by, and construed according to, the laws of the State of Nevada, without giving effect to any principle of conflict-of-law that would require the application of the law of any other jurisdiction. **CONSULTANT** consents and agrees to the jurisdiction of the courts of the State of Nevada located in Carson City, Nevada for enforcement of this Contract.

32 ENTIRE CONTRACT AND MODIFICATION:

32.1 This Contract and its integrated attachment(s) constitute the entire Contract of the parties and such are intended as a complete and exclusive statement of the promises, representations, negotiations, discussions, and other Contracts that may have been made in

connection with the subject matter hereof. Unless an integrated attachment to this Contract specifically displays a mutual intent to amend a particular part of this Contract, general conflicts in language between any such attachment and this Contract shall be construed consistent with the terms of this Contract. Unless otherwise expressly authorized by the terms of this Contract, no modification or amendment to this Contract shall be binding upon the parties unless the same is in writing and signed by the respective parties hereto and approved by the Carson City Board of Supervisors.

CONTRACT FOR SERVICES OF INDEPENDENT CONTRACTOR
Contract No. 0809-100

33 **ACKNOWLEDGMENT AND EXECUTION:**

33.1 In witness whereof, the parties hereto have caused this Contract to be signed and intend to be legally bound thereby.

CARSON CITY
Finance Director
Attn: Sandy Scott, Purchasing & Contracts Coordinator
201 North Carson Street Suite 11
Carson City, Nevada 89701
Telephone: 775-887-2133 ext. 30137
Fax: 775-887-2107
SScott@ci.carson-city.nv.us

By: _____
SANDY SCOTT

DATED 8/12/08.

CITY'S LEGAL COUNSEL
Neil A. Rombardo, District Attorney

I have reviewed this Contract and approve as to its legal form.

By: _____
Deputy District Attorney

DATED 8-12-08.

CITY'S ORIGINATING DEPARTMENT
BY: Andrew Burnham, PW Director
Carson City Public Works Department
3505 Butti Way
Carson City, NV 89701
Telephone: 775-887-2355 Ext. 1001
Fax: 775-887-2112
ABurnham@ci.carson-city.nv.us

By: _____

DATED 8/12/08

CONTRACT FOR SERVICES OF INDEPENDENT CONTRACTOR
Contract No. 0809-100

Ira Rackley, P.E. deposes and says: That he is the **CONSULTANT** or authorized agent of the **CONSULTANT;** that he has read the foregoing Contract; and that he understands the terms, conditions, and requirements thereof.

CONSULTANT
BY: Ira Rackley, P.E.
TITLE: Associate Vice President
FIRM: Black and Veatch Corporation
CARSON CITY BUSINESS LICENSE #: 08-24336
Address: 503 North Division Street
City: Carson City **State:** Nevada **Zip Code:** 89703
Telephone: 775-720-0410/ **Fax #:** 775-283-0494
E-mail Address: rackleyis@bv.com

(Signature of **CONSULTANT**)

DATED Aug 11, 2008.

STATE OF Nevada)
) **ss**
County of Carson)

Signed and sworn (or affirmed) before me on this 11th day of August, 2008, by Ira Rackley, P.E.

(Signature of Notary)

(Notary Stamp)

JESSICA L. SANCHEZ
NOTARY PUBLIC
STATE OF NEVADA
No.07-2046-12 My Appt. Exp. Feb. 7, 2011

CONTRACT FOR SERVICES OF INDEPENDENT CONTRACTOR
Contract No. 0809-100

SAMPLE INVOICE

Invoice Number: _____
Invoice Date: _____
Invoice Period: _____

Carson City Contract Number: 0809-100
Carson City Contract Name: Calibrated Water Model and Integrated Water Supply Plan

Vendor Number: _____
Black and Veatch Corporation
503 North Division Street
Carson City, Nevada 89703

Invoice shall be submitted to:

Carson City Public Works
Attn: Karen White
3505 Butti Way
Carson City NV 89701

Line Item #	Description	Unit Cost	Units Completed	Total $$
			Total for this invoice	

Original Contract Sum $ _____
Less amount previously billed $ _____
= contract sum prior to this invoice $ _____
Less this invoice $ _____
=Dollars remaining on Contract $ _____

ENCLOSE COPIES OF RECEIPTS & INVOICES FOR EXPENSES & OUTSIDE SERVICES

CONTRACT FOR SERVICES OF INDEPENDENT CONTRACTOR
Contract No. 0809-100

CONTRACT ACCEPTANCE AND EXECUTION:

The Board of Supervisors for Carson City, Nevada at their publicly noticed meeting of August 21, 2008 approved the acceptance of **CONTRACT No. 0809-100**. Further, the Board of Supervisors authorizes the Mayor of Carson City, Nevada to set his hand to this document and record his signature for the execution of this contract in accordance with the action taken.

CARSON CITY, NEVADA

_____

MARV TEIXEIRA, MAYOR

DATED this 21st day of August, 2008

ATTEST:

_____

ALAN GLOVER, CLERK-RECORDER

DATED this 21st day of August, 2008

SCOPE OF WORK

Carson City has been awarded two grants by United States Environmental Protection Agency (USEPA) to help the City to fund studies on its water system. This scope of work is broken down into the two workplans presented to USEPA to fund this project:

Workplan for USEPA Grant 1 (Grant No. XP-98975301) - Hydraulic Modeling Services:

The purpose of this workplan is to provide the City with a hydraulic model properly documented and calibrated for static and extended period simulations. This model, in conjunction with the hydraulic analyses described in this workplan, will be used by the City to:

- Optimize the hydraulic performance of the conveyance, storage, and distribution facilities of its potable water system.
- Produce energy savings by optimizing pumping schedules to meet diurnal demands.
- Provide hydraulic analysis for the planning and design of water system facilities.
- Simulate blending scenarios to mitigate contaminants of concern.
- Provide facility analysis to specify treatment/blending, conveyance and distribution requirements to meet water demand conditions for the Base Year (2007), Intermediate Year (2020), and Build-Out Year (2030) demands.

The fee for the activities and deliverables included in this workplan is $ 520,000

Workplan for USEPA Grant 2 (Grant No. XP-96939101) - Integrated Water Supply and Facility Plan:

The goal or objective of this workplan is to provide the City with an Integrated Water Supply and Facility Plan (IWSFP). This Plan will provide the City with an integrated approach to reliably meet projected build-out water demands. Specifically, this IWSFP will:

1. Integrate identified potable and recycled water supplies to reliably meet future demands in a cost effective manner. This includes approaches such as the treatment of Carson River water obtained from water reclamation augmentation credits. Black & Veatch will coordinate reclaimed water considerations with the Cities wastewater consultant, BHC.
2. Provide a strategy to meet water quality regulatory requirements. In particular, this IWSFP will refine the recommendations produced in previous work for the optimum combination of blending/treatment to mitigate arsenic and uranium impacted zones.
3. Provide a system-wide strategy that will optimize the use of the individual water supply components between wet and dry climatic cycles. This IWSFP will also

provide recommendations on how to efficiently manage the system to minimize energy costs.

4. Provide a phasing plan and planning opinion of costs to serve as the basis for a Capital Improvements Program for the City's water System.

The fee for the activities and deliverables included in this workplan is $ 349,818.

The detailed workplans for both USEPA Grant 1 and USEPA Grant 2 are enclosed and are an integral part of this scope of work. The total fee for the activities and deliverables included in both workplans is $ 869,818.

Workplan for USEPA Grant 1 (Grant No. XP-98975301) Hydraulic Modeling Services

BACKGROUND

Over the last few years, Carson City has faced several challenges that can impact its ability to supply the current and future population with the necessary amount and quality of potable water. These challenges include:

- A continuing growth to a projected build-out population of 80,000 people.
- Drier than usual climate conditions.
- New, more stringent, drinking water regulations (e.g., arsenic and uranium rules).
- Higher operational and maintenance costs (e.g., energy costs, conveyance system materials, treatment systems).

Carson City has a growth ordinance that sets a cap on annual growth at a maximum of 3 percent per year. While this growth seems to have tapered off during the last several years, the City's supplies have experienced impacts due to new water quality regulations and the existing facilities have not been upgraded to meet new system demands. In particular, the City's distribution system experiences storage and pressure issues at several locations, particularly during high demand periods.

The Eagle Valley Basin has experienced a decline in well yields and drier than normal climate has limited available surface water resources and reduced groundwater recharge. This situation has apparent impacts to the overall production of water available from the City's existing water rights granted by the State's Engineer Office. The State Engineer has notified the City that a water supply plan will be required in the future.

Water quality monitoring results indicate that several wells in the City's potable water system have arsenic and uranium concentrations that exceed the current United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) of 10 µg/L for arsenic and 30 µg/L for uranium. Arsenic impacted wells include Wells 4, 7, 11, 24, 45, 47, 49, 53, and 54 and uranium impacted wells include Wells 6, 10B, 34, 46, 51, and 55. The City is currently in the process of constructing an arsenic treatment facility. However, this new facility will only treat groundwater produced by Wells 4 and 49.

As part of a previous project[1] with the City, Black & Veatch (Black & Veatch) is finalizing a Contaminant Mitigation Strategy (CMS), which includes grouping of wells into five groups for contaminant mitigation. It is Black & Veatch's understanding that the City desires to prioritize arsenic control in Well Group 1, which includes Wells 24A, 25B, 33, 40, 41, 44, and 47 and uranium mitigation in Well Group 4, which includes Wells 3, 5, 6, 7, 10B, 46, 48, 51, 55. For these groups of wells, the CMS recommends blending as the first step toward arsenic and

[1] Identification and Mitigation of Water Quality and Distribution Issues

uranium mitigation to meet water quality requirements. It is possible that, in some cases, blending may need to be followed by treatment to meet regulatory requirements. For arsenic, the recommended treatment will be either iron absorption columns or a coagulation and filtration system. For uranium, it is expected that the treatment will be ion exchange.

Due to higher energy costs, power costs from well pumping and treatment has increased to approximately $1.5 million per year.

Until recently and by efficiently and conjunctively operating its existing water resources and facilities, the City's Department of Public Works has been able to manage these challenges and continue providing adequate water quality and quantity to its population. However, it is clear that this situation is not sustainable and that the City will not be able to reliably provide adequate drinking water service unless the following specific actions are implemented:

- Improve its existing hydraulic model to identify the causes of hydraulic issues, optimize its operations, reduce operational costs, and provide sound planning to support the design of new facilities.
- Modify the existing water conveyance and distribution system to alleviate water quality issues as well as address water pressure and storage issues.
- Mitigate water quality issues via treatment and/or blending
- Increase the City supplies to meet future demands including firm supplies under drought conditions.

PROJECTS GOALS/OBJECTIVES

The purpose of this project is to provide the City with a hydraulic model properly documented and calibrated for static and extended period simulations. This model, in conjunction with the hydraulic analyses described in this workplan, will be used by the City to:

- Optimize the hydraulic performance of the conveyance, storage, and distribution facilities of its potable water system.
- Produce energy savings by optimizing pumping schedules to meet diurnal demands.
- Provide hydraulic analysis for the planning and design of water system facilities.
- Simulate blending scenarios to mitigate contaminants of concern.
- Provide facility analysis to specify treatment/blending, conveyance and distribution requirements to meet water demand conditions for the Base Year (2007), Intermediate Year (2020), and Build-Out Year (2030) demands.

DELIVERABLES/WORK PRODUCTS

This project will be conjunctively managed and developed with EPA grant XP-96939101. The specific deliverables/ work products associated with the tasks described in the following sections. A list of deliverables for this project includes the following:

1. The following workshops and supplemental materials
    a. WS1: Hydraulic Model Training Workshop, including:
        i. Training Materials on Hydraulic Modeling
        ii. CD with all WaterGems files required to run the Hydraulic Model (it does not include a WaterGems license)
    b. WS2: Hydraulic Analyses
    c. WS3: Energy Optimization
2. A Hydraulic Modeling Report including the following documents:
    a. TM1: Facility Inventory
    b. TM2: Demand Analysis and Projections
    c. TM3: Model Construction and Calibration
    d. TM4: Hydraulic Analyses
    e. TM5: Energy Optimization

PROJECT SCHEDULE

It is estimated that the timeframe to complete this project is twelve months from the issuance of the Notice to Proceed. A preliminary project schedule, broken down by the tasks described in the tasks section, is provided in Appendix A and includes timeframes for task completion and associated deliverables.

INCREMENTAL STEPS TO ACCOMPLISH THE WORK PRODUCTS (TASKS)

Black & Veatch has prepared a workplan with tasks specifically crafted to achieve the objectives described above with an integrated, methodical, and efficient approach. This workplan includes the following tasks:

Task A - Project Management

Task B - Hydraulic Model Update and Calibration

Task C - Hydraulic Modeling Support for work included in EPA Grant XP-96939101

These tasks are described in detail in the workplan provided below.

TASK A – PROJECT MANAGEMENT

Task A.1 - Administration and Invoicing

This task includes general administration duties associated with the project, including progress monitoring, scheduling, general correspondence, office administration, invoicing, and communication with City staff to execute work in accordance with scope, budget, and schedule.

Task A.2 - Project Procedures Manual

The Project Procedures Manual prepared for the "Evaluation and Mitigation of Water Quality and Hydraulic Issues" project will be updated. At a minimum, this manual will include updated information on project contacts, a project schedule, a project budget, a Quality Assurance/Quality Control (QA/QC) plan, and other information pertinent to this project execution.

Task A.3 - Meetings

A Kick-Off Meeting will be conducted with City staff. The purpose of the meeting will be to review the proposed workplan, schedule, staffing, and overall project organization.

Progress meetings will be conducted with City staff on a monthly basis or as needed. An agenda will be prepared and distributed to all attendees prior to each meeting.

Minutes will be prepared for all meetings and submitted within five working days. Twelve meetings are included in this task.

TASK B - HYDRAULIC MODEL UPDATE AND CALIBRATION

The purpose of this task is to update, calibrate, and properly document the City's existing WaterGEMs hydraulic model. In general, this work effort will 1) allow the model to be used for extended period simulations and 2) perform hydraulic analyses under current conditions of supply and demand.

Extended Period Simulation (EPS) refers to a method of hydraulic modeling, which tracks hydraulic parameters such as flow, pressure and tank levels, on a continuous basis over a period of time usually covering 24-hours or multiple days. EPS analyses are typically employed to simulate and analyze items such as reservoir fill and drain cycles, water age, source trace/blending, main flushing programs and energy conservation/pumping optimization. In comparison, a static model can analyze hydraulic conditions at a fixed point in time only, such as Peak Hour or Maximum Day + Fire Flow. Static models are valuable for many tasks, such as sizing pumps or pipes to meet one of these static conditions. However, EPS methodology is required for more complex analyses that must take dynamic conditions into account. EPS calibration generally also signifies a higher degree of overall model accuracy which will also benefit the static capabilities of the model. At present, the City's Base-Year model can perform static analyses, but it is not currently configured or calibrated to perform EPS analyses.

Under this task, the Base-Year model will be updated and calibrated to allow its use for EPS analyses as well as static runs under current conditions of supply and demand. The Base-Year model will then be conformed to include the proposed facilities for arsenic mitigation and uranium mitigation and their interaction with the distribution system will be analyzed to

determine the optimum configuration for these facilities. The following tasks are included in this workplan and are addressed in detail in the following sections.

Task B.1 - Data Collection and Compilation

Task B.2 - Demand Analysis and Projections

Task B.3 - Base-Year Model Update and EPS Calibration

Task B.4 - Buildout Model Extension and Demand Allocation

Task B.5 - Hydraulic Model Training

Task B.1 - Data Collection and Compilation

Task B.1.1 - Collect Data Files

Black & Veatch will prepare a Data Request List indicating current data required in order to perform the project work. It is anticipated that the following current data will be required:

- Water Production Records
- Metered Sales Records
- SCADA Records and Operating Logs
- Land Use Plan
- Facility Data
- Distribution Network Improvements

The Data Request List will indicate the desired data ranges and the preferred format (i.e., GIS shape file, AutoCAD drawing, Excel, Database, etc.).

City's responsibilities include locating/collecting/compiling the requested records and providing an electronic version to Black & Veatch.

Task B.1.2 - Prepare Facility Inventory Summary Memorandum

Using the existing model as well as additional plans, reports and records provided by the City, Black & Veatch will prepare a Facility Inventory Memorandum which will include a detailed inventory of the City's distribution system facilities including water production facilities, wells, treatment plants, pumping stations, pressure/flow control stations, reservoirs and metering facilities. To the extent available from City records and/or through discussions with City staff, system schematics, pump curves, equipment capacity and operational descriptions shall be compiled into a draft Facility Inventory Memorandum which will be provided to and reviewed by the City. Edits and revisions based on City comments will be incorporated into the final Facility Inventory Memorandum. This final Facility Inventory Memorandum will serve as a basis for system parameters and configurations in the Base-Year Model.

City's responsibilities include delivery of as-built plans, specifications and records from which Black & Veatch can construct simplified facility schematics and tabulate equipment capacity, curves and settings. City will also review the draft report and assist Black & Veatch with completion of missing data fields either through additional data supplied or based on staff's knowledge.

Task B.1.3 - Establish Digital Base Mapping.

Black & Veatch will produce the basic digital mapping/topographic files to be used as the basis for hydraulic modeling and the presentation of output results. Mapping will be prepared from GIS, CAD and other digital files received from the City and will include among other items:

- Incorporated City Boundaries
- Service Area Boundaries
- Pressure Zone Boundaries
- Land Use Plan
- Street Centerlines
- System Facility Locations
- Topographic Features and Elevation

City's responsibilities include delivery of data files with the above information in electronic GIS shape-file or AutoCAD format and with a compatible projection base.

Task B.1.4 - Geocode and Tabulate Metered Sales Records

Black & Veatch will geo-reference (by address or parcel data provided by the City in the electronic files) metered sales data and produce a shape file exhibit of the resulting meter locations. This shape file of geo-coded metered sales data will be used to develop demand unit rates and to guide the allocation of demands to the Base-Year water model. It is anticipated that a maximum of 40 hours of data cleaning will be needed to reach a goal of 90% or better (by sales volume) of the meters accurately located. The geocoded metered sales data will also be intersected with pressure zone polygons to determine existing demand by pressure zone.

City's responsibilities include compiling and delivery of metered sales records in shape file format using a projection which is compatible with other projected files such as streets, boundaries and the distribution system. Alternately, City may deliver metered sales records in excel or dbase format with a suitable hook (address or parcel number) which can link to street centerline or parcel maps, also provided in shape file format. Shape file or excel/dbase records shall also include indication of user class.

Task B.1.5 - Analyze SCADA Instrumentation Calibration Records

Model accuracy requires confirming that the City's SCADA instruments used for the hydraulic model calibration are calibrated and operating properly. The City will provide Black & Veatch with a current list of all distribution system SCADA instruments, identified by type, location and tag ID. Where available, a record of the instrument's calibration shall be provided showing the date, process and results of the most recent instrument calibration. Black & Veatch will select a set of instruments to be used in the calibration process of the hydraulic model and indicate any additional information that might be required to properly use the SCADA record for a particular instrument, which may include:

- Elevation of pressure sensing transducer
- Elevation of level sensing transducer
- Location of flow sensing units

- Confirmation of instrument output units, range and span

A list of the selected SCADA instruments to be used for the hydraulic model calibration will be included in the Facility Inventory Summary Report indicating calibration status, location and elevation to the extent that this information is available.

City's responsibilities include delivery of SCADA tag lists showing instrument, parameter and location for all distribution system flow, level and pressure instruments. City shall also provide instrument location details (elevation, etc) and calibration data (span, units, accuracy, etc) for all distribution system instruments. City staff will provide field survey / verification where needed to complete data for critical SCADA instruments.

Deliverables for Task B.1: TM1 - Facility Inventory

Task B.2 - Demand Analysis and Projections

Task B.2.1 - Historic Water Records Analysis and Base-Year Demands

Black & Veatch will compile and assess the water production records and SCADA data gathered in Task B.1.5 and will identify trends and peaking factors from an analysis of the past 5 years water production records including:

- Annual Average Day Demand (AAD)
- Max Day Demand (MDD) Factor
- Seasonal Monthly Demand Factors

Black & Veatch will also develop a 2008 Base-Year demands by applying the observed growth rate, (or rate specified by the City) to the geo-coded 2007 metered sales and tabulate AAD, MDD and Monthly Demand by individual pressure zone and City-wide total.

Task B.2.2 - Diurnal Curves

Black & Veatch will review available production records and SCADA data and select a representative high-demand day, with adequate data coverage and typical system operations, for use in EPS calibration. Black & Veatch will prepare a calibration day diurnal demand curve for each pressure zone or group of zones for which an isolated mass balance calculation can be performed. Preparation of a 24-hour zonal demand curve based on (supply +/- change in storage = demand) is also included in this task.

Black & Veatch will also identify a representative 14-day period in the record, with adequate data coverage and typical system operations and synthesize design diurnal curves for use in subsequent model scenarios, by averaging multiple diurnal curves over a 14-day period. Design diurnal curves, representing residential, non-residential or mixed-use diurnal demand patterns, shall be prepared for selected zones or groups of zones. Black & Veatch will also identify any significant weekday versus weekend patterns.

Task B.2.3 - Metered Sales Analysis and Unit Rates

Black & Veatch will develop demand unit rates for the range of residential and non-residential land uses contained within the City's Land Use Plan using the geo-coded metered sales records.

Residential meters will be sorted by single-family and multi-family designations and the sales records analyzed to determine gallons per day per dwelling unit (gpdu) rate demands. A range of residential gpdu unit rates will be developed for each different class of residential density in Carson City land use planning based on the metered sales analysis and typical

values. These gpdu rates will be converted to gallon per acre per day (gpad) rates by applying target densities for each residential class. Development of a typical residential seasonal curve based on monthly variations seen in the metered sales record is also included in this task.

Blocks of non-residential land, which will be filled at City buildout, will be identified with the help of City staff, and the projected sales meters with a geo-code within the identified polygon will be tabulated. The actual unit rate demands, in terms of gallons per acre per day (gpad) will be derived for the non-residential land use being analyzed based on observed metered sales records. Using these calculated unit rates as a guide, Black & Veatch will develop unit rates for the remaining non-residential uses in the City's Land Use Plan. Typical unit rates observed in similar municipalities, along with the City's planning guidelines such as allowable floor-to-area-ratio (FAR) will also be considered when formulating the design unit rates. Black & Veatch will also develop a typical non-residential seasonal curve based on monthly variations seen in the metered sales record.

Task B.2.4 - Projection of Future Demands

Black & Veatch will tabulate the acreage at buildout for each residential and non-residential land use class in the City's Land Use Plan and project buildout demands by applying the unit rates developed in Task B.2.3 to each of the land uses. Black & Veatch will also project intermediate demands, based on probable growth patterns and growth rates, and intersect land use with pressure zones. This task includes establishing Base-Year, Intermediate-Year and Buildout-Year demand projections by pressure zone.

Task B.2.5 - Demand Analysis and Projections

Black & Veatch will prepare a TM summarizing the analysis of the existing demands, development of diurnal curves and unit rates and the projection of future demands, and present and discuss a draft with the City. A final TM incorporating the City comments will be provided.

Deliverables for Task B.2: TM2 - Demand Analysis and Projections.

Task B.3 - Base-Year Model Update and EPS Calibration

Task B.3.1 - Network and Facilities Update

Base-Year Model facilities will be conformed to the record in the Facility Inventory created in Task B.1.2. The existing hydraulic model pipe network will serve as the starting point and will be updated to include recently completed pipelines, where indicated by the City, based on GIS shape-file records and/or quarter-section drawings provided by the City. This scope of services assumes that the current model network is generally complete and correct and that the network updates will result in no more than 5 percent increase in network length and maintain the same degree of skeletonization and reduction. Extensive, system-wide modifications to the existing hydraulic network or a complete re-import from GIS are not included in this scope of work.

Pressure zone boundaries within the model will be reviewed to confirm their correct location and all pipelines that connect from zone to zone will be identified. Connecting pipelines will be classified according to the method of cross-boundary flow control provided such as pressure-sustaining valve, flow-control valve, isolation valve, check valve, or none.

Boundary locations and flow regulation will be reviewed with City staff and adjustments/corrections made as noted. Where boundary conditions are not known or are unclear, field observations by the City will be recommended to confirm actual boundary locations and valve settings and the model will be adjusted in accordance with the observations provided.

Black & Veatch will summarize the data extraction, cleaning, and importation tasks utilized in updating the model pipe network from the City's GIS and provide recommendations for improvements to facilitate future network maintenance tasks. These observations and recommendations will be included in the Model Construction and Calibration Report (TM-3) and will also be addressed as a part of the training provided under the hydraulic model training task (Task B.5).

Task B.3.2 - Base-Year Demand Allocation

Black & Veatch will allocate the Base-Year demands using the GIS auto-allocator routines in WaterGEMs and the adjusted geo-referenced metered sales records compiled in Task B.1.4 (2007 metered sales records adjusted to reflect 2008 Base-Year demands). Black & Veatch will also assign the appropriate design diurnal curves per pressure zone and confirm via model output that the allocated demands and patterns match with those developed in Task B.2, both by zone and City-wide.

Task B.3.3 - EPS Calibration

Black & Veatch will allocate "Calibration-Day" demand sets and diurnal patterns to the model and conform facility settings to the operator's record for the Calibration Day. Black & Veatch will perform a 24-hour EPS run and compare model output in terms of flow, pressure and level with that recorded by the selected SCADA instruments. This task also includes the adjustment of model parameters and settings until a satisfactory level of calibration is achieved.

Outlying SCADA readings, associated with non-calibrated instruments or questionable data records will not be utilized in the calculation of Calibration percentages. Black & Veatch will prepare a TM displaying calibration results and discussing the adjustments made to the model and methods used to achieve calibration. Results shall include a graphic comparison of model output versus the SCADA record for the Calibration Day 24-hour period as well as a tabulation of the percent compliance within each band of accuracy.

Task B.3.4 - Base-Year Model Update and Calibration Report

A draft TM with initial calibration results will be presented to the City to discuss the degree of calibration achieved and the methods employed. Black & Veatch will provide recommendations to the City with respect to valve settings, facility parameters or other items that should be confirmed in the field. This task will also include necessary adjustments to the model per the City's findings and final calibration runs.

A final TM will be submitted to the City with the final Model Construction and Calibration Report.

Deliverables for Task B.3: TM3 - Model Construction and Calibration.

Task B.4 - Buildout Model Extension and Demand Allocation

As part of this task, Black & Veatch will create distribution networks for intermediate and buildout conditions, and demands will be allocated to the network. The Buildout Model will not be fully operational until water resources planning can provide guidance as to the source of new additional resources which are to be tapped in order to increase the models water production capacity. However, this effort will provide a guideline on where water will be needed in the future. It is assumed that identification of new water sources to meet future demands will be identified under a separate scope of work.

Task B.4.1 - Construct Intermediate-Year and Buildout Pipe Networks

A buildout hydraulic model will be constructed from the upgraded Base-Year model by extending a skeletonized network of distribution mains into currently undeveloped portions of the City's service area. The City's land use plan will be used as a guide for the extension of the distribution network. An Intermediate-Year model version will be created by scaling back the Buildout-Year model additions to access only those areas indicated by the City to be under development in the Intermediate Year.

Task B.4.2 - Allocate Buildout and Intermediate Year Demands

Buildout demands are to be auto-allocated to the buildout pipe network using the GIS based Land Use Plan and the established unit rates. Intermediate demands will be established by factoring the buildout demands to conform them to the projected Intermediate-Year demand total established in Task B.2.

Task B.5 - Hydraulic Model Training

Task B.5.1 - Hydraulic Model Training Materials

All TMs prepared under the tasks previously described along with the City's WaterGEMs Users manual will form the basic training materials for the City's hydraulic model. A CD copy of the updated WaterGEMs models will also be provided and utilized during the computer-based training session.

Task B.5.2 - Hydraulic Model Training Workshop

A two-day workshop will be provided to City staff to familiarize them with the features of the City's WaterGEMs model. It is assumed that the City owns a licensed copy of WaterGEMs and that those attending have a basic understanding of the WaterGEMs software, thereby allowing the training to focus on the specific features programmed into the model, which make it an accurate reflection of the Carson City distribution system.

Training topics will include:

- Model Construction
- Model Network Maintenance
- Demand Allocation
- Facility Modeling
- Model Run Parameters
- Model Output Interpretation

Deliverables for Task B.5: WS1 – Hydraulic Model Training Workshop, Training materials, and City's Hydraulic Model files.

TASK C - HYDRAULIC MODELING SUPPORT

Hydraulic modeling plays a critical role in the development of a complete system of water production, transmission, and distribution infrastructure. Black & Veatch will use the City's WaterGEMs hydraulic model after completing the work to update, allocate and calibrate, the model as per EPA Grant XP 98975301. In general, the following tasks will involve a series of static and extended period simulations (EPS) designed to:

a. Configure the distribution system to utilize the identified resources to meet projected demands, while providing adequate service pressure.

b. Configure the transmission system to deliver the identified resources from the points of production to the points of entry into the distribution system, independent of distribution system zonal operations.

c. Provide recommendations on how to operate the transmission and distribution systems to minimize energy expenses.

d. Provide an analysis of the effectiveness of blending scenarios for Arsenic and Uranium.

e. This modeling support will consider the Base Year as 2007, Intermediate Year as 2020, and Build-out year as 2030.

As part of this project, the following hydraulic analysis tasks will be performed.

TASK C.1 - Steady State Hydraulic Analyses

Black & Veatch will perform steady state (static) hydraulic analyses of the distribution system utilizing the Base-Year, Intermediate and Build-Out models. For each phase, the model will be used to identify stress and determine necessary improvements under:

- Peak Hour Conditions.
- Seasonal or Emergency Supply Variations

Hydraulic stress will be identified on the basis of areas noted for low pressures and/or high velocity. Proposed improvements, which are to be incorporated and analyzed may include:

- Augmenting hydraulic capacity through looping, paralleling and replacing with new or larger diameter distribution pipelines.
- Adding new interzonal PRVs and/or modifying the control parameters for existing interzonal PRVs.
- Augmenting existing storage/booster capacity and/or installing new storage/booster facilities.

Black & Veatch will prepare graphic and tabular exhibits of the model output for review with City staff in a workshop (WS2). The exhibits will identify the locations where hydraulic stress was found to occur and the improvement in performance following the incorporation of system improvements.

TASK C.2 - Fire Flow Analysis

Once the basic static modeling is completed (Task C.1), Black & Veatch will perform a fire flow analyses utilizing the automated routines available in WaterGems. The analysis will identify locations (nodes) within the model where the design residential and commercial fire-flow can not be delivered at a minimum residual pressure (typically 20-psi). Flow and pressure will be reported at model nodes, not specific actual fire hydrants. The model will however be configured to account for hydrant losses at a typical hydrant set-up. The design residential and commercial fire flow rates will be as provided/stipulated by the City's Fire Marshall. Model outputs will be used to:

- Revise the diameter upward, where necessary, for proposed new distribution system pipelines so that the required fire flow can be achieved at nodes along the new pipelines.
- Indicate areas of existing network piping where the design fire-flow can not currently be achieved. However, the re-configuration of existing residential and commercial network piping in order to meet the design fire-flow is not included in this scope of work.

Black & Veatch will provide the City with model output plots and tables showing the available fire flow for new and existing network pipelines within the system as part of a workshop (WS2).

TASK C.3 - EPS Analyses

Black & Veatch will perform extended period simulations (EPS) of the distribution system utilizing the Base-Year, Intermediate and Build-Out models. For each phase, the model will be used to identify stress and determine necessary improvements under:

- Max Day – Normal Supply Conditions.
- Max Day – Drought Supply Conditions
- ADD or Min Month – Normal Supply Conditions

As a result of the model runs, Black & Veatch will identify where system improvements are needed to meet reservoir refill requirements. Black & Veatch will also use the EPS output to confirm the degree to which blending can be used at specific locations (called for in TM2 - Facility Plan, to be produced concurrently with this project under separate City/EPA funding) for treatment of arsenic or uranium contaminated groundwater. Proposed improvements, which are to be incorporated and analyzed may include:

- Increasing pumping capacity at stations that feed water tanks and/or modifying pumping patterns.
- Adding new interzonal PRVs and/or modifying the control parameters for existing interzonal PRVs.
- Augmenting and/or relocating storage/booster facilities.
- Providing direct fill capacity through new transmission system pipelines, independent of distribution, configured to connect production facilities (wells and water treatment plants) to storage facilities.
- Modifying the input point for arsenic and uranium contaminated wells to enhance the available blending capacity.

Black & Veatch will prepare graphic and tabular exhibits of the model output for review with Utility personnel in a workshop (WS2). The exhibits will identify the locations where reservoir refill capacity is inadequate and system improvements are required to balance production and storage refill throughout all zones of the distribution system. Model output will also be used to quantify the blending capacity for proposed blending facilities.

TASK C.4 - Transmission System Hydraulic Analyses

Black & Veatch will build a model of the transmission system which conforms to the Facility Plan and Water Production Plan and meets the reservoir refill requirements identified in the EPS hydraulic analyses. The Transmission System may include elements of the Tri-County Transmission Main (TCTM) and the East-West Transmission Main which have been proposed in previous studies. The model will be constructed utilizing WaterGems and a series of static runs will be performed to analyze transmission capacity under:

- Max Day – Normal Supply Conditions.
- Max Day – Drought Supply Conditions
- ADD or Min Month – Normal Supply Conditions

As a result of the model runs, Black & Veatch will refine the transmission system elements required to connect production facilities to distribution system storage. Specifically, this task will identify:

- Transmission system configuration (location, alignment and capacity) for pipelines, pumps, and control valves.
- Hydraulic gradeline, pressure, and flowrate for each portion or segment of the transmission system.
- Basic control settings (pressure, level, flowrate) for each portion of the transmission system.

Black & Veatch will prepare graphic and tabular exhibits of the transmission system and hydraulic model outputs for review with City staff during a workshop (WS2). During this workshop, the system's hydraulic performance under the range of conditions analyzed in this task will be presented.

TASK C.5 - Hydraulic Analyses Workshop and Technical Memorandum

Black & Veatch will present the hydraulic analysis results and the recommended improvements to City staff in a Hydraulic Analysis Workshop. Following the workshop, Black & Veatch will revise the Transmission System and Distribution System models and rerun those analyses where required by the City to revise the methodology, correct errors or to explore alternative configurations, which may yield more favorable results. Following the workshop, a technical memorandum will be prepared, which will include exhibits, plots, printouts and descriptions clearly indicating the deficiencies found and the reasons for the recommended infrastructure improvements. This technical memorandum will be the guide used for the preparation of the CIP and the IWSFP Report.

Deliverables for Task - C.5: WS2 and TM4 – Hydraulic Analyses.

Task C.6 - Energy Optimization

Once the basic transmission, storage, and distribution system configuration and operation plans have been developed, Black & Veatch will use the hydraulic model to identify storage

availability to simulate pumping strategies that will meet water demands at reduced energy costs. Hydraulic simulations will be used to optimize the timing and the duration of pumping operations to maximize energy consumption during off-peak diurnal periods. Specifically, alternate pumping plans will be analyzed to see if pumping can be shifted to off-peak times, while still meeting reservoir refill requirements. In some cases, increased pumping capacity and/or reservoir volume may be required to ensure that reservoir drain and refill can be accomplished on the alternative pumping schedule. Specifically, as part of this task, Black & Veatch will:

- Identify incentives for off-peak energy consumption proposed by the electric utility.
- Update hydraulic model to extract the time of pump operation and associated costs.
- Perform hydraulic analyses simulating a range of various pump control strategies (scenarios) with potential for energy cost reductions.
- Propose modifications or improvements to the distribution system with potential to reduce energy expenditures associated with pumping operations. Alternative pumping schedules and control settings will be developed and presented to City staff for consideration.

To accomplish the objective of this task, the City will provide the following information

- Provide information describing power demands produced by the different pumping systems within the City's water distribution system.
- Provide cost incentives proposed by electric utility for energy consumption during off-peak periods.
- Provide operation/control restrictions or preferences for pumping station operation and storage/turnover in reservoirs.

Energy saving infrastructure improvements will be incorporated into the recommended CIP where agreed by the City.

Black & Veatch will present a workshop to City staff on energy optimization opportunities with the results of this task and will produce a TM on energy optimization.

Deliverables for Task - C.6: WS3 and TM5 - Energy Optimization.

PROJECT BUDGET

The project budget enclosed in Appendix B provides a breakdown of the costs associated with the work products and tasks described in this workplan.

SOURCE OF MATCHING FUNDS

As required by the Appropriations Act, the City will provide matching funds for the 45 percent of the total cost of this project or $ 234,000 of the total cost of $520, 000.

MEASURES USED TO EVALUATED THE SUCCESS OF THE WORK PRODUCTS AND ENVIRONMENTAL BENEFITS AND OUTCOMES

The modeling will provide an essential planning/design tool to model hydraulic scenarios to efficiently mitigate water quality and hydraulic issues in the City's water system. The ultimate environmental outcome is to provide enough safe water to Carson City using facilities that are energy efficient and with a reduced carbon footprint. This will be accomplished through a more efficient and reliable conveyance, storage, and distribution facilities to mitigate water quality and distribution issues.

In particular, it is anticipated that the recommendations produced during the execution of modeling activities proposed will help the City to plan economical and energy efficient solutions for its water system and support the City's master planning activities.

Given the nature of this project, the success of the work products and environmental benefits and outcomes will be evaluated by assessing how the technical memoranda and reports address the objectives of this project.

LOCATION MAP

The location map of the water system, which is the focus of this project, is provided in Appendix C.

REPORTING

The project will prepare Quarterly Reports. The last Quarterly Report will serve as a Final Report. Quarterly Reports will include an executive summary of work done to date and how effective the project was in achieving the stated environmental and public health objectives. Quarterly Reports will also include any deliverable produced during the reporting quarter. Per EPA guidance, the following quarterly report schedule will be followed:

Reporting Period	Report Due Date
January 1 - March 31	April 30
April 1- June 30	July 31
July 1 - September 30	October 31
October 1 - December 31	January 31

GRANT 1 APPENDIX

APPENDIX A

Preliminary Project Schedule

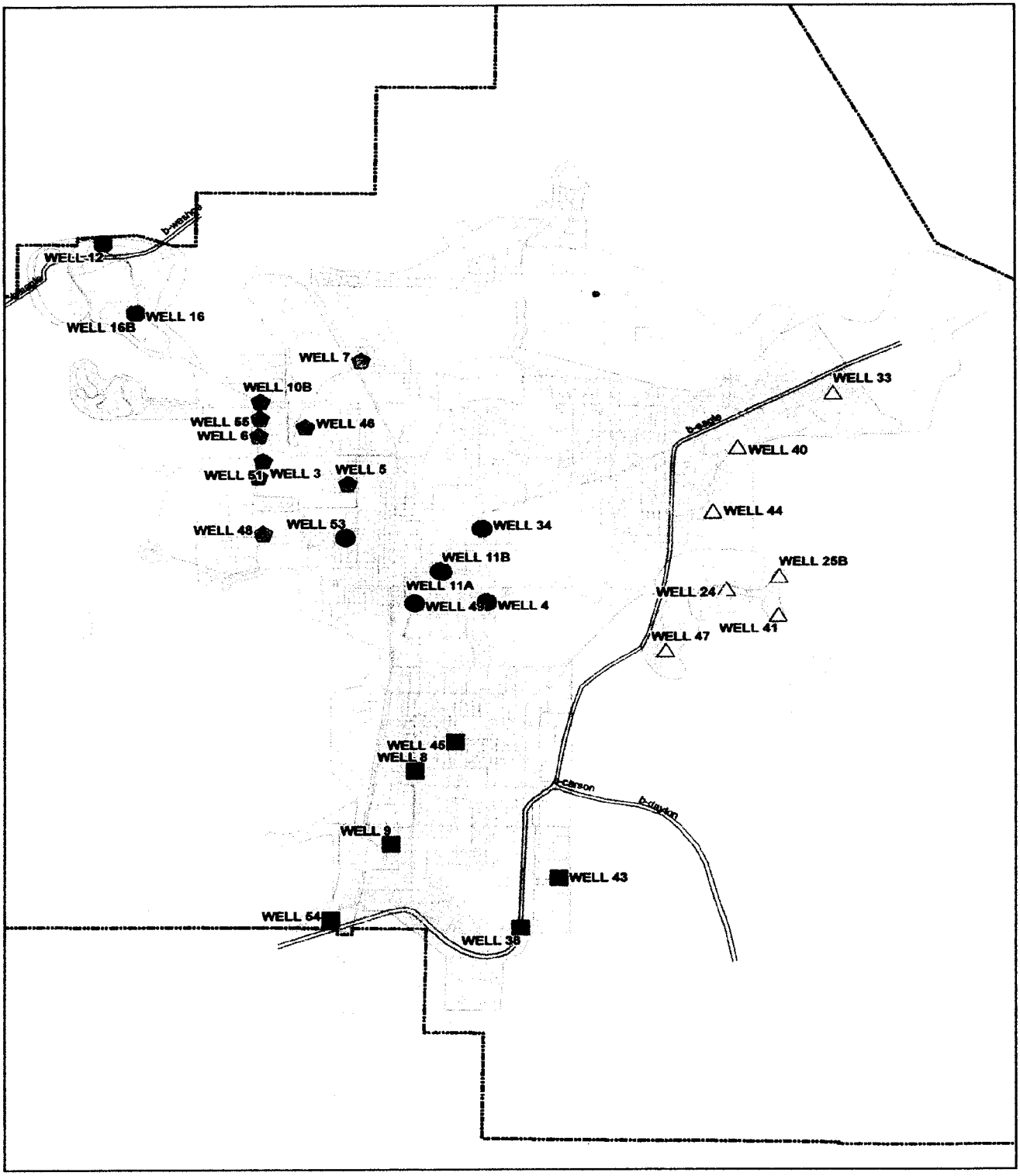
Carson City Water System Hydraulic Modeling

TASK	DESCRIPTION	MONTH											
		1	2	3	4	5	6	7	8	9	10	11	12
A	**PROJECT MANAGEMENT**												
A.1	Administration and Invoicing												
A.2	Project Procedures Manual												
A.3	Meetings												
B	**HYDRAULIC MODEL UPDATE AND CALIBRATION**												
B.1	Data Collection and Compilation												
B.2	Demand Analysis and Projections												
B.3	Base-Year Model Update and EPS Calibration												
B.4	Build-out Model Extension and Demand Allocation												
B.5	Hydraulic Model Training												
C	**HYDRAULIC MODELING SUPPORT**												
C.1	Steady State Hydraulic Analyses												
C.2	Fire Flow Analysis												
C.3	EPS Analyses												
C.4	Transmission System Hydraulic Analyses												
C.5	Hydraulic Analyses Workshop and Technical Memorandum												
C.6	Energy Optimization												

APPENDIX B
Project Budget
Carson City Water System Hydraulic Modeling

Task	Task Description	Labor Hours	Labor Cost	Expenses	Total Fee (Rounded)
A	**Project Management**	**437**	**$84,262**	**$594**	**$85,000**
A.1	Administration and Invoicing	269	$49,202	$0	$49,202
A.2	Project Procedures Manual	8	$1,060	$0	$1,060
A.3	Meetings	160	$34,000	$594	$34,594
B	**Hydraulic Model Improvements and Calibration**	**1,504**	**$205,840**	**$6,880**	**$213,000**
B.1	Data Collection and Compilation	348	$46,880	$2,740	$49,620
B.2	Demand Analysis and Projections	404	$55,200	$500	$55,700
B.3	Base-Year Update and EPS Calibration	456	$62,080	$500	$62,580
B.4	Buildout Model Update	144	$20,760	$500	$21,260
B.5	Hydraulic Model Training	152	$20,920	$2,640	$23,560
C	**Hydraulic Modeling Support**	**1,376**	**$205,040**	**$17,340**	**$222,000**
C.1	Steady State Hydraulic Analysis	240	$33,800	$2,740	$36,540
C.2	Fire Flow Analysis	100	$15,240	$2,740	$17,980
C.3	EPS Analysis	320	$44,400	$2,740	$47,140
C.4	Transmission System Hydraulic Analysis	180	$26,600	$2,740	$29,340
C.5	Hydraulic Analysis Workshop and Technical Memorandum	184	$24,960	$3,240	$28,200
C.6	Energy Optimization	352	$60,040	$2,540	$62,580
	TOTALS	**3,317**	**$495,142**	**$24,814**	**$ 520,000**

APPENDIX C



N
W E
S

0 4,500 9,000
Feet

1 inch equals 4,500 feet

Data source: City of Carson City GIS

LEGEND

- Well Group 1
- Well Group 2
- Well Group 3
- Well Group 4
- Well Group 5

Project Area Map

Water Distribution System Utilities

Carson City, NV

BLACK & VEATCH
Building a world of difference

Cygnet 149289 C. Hassell 10 Jan 2008

Workplan for USEPA Grant 2 (Grant No. XP-96939101) Integrated Water Supply and Facility Plan:

BACKGROUND

Introduction

With the increasing cost and scarcity of new water supplies coupled with emerging water quality issues, Carson City must consider all options and have a sustainable approach to meet current and future needs of its customers. Carson City has recognized this situation and plans to address this matter via a new Integrated Water Supply and Facility Plan (IWSFP) that identifies and optimizes the use of both raw water and recycled water resources and provides a roadmap for future supplies and facilities. This IWSFP will:

1. Integrate identified potable and recycled water supply to reliably meet future demands in a cost effective manner,

2. Provide a reliable supply that will meet water quality regulatory requirements, and

3. Provide a system-wide water management program that will optimize the management and use of the individual water supply components between wet and dry climatic cycles.

4. Provide a phasing plan and planning cost estimate to serve as the basis for a Capital Improvements Program for the City's water System.

The sustainable water planning proposed here encompasses the actions necessary to promote sustainable water use and management, and achieve a maintainable state in water supply, water quality, water resources, watersheds, and ecosystems. This sustainable planning approach provides a balance between environmental, economic, and socio-cultural aspects.

Relevant Planning Efforts to Date

Carson City has conducted a significant amount of planning work for its water supply and water recycling systems. Black & Veatch understands that it is important to take advantage of the value already created to date and plans to fully integrate the knowledge embedded in previous planning work into the IWSFP. Black & Veatch is aware of the following recent documents that may provide a basis for future planning:

- Water System Master Plan – (B&C, July 2008)
- Identification and Mitigation of Water Quality and Distribution Issues (B&V, July 2008)
- Carson City Wastewater Reclamation Plant Flow Analysis (BHC Consultants, June 2007)
- Water Resources And Service Reliability Report (2007)
- Arsenic Compliance Implementation Plan (B&C, June 2006)

- Reuse Master Plan Update (BHC Consultants, March 2006)
- Reuse Master Plan Update – Project Review Meeting (BHC Consultants, March 2006)
- Carson City Water Rights Assessments – Letter Report prepared for the State of Nevada, Division of Water Resources (Carson City Development Services, 2002)

Besides previous planning efforts, Black & Veatch will upgrade, under a separate contract, the existing water system hydraulic model. This model, once completed, will be used for all modeling work requested by Carson City and will be used to develop the IWSFP.

Water System Issues

Over the last few years, Carson City has faced several challenges that can impact its ability to supply the current and future population with the necessary amount and quality of potable water. These challenges include:

1. A continuing growth to a projected build-out population of 80,000 people.
2. Drier than usual climate conditions.
3. Increased demand for water supply from limited water resources.
4. Identification of firm future water supplies for meeting demands during prolonged dry climatic periods.
5. New, more stringent, drinking water regulations (e.g., arsenic and uranium rules)
6. Higher operational and maintenance costs (e.g., energy costs, conveyance system materials, treatment systems).

Carson City has a growth ordinance that sets a cap on annual growth at a maximum of 3 percent per year. While the growth rate seems to have tapered off during the last several years, significant growth has occurred in the preceding decade, the City's supplies have experienced impacts due to new water quality regulations and the existing facilities have not been upgraded to meet new system demands. In particular, the City's distribution system experiences storage and pressure issues at several locations, particularly during high demand periods.

The Eagle Valley Basin has experienced a decline in well yields and drier than normal climate has limited available surface water resources and reduced groundwater recharge. This situation has apparent impacts to the overall production of water available from water rights granted by the State's Engineer Office. The State Engineer has notified the City that a water supply plan will be required in the future.

Water quality monitoring results indicate that several wells in the City's potable water system have arsenic and uranium concentrations that exceed the current United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) of 10 μg/L for arsenic and 30 μg/L for uranium. Arsenic impacted wells include Wells 4, 7, 11, 24, 45, 47, 49, 53, and 54 and uranium impacted wells include Wells 3, 6, 10B, 34, 46, 51, and 55. The City is currently in the process of constructing an arsenic treatment facility. However, this new facility will only treat groundwater produced by Wells 4 and 49.

As part of a previous project[1] with the City, Black & Veatch identified the need to develop a water supply plan capable of meeting the city demands during drought and prolonged dry climatic periods.

Available and New Water Supplies

Table 1 provides a preliminary tabulation of the water supply elements known to date, which will be considered in this work. All water quantities are estimates and are to be refined during this project.

Table 1
Preliminary Tabulation of Carson City Water Supply Elements (MGD)

Element	Element Description	Normal Climatic Conditions	Drought or Dry Climatic Conditions
1	Existing Eagle Valley GW wells	20.4	16.3
2	New South Carson Wells	1.7	1.7
3	Carson Valley GW rights	1.6	1.6
4	New Eagle Valley GW Wells	3.9	3.1
5	East Slope Tributaries	1.5	0.7
6	Existing Marlette-Hobart	2.5	0.5
7	New Marlette-Hobart	4.0	0.0
8	Carson River Augmentation	6.0	6.0
	Total Water Supplies (Estimated)	**41.6**	**30.0**
	Total Estimated Demand	**34.5**	**34.5**

Other supplies identified and quantified during the development of this project will also be considered.

PROJECTS GOALS/OBJECTIVES

The goal or objective for this project is to provide the City with an Integrated Water Supply and Facility Plan (IWSFP). This Plan will provide the City with an integrated approach to reliably meet projected build-out water demands. Specifically, this IWSFP will:

1. Integrate identified potable and recycled water supplies to reliably meet future demands in a cost effective manner. This includes novel approaches such as the treatment of Carson River water obtained from water reclamation augmentation

[1] Identification and Mitigation of Water Quality and Distribution Issues

credits. Black & Veatch will coordinate reclaimed water considerations with the Cities wastewater consultant, BHC.

2. Provide a strategy to meet water quality regulatory requirements. In particular, this IWSFP will refine the recommendations produced in previous work for the optimum combination of blending/treatment to mitigate arsenic and uranium impacted zones.

3. Provide a system-wide water management program that will optimize the management and use of the individual water supply components between wet and dry climatic cycles. This IWSFP will also provide recommendations on how to efficiently manage the system to minimize energy costs.

4. Provide a phasing plan and planning cost estimate to serve as the basis for a Capital Improvements Program for the City's water System.

DELIVERABLES/WORK PRODUCTS

This project will be conjunctively managed and developed with EPA grant XP-98975301. The deliverables of this project will include workshops, a series of technical memoranda (TMs), and a report. Each document will include an executive summary. The list of deliverables for this project includes:

1. The following workshops:
    a. WS1: Identification, Quantification, and Analysis of Water Supply Options
    b. WS2: Infrastructure Plan
    c. WS3: Water Production Plan
    d. WS4: Hydraulic Analyses
    e. WS5: Energy Optimization
    f. WS6: Basis for Capital Improvement Program
2. The following technical memoranda:
    a. TM1: Identification, Quantification, and Analysis of Water Supply Options
    b. TM2: Infrastructure Plan
    c. TM3: Water Production Plan
    d. TM4: Hydraulic Analyses
    e. TM5: Energy Optimization
3. A Report with the Integrated Water System Master Plan

All the documents described above, with the exceptions of the workshop material, will be initially presented to the City in draft form for their review. After receiving the City's feedback on their review of the draft document, Black & Veatch will issue a final version of each document that will address the City's comments and incorporate the City's suggestions.

PROJECT SCHEDULE

It is estimated that the timeframe to complete this project is twelve months from the issuance of the Notice to Proceed. A preliminary project schedule, broken down by the tasks described in the tasks section, is provided in Appendix A and includes timeframes for task completion and associated deliverables.

INCREMENTAL STEPS TO ACCOMPLISH THE WORK PRODUCTS (TASKS)

Black & Veatch has prepared a workplan with tasks specifically crafted to achieve the objectives described above with an integrated, methodical, and efficient approach. This workplan includes the following tasks:

Task A - Project Management

Task B - Water Supply Options and Production Facilities

Task C - Hydraulic Modeling Support

Task D - Integrated Water Supply and Facility Plan

These tasks are described in detail in the workplan provided below.

TASK A – PROJECT MANAGEMENT

Task A.1 - Administration and Invoicing

This task includes general administration duties associated with the project, including progress monitoring, scheduling, general correspondence, office administration, invoicing, and communication with City staff to execute work in accordance with scope, budget, and schedule.

Task A.2 - Project Procedures Manual

The Project Procedures Manual prepared for the "Evaluation and Mitigation of Water Quality and Hydraulic Issues" project will be updated. At a minimum, this manual will include updated information on project contacts, a project schedule, a project budget, a Quality Assurance/Quality Control (QA/QC) plan, and other information pertinent to this project execution.

Task A.3 - Meetings

A Kick-Off Meeting will be conducted with City staff. The purpose of the meeting will be to review the proposed workplan, schedule, staffing, and overall project organization.

Progress meetings will be conducted with City staff on a monthly basis or as needed. An agenda will be prepared and distributed to all attendees prior to each meeting.

Minutes will be prepared for all meetings and submitted within five working days. Twelve meetings are included in this task.

TASK B –WATER SUPPLY OPTIONS AND PRODUCTION FACILITIES

Our approach to developing an IWSFP involves a comprehensive analysis at the water resource elements and facilities required to place them into production. In general, it follows

the procedures recommended in the AWWA M50 Manual (Water Resources Planning), and has been tailored to meet Carson City's specific needs. The following tasks are included.

Task B.1 – Identification, Quantification, and Analysis of Water Supply Options

Black & Veatch will work with City staff and the City's water resources consultant to develop a portfolio of the water resources available for meeting current and future potable water demands. In addition to those surface and groundwater resources already accounted for, it is anticipated that the following potential additional resources will be also assessed:

- Potential water exchange programs between existing City water supply wells with lower water quality and existing agricultural surface water uses within the City. The surface water received in the exchange would be received at the Quill WTP.
- Potential water exchange between existing City water supply wells with lower quality and existing effluent reuse programs on existing golf courses within the City. The effluent made available through this exchange would be utilized to supplement potable water supplies through the Carson River augmentation program.
- Assess and recommend options for a water supply augmentation program using NPDES permitted effluent to the Carson River exchanged for a like amount of Carson River water supply. This type of augmentation program is currently used in other urban areas within the State and will be investigated for its feasibility as a water supply option for Carson City. This will include the assessment of surface water treatment vs. groundwater extraction for the Carson River augmentation credits.
- Transferred water from other purveyors/purchased water from other suppliers (including public-private partnerships)
- Assess opportunities for water exchanges other purveyors/purchased water from other suppliers (including public-private partnerships – e.g., Vidler Water).

Once established, the identified water resources elements become the basis for development of the production facilities (wells and water treatment plants), which will be utilized to meet demands during normal and drought conditions. Specifically, this task will:

- Identify the specific resources to be utilized, whose sum meets the projected demand at each phase of the project (Base Year, Intermediate, and Buildout).
- Establish the origin/location where each resource will be obtained and the mechanism by which it will be produced.
- Establish the type of treatment required, if any, for each resource element based on known or assumed water quality.
- Establish constraints (legal, hydraulic, and/or seasonal) affecting each resource's availability.
- Identify the susceptibility to and the response of each element under drought conditions.

As a part of the effort to identify and tabulate future water supplies, Black & Veatch will address relevant water resources management issues during normal supply and dry climatic periods including the following:

- Conjunctive management programs between available surface water sources and the use of groundwater sources.
- Groundwater aquifer storage and recovery (ASR) programs. This includes maximizing the use of surface waters when available and relaxing groundwater use during normal climatic periods. This ASR program will account for the known zones of arsenic and uranium impacted groundwater zones.
- Drought levels at which supply would fall short of projected demands and demand management would be become necessary.

Recycled water is a key water resource and will be considered in this project. The assessment of the quantity of reclaimed water, which will be available for conjunctive uses such as exchanges or augmentation programs, Black & Veatch will:

- Confirm future reclaimed water production levels based on historical wastewater flows and land uses from previous work.
- Calculate the portion of reclaimed water production, which is available for potable supply augmentation (via recharge, exchange, or other processes) by subtracting direct reuse (after updating to reflect new exchanges).

Black & Veatch will present the results of this task to City staff in a workshop (WS1). After the workshop, Black & Veatch will prepare a technical memorandum with the analyses and results of this task.

Deliverables for Task B.1: WS1 and TM1 - Identification, Quantification, and Analysis of Water Supply Options.

Task B.2 – Development of Production Facilities Infrastructure

To utilize the resources identified in the Task B.1, new water production facilities will be required such as wells, well fields, groundwater and surface water treatment plants, transmission lines and pumping stations. It is anticipated that these new facilities will be primarily associated with developing the following resources:

- Carson River Augmentation/Water Exchanges
- Marlette – Hobart Resources
- Carson Valley Groundwater
- Eagle Valley Groundwater
- Dayton Valley Groundwater

The purpose of this task is to define at a conceptual level, the infrastructure required to produce the potable water and deliver it to the point of input to the distribution system. For each new source, a conceptual infrastructure package will be developed to produce the water, treat as necessary, and deliver it to the required point of entry into the Carson City distribution system. It is anticipated that the new production facilities will consist of the following basic elements:

- **Carson River Augmentation/Water Exchanges**. New production facilities may include pipelines and pumping stations associated with groundwater and reclaimed water transfers, river bank extraction well fields and/or surface water intakes, surface water treatment plants and finished water pumping stations and delivery pipelines. The conceptual design will address the potential participation and co-ownership by other agencies or private entities.
- **Marlette–Hobart Resources.** New production/transmission facilities for the Marlette-Hobart Water Project are defined as a part of the State Water Project. They will be presented herein, in the form of a map, schematic and brief description.
- **Carson Valley Groundwater.** New production/transmission facilities will include the ability to deliver supply from the Cities future Carson Valley wells, transmission pipeline, and pumping stations. The conceptual design will address the participation and co-ownership by other agencies.
- **Eagle Valley Groundwater.** New production facilities may include well, well-field pipelines, well-head or centralized groundwater treatment facilities and discharge pipelines associated with the production of Eagle Valley Groundwater.

For each system, a conceptual planning package will be developed which addresses:

- Facility siting and pipeline alignments.
- General configuration and basic process and operating philosophy.
- Planning level design criteria for pipelines and pumping stations.
- Estimated capital cost of key elements
- Environmental and Institutional concerns

Where viable alternatives exist in the manner that one or more of the new resources are to be developed, they will be analyzed and the preferred alternative selected utilizing a weighted matrix ranking with criteria such as capital cost, operating cost, ease of operation, institutional complexity, reliability, drought resistance, etc. Black & Veatch will develop a conceptual plan of each water production system (including alternatives) and bring the preliminary findings to a workshop for presentation and discussion with City staff.

Black & Veatch will present the analyses and results of this task to City staff in a workshop (WS2). The conceptual facility plans and alternative ranking will be modified as per the City's direction and Black & Veatch will prepare a technical memorandum with the recommended production facilities associated with each of the new water resource elements. Black & Veatch, if requested by the City, will participate in a public meeting concerning the water production facilities.

Deliverables for Task - B.2: WS2 and TM2 - Infrastructure Plan

Task B.3 – Water Production Plan

Water Production Plans (detailed spreadsheets) will be prepared based upon the identified water resources and associated water production facilities. The Water Production Plans will provide a detailed seasonal operating plan, showing anticipated production levels for each supply element (wells, well fields, groundwater and surface water treatment plants, regional facilities, etc,) which:

1. In total, can meet the projected demand for any day or seasonal condition.
2. When extended over a 12-month period, operate within the constraints of annual resource allocations.

Water Production Plans will be prepared which respond to both normal-year and drought-year resource availability and to Base-Year, Intermediate Year, and Buildout demand projections. The completed Water Production Plans will serve as the hydraulic modeler's guide for:

- Configuration of the Transmission System Model, which will move water from the supply origin to points of entry into the distribution system. The transmission system operates independently of distribution system zone piping.
- Configuration of the Distribution System Model, once the points of entry have been defined for each element of the water resources portfolio.
- Establishing production settings for wells, well-groups, water treatment plants, transmission pipelines, pumping stations, etc which are to be incorporated into both the Distribution System Model and the Transmission System Model under the various Base-Year, Intermediate, and Buildout scenarios to be analyzed.

Black & Veatch will present the analyses and results of this task to City staff in a workshop (WS2). Black & Veatch will prepare a technical memorandum with the analyses and results of this task.

Deliverables for Task - B.3: WS3 and TM3 - Water Production Plan

Task B.4 - Stakeholder Coordination

Stakeholder involvement is a key element in successful planning. Black & Veatch will work with Carson City to develop a comprehensive stakeholder list. A Project Advisory Committee (PAC) comprised of key stakeholder representatives could be used to provide input into the planning activities. Black and Veatch will coordinate, provide preparation assistance, and participate in stakeholder coordination meetings.

Deliverables for Task - B.4: Up to four meetings with City staff and four meetings with stakeholders. This includes the preparation of materials (e.g., powerpoint presentations) for stakeholders meetings.

TASK C. INTEGRATED WATER SUPPLY AND FACILITY PLAN

Task C.1 - Capital Improvements Program

Black & Veatch will prepare a phasing plan and planning level cost estimates for the facilities identified in Task C. This will be used to identify funding needs and provide the

basis for a Capital Improvements Program for the City's water system. The results of this task will be presented in a workshop.

Deliverables for Task - D: WS6 – Basis for Capital Improvement Program

Task C.2 – Preparation of Integrated Water Supply and Facilities Plan Report

Black & Veatch will incorporate the findings and analyses produced during the development of Task B and Task C.1 into an Integrated Water Supply and Facilities Plan Report. This report will provide the City with a road map that will balance cost-effectiveness, financial feasibility, public acceptability, and environmental and regulatory issues to provide Carson City with the water supplies and facilities necessary to reliably meet forecasted demands in a timely manner.

Black & Veatch will participate with City staff in a presentation to the City Board of Supervisors on the IWSFP.

Deliverables for Task - C: Integrated Water Supply and Facilities Plan Report

PROJECT BUDGET

The project budget enclosed in Appendix B provides a breakdown of the costs associated with the work products and tasks described in this Workplan.

SOURCE OF MATCHING FUNDS

As required by the Appropriations Act, the City will provide matching funds for the 45 percent of the total cost of this project or $ 157,418 of the total cost of $349,818.

MEASURES USED TO EVALUATED THE SUCCESS OF THE WORK PRODUCTS AND ENVIRONMENTAL BENEFITS AND OUTCOMES

Given the nature of this project, the success of the work products and environmental benefits and outcomes will be evaluated by assessing how the technical memoranda and reports address the objectives of this project.

LOCATION MAP

The location map of the water system, which is the focus of this project, is provided in Appendix C.

REPORTING

The project will prepare Quarterly Reports. The last Quarterly Report will serve as a Final Report. Quarterly Reports will include an executive summary of work done to date and how effective the project was in achieving the stated environmental and public health objectives. Quarterly Reports will also include any deliverable produced during the reporting quarter. Per EPA guidance, the following quarterly report schedule will be followed:

Reporting Period	Report Due Date
January 1 - March 31	April 30
April 1- June 30	July 31
July 1 - September 30	October 31
October 1 - December 31	January 31

GRANT 2 APPENDIX

Exhibit A