

TECHNICAL MEMORANDUM 2 - 1

Audit of Bulk Water Meters

This memo constitutes the deliverable for Phase 2 Task 1 of the contract between The Abrahams Group (TAG) and the City of Brockton. The information documented in this memo was compiled over the course of multiple interviews with Department of Public Works (DPW) staff and reviews of both paper and digital documentation kept in both the DPW's files, as well as the City's MUNIS Utility Billing database.

PLAN OF SERVICE

- A. Review and document the testing and calibration activities performed by Brockton on the active treated water supply sources (2 reservoir sources, one inactive well supply, and Aquaria Regional Desalination Project) master meters. The goal of this task is to gain confidence that the master meters are properly reporting bulk water supply and are a competent basis for items such as Aquaria billing and Brockton's unaccounted-for-water calculations.
- B. Review and document the testing and calibration activities performed by Brockton on water master meters governed by any Inter-municipal Agreements for the emergency connections. The goals of this task are to gain confidence that the master meters are properly reporting and are a competent basis for inter-municipal billing and accounting purposes and to understand what services are to be provided.
- C. Review the financial agreement between Brockton and water suppliers or other municipalities which use master meters as the basis for compensation.
- D. We will prepare a Technical Memorandum on our findings for the master meters' impacts on management, financial performance, and regulatory reporting.

This memo describes the processes associated with the management of all master meters and inter-municipal meters currently connected to the Brockton distribution system.

MASTER METERS

The Master/bulk water meters in Brockton fall into two categories. The first category is large diameter meters (12" or greater) associated with the supply of water into the distribution system. There are two of these meters and they measure 1) the amount of water taken from Silver Lake and pumped into the Brockton distribution system, and 2) the amount of water which is pumped from the Aquaria/North Dighton desalinization plant into the distribution system. The second type of master meter is a smaller diameter meter through which the City sells water to surrounding communities. Field inspections were conducted at the locations of all master meters; however, the presence of ice/snow piles prevented access to several of the smaller meter pits. The installation setup of these meters is described below.

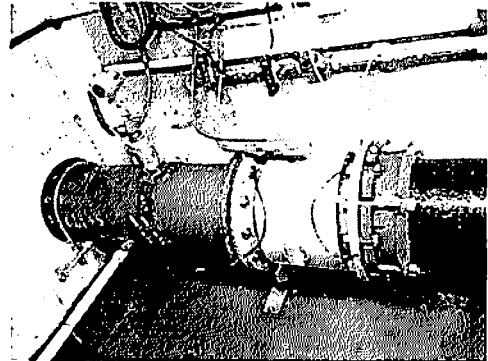
Supply Meters

Silver Lake Treatment Plant

The Silver Lake Treatment Plant is equipped with both raw and finished water meters. In each location, there are large diameter venturi meters. Although the original specification could not be located as part of this audit, they were measured to be approximately 20" x 36" in size and have a peak flow metering capacity of 24 million gallons per day. Both are original equipment from the construction of the treatment plant. Both the raw and finished water meters at the plant have been installed on extended straight sections of pipe, an aspect critical for this type of meter to read accurately.

Aquaria Water Meter

The bulk water meter from the Dighton desalinization plant is located along Pearl Street and delivers water from the Aquaria plant into the Brockton distribution system via a 12" main. The meter is a 12" diameter magnetic flow meter and has been installed in accordance with generally accepted engineering design standards. A photo of the metering pit installation is provided to the right.



Inter-municipal Connection Meters

At the present time, W&C was able to document the presence of two intermunicipal connections to the City of Brockton's water distribution system, including a 10" connection to the Town of Whitman distribution system and a smaller connection to the Hanson distribution system. While the Whitman connection is active full-time, the connection to the Hanson distribution system is used only when Hanson's own water supplies are insufficient to meet water demands.

Water sales to these customers are completed in accordance with the provisions of Chapter 371 of the Acts of 1964 (Chapter 371), a copy of which is included in Appendix 2-1.1. Water use is billed to the Towns based upon quarterly meter readings at Brockton wholesale rates. In the case of non-Brockton residential customers who are directly metered and billed by the City, they are assessed water charges in a manner similar to any other customer of the system. W&C is not aware of any in-force negotiated water sales agreements with Towns not explicitly listed in Chapter 371.

TECHNICAL DISCUSSION OF METERS

The table below details the reading technique and frequency associated with each of the bulk meters connected to the Brockton distribution system. As noted, the two large diameter supply meters are read continuously via flow totalizers. The inter-municipal connections are positive displacement (PD) meters similar in construction and reading technique to most of the City's residential customers.

Meter Location	Meter Type	Meter Size	Reading Device	Reading Frequency
Silver Lake Finished Water Meter	Venturi	19.1" x 35.5"	Automated	Continuous; Daily totalizer
Aquaria Meter	Magnetic	12"	Aquaria handles read	Continuous; Daily totalizer
Hanson	PD	6"	Touchpad	Quarterly
Whitman	Turbine	10"	Touchpad	Quarterly

Meter Tests/Calibration

Due to the volumes associated with bulk meters, the completion of regular calibration tests ensures that water passing through the meter is accurately measured. The table to the right details the meter test & calibration results, which were documented during the audit. In the case of the Aquaria meter, the meter is calibrated rather than tested and there are not specified standards which must be met.

Meter	Last Test/ Calibration	Within Standards
Silver Lake Finished Water Meter	12/09	Yes
Aquaria Meter	12/10	N/A
Hanson	Unknown	Unknown
Whitman	3/10	Yes

The determination of whether a meter is within standards is based on generally accepted engineering practices and the recommendations of AWWA Standards for the accuracy requirements of each type of meter. Documentation associated with the tests and calibrations is included in Appendix 2-1.2.

FINDINGS

Based upon our review of supporting documentation and inspection of the bulk supply meters, W&C finds the following:

1. Water entering the distribution system from the Silver Lake treatment plant and Aquaria facility is being properly metered. In both locations, highly reliable meter types are in use and monitored (either in person or remotely) continuously. Calibration records exist, which indicate that the meters are being properly maintained and their performance monitored.
2. The bulk water meters measuring the volume of water sold to surrounding communities and their residents vary in size and type. The sizes and types of meters used at these locations appear appropriate based on generally accepted industry standards. Meter test/calibration records are available for the Whitman meter but unavailable for Hanson. All other non-Brockton residential connections are metered and billed in a manner similar to all other customers.

RECOMMENDATIONS

1. Complete meter tests on the Hanson inter-municipal meters to ensure that Brockton is properly billing for the water sold to surrounding communities. In the event that the meter is registering water with accuracy outside of the AWWA specified range, require the Town of Hanson to replace its meter.

2. Install automated meter reading technologies on all master meters as part of the meter replacement and automated meter reading system installation project.

APPENDICES

Appendix 2-1.1 – Chapter 371 of the Acts of 1964

Appendix 2-1.2 – Master Meter calibration records

APPENDIX 2-1.1: CHAPTER 371 OF THE ACTS OF 1964

Chap. 370. AN ACT REGULATING THE HOLDING OF SESSIONS OF THE
PROBATE COURT FOR THE COUNTY OF WORCESTER.

Be it enacted, etc., as follows:

Section 62 of chapter 215 of the General Laws is hereby amended by striking out the last paragraph, as amended by chapter 274 of the acts of 1933, and inserting in place thereof the following paragraph: —

Worcester, at Worcester, every Monday, Tuesday, Wednesday, Thursday and Friday between the second Monday of September and the fourth Tuesday of July, both dates inclusive, and the third Tuesday of August.

Approved May 7, 1964.

Chap. 371. AN ACT ESTABLISHING THE CENTRAL PLYMOUTH COUNTY
WATER DISTRICT AND AUTHORIZING THE CITY OF BROCKTON
TO EXTEND ITS SOURCE OF WATER SUPPLY.

Whereas, The deferred operation of this act would tend to defeat its purpose, which is in part to establish immediately the Central Plymouth County Water District and to authorize immediately the city of Brockton to extend its source of water supply, therefore, it is hereby declared to be an emergency law, necessary for the immediate preservation of the public convenience.

Be it enacted, etc., as follows:

SECTION 1. There is hereby established the Central Plymouth County Water District, hereinafter called the district, consisting of the city of Brockton and the towns of East Bridgewater, Halifax, Hanson, Kingston, Pembroke, Plympton and Whitman.

SECTION 2. There shall be in the district an advisory board consisting of a member of the board of selectmen or other person designated by the board of selectmen of each of the towns in the district, the mayor of the city of Brockton or his designee, and a member of the city council of said city to be appointed by the mayor. The advisory board shall serve without compensation and shall meet on the first Monday of the months of May and November or oftener as required. It shall elect annually a chairman and secretary from its membership and shall keep records of its deliberations and actions and its recommendations to the commission.

SECTION 3. The district shall be under the direction of a commission consisting of three commissioners, hereinafter called the commission, who shall be appointed by the advisory board. One of said commissioners shall be a resident of the city of Brockton. The initial appointment of said commissioners shall be as follows: one commissioner to be appointed for a term of one year, one for a term of two years, and one for a term of three years. Thereafter all appointments shall be for a term of three years except that an appointment to fill a vacancy shall be for the balance of the unexpired term. Said commissioners shall serve without compensation until such time as the city of Brockton cedes ownership in its water supply facilities to the district. A commissioner may be removed from office for cause and after a hearing by a vote of three-fourths of the membership of the advisory board. Any vacancy in the office of commissioner shall be filled by the advisory board within three months.

The commission shall meet no later than one month after all appointments have been made and said commission at its first meeting and annually thereafter, on or before the first Monday in May, shall elect one of its members to serve as chairman of the commission.

The commission shall, in co-operation with and with the advice of the state department of public health, the department of agriculture and the water resources commission, investigate available surface and sub-surface sources of water supply for the district and the allocation of said supplies within the district, and shall study the water supply needs and resources of Plymouth county and the adjacent portions of Norfolk county, with priority given to the study of Cleveland Pond in Abington, and to ground water in the city of Brockton and the towns of Hanson, Halifax, East Bridgewater and Whitman.

The commission shall also investigate all pertinent matters relating to the quantity of water required, the quantity of water to be obtained from available sources, its quality, the best method of protecting the purity of the water, the construction, operation and maintenance of the works for storing, conveying or purifying the water and the cost of the same, the damages to property and all other matters pertaining to the subject.

The commission may expend for engineering and other assistance and other expenses such sums as may be appropriated therefor.

The commission shall report fully with plans and estimates to the general court on or before the fourth Wednesday in January, nineteen hundred and sixty-six and shall append to its report drafts of legislation to carry its recommendations into effect.

SECTION 4. The city of Brockton, hereinafter called the city, for the purpose of increasing its water supply is hereby authorized to divert surplus flow as defined in section nine from Furnace Pond, situated in the town of Pembroke, and Monponsett Pond situated in the towns of Halifax and Hanson, into Silver Lake and thence to the city and the towns also supplied; provided that no diversion shall be made and no necessary lands shall be acquired under this act without first obtaining the advice and approval of the department of public health and that the location of all intake structures and treatment works hereunder shall be subject to the approval of said department. Before any property is taken or any construction is begun the city shall submit to the commission at least two copies of all construction plans, specifications, estimates, plans and descriptions of property to be taken, and of proposed easements, and the commission within sixty days after receipt of any such information, shall notify the city in writing of any recommendations it may have concerning the proposed work. The city shall study all such recommendations and whenever feasible the city shall adopt such recommendations. The city shall proceed forthwith with the design and construction of a suitable water filtration plant at Silver Lake having a capacity of not less than twenty million gallons per day, to purify all water supplied. Any rights granted under this section to the city or to the district to divert surplus flow from said Furnace Pond or said Monponsett Pond shall be revoked and cease to be of any effect if said water filtration plant is not constructed and actually in use on or before October first, nineteen hundred and sixty-eight. The commission may prohibit any diversions when the water level of Silver Lake is above elevation forty-six and one-half, United States Coast and Geodetic Sur-

vey base. All authority granted to the city by this act shall be vested in its board of water commissioners, hereinafter called the board.

SECTION 5. The city for the purpose aforesaid, may take by eminent domain, acquire or hold by purchase or otherwise all land, rights-of-way and easements necessary for diverting and purifying such water from the aforesaid ponds and conveying same to Silver Lake. No land shall be taken at Furnace Pond except for necessary spillway and diversion structures near the outlet of Furnace Pond, and no land shall be taken at Monponsett Pond except for necessary spillway and diversion structures. The city shall obtain the advice of the commission with regard to the taking of land.

SECTION 6. The city may erect on lands taken or held under the provisions of this act, diversion works and other structures and may make excavations, procure and operate machinery and provide such other means and appliances and do such other things as may be necessary for the effective use of the aforesaid auxiliary supplies, and for that purpose may lay down and maintain aqueducts, conduits, pipes and other works, in, under, on or over any lands, water courses, or public or private ways, and along any such ways in said towns of Pembroke, Hanson, Halifax, and Plympton, in such manner as not unnecessarily to obstruct the same; and for the purpose of constructing, laying, maintaining, operating and repairing such conduits, pipes and other works, and for all proper purposes of this act, the city may dig up in such manner as to cause the least hindrance to public travel, and shall restore and keep in repair such ways where they have been dug up, to the satisfaction of the proper authority in the respective town in which such ways are situated. The city shall not enter upon the location of any railroad corporation or construct or lay any aqueducts, pipes, conduits or other works within such location except at such time and in such manner as it may agree upon with such railroad corporation, or, in case of failure so to agree, as may be approved by the department of public utilities.

SECTION 7. If any public way shall hereafter be laid out in whole or in part over said aqueducts, pipes or conduits such laying out shall not prejudice the right of the city to care for, alter or repair the aqueducts, pipes or conduits therein or thereunder. All such public ways shall as far as possible conform to the grade of such aqueducts, pipes or conduits, and their surfaces shall be no less than four feet above the top of such aqueducts, pipes or conduits, unless a different construction is agreed upon between the city and the town in which such ways are situated.

SECTION 8. If any person shall without the consent of the board and of the commission use any water taken after entry into the diversion system or obtained under this act, or shall wantonly or maliciously divert the water or any part thereof or corrupt the same or destroy or injure any intake structure, pipe, conduit or other property held, owned or used by the city under the authority of and for the purpose of this act, he shall forfeit and pay to the city three times the amount of damages assessed therefor, to be recovered in an action of tort; and on conviction of any of the wanton or malicious acts aforesaid may be punished by a fine not exceeding three hundred dollars or by imprisonment in a jail or house of correction for a term not exceeding one year.

Notwithstanding the provisions of sections one hundred and sixty and one hundred and seventy-two of chapter one hundred and eleven of

the General Laws, nothing in this act shall be construed as preventing the normal use of the aforesaid Furnace Pond and Monponsett Pond for bathing, boating, fishing and other purposes, nor shall the provisions of this act prevent the withdrawal of sufficient water for flooding or irrigation of cranberry bogs, nor shall the provisions of this act prevent the return flow of such flood waters from cranberry bogs to the aforesaid ponds. There shall be no diversion of water from Furnace Pond or from Monponsett Pond into Silver Lake, if, in the opinion of the department of public health, the diversion of such waters would endanger the public health.

SECTION 9. The city shall construct facilities at or near the present outlets of the aforesaid Furnace and Monponsett ponds in such a manner as to allow a minimum daily flow of three hundred thousand gallons from Furnace Pond, a minimum daily flow of nine hundred thousand gallons from Monponsett Pond to pass downstream at all times when water is being diverted except in case of emergency when less water may be discharged downstream if ordered by the department of public health and approved by said commission and this flow shall be measured and recorded and such records maintained by said city. Notwithstanding the aforesaid minimum flow, sufficient water shall be allowed to pass downstream, at all times when water is being diverted to allow herring to travel upstream and downstream. During the months of October to May, inclusive, all flows in excess of the aforementioned minimum flows may be diverted into Silver Lake but no diversion shall be made from Furnace Pond when the water level of Furnace Pond is below elevation fifty-six, United States Coast and Geodetic Survey base. During the months of June through September, inclusive, no flow may be diverted, from said ponds except when, in the opinion of said commission, an emergency exists due to imminent flooding. At such times of emergency, for the purpose of preventing flooding and damage to property in the vicinity of said pond, the commission may, subject to the approval of the department of public health, authorize the diversion of excess waters at stated times during said months but, in no case, may the ponds be drawn down below the minimum elevations established in this section. Control works shall be constructed by the city to prevent diversion from Furnace Pond when the water level in Furnace Pond is below elevation fifty-six, United States Coast and Geodetic Survey base. Control works shall be constructed to prevent diversions from Monponsett Pond when the water level in Monponsett Pond is below elevation fifty-two and one-half United States Coast and Geodetic Survey base. Notwithstanding the provisions of section forty of chapter forty of the General Laws, water shall not be drawn from Furnace Pond below elevation fifty-six nor from Monponsett Pond below elevation fifty-two and one-half, United States Coast and Geodetic Survey base. It shall be the sole responsibility of the city to assume all costs of water filtration or purification required by the department of public health because of the public use of Furnace, Oldham and Monponsett ponds, as provided in section eight in order that they may be permanently usable by the public for the purposes described therein.

SECTION 10. The board shall, upon application by the selectmen of any town herein named and with the approval of the commission, supply such town with a public water supply. In case a town not herein named desires a supply of water as aforesaid, such town shall first obtain from

the department of public health and from the commission an opinion in writing to the effect that one or more of the aforesaid Furnace and Monponsett ponds, is a natural and proper source of supply for the town and upon presentation of such an opinion the said board shall furnish water to said town by delivering the same in a main water pipe, reservoir or tank to the town, under the head or pressure required and maintained by the city, unless it be delivered in some other manner by agreement between the parties interested. The board shall have the direction and control of all connections made between the city and town system, but the cost of such connections shall be paid by the town for which they are made.

SECTION 11. The price to be paid by any town for water delivered to it, or by any person, corporation or water company taking said water under authority of the selectmen of such town, if not determined by mutual agreement, shall be determined by three commissioners to be appointed by the supreme judicial court, upon application of either party and notice to the other; and the award of said commissioners when accepted by the court shall be binding upon both parties for a period to be designated by the court.

SECTION 12. Nothing in this act shall interfere with the right granted to the town of Pembroke by chapter two hundred and eighty of the acts of nineteen hundred and thirty, nor prevent the town of Plympton, Hanson or Halifax from taking an independent supply of water from said ponds, provided, that satisfactory arrangements cannot be made with said city therefor; and provided, further, that whenever said water is taken by any town as an independent source of supply it shall be taken under the advice and with the approval of the commission and the department of public health, and subject to the restrictions which said department may impose; and provided, further, that each town taking an independent supply of water shall pay its proportionate part of the damages which the city may be called upon to pay for any improvements to said auxiliary supplies required due to the taking of an independent supply by said towns.

SECTION 13. Nothing in this act shall interfere with rights granted to the towns of Abington, Rockland and Whitman by chapter two hundred and six of the acts of eighteen hundred and eighty-five, relating to the taking of a water supply from Great Sandy Bottom Pond, or by chapter six hundred and eighteen of the acts of nineteen hundred and forty-five authorizing the aforesaid towns to take water by means of wells or filter galleries on their property near Furnace Pond.

Approved May 11, 1964.

Chap. 372. AN ACT AUTHORIZING THE COUNTY COMMISSIONERS OF HAMPDEN COUNTY TO BORROW MONEY TO ALTER, REPAIR AND RENOVATE A CERTAIN BUILDING IN THE CITY OF SPRINGFIELD PURCHASED BY THEM FOR THE FACILITIES OF THE DISTRICT AND SUPERIOR COURTS AT SAID CITY.

Be it enacted, etc., as follows:

SECTION 1. The county commissioners of Hampden county are hereby authorized to expend a sum not exceeding one hundred and ninety-four thousand dollars, for the repair, alteration, renovation,

APPENDIX 2-1.2: MASTER METER CALIBRATION RECORDS

Test Results

Brockton Water Filtration Plant – Finished Water

Meter Data	Manufacturer	BIF
	Size of Meter	19.116-inch x 35.5-inch
	Number	67401
Test Data	Date of Test	August 14, 2007
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	36-inch
Test Results	Pitometer Rate of Flow	10,540,000 gpd
	Metered Rate of Flow	10,224,000 gpd
	Difference	316,000 gpd
	Percentage Difference	3%; meter registers within allowable limits of accuracy

Brockton Water Filtration Plant – Raw Water

Meter Data	Manufacturer	BIF
	Size of Meter	20.635-inch x 36-inch
	Number	Not available
Test Data	Date of Test	August 14, 2007
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	48-inch
Test Results	Pitometer Rate of Flow	12,210,000 gpd
	Metered Rate of Flow	12,380,000 gpd
	Difference	170,000 gpd
	Percentage Difference	1%; meter registers within allowable limits of accuracy

Test Results

Brockton Water Filtration Plant – Finished Water

Meter Data	Manufacturer	BIF
	Size of Meter	19.116-inch x 35.5-inch
	Number	67401
Test Data	Date of Test	August 11, 2008
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	36-inch
Test Results	Pitometer Rate of Flow	10,360,000 gpd
	Metered Rate of Flow	10,734,000 gpd
	Difference	374,000 gpd
	Percentage Difference	4%; meter registers within allowable limits of accuracy

Brockton Water Filtration Plant – Raw Water

Meter Data	Manufacturer	BIF
	Size of Meter	20.635-inch x 36-inch
	Number	Not available
Test Data	Date of Test	August 11, 2008
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	48-inch
Test Results	Pitometer Rate of Flow	10,670,000 gpd
	Metered Rate of Flow	11,150,000 gpd
	Difference	480,000 gpd
	Percentage Difference	4%; meter registers within allowable limits of accuracy

Test Results

Brockton Water Filtration Plant – Finished Water

Meter Data	Manufacturer	BIF
	Size of Meter	19.116-inch x 35.5-inch
	Number	67401
Test Data	Date of Test	July 13, 2009
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	36-inch
Test Results	Pitometer Rate of Flow	10,210,000 gpd
	Metered Rate of Flow	10,080,000 gpd
	Difference	130,000 gpd
	Percentage Difference	1%; meter registers within allowable limits of accuracy

Brockton Water Filtration Plant – Raw Water

Meter Data	Manufacturer	BIF
	Size of Meter	20.635-inch x 36-inch
	Number	Not available
Test Data	Date of Test	September 10, 2009
	Length of Test	30 minutes
	Condition of Test	Normal flow
	Size of Pipe	48-inch
Test Results	Pitometer Rate of Flow	11,190,000 gpd
	Metered Rate of Flow	10,990,000 gpd
	Difference	200,000 gpd
	Percentage Difference	2%; meter registers within allowable limits of accuracy



ORIGINAL INVOICE & CUSTOMER SERVICE REPORT

Environmental Instrument Services Inc.
FEDERAL TAX ID # 04-3512616PLEASE REMIT TO: ENVIRONMENTAL INSTRUMENT SERVICES INC.
P.O. BOX 257
GEORGETOWN, MASSACHUSETTS 01833-9998
978-372-1971

INVOICE # 301541

PURCHASE ORDER # _____

BILL TO ADDRESS

Brookline Water (Village Water)
1 Silver Lake Ave 36
Brookline Ma 02359

PAYMENT TERMS ARE NET 30 DAYS

SITE ADDRESS

7/26/07

CUSTOMERS TAX ID NO. _____

TYPE OF SERVICE: _____ CONTRACT: _____ DEMAND: ☒ PERIODIC: _____ FLAT RATE: _____

CHECK ONE ONLY: _____ CALL-BACK: _____ WARRANTY: _____ START-UP: _____ TRAINING: _____

DESCRIPTION OF WORK PERFORMED:

Calibration of Raw +
Finish Flow meters per
pitometer readings
Raised Raw w.p. 10% from
46.004 to 45.004 H2O
at 24 MGD
Raised Finished up 3% from
86.65 to 84.65
0 to 24 MGD

BILLING DETAILS:

PARTS / PRODUCTS / SUPPLIES:

QTY	PART / PRODUCT NUMBER	AMOUNT

1. PARTS TOTAL

LABOR (REG) 2 HRS@ 85 /HR 680 00

LABOR (OT) HRS@ /HR

TRAVEL HRS@ /HR

2. LABOR TOTAL

EXPENSES (TOLLS, ROOM, MEALS ETC)

MILEAGE 120 MILES@ .50 /MILE 60 00

3. EXPENSE TOTAL

4. SHIPPING CHARGES

SUB-TOTAL (1+2+3+4)

TAXES:

FINAL AMOUNT DUE

740 00

SIGNATURES:

SERVICE REP: *[Signature]*CUSTOMER: *[Signature]*

DATE: 7/26/07

White- Original Invoice

Yellow- Customer Copy

Pink- Office Copy

PURCHASE ORDER #**CUSTOMER TAX ID NO.**

DATE: 12/29/2009

ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

CERTIFICATION
OF INSTRUMENT CALIBRATION

CERTIFICATION NUMBER: 7512-1 DATE: 9/26/2007

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Raw Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Raw Water Flow

RANGE & UNITS: 0-24 MGD (0-45.004")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-07</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

CERTIFICATION OF INSTRUMENT CALIBRATION

CERTIFICATION NUMBER: 7512-2 DATE: 9/26/2007

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Finished Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Finished Water Flow

RANGE & UNITS: 0-24 MGD (0-84.65")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-07</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

CERTIFICATION OF INSTRUMENT CALIBRATION

CERTIFICATION NUMBER: 7512-42 DATE: 10/22/2008

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Finished Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Finished Water Flow

RANGE & UNITS: 0-24 MGD (0-87.851")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-08</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

CERTIFICATION OF INSTRUMENT CALIBRATION

CERTIFICATION NUMBER: 7512-13 DATE: 10/22/2008

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Raw Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Raw Water Flow

RANGE & UNITS: 0-24 MGD (0-48.527")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-08</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

CERTIFICATION OF INSTRUMENT CALIBRATION

CERTIFICATION NUMBER: 7512-32 DATE: 12/29/2009

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Finished Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Finished Water Flow

RANGE & UNITS: 0-24 MGD (0-86.732")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-09</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



ENVIRONMENTAL INSTRUMENT SERVICES INC.
Georgetown, Massachusetts

**CERTIFICATION
OF INSTRUMENT CALIBRATION**

CERTIFICATION NUMBER: 7512-33

DATE: 12/29/2009

CALIBRATION PERFORMED FOR: Veolia Water NA - Brockton Water Plant

LOCATION: Silver Lake Water Treatment Plant

INSTRUMENT NAME & TAG NO: Foxboro Raw Water Flow Meter

MODEL NUMBER: IDP10

SERIAL NUMBER: N/A

PROCESS: Plant Raw Water Flow

RANGE & UNITS: 0-24 MGD (0-47.66")

This document certifies that the above listed equipment was calibrated to the original equipment manufacturers specifications. The test equipment used to perform the calibrations are certified by an independent calibration laboratory on an annual basis. The test equipment certifications are traceable to the National Institute of Standards and Technology.

TEST EQUIPMENT USED FOR THIS CALIBRATION

ITEM:	TYPE:	CERT NO.
1	<u>DRUCK</u>	<u>1-507003-09</u>
2	<u></u>	<u></u>

SIGNATURE: Justin Chicca

EIS CALIBRATION SPECIALIST



**REGAN SUPPLY
& TESTING SERVICE**

P.O. Box 145 • North Easton, MA 02356

(508) 583-5018 • 1-800-843-2008

Location Whitman P.W.D.
at Cresent Street Meter
Rte. 18 Whitman, MA

Name Donnie Westhaver

Phone 781-447-7630

Date 3/30/2010

Line Size 16"

Meter Size 10"

Mfg. Rockwell

Type W-5500

Number 1185587

Pressure 74

By Pass

Test Valve 2 1/2" Hydrant Nozzle

WATER METER TEST REPORT

VOLUME	RATE G.P.M.	FIRE LINE	TURBINE	POS. DISPLACE	ACCURACY %	
1000	50		987.50		98.75	
1000	150		992.50		99.25	
1000	235		990.00		99.00	
					99.00	Average Accuracy

REGISTRATION

Fire Line

Turbine 84956300

Pos. Displace

Registration 1000 Gallons

BY THIS HAND AND SEAL WE CERTIFY
 THIS TO BE A TRUE COPY OF THE
 TEST RESULTS.

COMMENT: Allowance made for leakage at approximately 12 gallons per minute.

Recommend valve be repaired or replaced for future testing/service.

X Joseph W. Hill

**REGAN SUPPLY
& TESTING SERVICE**

P.O. Box 145 • North Easton, MA 02356

(508) 583-5018 • 1-800-843-2008

Location Whitman P.W.D.
at Bedford Street Meter
Rte. 18 Whitman, MA

Name Donnie Westhaver

Phone 781-447-7630

Date 3/30/2010

Line Size 16"

Meter Size 10"

Mfg. Rockwell

Type W-5500

Number 1155887

Pressure 80

By Pass

Test Valve 2 1/2" Hydrant Nozzle

WATER METER TEST REPORT

VOLUME	RATE G.P.M.	FIRE LINE	TURBINE	POS. DISPLACE	ACCURACY %	
1000	50		980.00		98.00	
1000	150		1017.50		101.75	
1000	450		1015.00		101.50	
					100.42	Average Accuracy

COMMENT:

REGISTRATION

Fire Line

Turbine 596201000

Pos. Displace

Registration 1000 Gallons

BY THIS HAND AND SEAL WE CERTIFY
 THIS TO BE A TRUE COPY OF THE
 TEST RESULTS.

X Joseph W. Hill