City of Stuart

121 SW Flagler Avenue • Stuart • Florida 34994
Department of Financial Services
Procurement & Contracting Services Division

Lenora Darden, CPPB
Procurement Manager
purchasing@ci.stuart.fl.us

Telephone (772) 288-5308
Fax: (772) 600-0134
www.cityofstuart.us

August 16, 2017

Via: Email transmission: rbtaylor@hazenandsawyer.com
jwietgrefe@hazenandsawyer.com

Hazen and Sawyer, P.C.
Attn: Mr. Robert B. Taylor, Jr., PE, Vice President
2101 NW Corporate Boulevard, Suite 301
Boca Raton, Florida 33062

Subject: Notice of Award
REI #2017-170: Professional Services for Assessment of Sustainable Alternative Water Supply Options

Dear Mr. Taylor:

The Stuart City Commission awarded REI# 2017-170, Professional Services for Assessment of Sustainable Alternative Water Supply Options to your firm on Monday, August 14, 2017**.** Please consider this your formal notice of award. The detailed scope of services to be performed and schedule of fees for those services shall be detailed in each Work Authorization.

The effective date of this Agreement shall be August 14, 2017 for the term of one (1) year or until completion of the project.

The City of Stuart looks forward to a mutually beneficial business relationship. If you have any questions, please feel free to contact me by email at purchasing@ci.stuart.fl.us or call me at (772) 288-5308.

Sincerely yours,

L Darden

Lenora Darden
Procurement Manager

c: Public Works Staff
REI 2017-170 Official File

BEFORE THE CITY COMMISSION
CITY OF STUART, FLORIDA

RESOLUTION NUMBER 93-2017

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF STUART, FLORIDA TO AWARD REI# 2017-170, PROFESSIONAL ENGINEERING SERVICES, ASSESSMENT OF SUSTAINABLE ALTERNATIVE WATER SUPPLY TO THE TOP RANKED FIRM, HAZEN AND SAWYER OF BOCA RATON, FLORIDA, PROVIDING AN EFFECTIVE DATE; AND FOR OTHER PURPOSES.

* * * * *

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF STUART, FLORIDA that:

SECTION 1: The City Commission of the City of Stuart approves the award for REI# 2017-170, Professional Engineering Services, Assessment of Sustainable Alternative Water Supply to the top ranked firm, Hazen and Sawyer of Boca Raton, Florida, to identify and evaluate the sustainable alternative water sources to accomplish the City's finished water quality goals and future water demands; and requests authorization to execute an agreement subsequent to review and approval by City Attorney.

SECTION 2: This resolution shall take effect upon adoption.

Resolution No. 93-2017
Award REI# 2017-170, Professional Engineering Services, Assessment of Sustainable Alternative Water Supply

Commissioner GLASS LEIGHTON offered the foregoing resolution and moved its adoption. The motion was seconded by Commissioner KRAUSKOPF and upon being put to a roll call vote, the vote was as follows:

	YES	NO	ABSENT	ABSTAIN
TROY A. MCDONALD, MAYOR	x			
KELLI GLASS LEIGHTON, VICE MAYOR	x			
JEFFREY A. KRAUSKOPF, COMMISSIONER	x			
EULA R. CLARKE, COMMISSIONER	x			
TOM CAMPENNI, COMMISSIONER	x			

ADOPTED this 14th day of August, 2017.

ATTEST:

CHERYL WHITE
CITY CLERK

TROY A. MCDONALD
MAYOR

APPROVED AS TO FORM
AND CORRECTNESS:

MICHAEL MORTELL
CITY ATTORNEY

STANDARD AGREEMENT

BETWEEN
CITY OF STUART AND CONSULTANT
FOR PROFESSIONAL SERVICES

PROJECT: REI #2017-170: ASSESSMENT OF SUSTAINABLE ALTERNATIVE WATER SUPPLY OPTIONS

CONSULTANT: Hazen and Sawyer, P.C.
2101 NW Corporate Boulevard, Suite 301
Boca Raton, Florida 33062

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, hereinafter "Contract," adopted and entered into the 14th day of August, 2017 by and between Hazen and Sawyer, hereinafter referred to as "CONSULTANT" and the City of Stuart, Florida, a municipal corporation, 121 S.W. Flagler Avenue, Stuart, Florida 34994, hereinafter referred to as "CITY", for and in consideration of the following terms, conditions and covenants.

I. PURPOSE OF AGREEMENT

CITY intends to enter into a contract with CONSULTANT to identify sustainable water supply options with planning level cost estimates, a comparison of options, and recommended succession steps in developing long-term sustainable alternative water supply options; and the payment for those services by CITY as set forth below.

The Professional shall provide professional services in all phases of any project for which a Work Authorization has been issued by the City pursuant to this Agreement as hereinafter provided. These services will include serving as City's professional consulting representative for the Project, providing professional consulting consultation and advice and furnishing customary for planning services and customary services incidental thereto as described in the Work Authorization. The detailed scope of services to be performed and schedule of fees for those services shall be detailed in each Work Authorization. A sample work authorization is included as Exhibit C.

II. SCOPE OF SERVICES

CITY enters into this contract with CONSULTANT for provision of Professional Services associated with the project described above. The CONSULTANT agrees it will perform those professional services for the fees stipulated below. The detailed scope of services to be performed is as follows:

- Review of existing water supply and treatment processes.
- Identification and evaluation of long term water supply needs.
- Identification and evaluation of alternative water supply options.
- Planning level estimated costs for each alternative water supply option.
- Consideration of cost effective alternatives.
- User rate impact analysis.
- Regulatory permitting experience.

- Preliminary site layout options for each alternative water supply option.
- Presentations to numerous agencies on the selected alternatives.
- Preparation of grant applications.
- And other tasks as identified.

III. AGREEMENT PROVISIONS

Section 1. Term of Agreement

Upon award of this Agreement, the effective date of this Agreement shall be the adopted date of this Agreement by both City and Professional. Term of this agreement shall be for a period of one (1) year or until completion of the project.

Section 2. Work Authorization

Each "Work Authorization" shall specify the Period of Service agreed to by the City and the Professional for services to be rendered under said "Work Authorization".

CITY will compensate Professional for services under each Work Authorization. The fee due to the Professional shall be set forth in each Work Authorization and shall be in accordance with Professional's personnel hourly rate schedule formalized in "**Exhibit A**" to this Agreement.

Section 3. Invoices / Payment

CONSULTANT shall submit an invoice to the CITY upon completion of each work authorization, unless specifically identified in the work authorization. Payment may be made within thirty (30) days after submission of a proper invoice and approval by the Project Manager of the CITY.

Payment for services rendered is due within thirty days of receipt and approval of invoice by City. Payment is delinquent 30 days following receipt and approval of invoice by City.

Section 4. Reimbursable Expenses

CONSULTANT shall be reimbursed only for approved out pocket expenses directly chargeable to the Project, at actual cost incurred for standard office expense items, i.e., general copying, postage, routine long distance phone calls, regular size plots and prints; and additional expense items include, but are not limited to: express mail deliveries, large copy projects, extraordinary telephone charges, conference calls, signage, certified mail and title searches.

Section 5. Additional Services

The undertaking by the CONSULTANT to perform professional services defined within this Contract extends only to those services specifically described herein. If upon the request of the CITY, the CONSULTANT agrees to perform additional services hereunder, the CITY shall pay the CONSULTANT for the performance of such additional services an amount (in addition to all other amounts payable under this Agreement) based on an hourly fee in accordance with CONSULTANT's current professional fee schedule, Exhibit B, plus reimbursable expenses so incurred by the CONSULTANT; unless a lump sum addendum to this Contract is executed by the parties to this Contract which addresses the additional services.

Section 6. Use of Documents

6.1 Ownership of Original Documents

All deliverable analysis, reference data, survey data, plans and reports or any other form of written instrument or document that may result from the CONSULTANT'S services or have been created during the course of the CONSULTANT'S performance under this Contract shall become the property of and shall be delivered to the CITY after final payment is made to the CONSULTANT.

6.2 Photographs

Photographs of any completed project embodying the services of the CONSULTANT provided hereunder may be made by the CONSULTANT and shall be considered as its property, and may be used by it for publication.

Section 7. Termination

7.1 Termination for Convenience

Either party upon a thirty (30) day written notice to the other party may terminate this Contract. In the event of any termination, CONSULTANT shall be paid for all services rendered to the date of termination.

7.2 Termination for Cause

The performance of the Agreement may be terminated by the CITY of Stuart in accordance with this clause, in whole or in part, in writing, whenever the CITY shall determine that the CONSULTANT has failed to meet performance requirement(s) of the Agreement. If the successful bidder should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should fail to provide properly skilled personnel or proper service in the sole discretion of the CITY, then the CITY can, after giving the successful bidder seven (7) days written notice, and without prejudice to any other right or remedy, terminate this agreement.

Section 8. ClTY's Obligations

8.1 Data to be Furnished

CITY shall provide the following information or services as required by CONSULTANT to complete the terms of the Agreement:

8.2 Designated Representative

The Designated Representative of the CITY to act with authority on the ClTY's behalf with respect to all aspects of the Project is Dave Peters, Assistant Public Works Director. This designation may be delegated by the Public Works Director to another person provided such delegation is done in writing provided to the CONSULTANT.

Section 9. Persons Bound by Agreement

9.1 Parties to the Agreement

The persons bound by this Contract are the CONSULTANT and the CITY and their respective partners, successors, heirs, executors, administrators, assigns and other legal representatives.

9.2 Assignment of Interest in Agreement

This Contract and any interest associated with this Contract may not be assigned, sublet or transferred by either party without the prior written consent of the other party. The city may grant consent based upon the following factors: The qualifications of the assignee, the financial stability of the assignee, the likelihood of time to complete the contract, and other applicable factors as they relate to the service. Nothing contained herein shall be construed to prevent CONSULTANT from employing such independent consultants, associates and subcontractors as CONSULTANT may deem appropriate to assist in the performance of the services hereunder.

9.3 Rights and Benefits

Nothing herein shall be construed to give any rights or benefits arising from this Contract to anyone other than CONSULTANT and the CITY.

Section 10. Indemnification of CITY

The CONSULTANT shall indemnify and hold harmless CITY, its employees, and elected officers from liabilities, damages, losses and costs, including but not limited to, reasonable attorney's fees, where recoverable by law, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the indemnifying party and persons employed by or utilized by the indemnifying party in the performance of this contract. The CONSULTANT agrees to hold harmless CITY, its agents, employees, elected officers and representatives from liabilities, damages, losses and costs, arising directly from the negligent acts or omissions of the CONSULTANT, its employees, agents or subconsultants.

PURSUANT TO F.S. 558.0035. THE CONSULTANT; CONTRACTUAL LIMITATION ON LIABILITY, AN INDIVIDUAL EMPLOYEE OR AGENT MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE IN THE PERFORMANCE OF THIS CONTRACT.

Section 11. Insurance.

11.1. General

CONSULTANT assumes the entire responsibility and general liability for all damages or injury to all persons, and to all property, arising out of or in any manner connected with the execution of the work under this Contract by CONSULTANT, and to the fullest extent permitted by law, CONSULTANT shall defend and indemnify the CITY from all such claims including without limitation claims for which the CITY may be, or may be claimed to be, liable in whole or in part and legal fees and disbursements paid or incurred to defend any such claims, as well as legal fees paid or incurred in connection with enforcing the provisions of this paragraph. CONSULTANT assumes the entire responsibility and liability for all damages and injury to all persons, whether their employees or otherwise, and to all property arising out of or in any manner connected with the execution of the work by CONSULTANT under this Contract. CONSULTANT shall obtain, maintain and pay for general liability insurance coverage as will insure the provisions of this paragraph and any other contractual indemnities assumed by CONSULTANT in this specific consideration for this indemnity is $10.00, the receipt and sufficiency of which are hereby acknowledged by CONSULTANT.

11.2 Workers' Compensation

The CONSULTANT shall procure and maintain, during the life of this Contract, Worker's Compensation insurance as required by Florida Statutes for all of employees of the CONSULTANT engaged in work on the Project under this Contract.

11.3 Insurance Policy Limits

CONSULTANT shall procure and maintain insurance policies as specified in Exhibit B.

11.4 Insurance Cancellation

The CONSULTANT shall furnish to the CITY Certificates of Insurance stating the Insurer will grant the City the same notification rights that it provides to the first named insured as respects cancellation and nonrenewal. If the insurance policies expire during the terms of the Contract, a renewal certificate or binder shall be filed with the CITY fifteen (15) days prior to the renewal date.

11.5 CITY to be Named Additional Insured

The amounts of insurance shall be determined by the CITY. The CITY shall be named as "additional insured" with regard to the coverage of General Liability and Automobile Liability policies.

11.6 Status of Claim.

The CONSULTANT shall be responsible for keeping the CITY currently advised as to the status of any claims made for damages against the CONSULTANT resulting from services performed under this Contract. The CONSULTANT shall send notice of claims related to work under this Contract to the City. Copies of the notices shall be sent by fax, hand delivery or regular mail to:

Public Works Director
City of Stuart
121 S.W. Flagler Avenue
Stuart, Florida 34994
FAX: (772) 288-5381

Section 12. Professional Standards

12.1 Other Agreements

CONSULTANT is entering into this Contract with the understanding that the CITY has no agreements, either written or oral, for professional services relating to this specific Project which include any of those services within the Scope of Services defined herein.

12.2 Approvals Not Guaranteed

All work performed by CONSULTANT will be in accordance with the highest professional standards and in accordance with all applicable governmental regulations. However, CONSULTANT does not warrant or represent that any governmental approval will be obtained, only that the CONSULTANT will exercise its best efforts to obtain all such approvals contemplated under this Contract.

12.3 Governmental Regulations Affecting Land Use

Unless the Scope of Services of this Contract includes an investigation into the applicable land use, zoning and platting requirements for the Project, CONSULTANT shall proceed on the assumption that the Project as presented by the CITY, is in accordance with all applicable governmental regulations.

Section 13. Opinions of Cost

Since the CONSULTANT has no control over the cost of labor, materials, equipment or services furnished by others, or over methods of determining prices, or over competitive bidding, or market conditions, any and all opinions as to costs rendered hereunder, including but not limited to opinions as to the costs of construction and materials, shall be made on the basis of its experience and qualifications and represent its best judgment as an experienced and qualified CONSULTANT, familiar with the construction industry. The CONSULTANT cannot and does not guarantee that proposals, bids or actual costs will not vary from opinions of probable cost. If at any time the CITY wishes greater assurance as to the amount of any cost, the CITY shall employ an independent cost estimator to make such determination. Consulting services required to bring cost within any limitation established by the CITY will be paid for as additional services hereunder by the CITY.

Section 14. General Conditions

14.1 Venue in Martin County

Venue for any lawsuit to enforce the terms and obligations of this Contract shall lie exclusively in the County Court or the Circuit Court in and for Martin County, Florida.

14.2 Laws of Florida

The validity, interpretation, construction, and effect of this Contract shall be in accordance with and governed by the laws of the State of Florida.

14.3 Attorney's Fees and Costs

In the event the CONSULTANT defaults in the performance of any of the terms, covenants and conditions of this Contract, the CONSULTANT agrees to pay all damages and costs incurred by the CITY in the enforcement of this Contract, including reasonable attorney's fees, court costs and all expenses, even if not taxable as court costs, including, without limitation, all such fees, costs and expenses incident to appeals incurred in such action or proceeding.

14.4 Mediation as Condition Precedent to Litigation

Prior to the initiation of any litigation by the parties concerning this Contract, and as a condition precedent to initiating any litigation, the parties agree to first seek resolution of the dispute through non-binding mediation. Mediation shall be initiated by any party by serving a written request for same on the other party. The party shall, by mutual agreement, select a mediator within 15 days of the date of the request for mediation. If the parties cannot agree on the selection of a mediator then the CITY shall select the mediator who, if selected solely by the CITY, shall be a mediator certified by the Supreme Court of Florida. The mediator's fee shall be paid in equal shares by each party to the mediation.

14.5 Contract Amendment

No modification, amendment or alteration in the terms or conditions contained in this Contract shall be effective unless contained in a written documents executed with the same formality and of equal dignity herewith. No verbal agreement by the CITY or the CITY's representative identified herein shall be binding or enforceable against the CITY.

14.6 Contractual Authority

By signing this Contract the Contractor swears or affirms, under penalty of perjury, that this is a valid act of the Contractor, and that no later claim shall be made by the CONTRACTOR that the Contract

is invalid or an *ultra vires* act, by reason of a failure to have the proper authority to execute the Contract. In the event that a court of competent jurisdiction later determines that the Contract is or would be null and void for failure of the signatory to have proper or complete authority, this Contract shall nonetheless be deemed valid under the theory of "apparent authority," or in the sole alternative of the City, shall be deemed to be the act of the signatory, as an individual, who shall be fully responsible for its complete performance.

14.7 Sovereign Immunity

Nothing contained herein shall be construed or interpreted as a waiver of the sovereign immunity liability limits established under chapter 768.20 Florida Statutes as amended.

14.8 Competitive Negotiation

CONSULTANT shall execute a truth-in-negotiation certificate stating that wage rates and other factual costs supporting the compensation are accurate, complete, and current. The original contract price and any additions thereto will be adjusted to exclude any significant sums by which the City determines the contract price was increased due to inaccurate, incomplete, or noncurrent wage rates and other factual costs. All such contract adjustments must be made within one (1) year following the end of the contract.

14.9 Prohibition Against Contingent Fees

CONSULTANT warrants that he or she has not employed or retained any company or person, other than a bona fide employee working solely for the Engineer to solicit or secure this agreement and that he or she has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the CONSULTANT any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this agreement. For the breach or violation of this provision, the City shall have the right to terminate the agreement without liability and, at its discretion to deduct form the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration.

CONSULTANT or partnership thereof, who offers to pay, or pays any fee, commission, percentage, gift, or other consideration contingent upon, or resulting from, the award or making of any City contract for professional services shall, upon conviction in a state court of competent authority, be found guilty of a first degree misdemeanor, punishable as provided in F.S. 775.082 or F.S. 775.083.

Section 15. Public Records

If the Contractor has questions regarding the application of Chapter 119, Florida Statutes, to the Contractor's duty to provide public records relating to this contract, contact the office of the City Clerk as the custodian of Public Records for the City of Stuart, and all the respective departments at 772-288-5306 or cwhite@ci.stuart.fl.us , City of Stuart, City Clerk 121 SW Flagler Avenue, Stuart, Fl. 34994 per F.S. 119.12.

Public Records Relating to Compliance, Request for Records; Noncompliance, & Civil Action with F.S. 119.0701 the Contractor shall:

Keep and maintain public records required by the public agency to perform the service.

Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.

Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.

Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request, and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.

If a contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.

A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under F.S. 119.10.

If a civil action is filed against a contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:

1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and

2. At least 8 business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.

A notice complies with subparagraph 2 above, if it is sent to the public agency's custodian of public records and to the contractor at the contractor's address listed on its contract with the public agency or to the contractor's registered agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.

A contractor who complies with a public records request within eight (8) business days after the notice is sent is not liable for the reasonable costs of enforcement.

Section 16. Exhibits

The following Exhibits are attached to and made a part of this Contract:

"Exhibit A" **"Proposal as Submitted by Respondent and Accepted by City, including Professional's Personnel Hourly Rate Schedule."**

"Exhibit B" **"Original RFP as Issued by City, including All Addenda"**

"Exhibit C" **"Insurance and Indemnification."**

"Exhibit D" **"Sample Work Authorization."**

IN WITNESS WHEREOF, the City has hereunto subscribed and the Contractor has signed his, its, or their name, or names the date aforesaid.

CITY OF STUART, FLORIDA

ATTEST:

CHERYL WHITE
CITY CLERK

TROY MCDONALD
MAYOR

APPROVED AS TO FORM AND CORRECTNESS:

MICHAEL MORTELL
CITY ATTORNEY

WITNESSES:

(Signature)

(Signature)

CONSULTANT
HAZEN AND SAWYER

(Signature)

Robert B. Taylor, Jr., P.E.
Printed Name

Vice President
Title

EXHIBIT A

"PROPOSAL AS SUBMITTED BY RESPONDENT AND ACCEPTED BY CITY, INCLUDING PROFESSIONAL'S PERSONNEL HOURLY RATE SCHEDULE"

Hazen

Professional Engineering Services

REI#2017-170

Assessment of Sustainable Alternative Water Supply Options

March 29, 2017

Hazen and Sawyer
2101 NW Corporate Boulevard, Suite 301
Boca Raton, FL 33431 • 561.997.8070

March 28, 2017

Stuart City Hall
Procurement & Contracting Services Division
121 S.W. Flagler Avenue
Stuart, Florida 34994

Subject: REI# 2017-170 / Assessment of Sustainable Alternative Water Supply Options

Dear Evaluation Committee Members:

The City of Stuart is dedicated to promoting the highest quality of life and, as such, has proactively decided to thoroughly investigate sustainable alternative water supply solutions. The City recognizes, as does Hazen and Sawyer (Hazen), that the most appropriate alternative water supply option may not be obvious and may require detailed investigations and extensive analysis to determine the true ranking order of alternatives. The Hazen team is prepared to perform such intricate, tailored evaluations we have for multiple south Florida clients previously. Planning for sustainable water supply options in an ever-changing environment is at the heart of our business. Stuart can be assured that the depth of our resources will be applied to the City's project such that the most applicable alternatives are vetted and developed.

The Hazen team is an experienced, local, multi-faceted alternative water supply team, working exclusively for Stuart to develop your sustainable solutions. The keys to our successful delivery of this assignment include:

- Previous experience with other local utilities for water alternative supply planning.
- A thorough knowledge of the available supply and treatment options to the City.
- A clear eyed, realistic view of the future regulatory framework and potential climate impacts.
- A robust, defensible evaluation process.
- Familiarity with the City's vision and requirements.
- The right leadership for the assignment.

We appreciate the opportunity to propose on this interesting and important project for the City of Stuart. We believe we have assembled the right team to assist you with this program. We have assembled individuals who are experienced with the City and with the potential alternative water supply and treatment options. We are ready to develop the alternative requirements, identify the alternatives, rank the alternatives, and recommend succession steps for the City to implement the recommended, sustainable alternative water supply solutions.

I am an agent authorized to negotiate for Hazen, and I certify the veracity of the contents of this proposal, binding our firm to this response to the City of Stuart's Request for Expressions of Interest. I can be reached at 561.997.8070 or rbtaylor@hazenandsawyer.com if you have any questions or would like to discuss our qualifications further.

Very truly yours,

Robert B. Taylor, Jr., PE
Vice President / Proposed Project Director

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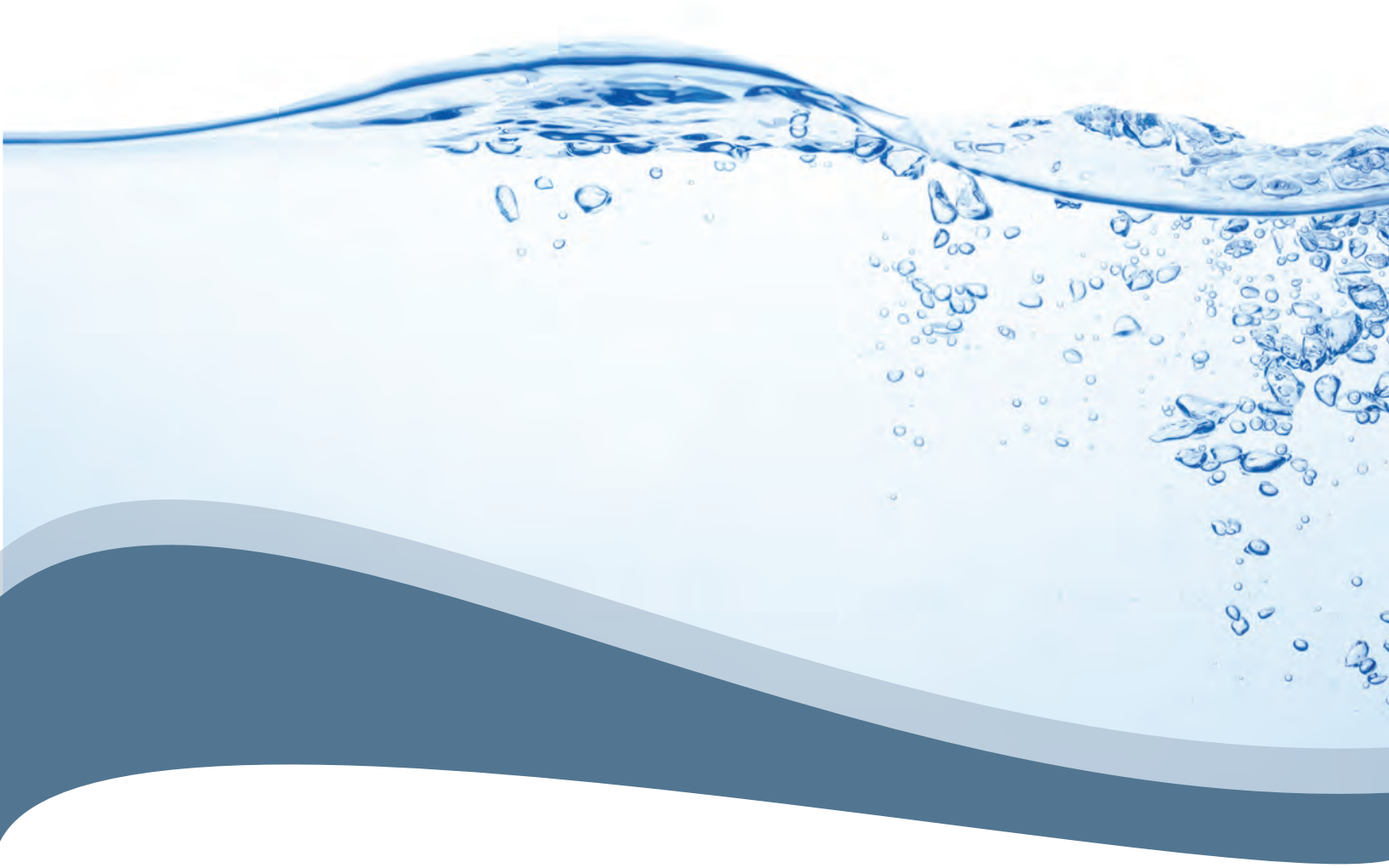


1 Company Qualifications

Section No. 1

Company Qualifications

Hazen specializes solely in water and wastewater engineering. It is the core business, and only business, of the firm.

Firm History and Corporate Structure

Hazen and Sawyer's (Hazen) roots go back over 100 years to the accomplishments of Allen Hazen, one of the pioneers of modern water supply engineering and co-developer of the Hazen-Williams formula for fluid flow in pipes in 1903. Hazen was established by Allen Hazen's son Richard and Alfred W. Sawyer in 1951, as a Partnership in the State of New York. Together, they created a company culture focused on the profession—not just the business of engineering. Their legacy continues today as we are a firm with a reputation for high-quality work and customer service.

In 1977, the firm was incorporated as a Professional Corporation in the State of New York. The firm has provided engineering services in the water resources and infrastructure field for the last 65 years in the United States and abroad; and in Florida since 1968. The firm is owned entirely by its employees, many of whom have been with the firm for more than 15 years.

Hazen is a nationally and internationally recognized environmental engineering consulting firm, specializing in all things water, including water supply, water treatment, water distribution, storage and pumping, water quality and hydraulic modeling, and all other aspects of water engineering. We are committed to helping our clients successfully and sustainably supply water to its customers. We recognize the importance of cost-effective delivery of high quality water. Over time, our clients' needs have expanded, and we have continued to grow with them.

Hazen specializes solely in water, wastewater, reclaimed water, and stormwater engineering. It is our core business, and only business of the firm. We have expertise in all the service areas needed to support the City as specified in the REI.

Our comprehensive capabilities will allow Hazen to develop sustainable alternative water supply options for the City.

Hazen has gained the trust of our public-sector clients by providing smart and cost-effective solutions to solve water supply challenges since our inception.

Corporate Structure

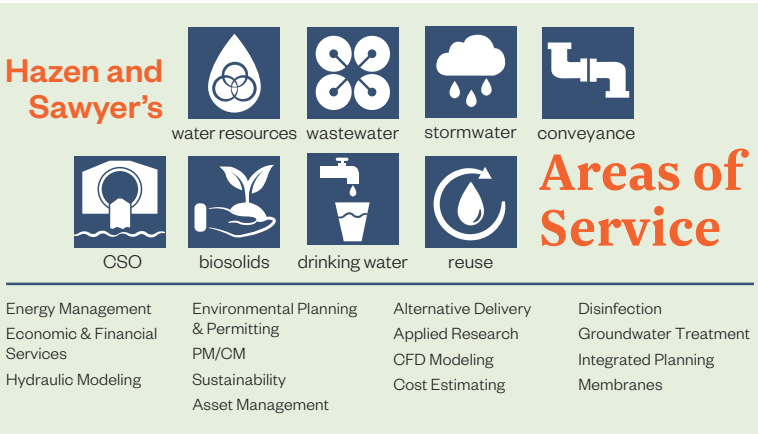
Hazen and Sawyer was incorporated as a Professional Corporation in the State of New York and is authorized to transact business in the State of Florida.

Ownership Interest

The firm is an employee-owned company.

Length of Company's Existence

65 years (since 1951)



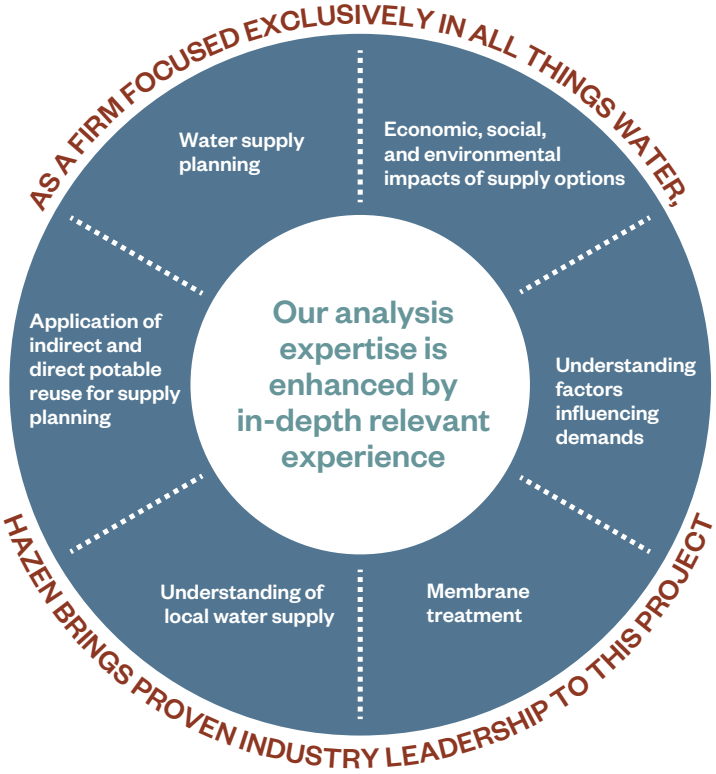
1021-132

Our Florida staff has been involved in the implementation of more than $2 billion in water-related projects in Florida over the past 10 years.

These Florida projects include planning, evaluation, finance, design, value engineering and facility optimization, permitting, construction management, and operation of water supply, treatment, and distribution systems; wastewater collection, treatment, and reclaimed water and storage systems; conveyance systems; and stormwater collection and systems.

Hazen brings proven industry leadership to this project: we successfully executed several of the most advanced demand forecasting and supply planning projects in the nation, working for large and small utilities alike.

Our staff has helped other Florida clients in multi-parameter criteria decision-making for comprehensive comparison of water supply alternatives.



Our local Hazen team has a strong background in the following key areas:

Water supply planning

Maintaining reliable long-term water supplies is critical for supporting public health, quality of life, and economic activity. Hazen has experience in the development of robust approaches for assessing future water needs that explicitly accounts for planning uncertainties driven by expectations of future demands and variability of supply source alternatives. Our team has been at the forefront of applying unique statistical and modeling resources to water supply planning problems, including approaches to understanding and mitigating uncertainties related to future conditions.

1021-132

Hazen has worked with and led water supply planning efforts for many South Florida clients including Cities of Fort Lauderdale, Hallandale Beach, Naples, and Plantation.

City of Fort Lauderdale

Relevance to City's Scope of Work: Design and permitting services during construction of two Floridan Aquifer System test wells, groundwater modeling based on test well results, wellfield conceptual plan, reverse osmosis facility basis of design, and successful funding application for implementation. In parallel, Hazen assisted the City with regional reservoir participation and conservation methods.

City of Hallandale Beach, FL

Relevance to City's Scope of Work: Evaluation of alternative water supply in response to the reduced allocation from the regional wellfield due to SFWMD's application of the Regional Water Availability Rule. Hazen assists in the evaluation of alternatives (Floridan aquifer, water bulk purchase, and regional reservoir participation), development of projected water needs, economic evaluation, and participation with regional permitting agencies.

City of Plantation, FL

Relevance to City's Scope of Work: Technical and economical evaluation and pilot testing of selected processes for the Biscayne aquifer recharge with highly treated reclaimed water through surface water discharge.

Systems operations and management

Optimization of water systems operations can result in increased economic benefits through greater water production efficiency, as well as a greater readiness for coping with acute system failures and other risks. Our team has experience in risk assessment and the systematic identification and evaluation of alternative operational and management strategies that increase system efficiencies while mitigating risks.

Water demand management

Water that is conserved through water efficiency improvements represents a non-traditional and environmentally friendly source of supply. As a standard of practice, Hazen identifies water efficiency potential and formulates cost-effective demand management alternatives, including conservation and pricing strategies, to evaluate along-side hard infrastructure.

Economic and environmental impact assessment

Water resources management decisions have several potential outcomes that can affect the economic viability and environmental sustainability of planning alternatives. Hazen's experts estimate impacts and derive solutions that strike an effective and defensible balance among diverse social, environmental, and economic perspectives.

Most of our team members are long-time Florida residents and offer considerable knowledge of Florida's current and historic issues with water resources, treatment and distribution; wastewater collection, treatment and disposal; and indirect/direct potable reuse.

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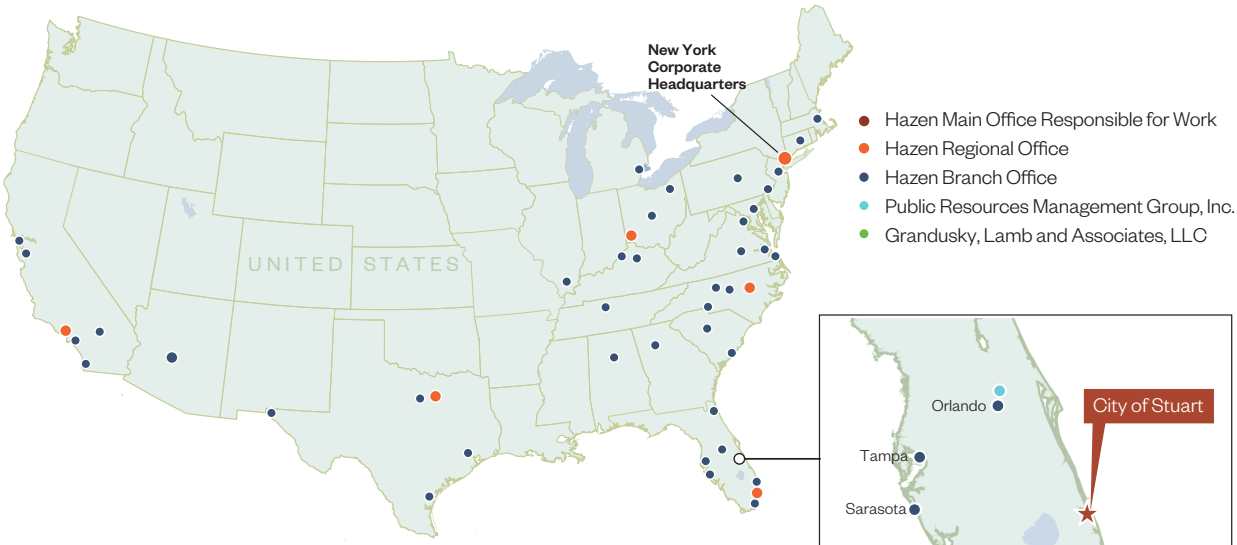
Office Locations

Hazen has offices strategically located throughout Florida and nationwide to provide full engineering services to our local clientele.



Alabama
Birmingham
Arizona
Tempe
California
Irvine
Palm Desert
San Diego
San Francisco
San Jose
Los Angeles
Connecticut
Rocky Hill

Florida
Boca Raton
Coral Gables
Hollywood
Jacksonville
Orlando
Sarasota
Tampa
Georgia
Atlanta
Illinois
Marion
Kentucky
Lexington
Louisville

Maryland
Baltimore
Massachusetts
Boston
Michigan
Detroit
New Jersey
Iselin
New York
New York
North Carolina
Charlotte
Greensboro
Raleigh
Winston-Salem

Ohio
Cincinnati
Columbus
Northeast
Pennsylvania
Philadelphia
State College
South Carolina
Charleston
Columbia
Tennessee
Nashville

Texas
Corpus Christi
Dallas
El Paso
Fort Worth
Houston
Virginia
Fairfax
Newport News
Richmond
Virginia Beach

Hazen's Boca Raton office, a short drive from Stuart, will serve as the main office that will be responsible for production of the work. Our Project Manager, **George Brown, PE,** and Deputy Project Manager, **Monica Pazahanick, PE,** will work closely with our Alternative Water Supply Team to develop sustainable solutions for the City. Our team is ready and available to respond to the City's needs.

Project Manager George Brown, PE, and Deputy Project Manager Monica Pazahanick, PE, will work together with our team to develop sustainable water supply solutions for the City.

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Water Treatment

Hazen's qualifications relative to water treatment, both locally and nationally, are impressive and continue to grow. The experience gained in the successful execution of these projects is of direct value to our clients. We offer recent experience in the planning, design, permitting, construction, start-up, and trouble-shooting of membrane treatment plants along with the refurbishment of existing facilities. Our Florida water treatment experience includes reverse osmosis, nanofiltration, and lime softening plants.

Hazen is also actively involved in many water supply well projects in South Florida, which provides us with an in-depth understanding of both Floridan and surficial aquifer wells. The firm offers significant Florida membrane experience (e.g., Collier County, Fort Lauderdale, Plantation, Hallandale Beach, Town of Jupiter nanofiltration Plant), as shown on the table on the next page.

Hazen also has considerable expertise in lime softening design and troubleshooting, including:

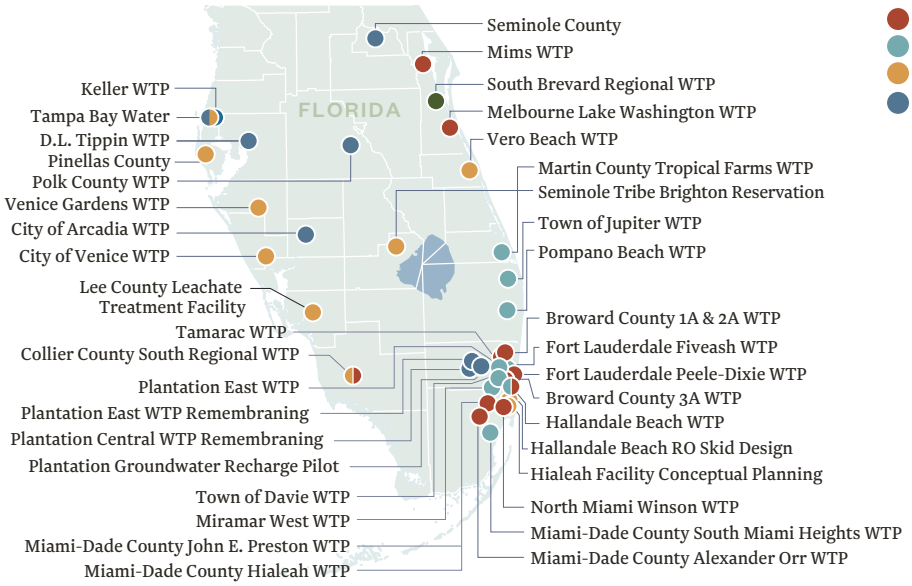
- North Miami Winson Water Treatment Plant, Florida.
- Miami-Dade Water and Sewer Department, Florida – Piloting, study, and design services for the 165-mgd Preston lime softening facility.
- City of Tamarac, Florida – Piloting, study, design and construction management services of 16-mgd lime softening water treatment plant.
- Fort Lauderdale, Florida – Master planning of water treatment system, and detailed design of improvements to the 70-mgd Fiveash Lime Softening WTP.
- Broward County, Florida – Design and construction management services of lime softening Water Treatment Plant 3A Upgrades.

Our water supply well experience includes design, permitting, and services during construction for projects including:

City of Fort Lauderdale Dixie Wellfield Floridan Aquifer Test Wells and Dixie Wellfield

Pompano Beach Western Wellfield Expansion

Collier County North and South Wellfields



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Hazen offers recent Florida experience in the planning, design, construction, start-up, and trouble-shooting of membrane treatment facilities.

	Year Completed	Planning and design of membrane water treatment systems, including determination of capacity requirements	Evaluation and selection of appropriate treatment technology	Assessment of water supply options and constraints in or hydrologically similar areas	Underground injection of membrane concentrate	Water plant construction administration with full construction services	State, regional, and local agency permitting requirements for public water systems
Seminole Tribe of Florida Brighton WTP Reverse Osmosis	2016	●	●	●	●	●	●
City of Hallandale Beach Reverse Osmosis Skid Design	2016	●	●	●			
City of Plantation 12-mgd Central WTP Remembraning	2016	●	●			●	●
City of Plantation 12-mgd East WTP Remembraning	2015	●	●			●	●
City of Fort Lauderdale Peele-Dixie 12-mgd Membrane Plant	2008	●	●	●	●	●	●
Brevard County South Mainland Regional RO Water Treatment Plant	2008	●	●	●			
City of Hallandale Beach 6-mgd Membrane Plant	2008	●		●	●	●	●
Collier County South Regional RO 12-mgd WTP Expansion to 20 mgd	2008	●	●	●	●	●	●
Miami-Dade County South Miami Heights Membrane Plant	2007	●				●	●
Town of Jupiter 14.5-mgd Nanofiltration Plant	2007	●	●				●
City of Hialeah 4-mgd RO Facility Conceptual Design	2006	●	●				
Collier County South Regional 8-mgd RO WTP (in association with another firm)	2005	●				●	●
City of Plantation East 6-mgd WTP Membrane Expansion	2003	●				●	●
Town of Davie 4-mgd Membrane Plant	2003		●				
City of Vero Beach 2-mgd RO Element Replacement	2003	●		●		●	●
City of Pompano Beach 10-mgd Membrane Treatment Plant	2002	●	●		●	●	●
City of Miramar West Membrane Plant Construction Management Services	2002					●	
City of North Miami Beach Membrane Predesign	2000	●	●				
North Miami Beach Feasibility Study for new 50-mgd Regional WTP	2000	●	●				

Hazen's depth of experience in design and planning of all types of alternative water supply projects ensures rapid development of a sustainable water supply plan for the City of Stuart.

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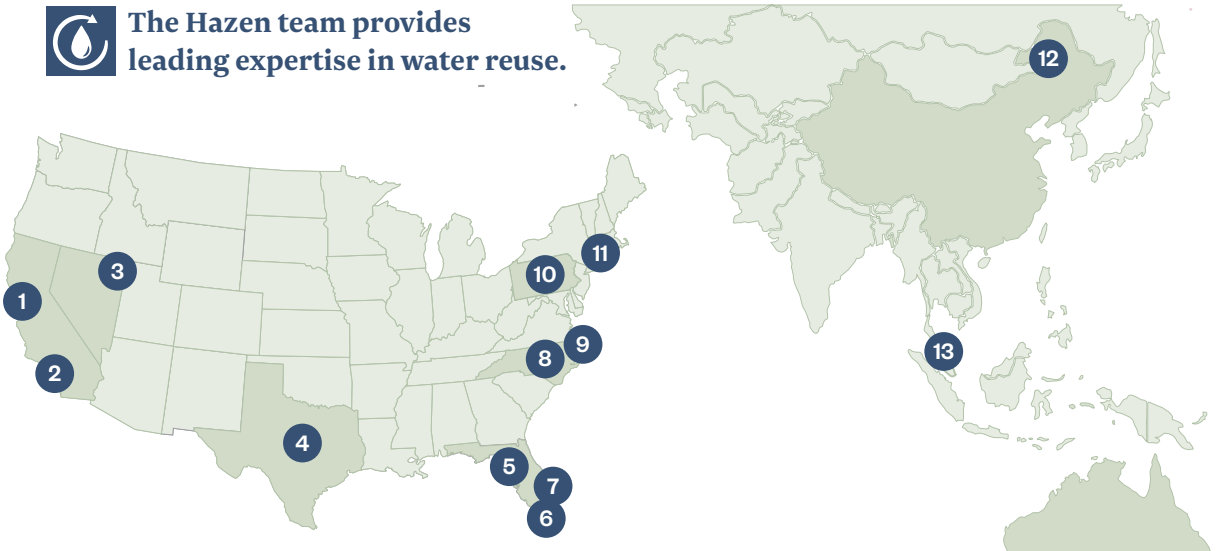
Water Reuse Options

Water supply evaluations that include a comprehensive review of water reuse options provide additional value and flexibility to water utilities. However, it requires an experienced team with a broad understanding of the benefits and limitations of each type of water reuse option to do this well. The Hazen team provides leading expertise in water reuse and desalination (see map, below). Staff dedicated to this project are already working on developing a triple bottom line methodology and multi-criteria decision analysis (MCDA) framework that can be applied to potable and non-potable water supply options as part of WateReuse Research Foundation project #14-03. We will apply this framework and our extensive knowledge of water reuse and desalination systems to the City of Stuart water supply evaluation, providing timely answers from a team that fully understands the implications and implementation needs for each water supply option.

Water reuse supply options that can be considered for this project:

Augmenting groundwater supplies through aquifer storage and recovery (ASR). The production of potable quality recycled water for augmenting groundwater supplies using ASR has been the basis of the southern California water supply portfolio since the inception of Water Factory 21 in the 1970s. With decades of demonstrated safe use and sustainable yields, ASR can be a viable potable supply option for communities that rely heavily on groundwater. A thorough understanding of treatment needs and salinity management, in addition to evaluating the environmental and economic costs of such a system, are required to provide a comparison of ASR to other options.

The Hazen team provides leading expertise in water reuse.



1 **San Francisco**
City Ordinances for Water Reuse in Buildings & Communities

2 **Orange County Water District**
Groundwater Replenishment

3 **California/Nevada**
Direct Potable Reuse Research & Operational Support

4 **Texas**
Planning, Design & Construction of Potable and Non-potable Reuse Systems, with Freese and Nichols, Including the First Direct Potable Reuse Projects in the US

5 **Florida**
Studies, Planning, Piloting, Design & Construction of Potable and Non-potable Reuse Systems for More Than 25 Municipalities

6 **Miami-Dade**
SDWRF Groundwater Replenishment and IPR

7 **Loxahatchee River District**
1981 1st Recycled Water Irrigation & IPR

8 **UNC/OWASA**
Design 2009 Water Reuse Institution of the Year

9 **North Caroina**
Over 20 Reclaimed Water Projects

10 **Penn State University**
Water Reuse Master Plan

11 **UConn**
Design, 2011 Water Reuse Institute of the Year

12 **E'erguna, China**
Eco-City Water Reuse Master Plan

13 **Singapore, Malaysia**
NeWater Program

14 **Brisbane, Australia**
Western Corridor Recycling Water Scheme

15 **Eraring Power Station, Australia**
1994 World's 1st Dual Membrane Recycled Water Project

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Hazen's Economics Group Capabilities

- Water demand modeling and forecasting
- Statistical analysis
- Water resource economics
- Economic feasibility (benefit-cost) analysis
- Economic impact analysis and modeling
- Cost-effectiveness analysis
- Utility finance
- Water supply development
- Environmental benefit valuation
- Recreation economics
- Industrial, agricultural and mining
- Economics
- Impact of regulations on individuals and businesses
- Survey research
- Data collection and analysis

Financial and Economic Feasibility Studies

Hazen's Economics Group provides professional services in economics and financial analysis with special expertise in the economics of water and related natural resources. Primary activities focus on providing assistance to public and private entities in resolving complex policy issues of sustaining natural resources and economic growth.

The Economics Group has established a reputation for quality, thoroughness, and responsiveness to client priorities. Staff members hold doctoral or master's degrees in natural resource economics from universities with outstanding programs in the field. Hazen's Economics Group:

- Offers knowledge of natural resource and engineering characteristics, water supply planning and development, and expertise in the application of economic and financial tools.
- Formulates relevant analytical tools for individual client issues and concerns.
- Applies a project performance standard designed to withstand legal challenge.

The Economics Group has broad professional experience from complex studies requiring teams of professionals to short-duration independent reviews. We have performed sophisticated economic analyses of government regulations and programs related to water, wastewater, stormwater, agriculture, and community development. Most of our studies include surveys of beneficiaries and the regulated community. We also perform environmental benefits valuation; rate studies for water supply, water reuse, stormwater and solid waste utilities; and funding analyses of environmental programs.

Reverse Osmosis of Floridan Aquifer

One of the City's viable options for sustainable water supply is the use of the Floridan aquifer either as a sole water supply or as a supplement to the surficial aquifer. In southeast Florida, the Floridan aquifer system contains water that is considered brackish to seawater in nature, depending on depth. The Hazen team has extensive experience and understanding of the considerations required for the evaluation, implementation, and sustainable management of Floridan aquifer production wells, including the selection of production zones that address yield and water quality consistency. Moreover, our planning and design approach provides our clients with the flexibility to plan for future conditions, including potential water quality degradation related to long-term use of the wells.

Brackish water from the Floridan aquifer is treated with reverse osmosis membrane process. Reverse osmosis treatment requires the use of high pressure to force water through a semipermeable membrane to separate

dissolved salts from the water. The Hazen team has assisted a number of local South Florida clients in the planning, design, construction, start-up, and operational improvements of reverse osmosis facilities treating raw water from the Floridan aquifer. Our experience includes providing alternative water supply planning through well development, testing, and/or startup for various clients including Cities of Fort Lauderdale and Hallandale Beach, and Collier County. Our team has also participated in a number of blending studies and implementation projects associated with the use of membrane-treated effluent to supplement conventional lime softening treated effluent.

For Fort Lauderdale, Hazen designed and provided services for construction of two Floridan Aquifer test wells, collected water quality data, and utilized the data to plan expansion of the Peele-Dixie Water Treatment Plant. The planning documents prepared by Hazen provided the City with a road map to quickly implement the alternative water supply in advance of a supply shortfall. Hazen also assisted the City in the conversion of a conventional lime softening plant to the existing nanofiltration membrane facility. Hazen's forward-thinking approach during the original design of the nanofiltration facility provided the City with the flexibility to incorporate reverse osmosis skids within the existing treatment scheme.

Additionally, Hazen has worked with the City of Hallandale Beach on its alternative water supply planning since the 1980s, and has designed its water projects through today. Work has included siting wells preliminarily, preparation of a planning-level cost estimate for the Floridan Aquifer wells, additional reverse osmosis skids, and associated infrastructure. Hazen assisted the City in planning and design of the existing membrane facility and assisted the City in the optimization of blending strategies between the lime softening and membrane facilities to achieve the City's finished water quality goals.

Additional experience includes Collier County's South Regional WTP 12-mgd Reverse Osmosis Expansion project, which included planning through construction management and startup of the facility expansion. In addition, Hazen performed a process review, bench-scale testing, and provided process enhancement recommendations regarding the lime softening facility operations to optimize the blending strategy between both treatment processes.

Reservoir Participation/Bulk Purchase Analyses

In response to projected drinking water supply limitations and growing population and water demands, regional agencies in South Florida elected to investigate and evaluate the potential use of captured stormwater and the concept of using a regional reservoir to recharge the surficial aquifer system. Hazen led the C-51 Reservoir evaluation. Key tasks performed for this award-winning project included projection of future water demands, hydrologic modeling, conceptual facilities plan, and financial feasibility. The C-51 Reservoir project was a collaborative project between the Cities of Fort Lauderdale, Pompano Beach, Sunrise, Plantation, and Hollywood; and Palm Beach and Broward Counties. This project will enable these utilities to extend their water source, providing a cost-effective water supply to South Florida residents.

Our team is ready and has the experience necessary to help the City of Stuart investigate and evaluate the feasibility of participating in a regional reservoir project similar to the C-51 Reservoir. We are confident that our experience enables us to provide the City with the knowledge to develop a comprehensive investigation and evaluation of this alternative.

Contamination Remediation

Hazen's portfolio of treatment of contaminated groundwater includes planning, design, and operations of some of the largest systems in the nation. Selected projects are highlighted below.

For Miami-Dade County's 156-mgd Air Stripping Facility project, where volatile organic compounds (VOC) were detected in the wellfields that serve northern Miami-Dade County, Hazen staff (while employed by Miami-Dade Water and Sewer Department) performed pilot testing, developed a prototype air stripper unit, provided design and construction services of the air stripping facilities at the Hialeah and John E. Preston Water Treatment Plants.

City of Fort Lauderdale's Dixie Wellfield was found to be contaminated with VOCs by the U.S. Environmental Protection Agency (EPA). Hazen provided assistance in negotiations with EPA, technical support related to groundwater modeling and assessment of movement of contaminants, engineering services for corrective action alternatives, and funding approval for implementation of stripping towers.

For Los Angeles (CA) Department of Water and Power (LADWP), Hazen is the prime consultant responsible for providing a full range of engineering and consulting services as the Owner's Agent to assist with the Groundwater Remediation Facilities. The San Fernando Basin is the City's largest local groundwater basin and comprises over 80 percent of the City's total annual adjudicated water rights. Services may include advice and recommendations regarding optimal project scheduling options; budgeting and cost estimating; preparation of design drawings, facility layouts, and specifications in accordance with LADWP design requirements; preparation of engineering project reports; and project progress documentation.

For the City of Glendale, CA, Hazen served as the technical leader and Owner's Agent guiding the study for Chromium-6 removal from groundwater and interpreting results as they apply to treatment of San Fernando Basin groundwater. Analysis involved process selection for upstream treatment to optimize treatment train effectiveness and downstream treatment to ensure safe introduction of the water into the distribution network without corrosion impacts to the system. At Glendale, the chromium-6 treatment facilities were incorporated into existing treatment trains consisting of packed tower aeration with granular activated carbon (vapor and liquid phase).

Experience Working with Regulatory and Other Permitting Agencies

The Hazen team has in-depth familiarity with the regulatory and permitting agencies (and their procedures) that regulate water supply and water treatment in Southeast Florida. Our team has performed numerous analysis and/or modeling of surface water and groundwater systems relative to water quality, water supply, wellfield capacity, wellfield protection, and environment impacts. Our team's knowledge of the water supply regulations, long-term relationships with regulatory staff, along with our extensive experience with water use permitting and groundwater modeling, will serve the City's needs in the evaluation of alternative water supply efforts. In addition to permitting, Hazen has worked closely with many of our clients to develop operational tools that can be used to track monitoring and permit requirements, which can be added to the computerized maintenance management system.

Wellfield Management

Management of raw water supplies is critical due to limited allocations and resources. This is especially true for coastal communities where freshwater resources are under the constant threat of saltwater intrusion. In addition to saltwater intrusion challenges, many surficial aquifer sources are susceptible to other contaminants that can enter the aquifer, since there is little to no barriers present to isolate productive zones. Water quality may deteriorate over time from upconing. One solution is to implement a wellfield management program to limit withdrawals to the natural sustainable quantities. This approach will limit the potential of upward migration of poorer quality water that could impact the treatment process. Establishing the reliable withdrawal rates will result in a sustainable system. Additionally, the specific capacity of raw water supply wells should be monitored to ensure that they are operating in the most productive range possible. For example, if specific capacity is reduced by 20-25%, a program to redevelop the well would be encouraged to restore capacity and minimize operating costs.

Project Team Organization

We have assembled a qualified team to serve the City of Stuart, as demonstrated in the organizational chart on the next page. It details the structure of the proposed team and primary areas of responsibility as well as indicates reporting/accountability relationships and proposed points of contact for interaction with City staff.

We understand that clients select consultants based on team qualifications, and we have proposed individuals who will work on your projects—what you see is what you get. In addition, many of our team members have worked together on previous and current projects.

> **Robert Taylor, Jr. PE, George Brown, PE, and Monica Pazahanick, PE, will work together with our experienced Alternative Water Supply team to develop long-term sustainable solutions for the City.**

Our team members are primarily local South Florida staff, which is a significant benefit to the City in that a range of experienced engineers are just a short drive away. Our team leadership is further strengthened by seasoned technical experts (in all disciplines needed), who have performed numerous projects of similar nature. Resumes are provided at the end of this section.

> **The [Riviera Beach Utility District] Master Plan was the most thorough, detailed and valuable I have seen in my 49-year utility career.**
>
> Bevin A. Beaudet, PE,
> Interim Executive Director
> Riviera Beach Utility District
> March 21, 2017

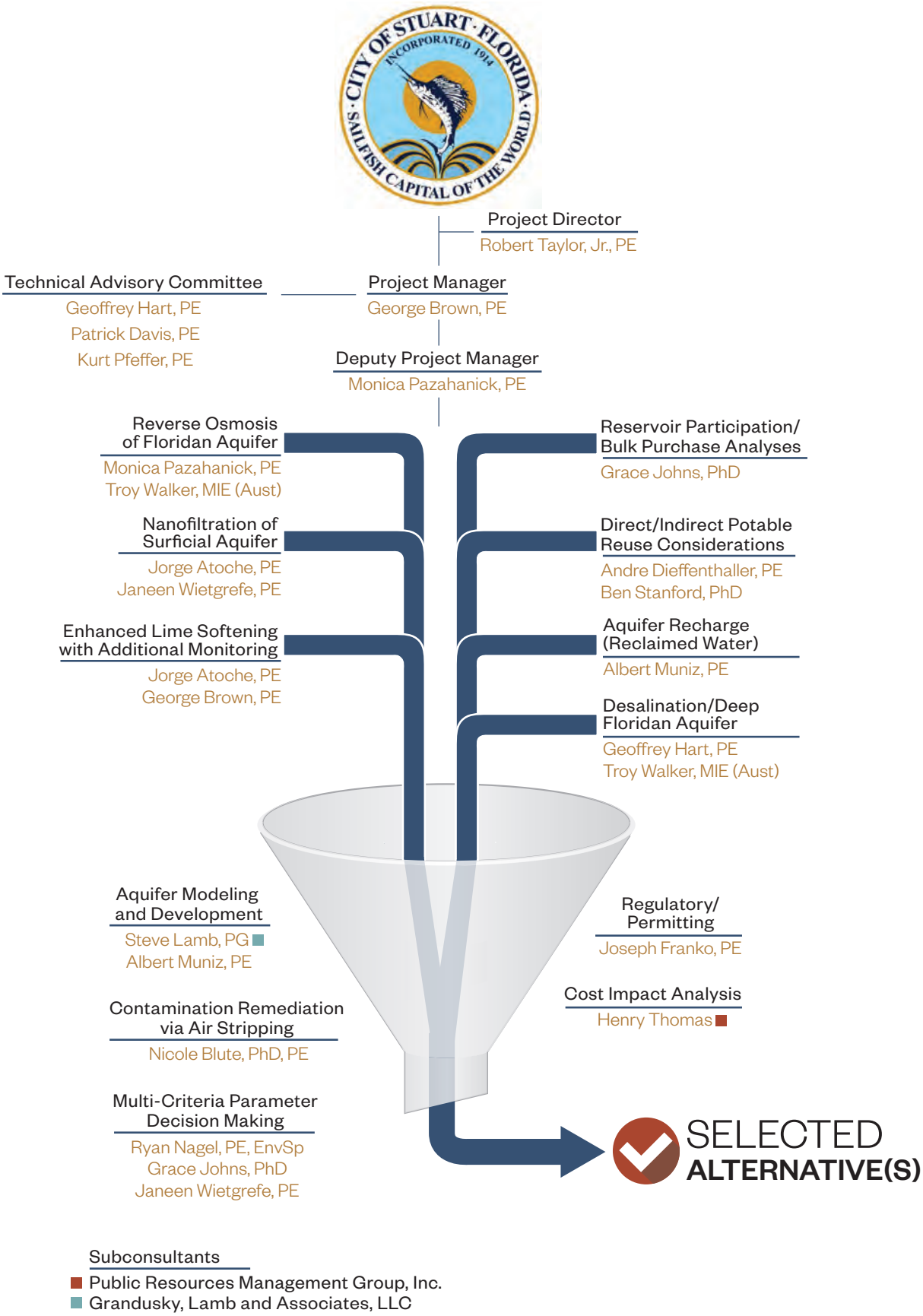
KEY PERSONNEL
that worked on the District's master plan will also work on the **CITY OF STUART'S AWS PLAN.**

GEORGE BROWN, PE

Project Manager

22 YEARS OF EXPERIENCE

- Extensive experience managing and developing long-term sustainable alternative water supply plans for clients including the Cities of Fort Lauderdale and Hallandale Beach
- Experience managing multidisciplinary design teams from master planning, conceptual planning, detailed design, permitting through construction and startup
- Master planned $2.1 billion dollars of water infrastructure improvements
- Managed design and construction of water supply wells in the Biscayne, Upper Floridan, and Lower Hawthorn aquifers
- Extensive resume of water treatment plant upgrade designs


Project Director
Robert Taylor, Jr., PE
Technical Advisory Committee
Geoffrey Hart, PE
Patrick Davis, PE
Kurt Pfeffer, PE
Project Manager
George Brown, PE
Deputy Project Manager
Monica Pazahanick, PE
Reverse Osmosis of Floridan Aquifer
Monica Pazahanick, PE
Troy Walker, MIE (Aust)
Nanofiltration of Surficial Aquifer
Jorge Atoche, PE
Janeen Wietgrefe, PE
Enhanced Lime Softening with Additional Monitoring
Jorge Atoche, PE
George Brown, PE
Reservoir Participation/ Bulk Purchase Analyses
Grace Johns, PhD
Direct/Indirect Potable Reuse Considerations
Andre Dieffenthaller, PE
Ben Stanford, PhD
Aquifer Recharge (Reclaimed Water)
Albert Muniz, PE
Desalination/Deep Floridan Aquifer
Geoffrey Hart, PE
Troy Walker, MIE (Aust)
Aquifer Modeling and Development
Steve Lamb, PG
Albert Muniz, PE
Contamination Remediation via Air Stripping
Nicole Blute, PhD, PE
Multi-Criteria Parameter Decision Making
Ryan Nagel, PE, EnvSp
Grace Johns, PhD
Janeen Wietgrefe, PE
Regulatory/ Permitting
Joseph Franko, PE
Cost Impact Analysis
Henry Thomas
SELECTED ALTERNATIVE(S)
Subconsultants
Public Resources Management Group, Inc.
Grandusky, Lamb and Associates, LLC

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MONICA PAZAHANICK, PE

Deputy Project Manager

10 YEARS OF EXPERIENCE

- Has assisted local south Florida clients in the evaluation of alternate water supplies and available treatment processes, including Floridan aquifer supply with RO treatment
- Experience in conceptual design and detailed design of RO treatment
- Experience in planning, design, permitting, and construction management of water treatment plants using conventional lime softening treatment and advanced membrane technology
- Experience managing and working along multidisciplinary teams in water-related projects including planning, permitting, pre-design, detailed design, construction, and commissioning
- Has successfully permitted and worked closely with permitting agencies for water-related projects, including Floridan aquifer RO systems

ROBERT TAYLOR, JR., PE

Project Director

32 YEARS OF EXPERIENCE

- Has served as Project Director or Project Manager for numerous City of Stuart projects since 1992, which provides him with in-depth familiarity and institutional knowledge of the City
- Well-acquainted with the area, having lived in Stuart from 1965 to 1981 and in Jupiter since 1987.
- Extensive experience related to municipal water utilities, including aspects of supply, treatment, storage, transmission and distribution
- Has managed and completed numerous water supply and water resource projects in south Florida over the last 30 years
- Hazen Vice President with authority to assign all necessary resources required for this contract

ALBERT MUNIZ, PE

Aquifer Recharge, Aquifer Modeling and Development

36 YEARS OF EXPERIENCE

- Expertise in South Florida water supply planning since 1985
- Water resources-related experience includes water supply, aquifer storage and recovery (ASR), effluent disposal and deep well injection programs, wellfield design and evaluation, saltwater intrusion analysis, permitting, and regulatory development
- Pioneered the first successful potable water ASR systems in South Florida
- Has managed ASR projects for the City of Naples, Miami-Dade County, Broward County, SFWMD Lake Okeechobee, private clients, and has worked on or is currently working on the Cities of Sunrise, West Palm Beach, and Delray Beach; and Palm Beach County ASR projects

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JANEEN WIETGREFE, PE

Nanofiltration of Surficial Aquifer/ Multi-Criteria Decision Making

22 YEARS OF EXPERIENCE

- Experienced with multi-parameter decision making with multiple stakeholder involvement. Prior experience developing Regional Reuse Master Plan for Broward County will greatly assist City in navigating the options.
- Currently navigating similar water supply alternative considerations for the City of Hallandale Beach, including Floridan Aquifer, reservoir participation, salty Biscayne Aquifer treatment, and bulk purchase options
- Extensive design, piloting, and/or testing of membrane plants including the City of Plantation East WTP, Town of Jupiter 14.5-mgd Nanofiltration project, City of Fort Lauderdale Peele-Dixie Membrane Plant, and City of Hallandale Beach 6-mgd Membrane Softening Plant

STEVEN LAMB, PG

Aquifer Modeling and Development

41 YEARS OF EXPERIENCE

- Expertise includes conducting modeling of complex groundwater and groundwater/ surface water systems in Florida and obtaining consumptive use permits for Public Water Supplies
- Extensive experience in groundwater and water use issues, including 30 years as an environmental consultant in Florida
- Former Director of Regulation with South Florida Water Management District, where he was responsible for all regulatory issues within SFWMD. Assisted in the development of water supply plans to resolve existing and future water resource problems. Also addressed local and regional problems along with state and federal policy issues related to water supply.

GRACE JOHNS, PHD

Reservoir Participation/Bulk Purchase Analyses/ Multi-Criteria Decision Making

36 YEARS OF EXPERIENCE

- Instrumental in the development of criteria and weighting of criteria for the Broward County Regional Reuse Master Plan
- Experienced in multi-parameter decision making for alternative water supply analyses
- Expertise in economic and financial studies that involve economic and financial feasibility evaluations related to water, wastewater, stormwater, agriculture, and land use
- Evaluations experience includes contingent valuation surveys, economic impact analysis, and benefit-cost analysis as well as the design of rates, fees, and funding for water resource projects
- Managed technical and economic evaluations of three proposed reservoirs in Florida including the C-51 Reservoir in Palm Beach County, Groveland Reservoir and stormwater treatment area in St. Lucie County, and Four Corners Reservoir in Lee County

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TROY WALKER, PE

Reverse Osmosis of Floridan Aquifer

21 YEARS OF EXPERIENCE

- Experience in the manufacture, design and operation of membrane treatment systems, including microfiltration, reverse osmosis, nanofiltration, and membrane bioreactors
- Has worked on dozens operational monitoring and operational support projects including plant troubleshooting and membrane selection and replacement strategies
- Extensive experience in piloting, detailed design, construction, commissioning, and long-term operations of membrane treatment technologies focused on the treatment of municipal effluent for direct, indirect potable as well as industrial reuse
- Serves as Hazen's Membrane Technical Lead

JOSEPH FRANKO, PE

Regulatory/Permitting

28 YEARS OF EXPERIENCE

- In-depth project experience in the Stuart/Martin County area gained from being involved in most of the Stuart projects since the firm began work in 1992
- Has directed or participated in the planning, permitting, design, and construction oversight of many south Florida water, wastewater, and stormwater projects
- Comprehensive familiarity of the City's processes and goals
- Served as Engineer-of-Record for the City's Old City Landfill responsible for design, permitting, and implementation of the remedial action facilities. The project also consisted of installation of groundwater recovery wells, an air stripper system, effluent pump station, and exfiltration trench. Also participated in permitting and design of the closure and golf teaching facility.

HENRY THOMAS

Cost Impact Analysis

37 YEARS OF EXPERIENCE

- Has served the City of Stuart since 2004 providing utility rate, financial planning, and management consulting services to the City's water, wastewater, and solid waste systems
- Currently engaged by the City to update its water, wastewater, and solid waste rates
- Has been responsible for preparing utility rate and cost-of-service studies, business plans, bond feasibility studies, designing innovative utility rates, connection and development fees, municipal impact fees, developing utility financial policies and assisting with the acquisition of utility properties and other management consulting services

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Subconsultants

In addition to Hazen staff, we will utilize local partners **Grandusky, Lamb and Associates, LLC,** and **Public Resources Management Group, Inc. (PRMG),** to provide aquifer modeling and development and cost impact analysis services, respectively. Grandusky, Lamb and Associates offers unique expertise in the regulatory and planning aspects of Florida water resource development as well as groundwater modeling expertise in both the surficial and Floridan Aquifer systems. PRMG has provided utility rate, financial planning, and management consulting services to the City on an ongoing basis since 2001.

Hazen and PRMG has had a strong and successful relationship working together for a variety of clients over more than two decades. The two firms have come together to provide the City with longstanding financial services for this important project.

Hazen's working relationship with Grandusky, Lamb and Associates spans two decades. The firm has been instrumental in understanding the local aquifers and successfully permitted maximum withdrawals. Working with Hazen, the firm has accessed impacts on adjacent uses, cumulative drawdown effects, and water quality changes for a large number of municipal users including Hallandale, Fort Lauderdale, and Sunrise.

Public Resources Management Group, Inc.

PRMG is an established utility, financial, and management consulting firm that specializes in financial and strategic planning, and management consulting services to the public utility sector with clients in Florida and throughout the United States. PRMG's experience includes over 1,600 individual rate and financial planning projects conducted by the firm since 1994.

PRMG's extensive experience providing utility rate and financial consulting services to local governments in Florida include the development of utility rates, impact fees, miscellaneous service fees, preparation of financial plans, assisting in securing external funds for capital expansion programs, developing uniform extension policies and developer agreements, presentation of expert testimony on utility financial matters, contract negotiations, and the acquisition and establishment of utilities.

The firm has provided utility rate, financial planning, and management consulting services to the City of Stuart on an ongoing basis since 2001. In addition to preparing comprehensive water and wastewater rate studies in 2004, 2007 and 2012, PRMG has assisted the City with developing impact fees for water and wastewater service, development of

Areas of Expertise

- Utility rate and cost-of-service studies
- Capital finance and bond feasibility studies
- Water and wastewater impact fees
- Rates and policies for reclaimed water service
- Water conservation rates
- Utility system acquisitions
- Wholesale rate studies and service agreements
- Contract negotiations, developer agreements/uniform extension policies
- Litigation services and expert testimony
- Strategic business planning services
- Rates for stormwater, solid waste, electric and gas services
- Computer modeling for rate and financial planning

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bulk water and wastewater rates, reclaimed water rates for both retail and bulk users, and are involved in ongoing annual water and wastewater financial compliance reviews. In addition to these rate and financial planning activities, the firm has assisted the City in a review of billing policies and procedures, including credit and collections activities, and establishment of financial policies regarding utility reserve fund levels. PRMG also recently assisted the City of Stuart develop an interlocal agreement to facilitate a wholesale supplemental capacity exchange with Martin County.

PRMG has provided utility rate, financial planning, and management consulting services to the City of Stuart on an ongoing basis since 1999.

Grandusky, Lamb and Associates, LLC

Grandusky, Lamb and Associates provides specialized consulting for water supply, water quality, and environmental issues in Florida. Located in West Palm Beach, the firm offers unique expertise in the regulatory and planning aspects of Florida water resources development.

Grandusky Lamb and Associates
Water Resource and Environmental Consultants

Grandusky, Lamb and Associates has performed groundwater modeling in both the surficial and Floridan Aquifer systems for both public and industrial clients throughout Florida. The firm has modeled the effects of Floridan usage by every utility in Miami-Dade and Broward counties considering actual use data or proposed Lower East Coast Plan data.

The firm's Principal Hydrogeologist for water resource and environmental consulting, Steve Lamb, PG, has more than 41 years experience in groundwater and water use issues, including 30 years in environmental consulting in Florida. His experience with the South Florida Water Management District addressed local and regional problems along with state and federal policy issues related to water supply. His permitting experience includes major municipal water supplies including those with historical salt-water intrusion and wetland issues.

Areas of Expertise

- Consulting services for water supply, water quality, and environmental issues
- Water supply planning
- Regulatory and planning aspects of Florida water resource development
- Florida water supply and water quality policies and regulations expertise
- Modeling
- Permitting
- Hydrogeology
- Groundwater and water use issues

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Education

ME, University of Florida, Agricultural Engineering 1987

BS, University of Florida, Agricultural Engineering, 1985

Certification/License

Professional Engineer: FL, NY

Areas of Expertise

- Water Resources and Water Supply Engineering and Planning
- Stormwater Management
- Stormwater Utility Implementation
- Regulatory Compliance
- Civil Engineering
- Project Management

Experience

- 32 total years
- 24 years with Hazen

Professional Activities

American Society of Civil Engineers

American Membrane Technology Association

Florida Stormwater Association

Water Environment Federation

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Robert Taylor, Jr., PE

Project Director

Robert Taylor, Jr., PE, has managed and completed numerous water supply, water resource, water treatment, general consulting, and stormwater management projects in south Florida over the past 30 years.

Assignments have included design, permitting, master planning, utility development, utility financing, and construction management. Mr. Taylor has experience related to municipal water utilities, including aspects of supply, treatment, storage transmission and distribution.

Mr. Taylor serves as Hazen's Southeastern Regional Manager and for many years served as Corporate Practice Area Leader in the field of Stormwater Management. Mr. Taylor is extremely well-acquainted with the area, having lived in Stuart from 1965 to 1981 and in Jupiter since 1987. He has served as Project Manager for numerous City of Stuart projects dating back to 1992 including the General Stormwater Consultant and the Closure of the Old City Landfill projects. Services have included stormwater management and regulatory compliance. His representative Stuart projects are highlighted below.

General Stormwater Consultant, City of Stuart, FL

Mr. Taylor served as Project Manager on this comprehensive stormwater management program including stormwater master plan and stormwater utility development. In addition, a field inventory and needs assessment of the City-owned stormwater infrastructure were conducted. Mr. Taylor's duties included helping develop policies and procedures for stormwater management associated with new development, redevelopment, and retrofitting of existing systems, establishing the basis for a stable, equitable stormwater utility to fund the stormwater management program. He also assisted with regulatory compliance and planning and development of construction documents for stormwater capital improvements.

City of Stuart Closure of the Old City Landfill, FL

Mr. Taylor managed the closure of the Old City Landfill in Stuart. The City was required under Consent Order to assess contamination at the site, prepare a remedial action plan (RAP), and close the inactive 62-acre landfill. The CAR and RAP was approved, and the remediation system was constructed. An Environmental Resource Permit was also obtained, which approved construction of a Golf Teaching Facility, which Hazen designed. Mr. Taylor has continued to lead Hazen's efforts to assist the City with landfill-related issues and opportunities through the ensuing years.

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Town of Jupiter

Mr. Taylor has assisted with water utility master planning and implementation for the Town of Jupiter for two decades. This includes coordination with SFWMD regarding (water supply) interface with the regional system, as well as planning, design, permitting and construction of the Town's surficial wellfield recharge system. Selected Jupiter projects are highlighted below.

Professional General Engineering Services for Water and Stormwater Utility (2000 to present), Town of Jupiter, FL

Project Manager responsible for this General Water and Stormwater Consultant contract that includes major improvements to the Town's water and stormwater utility systems. Water system improvements include design and permitting for a 14.5-mgd Nanofiltration WTP, high service pump stations, ground storage tanks and various transmission/distribution system improvements. Master plan updates have been completed multiple times for both utility systems. Mr. Taylor serves as the primary client contact responsible for coordination with staff, directors, administration, and elected officials, and is responsible for timeliness, budget, and quality related to stormwater and water utilities projects and programs.

Limestone Creek Water Storage and Repump Facility, Conceptual Design and Site Plan Approval, Town of Jupiter, FL

The Town of Jupiter retained Hazen for the conceptual layout and design of a storage tank and repump facility to assist in maintaining system pressures in southern Martin County. Facilities proposed for the site include a 1-mg ground storage tank, an electrical building, a full storage tank (for emergency generator), a high service pumping station, and on site access roads and parking (including overflow parking for Jupiter Community Park). The project is being conducted in two separate phases.

City of Riviera Beach Utility District Water and Wastewater Master Plan, FL

Mr. Taylor served as Project Director for the City of Riviera Beach Utility District (CRBUD) Water and Wastewater Master Plan. The plan includes development of project needs to 2030, including extensive system renewal and replacement. In order to help identify and prioritize needs, Hazen developed CRBUD's first ever water and wastewater system hydraulic needs.

Conceptual Feasibility of a Sub-Regional Lower East Coast Water Supply Solution, City of Fort Lauderdale, FL

To achieve sustainable water supplies that serve a growing population, seven water utilities in south Florida collaborated on an investigation of the potential to harvest and store stormwater currently lost to tide and use this water to recharge the surficial aquifer. This innovative, multi-jurisdictional public-private partnership project evaluated alternative water supplies for the Lower East Coast of Florida. Hazen evaluated the financial feasibility of increasing water supplies to southeast Florida via the C-51 reservoir for wellfield recharge, aquifer recharge via reclaimed water treatment, and Floridan Aquifer reverse osmosis. This project was recognized as a 2014 Grand Award Winner of Engineering Excellence. Mr. Taylor served as Project Engineer.

Financial Feasibility Study of the Grove Land Reservoir and Stormwater Treatment Area (STA), Northern Okeechobee and Southern Indian River Counties, FL

Mr. Taylor served as Project Manager on this project to evaluate the possibility of diverting stormwater from the Indian River Lagoon, including St. Lucie Estuary. This excess runoff is causing environmental degradation of these coastal areas. Project benefits would include reduced stormwater flows and reduced total phosphorus and nitrogen loads to the estuary and the lagoon, increased water supply for numerous water utilities and to serve environmental needs, and increased water management flexibility from improved connection between water management districts. Mr. Taylor managed the large project team and reviewed study components and deliverables including conceptual design, stormwater flow, and nutrient load reductions to estuary and lagoon; life-cycle project costs; dollar value of benefits provided and beneficiary willingness-to-pay; and economic and financial feasibility analysis.

George Brown, PE

Project Manager; Enhanced Lime Softening with Additional Monitoring

George A. Brown, PE, has 22 years of experience in the design and construction of water and wastewater infrastructure along with managing multidisciplinary design teams from master planning, conceptual planning, detailed design, permitting through construction and startup.

Mr. Brown has managed and assisted with development of long-term sustainable alternative water supply plans for the Cities of Fort Lauderdale, Hallandale Beach. He has master planned $2.1 billion dollars of water infrastructure. Additionally, he has managed the design and construction of water supply wells in the Biscayne, Upper Floridan and Lower Hawthorn aquifers and has an extensive resume of water treatment plant upgrade designs. His experience ensures rapid identification of a sustainable and cost-effective alternative water supply pathway for the City of Stuart.

Conceptual Feasibility of a Sub-Regional Lower East Coast Water Supply Solution, City of Fort Lauderdale FL

Mr. Brown provided quality control assistance for this study conducted for the City of Fort Lauderdale, Florida and several other utilities. Hazen and Sawyer conceptualized and evaluated the feasibility of developing the C-51 Reservoir to harvest stormwater for public water supply. The reservoir would provide about 120-mgd of water to recharge the surficial aquifer allow water utilities in southeast Florida to withdraw water above their current permitted water allocations under the Regional Water Availability Rule. This water supply has the potential to become an alternative water source for the City of Fort Lauderdale and other southeast Florida water utilities. The South Florida Water Management District is currently working with stakeholders to develop this project. This project was recognized with the 2014 FICE Engineering Excellence Award and the 2014 ACEC National Recognition Award.

Alternative Water Supply Planning, City of Fort Lauderdale, FL

Mr. Brown served as project manager for the development of conceptual plans for implementing reverse osmosis and upper Floridan Aquifer wellfield for the City of Fort Lauderdale. This project included the design, permitting and construction of two full size Floridan Aquifer supply wells to collect water quality data, assess pumping impacts on the aquifer and the possibility of changes in water quality and quantity over time. These

Education

BS, University of Florida, Environmental Engineering, 1996

Certification/License

Professional Engineer: FL

Areas of Expertise

- Alternative Water Supply Planning
- Water Supply and Treatment Planning
- Upgrades to Existing Water Treatment Plants
- Water Supply Well, Pumping and Pipeline Design
- Saltwater Monitoring Well Design
- Water Treatment Plant Design

Experience

- 22 total years
- 21 years with Hazen

Professional Activities

American Water Works Association

American Society of Civil Engineers

Florida Section AWWA Risk Management/Safety Committee

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Hazen

plans provide the City with a roadmap to quickly implement this alternative water supply in advance of demand exceeding its traditional Biscayne Aquifer supply. This project was completed in 2008.

City of Hallandale Beach Alternative Water Supply Planning, FL

Mr. Brown provided quality control review along with cost estimating assistance for conceptual planning of Floridan Aquifer supply and treatment facilities for the City of Hallandale Beach. Mr. Brown developed conceptual Floridan Aquifer wellfield configurations for supplying future reverse osmosis treatment facilities to diversify supply/treatment options if existing surficial wells are impacted by salt water intrusion.

Riviera Beach Utility District Water and Wastewater Master Planning, FL

Recently, Mr. Brown led the project team for the Riviera Beach Utility District's water and wastewater master plan. The scope included master planning for: water supply; water treatment; water distribution and storage; along with wastewater collection, pumping and transmission. The infrastructure was evaluated relative to: 1) capacity to meet future growth (hydraulic modeling) 2) regulatory compliance (current and future regulations); 3) water quality and 4) renewal and replacement to ensure long term sustainability. This project, completed in February 2013, identified $159 million in water and $56 million in wastewater infrastructure improvement needs to maintain the reliability of existing infrastructure. Mr. Brown developed a technique dubbed "asset management lite" that leverages the experience of utility personnel to efficiently identify capital needs to ensure the long-term sustainability of the existing infrastructure. This approach ensured that less money was spent on engineering analysis and more money was available for capital investment. The project started in November 2011 and completed in February 2013.

2006 Water Master Plan Update, City of Fort Lauderdale, FL

Mr. Brown managed the update to the City of Fort Lauderdale Water Master Plan in 2006. This project focused on transmission system improvements to meet the year 2025 water demand. The report recommended $276 million in water infrastructure improvements over the next twenty years. The projects were mostly related to maintaining the reliability of the existing water distribution system and water supply infrastructure.

Broward County's Effluent Disposal and Reclaimed Water Master Plan, FL

Mr. Brown was the project manager for preparation of Broward County's Effluent Disposal and Reclaimed Water Master Plan which was completed in 2011. This master plan evaluated alternatives to comply with Senate Bill 1302 (Outfall Rule) which require cessation of ocean outfall based wastewater effluent disposal. The Outfall Rule also requires the County to implement a new 22.5 mgd capacity reclaimed water reuse facility prior to December 31, 2025. The Effluent Disposal and Reclaimed Water Master Plan recommends implementation of a large user reclaimed water irrigation system for golf courses that will dispose of approximately 7.8 mgd of reclaimed water on an annual average basis with the balance of reclaimed water being utilized by either residential irrigation or Floridan Aquifer recharge depending upon the outcome of a future study. The estimated capital cost of the program is between $740 and $890 million in 2010 dollars.

Monica Pazahanick, PE

Deputy Project Manager; Reverse Osmosis of Floridan Aquifer

Monica Pazahanick, PE, has assisted local south Florida clients in the evaluation of alternate water supplies and available treatment processes, including Floridan aquifer supply with RO treatment.

Her experience includes planning, design, permitting, and construction management of water treatment plants using conventional lime softening treatment and advanced membrane technology, as well as conceptual design and detailed design of RO treatment. Additionally, she has successfully permitted and worked closely with permitting agencies for water-related projects, including Floridan aquifer RO systems.

South County Regional Water Treatment Plant Water Quality Evaluation, Collier County, FL

Ms. Pazahanick served as Project Manager for this project, which included evaluation of different treatment technologies used for the removal of organics that would allow the plant to use free chlorine as the primary disinfection method. As part of this project, pilot testing and desktop evaluations were performed to determine the performance of three different alternatives. The alternatives under evaluation include fluidized and fixed-bed ion exchange as pretreatment to lime softening and nanofiltration membranes in combination with ion exchange.

Lime Softening versus Nanofiltration Water Treatment Plant Evaluation, City of Pompano Beach, FL

Ms. Pazahanick served as Project Manager. This project included inspection of existing facilities, evaluation of the lime softening water treatment plant current conditions and upgrade recommendations for the next 20 years. Project also included cost comparison of nanofiltration water treatment plant expansion versus upgrading the lime softening plant, including operational costs, and identification of advantages and disadvantages; and evaluation of incorporating ion exchange within the existing treatment processes.

Springtree Reverse Osmosis Water Treatment Plant, City of Sunrise, FL

Ms. Pazahanick served as Design Engineer for this project, which included preparation of construction drawings and specifications for a 3-mgd treatment capacity with 1.5 mgd installed during Phase 1. The project

Education

MS, University of Arkansas, 2007, Environmental Engineering

BE, Catholic University of Bolivia, Cochabamba, 2004, Environmental Engineering

Areas of Expertise

- Water and Wastewater Process and Mechanical Design

Experience

- 10 total years
- 1 year with Hazen

Professional Activities

American Water Works Association

Florida Section American Water Works Association (FSAWWA) Region VI - Membership Chair

American Membrane Technology Association (AMTA) - Co-Editor of the AMTA Quarterly Newsletter "Solutions" (06/2011 to 04/2015)

American Membrane Technology Association (AMTA) - AMTA/AWWA 2017 Membrane Technology Conference Planning Committee Member

AWWA/AMTA 2014 Membrane Technology Conference, Las Vegas, Nevada - Presidential Award

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design included conversion of an ASR well to a Floridan aquifer production well, pre-treatment (sand strainers and cartridge filters), 2-stage reverse osmosis membrane treatment, post-treatment (degasification and air scrubbers), and chemical systems.

Sawgrass 3-mgd Reverse Osmosis Water Treatment Plant, City of Sunrise, FL

Ms. Pazahanick served as Design Engineer for this project, which included preparation of construction drawings and specifications. The reverse osmosis system design included pre-treatment (sand strainers and cartridge filters), 2-stage reverse osmosis membrane treatment, post-treatment (degasification and air scrubbers), and chemical systems.

Sawgrass Nanofiltration Water Treatment Plant Re-rate Improvements, City of Sunrise, FL

Ms. Pazahanick served as Design Engineer for this project, which included uprating the existing facility from 18-mgd to 24-mgd capacity, replacement of concentrate pumps, and finished water transfer pumps along with other renewals and improvements.

North RO Water Treatment Plant Cost Estimate Evaluation, Manatee County, FL

Ms. Pazahanick served as Project Engineer. Project scope included development, evaluation, and comparison of previously developed construction, project, and O&M estimates and updated estimates for a new RO WTP, ancillary system, transmission mains, and wellfields. The project also included a 30-year life-cycle cost evaluation to evaluate alternatives for expansion and to compare with other proposed facilities.

Northeast Irrigation Quality (IQ) Water Resources Phasing Plan, Collier County, FL

Ms. Pazahanick served as Project Manager for this project that included preparation of a fully integrated plan for the provision of reuse (IQ) water over the course of the County's development of the Northeast service area. This evaluation explores different alternatives for IQ water sources as well as the required treatment processes and infrastructure.

Concentrate Disposal Evaluation, City of Pompano Beach, FL

Ms. Pazahanick served as Project Engineer for this project, which included the economical and non-economical evaluation of alternatives for concentrate disposal during emergency events, and evaluation of using concentrate blending with effluent from the City's reuse facility.

Water Supply Facilities Work Plan, City of Punta Gorda, FL

Ms. Pazahanick served as Project Engineer for this project, which included development of a Water Supply Facilities Work Plan (WSFWP) for the City of Punta Gorda, in accordance with Florida Statutes and the Florida Department of Economic Opportunity (DEO) requirements. Regular updates to local government Comprehensive Plans including the Public Facilities Water Supply Element (Potable Water Element) were required, which was based on development of a WSFWP. In addition, this report addressed projects outlined in the 2010 Regional Water Supply Plan developed by the Southwest Florida Water Management District.

Hialeah-Preston Water Treatment Plant, Miami-Dade Water and Sewer Department, FL

Ms. Pazahanick served as Design Engineer for the Groundwater Under the Direct Influence (GWUDI) of surface water upgrades design for the Hialeah-Preston Water Treatment Plant, a 153-mgd nanofiltration facility. Responsibilities included development of design criteria and equipment selection for chemical bulk storage facilities and feed systems, development of three-dimensional models and construction drawings and specifications, and development of opinion of probable cost estimates.

Potable Water Storage Tanks, Pumping Systems, and Chemical Systems, Broward County, FL

Project Engineer. Project included Phase II detailed design of new ground storage tanks, new high service pump stations, and new sodium hypochlorite and liquid ammonium sulfate feed and storage systems for disinfection. These improvements will be implemented at two of the County's Districts for potable water distribution.

Geoffrey Hart, PE

Technical Advisory Committee; Desalination/
Deep Floridan Aquifer

Education

BSME, University of Florida, 1969

Certification/License

Professional Engineer: FL

Area of Expertise

- Pumping Station Design
- Water Treatment Process Design
- Mechanical Equipment Specification
- Construction Management

Experience

- 45 total years
- 14 years with Hazen

Professional Activities

Southeast Desalting Association (SEDA)

American Membrane Technology Association

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Jacksonville, FL 32216
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ghart@hazenandsawyer.com

Geoffrey Hart, PE, has over 40 years of engineering experience primarily in the areas of potable water treatment and distribution and industrial water treatment.

This includes process and design responsibility for nanofiltration and reverse osmosis (RO) water treatment plants ranging in size from 100,000 gpd to 18 mgd; management of planning, design, procurement, and construction of water plants; utility operations engineering for Safe Drinking Water Act compliance and improved efficiency of water plants of up to 240-mgd capacity; water treatment process design for a broad range of raw water supplies and contaminants; and process/power systems and piping systems design.

6-mgd Membrane Water Softening Plant, City of Hallandale Beach, FL
Responsible for process mechanical QA/QC for membrane softening plant that treats a Biscayne aquifer supply. The project included: 6-mgd finished water capacity nanofiltration skids with room for expansion by the addition of two reverse osmosis skids to treat Floridan Aquifer supply. Additionally, the project included degasifiers, sodium hypochlorite storage and feed system (along with six other chemical systems), one 1,500 kW emergency generator and one 10,000 gallon fuel tank. Currently, Mr. Hart is providing technical guidance on the design of a new water supply well and addition of one osmosis skid to the plant.

12-mgd RO South Regional Water Treatment Plant, Collier County, FL
Senior Process Engineer responsible for QA/QC for preliminary reports and detailed design packages for plant expansion that included membrane treatment, hydrogen sulfide removal and odor control.

Indian River South County RO WTP Improvements, Indian River County, FL
Project Manager for the design of two degasifiers for hydrogen sulfide removal, a 2-mgd storage tank and chemical facilities for the 2-mgd RO plant.

Plantation East WTP Membrane Replacement Pilot Testing, Plantation, FL
Project Manager for side-by-side comparison testing of membranes in a full-size nanofiltration array. One pressure vessel in the first and second

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stages was fitted with each membrane type and performance evaluated for flux, alkalinity passage and iron passage for a period of one month. Commercial bids were evaluated based on present worth of membranes, energy and chemicals.

Sawgrass Membrane Softening WTP, City of Sunrise, FL
Membrane Process Engineer for design and CMS of an 18-mgd membrane softening plant. The plant treats a Biscayne aquifer well water supply and includes design features such as common high pressure feed manifolds, inter-stage boost pumping and acid dosing and an innovative layout.

Miramar West WTP Taste and Odor Investigation, Miramar, FL
Process Engineer for the investigation of taste and odor complaints and high turbidity resulting from inadequate hydrogen sulfide removal following the addition of Floridan RO treatment (not designed by Hazen). The problem was traced to iron sulfide precipitation, pH shift and deficient degasification facilities.

Peele-Dixie WTP Ground Water Rule Compliance Project, Fort Lauderdale, FL
Process Engineer for the disinfection process modifications for a 12-mgd membrane WTP to achieve 4-log virus treatment for GWR compliance. A tracer test was conducted on the finished water clear well to determine the baffle factor and the ammonia injection point was relocated to provide free chlorine disinfection in the clear well.

Plantation Central and East WTPs Ground Water Rule (GWR) Compliance Project, Plantation, FL
Process Engineer for the disinfection process modifications for two 12-mgd membrane WTPs to achieve 4-log virus treatment for GWR compliance. The project involved relocation of the ammonia injection point to provide free chlorine disinfection.

Plantation East WTP Concentrate Booster Pump Station, Plantation, FL
Lead Mechanical Engineer for design of a 3-mgd concentrate booster pump station to eliminate a concentrate disposal bottleneck that was limiting the capacity of a 12-mgd membrane plant. The project included three 60-Hp ANSI standard process pumps which allowed off-the-shelf delivery. Constant-speed pumps were utilized in conjunction with a back-pressure sustaining valve to reduce costs and eliminate installation restrictions imposed by VFDs.

Plantation East WTP Scale Inhibitor Pilot Testing, Plantation, FL
Process Engineer for emergency comparative pilot testing of scale inhibitor chemicals following the failure of the existing chemical in use at the City's East membrane WTP. Six chemicals were tested in a membrane pilot plant utilizing the same water supply as the main plant, requiring the design of a specialized test unit and accurate dosing of minute quantities of chemical. The project identified one of the chemicals as being several times more effective than the others.

Seminole Tribe of Florida Hollywood Reservation WTP, Hollywood, FL
Mr. Hart served as Quality Control Engineer for the design of miscellaneous improvements for a 3-mgd membrane softening facility. The project included replacement of the sulfuric acid storage, feed and injection facilities, mechanical and instrumentation improvements to two raw water wells, and installation of a new engine-driven high service pump and associated fuel storage and feed system.

Broward County WTP 3A System Improvements, FL
Project Manager for design of a new disinfection chemical, electrical building, and pumping system improvements.

City of Marco Island RO Plant, FL
Project manager for the design of an RO plant treating a highly brackish well water supply. The plant, owned by Southern States Utilities, had an initial capacity of 4 mgd and was expandable to 6 mgd.

Springtree Water Treatment Plant, City of Sunrise, FL
Project Engineer for the design of a 24-mgd lime softening treatment expansion including softeners and deep bed dual media filters.

Patrick Davis, PE

Technical Advisory Committee

Patrick Davis, PE, a Vice President with Hazen, has served as project director on over $900 million of public works construction and has been involved in an engineering capacity on over $1.6 billion of constructed local public works projects.

With 35 years of Florida-specific experience, Mr. Davis has assumed a leading role in assisting public utilities and providing regulatory advice on water supply and treatment issues, as well as all facets of wastewater regulations. A current focus of his consulting practice is the development of alternative water supply projects to ensure adequate supply to meet the growing potable water demand across the nation.

Mr. Davis has led Hazen's efforts on behalf of SE Florida's open Ocean Outfall utilities for over a decade (SEFLOE I, II and FACE). Mr. Davis recently directed the effluent Master Plan for Broward County necessitated by ocean outfall legislation.

City of Hallandale Beach 6-mgd Nanofiltration (plus 6-mgd RO) Membrane Treatment Facility, FL

Mr. Davis served as Project Director for the City's 6-mgd nanofiltration (plus 6-mgd RO) membrane treatment facility. He assisted the City with multiple facets of the project including negotiations with the South Florida Water Management District, testifying in court regarding technical issues related to the site acquisition of land for the concentrate disposal well, and managing the design and construction services for the membrane facility.

City of Riviera Beach Water and Wastewater Master Plan, Riviera Beach, FL

Hazen master planned water and wastewater infrastructure through the year 2030 for the City of Riviera Beach Utility District. The scope included: water supply; water treatment; water distribution and storage; along with wastewater collection, pumping and transmission. The infrastructure was evaluated relative to: 1) capacity to meet future growth (hydraulic modeling) 2) regulatory compliance (current and future regulations); 3) water quality and 4) renewal and replacement to ensure long-term sustainability.

Education

BSCE, University of Massachusetts, Dartmouth, 1980

Certification/License

Professional Engineer: FL, NY, MA, VA, NC

Areas of Expertise

- Planning, Permitting, Design, Procurement, and Construction Management of Wastewater, Water and Stormwater Facilities
- Water Resource Planning
- Project Management
- Conventional and Alternative Delivery Systems Procurement, International Procurements

Experience

- 38 total years
- 36 years with Hazen

Professional Activities

American Society of Civil Engineers

American Water Works Association

ASHRAE, NSPE, TAPPI

National AWWA Dual Distribution Committee

Water Environment Federation

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Millennium Challenge Corporation (MCC), Development and Assessment of Investments in Ulaanbaatar (UB) Water Supply, Wastewater Treatment and Utility Reform, Mongolia
Mr. Davis is the Principal for due diligence services being provided to MCC to support development of a second Compact for the Government of Mongolia. Mr. Davis has led the first two phases to validate the scope and urgency of UB's water and sanitation issues, assess GOM's proposed solutions, and to identify alternative solutions that would meets MCC's programmatic, technical, and financial requirements.

Conceptual Feasibility of a Lower East Coast Regional Water Supply Alternative, South Florida
Mr. Davis served as Officer-in-Charge of this study conducted for the Cities of Fort Lauderdale, Hollywood, Plantation, Pompano Beach, and Sunrise; and Broward and Palm Beach Counties. The study evaluated the feasibility of developing a C-51 Reservoir to store excess runoff from the C-51 canal for public water supply in terms of benefits and costs.

City of Plantation Advanced Wastewater Treatment Pilot Project, Plantation, FL
Mr. Davis served as Project Director for construction and testing of a dual membrane pilot treatment plant for the City of Plantation, which included microfiltration and reverse osmosis technology to evaluate recharging the Biscayne Aquifer with highly treated reclaimed water through surface water discharge.

Water Supply Program INAPA, Santo Domingo, Dominican Republic
Mr. Davis served as Officer-in-Charge of the $150-million Water Supply Program. The program was funded by US Ex-Im Bank and was procured as a design-build. The project featured over 80 km of primary, tertiary, and secondary water pipeline networks, 13 pumping stations, 10 water reservoirs, and three surface water treatment plants. Mr. Davis supervised the Program Manager responsible for contract compliance and service delivery for this $5-million service contract.

Water Treatment Plants, City of Fort Lauderdale, FL
Mr. Davis served as Project Director for the City's water system master plan and detailed design activities on the Fiveash (70 mgd) water treatment plant and Peele-Dixie (12 mgd) water treatment plant. The Peele-Dixie project is a new 12-mgd membrane treatment plant.

East Water Treatment Plant Expansion, City of Plantation, FL
Mr. Davis served as Project Director for the City of Plantation's East Water Treatment Plant expansion to 12 mgd. The project included the addition of three 2-mgd arrays, a booster pump, conversion of a Greenleaf filter to a clearwell, and the addition of a transfer/high service pump station.

Water System Upgrades (2001-2011), City of Fort Lauderdale, FL
As Officer-in-Charge, Mr. Davis was in charge of all water treatment plant studies and design tasks; development of a water master plan; design/construction of the new 12-mgd Peele-Dixie Membrane Treatment Facility; and rehabilitation of a 70-mgd lime-softening water treatment plant (Fiveash WTP), just to name a few. He participated in the master planning that formed the basis of the program and served as designer for all construction contracts. This contract included management and design of numerous water supply, treatment, storage and distribution projects under the City of Fort Lauderdale, WaterWorks 2011—a $690-million citywide program management project to overhaul the City's water, sanitation, and sewer infrastructure.

14.5-mgd Nanofiltration Facility, Town of Jupiter, FL
Project Director. The Town of Jupiter operates a water treatment plant with four independent treatment processes: lime softening, ion exchange, and reverse osmosis (RO) and Nanofiltration (NF). The Town retained Hazen to design, permit and oversee pilot testing and provide technical assistance during construction for its 14.5-mgd NF Facility (expandable to 17 mgd).

Countywide Water Reuse Feasibility Study, Broward County, FL

Mr. Davis also directed the Countywide Water Reuse Feasibility Study, which identified and analyzed reuse options for 13 wastewater treatment plants serving all of Broward County (1 million residents). The project emphasized environmental, technical, and financial feasibility of reuse of all wastewater generated in the County and included dual distribution, industrial, commercial, wetlands, hydrodynamic saltwater intrusion barriers and other reuse options.

Broward County Regional Reuse Master Plan, Broward County, FL

Mr. Davis served as Project Director for the development of a Regional Reuse Master Plan as mechanism to enhance and proliferate the existing reclaimed water infrastructure throughout the County. Following a series of stakeholder workshops, which including input from over 28 municipalities, a countywide reclaimed water master plan was developed that identified the most cost-effective opportunities for reuse development in the County. The evaluation determined that large scale spray irrigation of reclaimed water was most resilient to the effects of climate change. The dynamic planning tools were distributed to all Stakeholders at the end of the project and included a GIS based depiction of reclaimed water opportunities for large scale irrigation on a Google Earth platform, and a criteria evaluation model, for analysis of those potential projects based on relevant criteria.

City of Hollywood Implementation of 8-mgd Reclaimed Water System, FL

Mr. Davis conducted effluent reuse filter full-scale test studies. He directed the implementation of the City's 8-mgd reclaimed water system. He also directed a hydrodynamic salinity barrier study for the City to recycle 4 to 20 mgd of reclaimed water. Mr. Davis was in charge of the toxicity removal study for the City of Hollywood related to reuse (organo-phosphate removal).

City of Miramar East Water Treatment Plant Disinfection Alternatives Analysis and Implementation, FL

Mr. Davis was responsible for the Miramar East WTP disinfection alternatives analysis and implementation.

City of Miramar East Water Treatment Plant Rehabilitation, Miramar, FL

Mr. Davis provided engineering services for the rehabilitation of the East Water Treatment Plant as Project Director. This project included evaluation of the existing plant and addition of two new membrane nanofiltration units to replace the current lime softening capacity. **City of Tamarac, FL**

Mr. Davis served as Project Director of Tamarac's Safe Drinking Water Act research study and its Long-Term Water Supply Plan.

John E. Preston Lime Softening WTP Expansion, Miami-Dade Water and Sewer Department, FL

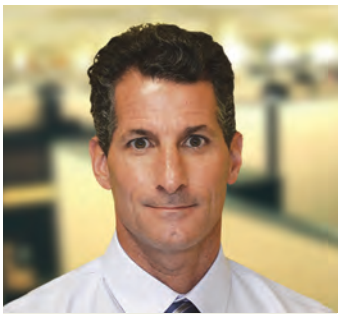
Project Director. Hazen provided process evaluation, design oversight, bidding and construction management services to Miami-Dade for an expansion at the John E. Preston Water Treatment Plant, a conventional lime softening facility. The facility has three 30-mgd Accelator units and three 25-mgd Hydrotreator softening units. Accelator bench scale tests, previously conducted by Hazen, had indicated that a simultaneous coagulation and softening process was efficient at reducing TTHMs, THAAs and color in the finished water and produced the highest quality process water from the Accelator units. A full-scale test program demonstrated the performance of the simultaneous coagulation and lime softening process could achieve the goals of the Department.

Collier County 8-mgd and Subsequent 12-mgd Reverse Osmosis Design Projects, FL

Mr. Davis served as Project Director of the 8-mgd and subsequent 12-mgd membrane design projects.

City of North Miami Beach 18-mgd Lime Softening Water Plant Performance and Upgrade, FL

Mr. Davis was responsible for reviewing the City's 18-mgd lime softening water plant performance and upgrade with respect to the SDWA regulations.



Kurt Pfeffer, PE

Technical Advisory Committee

Kurt Pfeffer has over 25 years of experience in water and wastewater engineering, providing design through construction services.

Education

BSCE, Louisiana State University, 1985, Civil Engineering

Certification/License

Professional Engineer: FL, CA

Areas of Expertise

- Project Management
- Water and Wastewater Treatment Plant
- Process and Mechanical Design
- Construction Management
- Project Scheduling

Experience

- 31 total years
- 22 years with Hazen

Professional Activities

Water Environmental Federation

American Society of Civil Engineers

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Collier County South Regional Water Treatment Plant (WTP) 12-mgd Reverse Osmosis Expansion, FL

Mr. Pfeffer served as Project Manager for the $25 million South County Regional Reverse Osmosis WTP. His design responsibilities included mechanical and instrumentation facilities and FDEP permitting. Mr. Pfeffer continuously analyzed the contractor's CPM schedule (time, sequence of construction, and resource/cost loading) to ensure successful completion of this expedited project within 15 months to avoid water demand shortages. Hazen also performed membrane pilot testing, predesign technical memorandum preparation, detailed design services, construction management services, and startup and testing support services for this expansion to 20 mgd.

Collier County North Regional Water Reclamation Facility 5-mgd Expansion, FL

Mr. Pfeffer served as On-Site Construction Manager/Resident Engineer for the $20 million, Collier County North Regional Water Reclamation Facility 5-mgd expansion. Expanded/new facilities included screenings/grit removal, activated sludge process (with MLE configuration for nitrogen removal), tertiary filters, conversion of chlorination facilities from chlorine gas to sodium hypochlorite storage/feed, sludge thickening/dewatering, odor control, and reclaimed water pumping. Mr. Pfeffer also served as Project Manager for design, permitting, startup, testing, and operator training for this project.

North Water Reclamation Facility Upgrades/Expansion, Collier County, FL

Mr. Pfeffer served as Project Manager/Construction Manager for the design, permitting, construction management, and startup of three water reclamation facility upgrades/expansions (total construction cost was $60 million). This project consisted of liquid stream, solids stream, and flow equalization system bid packages. New and expanded facilities included screenings/grit removal, activated sludge process (with MLE configuration for nitrogen removal), tertiary filters, sodium hypochlorite storage/feed system, sludge thickening/dewatering, odor control, and reclaimed water pumping. All projects were required under a Consent

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Order with FDEP and were completed on time and within budget. As Construction Manager, Mr. Pfeffer's duties included contract administration, construction schedule management, and supervision of two on-site resident observers.

City of Pompano Beach Membrane Softening Water Treatment Plant, FL

Mr. Pfeffer served as Project Manager for latter stages of construction, startup and project closeout for the City of Pompano Beach 10-mgd Membrane Softening Water Treatment Plant, with a construction cost of $16 million. Primary duties included supervision of plant startup, certification of substantial and final completion, and administration of contract closeout. He also served as Project Manager for design of additional upgrades to the City's WTP, including a secondary finished water blending system between the membrane and lime softening plants and hydraulic balancing between two existing sets of lime softening plant deep bed filters.

Peele-Dixie Membrane Softening Water Treatment Plant, City of Fort Lauderdale, FL

Mr. Pfeffer prepared the Basis of Design Report for a proposed 15-mgd raw water wellfield to serve the City of Fort Lauderdale's Peele-Dixie Membrane Softening Water Treatment Plant. The preliminary design evaluated various well placement and transmission piping configurations to recommend the most effective combination of cost-effective construction and operational reliability.

Collier County North Regional WTP, FL

Mr. Pfeffer provided design through construction services on a critical fast-track project for construction of three new water supply wells, raw water transmission piping, and appurtenances for the Collier County North Regional Water Treatment Plant.

City of Tallahassee Thomas P. Smith Water Reclamation Facility Improvements project, FL

Project Manager for the design, permitting and construction management of the City of Tallahassee Thomas P. Smith Water Reclamation Facility Improvements project (projected cost of $180 million). The TPSWRF improvements were designed for an annual average flow of 31 mgd and a peak wet-weather flow of 96 mgd. A Settlement Agreement with FDEP, the State of Florida, and several environmental groups mandated this project to upgrade the plant to advanced waste treatment to reduce nutrient loadings to the Wakulla Springs and provide 100 percent reuse capacity. Major process facilities include new headworks, primary clarifiers, activated sludge upgrades to five-stage Bardenpho configuration for AWT nutrient removal, deep-bed denitrification filters, sodium hypochlorite disinfection, and primary sludge thickening/fermentation, WAS thickening, anaerobic digestion, centrifuge dewatering, and thermal sludge drying. Mr. Pfeffer coordinated scheduling with the City's Program Manager and Construction Manager-at-Risk to ensure on-time completion by all interim and final Settlement Agreement deadlines.

West Palm Beach ECRWRF Biosolids Improvements Project, FL

Mr. Pfeffer has served as project manager for technical evaluation, design and construction phases of this project. Engineering evaluations included biological process modeling; screenings-level evaluations of multiple liquids treatment, solids treatment, cogeneration, and biosolids disposal options; and facility sizing, life-cycle cost analyses, and performance predictions to recommend the most cost-effective long-term solution to ECRWRF biosolids treatment and management. New processing facilities at the 70-mgd ECRWRF will include sludge storage and thickening upgrades and new facilities for temperature-phased anaerobic digestion, centrifuge dewatering, septage/grease receiving, odor control, and conversion of an aerobic digester to an aeration basin. Construction commenced in August 2015 and biosolids facilities are scheduled to be operational in 2018.

Howard F. Curren AWTP Master Plan, City of Tampa, FL

Mr. Pfeffer served as Design Engineer for the anaerobic digestion component of facilities master planning at the 96-mgd Howard F. Curren AWTP. A key component of the master planning effort is condition assessment of existing structures and equipment to establish a baseline scenario for evaluation of planned improvements.

Education

MS, Louisiana State University, Civil Engineering, 2003

BS, Universidad Autonoma de Yucatan, Chemical Engineering, 2000

Certification/License

Professional Engineer: LA

Areas of Expertise

- Membrane Desalination Technology
- Water Treatment Process Design
- Design of Advanced Treatment Processes for Water Reclamation
- Design and Construction Administration of Water Supply Facilities

Experience

- 15 total years
- 10 years with Hazen

Professional Activities

American Water Works Association

Southeast Desalting Association

Water Environment Federation

American Membrane Technology Association

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Jorge Atoche, PE

Nanofiltration of Surficial Aquifer; Enhanced Lime Softening with Additional Monitoring

Jorge Atoche, PE, has participated in a variety of water resource projects including membrane facility design, water planning and evaluation, water supply design, and water treatment design.

His diverse expertise with U.S. technology, environmental and engineering services is valuable for dissemination of best practices in water and wastewater treatment.

Winson WTP Lime Softening Plant Rehabilitation, North Miami, FL

Mr. Atoche served as a Mechanical and Process Engineer for design and permitting of upgrades to the City's 9.3-mgd lime softening WTP. Many of the WTP processes are at the end of their useful life. The project includes: replacement of underdrains, filter media, piping, valves, and flow meters for four filters; replacement of the water storage tanks; four new vertical turbine can style high service pumps, two new vertical turbine can style backwash pumps, and two new vertical turbine can style transfer pumps; new chemical storage and feed facilities for sodium hypochlorite, aqueous ammonia, fluoride, coagulant, and anticoagulant; new sludge and backwash recovery pump stations; replacement of the lime contactor mechanism and refurbishment of the accelator tank; replacement of two well pumps; and a new administration building.

Peele-Dixie 6-mgd Reverse Osmosis, City of Fort Lauderdale, FL

Mr. Atoche completed the basis of design report for the 6-mgd reverse osmosis facility. The scope of this project includes pre-treatment, membrane treatment, degasification, odor control, transfer pumping, chemical systems, concentrate disposal pumping, high service pumping, electrical, and control improvements. Mr. Atoche also prepared a preliminary opinion of probable project cost and a preliminary project delivery schedule.

Fiveash Water Treatment Plant, City of Fort Lauderdale, FL

Mr. Atoche served as Project Engineer for improvements to the 60-mgd lime softening facility. He participated in the civil, process, and mechanical design of multiple improvements and upgrades to the water treatment facility. Some of the improvements included a new color polymer system (ferric sulfate), replacement of the plant compressed air system and associated piping and replacement of the diesel air start and vacuum priming systems for the High Service Pump Station No. 2.

City of Hallandale Beach Membrane Softening Plant, FL

Mr. Atoche participated as a Project Engineer for the construction services including a 6-mgd membrane softening facility, pre-treatment facilities, related chemical storage, feed facilities, air strippers/clearwell, and concentrate booster pump station. He assisted with the startup activities for this facility, and is currently providing operational assistance.

City of Hallandale Beach Water Treatment Plant, FL

Mr. Atoche completed the reverse osmosis expansion technical memorandum for the City of Hallandale Beach Water Treatment Plant 9.0-mgd reverse osmosis facility. This technical memorandum provides a conceptual understanding of the major facilities necessary for the production of 9.0-mgd of finished water derived from the Floridan Aquifer. The scope of this project includes pretreatment, membrane treatment, degasification, odor control, transfer pumping, chemical systems, concentrate disposal pumping, high service pumping and electrical and control improvements. Mr. Atoche also prepared a preliminary opinion of probable project cost and a preliminary project delivery schedule.

Seminole Tribe of Florida Hollywood Reservation WTP, Hollywood, FL

Mr. Atoche served as a Civil, Mechanical and Process Engineer for the design of miscellaneous improvements for a 3-mgd membrane softening facility. The project included the replacement of the sulfuric acid storage, feed and injection facilities, mechanical and instrumentation improvements to two raw water wells, the installation of a new engine-driven high service pump, and associated fuel storage and feed system. Mr. Atoche was also responsible for the preparation of the contract documents, cost estimating, and bidding assistance.

East Water Treatment Plant, City of Miramar, FL

Mr. Atoche served as Civil, Mechanical, and Process Engineer for the preliminary design of a new 6-mgd membrane softening facility. The new membrane facility will replace an aging lime softening plant. The project includes the design of new raw water supply facilities including five new Biscayne Aquifer wells and associated transmission piping and a concentrate disposal system. The membrane facility includes pretreatment chemical storage and feed facilities, cartridge filtration, feed pumping, nanofiltration membrane arrays, a membrane clean-in-place system and post-treatment chemical storage and feed facilities for finished water stabilization and corrosion control in the distribution system.

City of Fort Lauderdale's Peele-Dixie Membrane Plant, Fort Lauderdale, FL

Mr. Atoche served as Project Engineer for the construction services for the Peele-Dixie Membrane Plant. Construction services included a 12-mgd membrane softening facility, two 4-mg storage tanks, related chemical storage and feed facilities, air strippers/clearwell, and high service and transfer pump stations. Mr. Atoche assisted with construction services and participated in the startup activities for this facility.

Mr. Atoche was also responsible for production of the Membrane Plant Operations and Maintenance manual, including development of standard operating procedures. Mr. Atoche was also involved in finished water corrosion control evaluations performed at the facility.

Plantation East and Central Water Treatment Plants Membrane Replacement Project, City of Plantation, FL

Mr. Atoche served as a Project Engineer for the East Water Treatment Plant Membrane Replacement Project and for the Central Water Treatment Plant Membrane Replacement Project. He was responsible for coordinating the membrane pilot testing, performing calculations for full-scale membrane performance projections, post-treatment stabilization modifications, and conducting present worth evaluations for the membrane manufacturer selection. He pilot tested 8-inch elements from two membrane manufacturers on a full scale train to provide an alternative for replacement of the elements the plant had been using for many years. The membrane replacement resulted in energy savings of about 35% at the East WTP and is expected to result in higher energy savings at the Central WTP.

Education / Certifications

MS, University of North Carolina, Environmental Engineering, 1997

BS, University of Florida, Environmental Engineering, 1995

Certification/License

Professional Engineer: FL, NY

Areas of Expertise

- Planning, Design and Construction Administration of Water and Wastewater Treatment Facilities
- Membrane Treatment Process Design
- Design of Advanced Water Treatment Processes
- Water Resources Engineering and Planning
- Quality Assurance

Experience

- 22 total years
- 16 years with Hazen

Professional Activities

American Water Works Association

Southeast Desalting Association

Water Environment Federation

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Janeen Wietgrefe, PE

Nanofiltration of Surficial Aquifer/Multi-Criteria Parameter Decision Making

Janeen Wietgrefe, PE, has managed and participated in a variety of water resource projects including water supply planning and evaluation, water treatment, water distribution, and wastewater treatment.

Ms. Wietgrefe's experience ranges from planning for future water infrastructure for clients to providing design services for water and wastewater projects; and permitting, budgeting, construction management, and operational assistance. She has also been involved in the piloting, design and construction oversight of membrane plants for many clients including the Town of Jupiter 14.5-mgd Nanofiltration project, City of Plantation (East and Central WTPs), City of Fort Lauderdale (Peele-Dixie Membrane Plant), and City of Hallandale Beach (6-mgd Membrane Softening Plant). Her Floridan aquifer experience includes conceptual planning for the cities of Hallandale Beach, Hialeah, and Fort Lauderdale.

Ms. Wietgrefe has also served as Lead Process Mechanical Design Engineer and/or Project Manager on water and wastewater construction throughout South Florida. She is experienced with facilitating technical reviews of projects with significant stakeholder involvement, including blue ribbon panels, peer review workshops and technical review meetings with multiple stakeholders, all for the intent of ensuring quality projects.

Pre-Design Phase of the Nanofiltration Facility, Town of Jupiter, FL
Ms. Wietgrefe served as Project Manager and Process Mechanical Engineer for the pre-design phase of the Town of Jupiter's 14.5-mgd nanofiltration facility. The scope of this project included pretreatment, membrane treatment, degasification, odor control, transfer pumping, and chemical systems.

Membrane Softening Plant, City of Hallandale Beach, FL
Ms. Wietgrefe served as Project Manager for the City of Hallandale Beach Membrane Softening Plant, a 6-mgd expandable membrane facility. She provided process mechanical support throughout the design, construction, and startup phases. Ms. Wietgrefe also provided construction management/office services for this facility.

Conceptual Evaluation of Reverse Osmosis, Cities of Hialeah and Hallandale Beach, FL
Ms. Wietgrefe served as Project Manager and Process Mechanical Engineer for the conceptual evaluation of reverse osmosis addition for the Cities of Hialeah and Hallandale Beach. These evaluations included sizing reverse

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osmosis equipment and preparing a conceptual layout and cost estimate for the implementation of reverse osmosis. Ms. Wietgrefe prepared a summary report for both cities, describing the Floridian Aquifer wellfield development requirements, membrane treatment facilities, and storage and pumping facilities.

Peele-Dixie Membrane Plant, City Fort Lauderdale, FL

Ms. Wietgrefe served as Project Manager and Process Mechanical Engineer for the Peele-Dixie Membrane Plant. Design and construction oversight services included a 12-mgd membrane softening facility, two 4-million gallon storage tanks, related chemical storage and feed facilities, air strippers/clearwell, concentrate booster, and high-service transfer pump stations. Ms. Wietgrefe also provided startup and completion activities for this facility.

Membrane Softening Facility Expansion, City of Plantation, FL

Ms. Wietgrefe served as Project Manager for the expansion of the City of Plantation's existing 6-mgd membrane softening facility to 12 mgd. This project included the addition of three 2-mgd hybrid membrane arrays, a third membrane booster pump, and the addition of a permeated flushing system within the existing membrane building. Additionally, a 12-mgd firm capacity transfer pump station and 18 mgd firm capacity high-service pump station were also constructed under this project.

City of Cooper City Continuing Professional Services, Cooper City, FL

Ms. Wietgrefe serves as Project Manager for several water and wastewater projects completed under the Cooper City Continuing Professional Services agreement since 2009. Projects include the Pine Island Road Pump Station, Lift Stations 2 and 49 Improvements, Master Plan Update of the Feasibility Review of Infrastructure Improvements for Wastewater, and the Effluent Reuse and Disposal Master Plan.

General Consulting Services, Broward County, FL

Ms. Wietgrefe served as Project Manager and/or Director for over 50 projects completed under the 2002 and 2006 General Consulting Services for Water and Wastewater Services (WWS) Agreements for Broward County WWS. The projects include design through construction administration services for multiple water and wastewater plant facilities, including NRWWTP Headworks, Screens, and Force Main Redirects; Generator 4, Digester 3 Improvements; SCADA Improvements and Chlorination projects and various rehab projects at the WTPs and pump stations. Ms. Wietgrefe is presently overseeing the final year of construction of four of these contracts. The general consulting contracts also included raw water modeling and permitting, basis of design report preparation, studies, and preparation of annual reports and bond reports for WWS.

Continuing Consulting Engineering Services, City of Plantation, FL

Ms. Wietgrefe serves as Project Manager for the continuing consulting engineering services agreement with the City of Plantation. Presently, Ms. Wietgrefe provides multiple engineers to the City to assist with operational assistance at the East and Central membrane plants and at the Regional WWTP as well as completes design through construction management services for various facility projects. Recent projects include the Gulfstream Pump Station, pilot study/present worth evaluation for replacing membranes at East WTP, pilot study for optimal antiscalant addition, and fine bubble aeration conversion at the Regional WWTP.

Broward County Regional Reuse Master Plan, Broward County, FL

Ms. Wietgrefe served as Project Manager for the regional reuse master plan, which builds upon current municipal and county efforts and coordinates a regional approach to reuse planning, maximizing cost-effective reuse development in Broward County. This project developed a state-of-the-art tool for future reclaimed water planning using a Google Earth platform that enables multiple decision makers to easily analyze the issues and spatially determine cost-effective reclaimed water opportunities. This project also evaluated the impacts of climate change on water resources in Broward County. Ms. Wietgrefe facilitated stakeholder meetings for 28 municipalities and multiple regulatory agencies throughout the reuse master plan project. Input from stakeholders was incorporated to develop a multi-parameter criteria decision model.

Grace Johns, PhD

Reservoir Participation/Bulk Purchase Analyses;
Multi-Criteria Parameter Decision Making

Grace Johns, PhD, is responsible for economic and financial studies. These studies involve economic and financial feasibility evaluations related to water, wastewater, stormwater, agriculture, tourism and land use.

Her evaluations include contingent valuation surveys, economic impact analysis and benefit-cost analysis as well as the design of rates, fees and funding for water resource projects. She has led valuation studies of natural resources including the Indian River Lagoon on the east coast of Florida, Biscayne Bay in Miami, Florida, the artificial and natural reefs of southeast Florida and the Bogota River in Colombia SA. She has provided expert review of economic impact modeling tools for US government agencies. Since 2000, Dr. Johns has conducted water demand forecasting for numerous water and wastewater utilities in Florida.

Methodology for a Triple Bottom Line Analysis of Alternative Water Supply Projects Compared to Direct Potable Reuse for the WaterReuse Research Foundation

Dr. Johns led the development of evaluation criteria that measures the benefits and costs, including life-cycle costs, of alternative water supply projects, especially with respect to direct potable reuse. She provided technical guidance to the research team regarding economic feasibility and other economic aspects of evaluating water supply projects. She is currently preparing the draft report for this project.

Reclaimed Water Evaluation Model for the Broward County Regional Reuse Master Plan, Broward County, FL

Dr. Johns developed an Excel-based evaluation model for Broward County, Florida that was used to analyze and rank potential reclaimed water projects in the County. The user enters information about each alternative project and the model evaluates the project alternatives with respect to evaluation criteria developed by Dr. Johns. The 20 criteria address: 1. Project Benefits; 2. Project Implementation Issues; 3. Project Reliability; 4. General Acceptance of Project; and 5. Project Costs. This model is being used by stakeholders, including cities and the County, to evaluate and prioritize alternative proposed reclaimed water projects.

Education

PhD, University of California, Berkeley, 1986, Agricultural and Natural Resource Economics

BS, University of Florida, 1981, Food and Resource Economics

Areas of Expertise

- Water Resource Economics
- Full-Cost Accounting/ Benefit-Cost Analysis
- Market and Non-Market Valuation
- Economic Impact Studies

Experience

- 36 total years
- 27 years with Hazen

Professional Activities

American Water Works Association (AWWA)

Florida Section AWWA

- Chair, 2016-present
- Chair-Elect, 2015 to 2016t
- Vice Chair, 2014 to 2015
- Treasurer, 2011 to 2014
- Treasurer-elect, 2010 to 2011

Kenneth J. Miller Founder's Award; Water for People, 2008

Water Pricing Work Group of the Florida Water Conservation Initiative, 2001 to 2009

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Economic Feasibility of Reclaimed Water Use by Non-Utility Water Use Permittees and Applicants, FL

Dr. Johns was project manager of this project for the Southwest Florida Water Management District. She developed a user-friendly computer model that water users can use to assess the economic feasibility of reclaimed water to them. The project focused on agricultural and recreational/aesthetic irrigation and industrial / commercial water uses. This study gathered the available information from literature reviews, survey research and interviews to address the following study goals. (1) Improve the District's ability to assist water users in assessing the benefits and costs of reclaimed water to them; (2) Identify areas of future research that address how the net benefits of reclaimed water to water users can be as great as possible; and (3) Better assess whether or not reclaimed water is economically feasible to specific water users.

Impact of Inclining Block Rate Structures on Water Sales and Revenue for the Village of Ossining, NY

Dr. Johns created an Excel-based model to evaluate alternative inclining block rate structures on water sales and revenue relative to the Village's 2014 water sales and revenue. Dr. Johns evaluated the water use and water bills of each of the 5,700 water customers to design rate structures that recover net revenue requirements from water sales. She applied price elasticity of demand estimates to the different water use categories to assess impacts to users and water use. The results were presented to the Village Trustees as they assess moving from a uniform water rate to an inclining block rate.

Broad Run Water Reclamation Facility (BRWRF) Master Planning: Financial Modeling for Loudoun Water, VA

Dr. Johns led the development of an Excel-based financial model reflecting the cost structure and revenue requirements of Loudoun Water and used it to evaluate integrated solutions for expanding the BRWRF. These integrated solutions include production of reclaimed water, fertilizer, energy, high value carbon, and other outputs of wastewater processing. The financial model is a planning tool for evaluating "what if" scenarios, and generating the relative financial costs and benefits of integrated solutions. The model will allow Loudoun Water to gauge the financial and economic feasibility of integrated solutions and the potential impact of integrated solutions on monthly sewer bills relative to a baseline scenario.

Financial Feasibility of the Grove Land Reservoir and Stormwater Treatment Area, FL

For Grove Land Utilities, LLC, Dr. Johns led this study for Hazen, in association with Federico, Lamb and Associates and AMEC, as they evaluated the technical, economic, and financial feasibility of the Grove Land Reservoir and Stormwater Treatment Area that would be sited in northern Okeechobee and southern Indian River counties, Florida. This project would capture water that currently flows to the St. Lucie Estuary and the Indian River Lagoon. Project benefits include increased water supply, lower nutrient concentrations and loads to surface water bodies, improved flood control, and reduced stormwater discharges to coastal estuaries. This conceptual feasibility study found that this project has the potential to be technically, financially and economically feasible to numerous water utilities and government agencies. This study's report is being used as a reference document to further develop this project and to obtain water utility and government agency consensus regarding its final design and cost-sharing arrangements. The final report is available at: http://www.evansprop.com.

Sanitary Sewers Division Cost of Service and Retail Rate Study, Coral Gables, FL

Dr. Johns directed the cost of service and retail rate study for the City of Coral Gables. This study recommended a 13 percent increase in wastewater rates which was passed by the City Commission on first reading. In 1998, she directed the City's wastewater utility cost of service and rate assessment of its large contract users including contract negotiations with volume customers to achieve full recovery of the disposal and maintenance costs incurred by the City as they serve these customers.

Business Case Evaluation (BCE) Model to support Palm Beach County's Asset Management Plan, FL

Dr. Johns developed and applied a business case evaluation model that was automated as a user-friendly computer application for the County's use in recommending projects and programs under its water and wastewater utility. Dr. Johns created an Excel-based BCE model that evaluates the benefits and costs of alternative projects identified by the model user. The user enters information about each alternative project and the model evaluates the project alternatives with respect to evaluation criteria developed by Dr. Johns. The 32 criteria address: 1. Provision of water and wastewater utility services; 2. Benefits to customers; 3. Environmental / Health / Social / Economic; 4. Safety; 5. Financial; 6. Alignment with strategic goals; 7. Risk assessment and 8. Speed of implementation. Each criterion is evaluated relative to a no action alternative. The model facilitates sensitivity analyses to identify those parameters that have the largest impact on the criteria values and the total score. The automated model provides for easy data entry and useful descriptions of evaluation results. The County is currently incorporating the automated model as a required component of their asset management program.

Conceptual Economic Evaluation of the Four Corners Reservoir, Lee County, FL

Dr. Johns recently completed the evaluation of benefits, costs and economic feasibility associated with a proposed reservoir in Lee County. This reservoir would capture water that currently flows into the Caloosahatchee River causing ecosystem degradation and instead use this water for water supply to a growing southwest Florida. The project estimated the dollar value of benefits and compared them to the life-cycle costs of the project. The study found that this project has the potential to be economically feasible and beneficial to the region. The draft report of this project was recently submitted to the client, the Florida Citrus Company. This study was funded by the Florida Department of Agriculture and Consumer Services.

Compilation of Benefits and Costs of STA and Reservoir Projects in the South Florida Water Management District, FL

For the World Wildlife Fund, Dr. Johns compiled and documented the benefits and costs of five completed or designed reservoir and storm water treatment area (STA) projects in south Florida. These projects are or will be located north, west, and east of Lake Okeechobee. The results of this study are being used by the World Wildlife Fund and the South Florida Water Management District as they evaluate the benefits and costs of alternative methods to improve water quality in the Everglades and coastal estuarine areas.

Conceptual Feasibility of a Sub-Regional Lower East Coast Water Supply Solution, Fort Lauderdale, FL

Dr. Johns served as project manager of this study conducted for the City of Fort Lauderdale and six other participating water utilities. This study received the 2014 Engineering Excellence Grand Award from the Florida Institute of Consulting Engineers and a 2014 National Award from the American Council of Engineering Companies. Hazen evaluated the conceptual feasibility of developing a C-51 Reservoir to store excess runoff from the C-51 canal for public water supply in terms of benefits and costs. This water storage and use by public water supply utilities in southeast Florida is expected to reduce water discharges that currently cause environmental concern in the Lake Worth Lagoon estuarine environments. For comparison purposes, the costs, water supply quantities, and conceptual feasibility of obtaining additional water from two other potential alternative sources were evaluated: (1) surface water recharge with reclaimed water; and (2) pumping and treating water from the upper Floridan aquifer system were also evaluated. This study found that the C-51 Reservoir has the potential to be a cost-effective, environmentally beneficial method to meet the future growth in southeast Florida water demand. The results of this study were used to obtain water utility and South Florida Water Management District consensus regarding how best to proceed with developing this water supply source. Phase 1 of this water supply project is under construction.

Education

MS, Rutgers University, 1993, Civil Engineering

BS, Princeton University, 1990, Civil Engineering

Certification/License

Professional Engineer: FL

Areas of Expertise

- Water and Wastewater Treatment Plant Design
- Process Evaluations
- Master Planning
- Condition Assessments
- Project Management

Experience

- 26 years overall experience
- 4 years with Hazen

Professional Activities

American Water Works Association

Water Environment Federation

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Andre Dieffenthaller, PE

Direct/Indirect Potable Reuse Considerations

Andre Dieffenthaller, PE, has over 26 years of experience in the planning, design, and construction management of water treatment plant improvements, including water quality evaluations, bench/pilot testing, regulatory assessments, and advanced treatment.

He has managed large multi-million projects and has earned a reputation of successfully managing projects within budget and schedule, many of which had tight budgets and/or schedules.

Brighton Water Treatment Plant Reverse Osmosis, Seminole Tribe of Florida (STOF)

Project Manager and Project Engineer for the pilot testing of reverse osmosis (RO) membranes for a 1.6-mgd water treatment plant upgrade based on a new water supply source. Included evaluation of various membranes and anti-scalants. The existing facility is supplied by seven surficial aquifer wells and has a rated capacity of 1.6 million gallons per day (mgd). Water from the surficial wells is treated through degasification, membrane filtration, and RO. In its current configuration, the plant has experienced high membrane fouling events. To address these challenges, STOF installed new Upper Floridian Aquifer wells and plans to reconfigure the existing process to treat the new source water. Hazen pilot tested the new water source to determine the effectiveness of an alternate membrane.

Long-Term Master Water Plan Update, Tampa Bay Water, FL

Project Manager for the update of Tampa Bay Water's long-term master water plan, which includes the evaluation of water supply and treatment alternatives including desalination and potable reuse, operational impacts and system integration, water quality assessment, and energy efficiency assessments. Existing treatment facilities include 120-mgd Actiflo/ozonation SWTP and 25-mgd desalination plant. Potable reuse projects being evaluated include aquifer recharge and wellfield development; blending before and after the existing desalination; and supplement to the existing surface water supply using both membrane-based and non-membrane-based technologies. Public information/education is also a large component of the master plan process.

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Tampa Bay Water - Lithia Ozone WTF, Tampa, FL
Project Manager for the pilot testing of ozone with biological filtration and ultrafiltration for the removal of hydrogen sulfide from a groundwater supply. Mr. Dieffenthaller also served as Engineering Project Manager for design, permitting, and construction of the resulting 45-mgd ozonation facility using a side stream injection system. Project included booster pump station and 84-inch stainless steel dissipation chambers.

Seminole County - Southeast Regional WTF, Sanford, FL
Design quality leader for the design, permitting, and construction of a 19-mgd ozonation facility using a side stream injection system. Project included retrofit of an existing building to fit the ozone equipment, interconnect piping to an existing water treatment plant, and all process control.

Calwater Well 53-02 Treatment Evaluation, Los Angeles, CA
Evaluated treatment alternatives for a well supply to remove ammonia, hydrogen sulfide, iron, manganese, and methane. Treatment alternatives included packed tower aeration, ozone, biological filtration, green-sand filtration, reverse osmosis and ferrate treatment.

Trihalomethane Study, Puerto Rico Aqueduct and Sewer Authority, San Juan, PR
Assisted with a THM process study at five surface water treatment plants in metropolitan San Juan. Plant capacities ranged between 30 and 75 mgd. Project included a critical performance evaluation in accordance with U.S. EPA guidelines for each of the five plants, and bench-scale studies to evaluate the removal of organics with enhanced coagulation.

City of Minneapolis WTP Improvements, Minneapolis, MN
Assisted with the evaluation of various treatment alternatives for a 40-mgd surface water treatment facility, including membrane softening, lime softening, and enhanced coagulation for organics removal. Performed bench-scale evaluations of various polymers and coagulants with and without pH adjustments.

Pipe Loop Study, City of St. Petersburg, FL
Project Manager for evaluation of corrosion control alternatives and impacts of blended water supplies (ground, surface, and desalinated water) on distribution system using pipe loops. Evaluated impacts of pH, alkalinity, and inhibitors using actual pipe samples.

Source Water Blending Feasibility Study, Tampa Bay Water, FL
Project Manager for a feasibility study to evaluate conceptual alternatives for blending three different Tampa Bay Water source waters (ground, surface, and desalinated water) before delivering to the Pinellas County Keller Water Treatment Facility.

Water Quality Master Plan, City of Oviedo, FL
As Project Engineer, evaluated existing and new sources of groundwater supply and the associated treatment alternatives including microfiltration, packed tower aeration, and greensand filtration for hydrogen sulfide removal, while complying with turbidity, THM, and corrosion control requirements.

Western Regional Water Study, Orange County, FL
As Project Engineer for water quality master plan, evaluated water quality and treatment options for compliance with existing and future regulations at six WTPs, including one regional facility. Water quality issues included hydrogen sulfide, disinfection, turbidity, corrosion control, and disinfection by-products.

TOHO Water Treatment Plant Upgrade, Kissimmee FL
Engineer-of-Record for the design of an 8-mgd ozonation system for hydrogen sulfide removal. Project included side stream injection system with booster pumps, piping modifications, electrical, and all process instrumentation and controls.

City of Tampa - Water Quality Assessment, FL
Project Manager for water quality assessment study for 96-mgd surface water plant to determine causes of elevated turbidities in finished water. Study identified several factors and made several operational recommendations. Plant processes include coagulation, sedimentation, ozonation, filtration and chloramines.

Burnt Store Reverse Osmosis WTP Expansion, Port Charlotte, FL
Project Manager for design, permitting, and construction of a 2-mgd RO plant expansion to increase WTP capacity to 3.1 mgd.

Education

PhD, Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, 2008

BS, Chemistry, Warren Wilson College, 1997

Areas of Expertise

- Potable and non-potable reuse
- Water quality and treatment
- Emerging contaminants, future regulations
- Advanced oxidation processes (UV/chlorine, UV/AOP)
- Membranes (RO, NF, UF, MF, MBR)
- Pilot system design, operation, and testing
- Natural organic matter characterization

Experience

- 22 total years
- 7 years with Hazen

Professional Activities

WateReuse Research Foundation

Water Research Foundation

National Science Foundation

American Water Works Association - CCL3 Technical Advisory Workgroup

Water Environment Federation

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Hazen

Benjamin Stanford, PhD

Indirect/Direct Potable Reuse Considerations

Dr. Stanford serves as Director of Applied Research and is also the firm's Corporate Water Reuse Practice Lead, where he coordinates company-wide research and implementation efforts in water, wastewater, and water reuse.

He has extensive experience in managing complex, multi-disciplinary projects related to potable water reuse, water quality, and treatment as both Project Manager and Principal Investigator (PI) or Co-PI. He is an internationally recognized expert in water chemistry, water quality and treatment, and trace contaminant research. Dr. Stanford is currently leading and/or participating in numerous studies involving direct potable reuse, indirect potable reuse, climate change, disinfection byproducts and process optimization for clients and numerous foundations. He is the co-author of the World Health Organization's Direct Potable Reuse Guidelines and serves as a technical expert on the AWWA Candidate Contaminant List Technical Advisory Workgroup. He is also on the Research Advisory Committee for the WateReuse Research Foundation.

In addition to the research efforts listed above, Dr. Stanford manages the company portfolio of ongoing applied research studies, and supports master planning and design work at Hazen as a technical expert. He serves as a resource for master planning projects for water, wastewater, and reuse facilities, providing guidance and advice on long-range regulatory compliance issues and ecological impacts of emerging contaminants.

Indirect Potable Reuse (IPR), City of Hollywood, FL

As Technical Advisor, Dr. Stanford participated in the selection, design, operation, and testing of membrane- and non-membrane-based processes to meet state and local water quality standards for this one-of-a-kind IPR system. Process configurations included ion exchange, ozone, UV/advanced oxidation, and biofiltration to achieve water quality goals for nutrients, regulated contaminants, and emerging contaminants. Dr. Stanford also served as QA/QC for the final report and supervised interpretation of data from the 12-month pilot.

Developing Methodology for Comprehensive Analysis (Triple Bottom Line) of Alternative Water Supply Projects Compared to DPR, WRRF-14-03

Project Manager developing triple bottom line analysis framework and multi-criteria decision analysis for potable water supply options including

DPR. This project uses an input-output life-cycle approach and will include valuation of economic, social, and environmental indicators relative to water supply options. This project will provide support and transparency in decision making regarding water supply and treatment.

Use of Ozone in Water Reclamation for Contaminant Destruction, WateReuse Research Foundation

Project Manager who developed cost curves for multiple water reuse technologies including ozone, biofiltration, microfiltration, reverse osmosis, and UV/advanced oxidation as part of a study investigating the ability of ozone to remove chemical and microbial contaminants from wastewater supplies intended for water reuse.

CCP Assessment to Quantify Robustness and Reliability of Multiple Treatment Barriers of a DPR Scheme (WRRF-13-03)

Dr. Stanford is co-PI on a project that will serve as an instrumental step in advancing the acceptance of DPR by demonstrating the robustness and reliability of multiple barriers of treatment to ensure the highest standards of water quality and help ensure protection of public health. This study is incorporating operational data and input from a multitude of existing reuse operations in the United States and around the world to identify the critical control points that manage health hazards and prove their reliability with operating data and supporting pilot studies. Additionally, the project will develop operational response processes necessary to ensure the safe and continuous operation of DPR systems.

Water Supply Evaluation and Permitting of DPR-Desalination Hybrid System, Tampa Bay Water, FL

Technical Advisor evaluating water supply and using the HACCP methodology to work with FDEP to develop the conceptual plan and permit for a DPR system that is integrated into the existing desalination facility.

Application of HACCP Process to DPR Scheme, Gwinnett County Department of Water Resources, GA

Technical Lead who applied the hazard analysis and critical control point (HACCP) methodology in selecting CCPs for a DPR pilot system at the F. Wayne Hill facility, informing the selection of analytes, and developing monitoring and response procedures for pilot testing.

Loudoun Water Broad Run Water Reclamation Facility Expansion, Loudoun Water, VA

Dr. Stanford is providing regulatory guidance on a 25-year and 50-year planning horizon for Loudoun Water's facility upgrade and expansion. Evaluation efforts are focused on regulatory constraints and compliance for future potable water reuse systems, including both indirect potable reuse (IPR) and direct potable reuse (DPR), in addition to how wastewater processes may impact downstream water recycling processes. He is also assisting in the development of a comprehensive cost evaluation tool that will incorporate capital, O&M, and environmental costs of various water treatment and water supply options for the client.

Pilot-Scale Oxidative Technologies for Reducing Membrane Fouling Potential in Water Reuse and Drinking Water Treatment Systems, WateReuse Research Foundation

Project Manager on a study that developed and evaluated the MF-ozone-RO and MBR-ozone-RO concept for fouling control in potable reuse applications. During this project Dr. Stanford also studied the mechanisms behind NDMA formation in ozonation of reclaimed waters and reported on numerous emerging contaminant removal through water reuse treatment technologies.

Integrating Management of Sensor Data for a Real-Time Decision Making and Response System (WRRF-14-01)

Dr. Stanford is co-Principal Investigator (PI) on a project that will provide operations staff at DPR facilities with a software interface that investigates system alarms and helps prioritize the alarms relative to

critical control points (CCPs) for human health protection. Operations staff will face greater scrutiny and will need to respond to more alarms with increasingly complex systems. This project will provide a practical set of tools and solutions to help make DPR systems as reliable and operable as possible.

Development of Operation and Maintenance Plan and Training and Certification Framework for Direct Potable Reuse Systems (WRRF-13-13)

Dr. Stanford is a co-PI on a project that will give operators the tools to evaluate and respond to issues that may arise during DPR. This project directly supports the development of DPR in California and around the U.S. by guiding regulatory agencies, utilities, and consultants on a path forward for permitting DPR systems, training and certifying operators, and developing sound operations and maintenance protocols.

Testing Water Quality in a Municipal Wastewater Effluent Treated to Drinking Water Standards

Dr. Stanford is advising the planning and implementation of a study that is investigating the presence and removal of regulated and unregulated contaminants for the Colorado River Municipal Water District's Raw Water Production Facility. Throughout this study, Dr. Stanford will provide input on data interpretation and study recommendations. This project is part of Texas's first DPR treatment facility.

Selected Technical Publications/Presentations

Stanford, B. D., A. N. Pisarenko, S. A. Snyder and R. D. Holbrook (2014). Pilot-Scale Oxidative Technologies for Reducing Fouling Potential in Water Reuse and Drinking Water Treatment Membranes. Project 08-08, WateReuse Research Foundation,Alexandria, VA: 241 Pages.

Gerrity, D., E. Owens-Bennett, T. Venezia, B. D. Stanford, M. H. Plumlee, J. F. Debroux, and R. S. Trussell (2014). "Applicability of Ozone and Biological Activated Carbon for Potable Reuse". Ozone Science and Engineering, 36: 123–127.

Stanford, Benjamin D., A.N. Pisarenko, R.D. Holbrook, S. A. Snyder (2011) "Preozonation Effects on the Reduction of Reverse Osmosis Membrane Fouling in Water Reuse", Ozone Science and Engineering, 33 (5), pp. 379-388.

Pisarenko, A.N., D. Yan, S. Snyder, B.D. Stanford (2011) "Comparing Oxidative Organic Fouling Control in RO Membrane Applications", International Desalination Association (IDA) Journal, 3 (2), pp. 45-49.

Stanford, B. D., A. Luck, R. Cisterna, P. Knowles, L. Shuler, Y. Liu and M. LeChevallier (2013). Guidance for Implementing Reuse in New Buildings and Developments to Achieve LEED/Sustainability Goals. Project 10-08, WateReuse Research Foundation, Alexandria, VA: 170 Pages.

Major Research Initiatives and Project Involvement

WRRF 14-03, "Developing Methodology for Comprehensive Analysis (Triple Bottom Line) of Alternative Water Supply Projects Compared to Direct Potable Reuse"

WRRF 14-01, "Developing Methodology for Comprehensive Analysis (Triple Bottom Line) of Alternative Water Supply Projects Compared to Direct Potable Reuse"

WRRF-13-13, "Development of Operation and Maintenance Plan and Training and Certification Framework for Direct Potable Reuse (DPR) Systems"

WRRF-13-10, "Controlling Trace Organic Contaminants Using Alternative, Non-FAT Technology for Indirect Potable Reuse"

WRRF-13-03, "Critical Control Point Assessment to Quantify Robustness and Reliability of Multiple Treatment Barriers of a DPR Scheme"

Albert Muniz, PE

Aquifer Recharge (Reclaimed Water); Aquifer Modeling and Development

Albert Muniz has participated in the management, planning, permitting, design and construction phases of numerous water, wastewater, and water resources projects in Florida since 1980.

He has extensive experience related to water resources, including water supply planning, aquifer storage and recovery (ASR), saltwater intrusion analysis, effluent disposal and deep well injection programs, wellfield design and evaluation, permitting, and regulatory development. Mr. Muniz even pioneered the first successful potable water ASR systems in South Florida. Mr. Muniz has worked with regulators from U.S. Environmental Protection Agency, Department of Environmental Protection, and South Florida Water Management District during rule making for injection wells including ASR systems.

He is actively involved in many water supply well projects in South Florida, which provides him with an in-depth understanding of both Floridan aquifer and surficial wells. His experience includes design, permitting, and services during construction services for projects including the City of Fort Lauderdale Dixie Wellfield Floridan Aquifer Test Wells and Dixie Wellfield; Cooper City Wellfield Expansion; and Collier County North and South Wellfields.

Mr. Muniz's signature projects include management of the first operational ASR system at the City of Boynton Beach, and management of the first ever-successful storage of freshwater in a saltwater environment in the Florida Keys. In addition, Mr. Muniz has managed ASR projects for the City of Naples, Miami-Dade County, Broward County, SFWMD Lake Okeechobee, private clients, and has worked on or is currently working on the City of Sunrise, West Palm Beach, Delray Beach, and Palm Beach County ASR projects.

Mr. Muniz also has extensive experience in the development of innovative water management projects. He has assisted several clients in the establishment of wellfield operating plans and monitoring networks to enable use of wellfield threatened by saltwater intrusion. His saltwater intrusion work has resulted in the restoration of coastal wellfields.

Conceptual Feasibility of a Lower East Coast Regional Water Supply Alternative, Broward and Palm Beach Counties, FL
Mr. Muniz provided water supply planning for this innovative, multi-jurisdictional public-private partnership project that evaluated alternative

Education

BS, University of Florida, Civil/ Environmental Engineering, 1980

Certification/License

Professional Engineer: FL, NY

General Contractor: FL

Areas of Expertise

- Project Management
- Aquifer Storage and Recovery
- Design and Construction of Water, Wastewater, and Water Resources Projects
- QA/QC Procedures

Experience

- 36 total years
- 21 years with Hazen

Professional Activities

Adjunct Professor at Florida Atlantic University

Advisory Board College of Engineering for University of Florida and Florida Atlantic University

Water Environment Federation

American Water Works Association

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water supplies for the Lower East Coast of Florida. Hazen evaluated the financial feasibility of increasing water supplies to southeast Florida via the C-51 reservoir for wellfield recharge, aquifer recharge via reclaimed water treatment, and Floridan Aquifer reverse osmosis. This project was recognized as a 2014 Grand Award Winner of Engineering Excellence.

Fast-Track Water Supply Wells for the North County Regional Water Treatment Plant (NCRWTP), Collier County, FL

Project Manager for engineering services for the design and construction of new water supply wells to supply raw water to NCRWTP reverse osmosis (RO) treatment units. Hazen was requested to assist with this issue in an expedited manner that included design through construction and startup of additional water supply wells and a raw water transmission main to convey the water back to the treatment plant. The Hazen team was also responsible for preparing the Water Use Permit for the three Lower Hawthorn wells. Three 1-mgd Lower Hawthorn wells and ten 0.5-mgd Hawthorn Zone 1 wells were designed as part of this project.

Reclaimed/Surface Water Aquifer Storage and Recovery System (Phases 1 and 2), City of Naples, FL

Mr. Muniz serves as Project Manager for this project. Phase I included preparation of a Water Use Permit (WUP) renewal application to secure existing supplies and permitting of an ASR test well through the Florida Department of Environmental Protection (FDEP). Hazen is assisting with the continued implementation of Phase 2 of the reclaimed/surface water ASR system providing design, permitting, construction, and testing of a second ASR well and two monitor wells.

City of Pompano Beach Implementation of a Comprehensive Water Supply and Treatment Plan, FL

Mr. Muniz was responsible for implementation of a comprehensive water supply and treatment plan. The plan includes construction of a nanofiltration water treatment plant, wellfield expansion, concentrate disposal system, and compliance with a consent agreement between the City and SFWMD. Construction costs for the City's water expansion are in excess of $30 million.

Reclaimed Water Aquifer Storage and Recovery Program, City of Naples, FL

Mr. Muniz managed one of the first reclaimed water aquifer storage and recovery projects in the State. This project stores excess reclaimed water in a saline environment for recovery during peak demand periods. Management of excess reclaimed water has allowed the City to virtually eliminate surface discharge to the highly sensitive Naples Bay. Mr. Muniz also worked with the City to obtain supplemental water from the Golden Gate Canal to assist in meeting peak irrigation demands. This innovative concept has allowed the City to not only significantly reduce discharge of nutrients to sensitive waters, but to defer expansion of their water system (i.e., water treatment facility and raw water supplies). Initiated in 2009, the project consists of three reclaimed water ASR wells with associated piping and instrumentation facilities to allow up to 6 mgd of reclaimed water to be stored underground for later retrieval. Mr. Muniz was involved from permitting and design through construction and testing. The facility is operational and currently being expanded. Construction costs were $3.5 million.

Deep Injection Well System Design, Loxahatchee River District, FL

Mr. Muniz worked with District staff and the FDEP to successfully secure a permit that allows blending of concentrate produced from a nanofiltration water treatment plant with reclaimed water to expand the quantity of irrigation-quality water available. This strategy was not only approved and supported by the FDEP, but allowed to continue to use their existing deep injection well system without converting the injection well to an industrial design (i.e., the addition of a tubing and packer). This resulted in significant cost savings and allowed the District to keep the existing disposal capacity intact.

Consumptive Use Permitting Projects, Collier, Broward, Miami Dade Counties, FL

Mr. Muniz has managed many consumptive use permitting projects in Florida, including Naples, Collier County, Pompano Beach, Broward County, Fort Lauderdale, Miramar, Plantation, Hallandale Beach, and Cooper City. He was instrumental in obtaining a 20-year permit from the SFWMD for use of surface water from the Golden Gate Canal. Mr. Muniz has worked with regulators from EPA, DEP and the WMDs. These efforts led to reclassification of ASR wells to facilitate implementation of both treated and untreated systems. Mr. Muniz worked with these agencies to obtain raw water permits for Miami-Dade County and Broward County. These two systems were the first permitted untreated ASR systems in Florida.

Injection Well System Design, City of Naples, FL

Mr. Muniz designed an injection well system that stores reclaimed water in a saline environment for later retrieval to meet irrigation demands. This system has pioneered the concept to successfully store and recover both reclaimed and surface water in waters containing more than 10,000 mg/L total dissolved solids.

Groundwater Modeling, City of Hollywood, FL

Mr. Muniz managed one of the most innovative projects in the state, which involves creating a groundwater divide to prevent further inland movement of the saltwater interface by injecting reclaimed water along the coastline. Plans consisted of shallow injection of reclaimed water near the saltwater interface to create a hydraulic gradient, which would allow continued use of the City's coastal wellfield.

North Miami Water Lime Softening Plant Rehabilitation, North Miami, FL

Mr. Muniz provided Quality Control – Water Supply Design. The Winson WTP is a lime softening treatment plant with a permitted capacity of 9.3 mgd (treating Biscayne Aquifer raw water). The WTP was constructed in the early 1960s; many of its existing facilities are at the end of their useful lives. Hazen planned, designed, and permitted rehabilitation of the existing facilities (including filter media, underdrains and valves replacement; new high service, backwash and transfer pump stations; new chemical facilities and new electrical distribution system.

Cities of Fort Lauderdale and Pompano Beach Wellfield Expansions, FL

Mr. Muniz managed and designed wellfield expansions for the Cities of Fort Lauderdale and Pompano Beach. These projects involved consumptive use permitting, design and siting of new production wells, and construction and testing oversight. Both projects resulted in expanded wellfield capacities and issuance of favorable permit conditions. These projects were completed in association with MacVicar Federico and Lamb (now Grandusky, Lamb and Associates).

City of Deerfield Beach Multiple Wellfield Projects, FL

Mr. Muniz managed a series of wellfield projects, which enabled the City to continue operation of their eastern wellfield and remediate the western wellfield, which was contaminated by EDB. A safe yield was performed and a monitoring plan was developed for the eastern wellfield to optimize use of this wellfield. Remediation of the western wellfield consisted of determining the source of contamination and creating an early warning monitoring system. EDB removal was achieved using a GAC treatment system.

City of Pompano Beach Eastern Wellfield, FL

Mr. Muniz led the efforts to locate, track, and establish a safe yield for the Eastern Wellfield, which is threatened by saltwater intrusion. Efforts consisted of data evaluation, installation of monitoring wells, establishment of a monitoring program modifying wellfield operations, and negotiations of permit conditions with the SFWMD. The project also included development of plans to expand the City's current water supply to meet future demands.

Joseph Franko, PE

Regulatory/Permitting

Joseph Franko has 29 years of water resources expertise including the planning, permitting, design, and construction of water and wastewater projects for Hazen in Florida.

Mr. Franko has been involved with many of the projects Hazen has performed for the City of Stuart since 1992. He was based in Hazen's Treasure Coast office in Fort Pierce from 1990 until its closing in 2013. His experience in the Stuart/Martin County area includes serving as Project Manager for the development and implementation of a Remedial Action Plan for the Stuart Old City Landfill and also participated in the permitting and design of the closure and golf teaching facility. Mr. Franko's Martin County experience includes serving as Project Manager for the Dixie Park Wastewater Treatment Plant, sludge treatment, and odor abatement improvements project, and Design Engineer for the Tropical Farms Water Treatment Facility.

Old City Landfill, City of Stuart, FL

Mr. Franko served as Engineer-of-Record for the City of Stuart's Old City Landfill. He was responsible for the design, permitting and implementation of the Remedial Action Facilities. The system design is based on the pump and treat method for removing Volatile Organic Compounds (VOC). A series of shallow and deep recovery wells pump groundwater to a forced draft air stripping tower for treatment. Treated effluent is then pumped into an on-site exfiltration trench. The completed system cost the City less than $400,000. Alternative remediation/closer plans that were proposed to the City prior to Hazen's involvement could have cost the City up to $10 million. He also participated in the permitting and design of the closure and golf teaching facility.

Tropical Farms Water Treatment Facility, Martin County, FL

Mr. Franko served as Design Engineer for the Tropical Farms Water Treatment Facility. Design assignments included high service pumps, storage tanks, chlorination system, and yard piping. He has also served as Project Manager for the Martin County Dixie Park Wastewater Treatment Plant, sludge treatment and odor abatement improvements project. He was responsible for design, permitting, and construction services. This $780,000 project was completed 1 month ahead of schedule and under budget.

Education

BS, University of Florida, 1989, Civil Engineering

Certification/License

Professional Engineer: FL

Areas of Expertise

- Project Management
- Permitting
- Construction Management
- Pump Station and Pipeline Design
- Hydraulic Modeling
- Design of Water and Wastewater Facilities
- General Civil and Yard Piping
- Treatment Facility Permitting

Experience

- 28 total years
- 26 years with Hazen

Professional Activities

American Society of Civil Engineers

American Water Works Association

Florida Engineering Society

National Society of Professional Engineers

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Water and Wastewater Master Plan, Riviera Beach, FL

Project Engineer responsible for providing engineering design services for the City's water and wastewater master plan study. Hazen was selected by the City of Riviera Beach Utility District to provide master planning services for the City's water and wastewater infrastructure through the year 2030. The City of Riviera Beach Utility District owns and operates water and wastewater infrastructure for the City of Riviera Beach, which includes one water treatment plant, three storage tanks and 86 miles of water distribution pipes, 51 wastewater pump stations and 37 miles of wastewater force mains. Some of the work provided under this contract included hydraulic modeling, water transmission and distribution and wastewater collection and transmission system evaluations.

Water Distribution System Master Plan and Water System Improvements, City of Melbourne, FL

Mr. Franko served as Project Manager for this project that identified $23 million of capital improvements over a 15-year planning period. Hazen provided design and construction services for Phase I Improvements, which consisted of: The Harlock Road Water Main Extension (14,000 feet of 18-inch and 12-inch DIP with 380 feet of 20-inch HDPE HDD under a County Road intersection and deep stormwater canal and maintenance of traffic [MOT]), Pineda Causeway Ground Storage Tank and Booster Pump Station (a 2-MG water storage tank and high service pumping station), Pineda Causeway Water Main (3,000 feet of 16-inch and 1,300 feet of 12-inch DIP, 146 feet of 28-inch jack and bore crossing FEC RR, 35 feet jack and bore crossing US 1 ramp with Brevard County, FEC RR, and FDOT permitting and MOT). Construction of the Harlock Road project was completed in 2007; the Pineda Water Main was completed in 2009; and the Pineda Causeway Storage Tank and Pump Station project was completed in 2012.

Palm City II Landfill Expansion, FL

Mr. Franko was involved in the Palm City II Landfill Expansion from design through construction including modifications to the groundwater monitoring plan. The project consisted of the design of Class I cells 3 and 4, life extension of Class III cell, new stormwater plan and leachate treatment/disposal works.

Northwest Water Reclamation Facility Reject Water and Pumping Improvements Phase 1 - Preliminary Engineering Services, Orange County Utilities, Orlando, FL

Mr. Franko served as Project Manager for evaluation and conceptual design of the facility's existing reuse storage and pumping facilities in order to meet current reuse demands and future demands from the Utility's large users. Conceptual design consisted of detailed evaluation of the existing reuse pumping facilities, reuse disposal options, long term storage requirements, reject water storage facilities and design of electrical and instrumentation facilities.

Moffet Street and 14th Avenue Pump Station, City of Hollywood, FL

Mr. Franko was responsible for design, permitting ,and construction of a $1.2 million facility. The facility is a duplex 33,000 gpm stormwater pump station which discharges 2,000 feet through a 42-inch PCCP force main. The 42-inch force main was routed through a golf course and discharges into existing pump station that was modified to provide a gravity discharge to the Intracoastal Waterway. The pump station is equipped with an RTU for complete supervisory and control.

City of Melbourne Surface Water Treatment Plant Improvements Phase 2A and 2B Melbourne, FL

This $12 million project consists of a new raw water pump station, ozone generator building, ozone contactor, filter backwash pump station and solids handling improvements. Mr. Franko serves as Engineer-of-Record/Project Manager responsible for all construction management, yard piping, project closeout, and permitting certifications.

14.5-mgd Nanofiltration Facility, Town of Jupiter, FL

The Town of Jupiter currently operates a water treatment plant with four independent treatment process-

es: lime softening, ion exchange, and reverse osmosis (RO) and NF. The Town added a nanofiltration (NF) facility to produce potable water from the surficial aquifer. The NF treatment will continue ongoing product water quality improvement and ultimately allow retirement of a portion of the lime softening treatment plant. Mr. Franko's responsibilities included gravity collection system and waste stream lift station design/ concentrate disposal line design.

Loxahatchee River Environmental Control District, Martin and Palm Beach Counties, FL

Mr. Franko participated in the Stormwater Management and Utility Study for the Loxahatchee River Environmental Control District (ENCON). The ENCON 70-square-mile service area is located in Martin and Palm Beach Counties.

Multiple Projects, City of St. Augustine, FL

Hazen is providing professional engineering services for the City of St. Augustine since 2010. Mr. Franko is the Project Manager for all City projects that have been completed or are ongoing at the City's water and wastewater treatment facilities. City projects include; Corrosion Control Studies, Cold Lime Softener Process Studies, Water Quality and Blend Recommendations, Structural Assessment of Existing Tanks and Buildings, CFD Modeling of Secondary Clarifiers and Evaluation of existing RAS Pump Station, design and construction of Secondary Clarifier Rehabilitation and RAS Pump Station Improvements.

Fairfax Water Treatment Plant Reservoir Rehabilitation, JEA, Jacksonville, FL

Mr. Franko served as Engineer-of-Record for design of a fast-tracked project to replace existing leaky valves inside the Fairfax WTP prior to rehabilitation of the +60-year-old concrete reservoirs. With the valve issue resolved, it allowed construction to occur one reservoir at a time thereby providing JEA with additional flexibility to serve their customers. Construction was completed in 2014.

North Lake Pump Station Project, City of Hollywood, FL

The North Lake Pump Station consisted of the design, permitting, bidding and construction oversight to drainage system improvements for a 57-acre drainage basin. Improvements included the installation of approximately 1,000 LF of 36-inch RCP stormwater collection system, cross drains, inlet structures, a water quality inlet structure, two 24-inch vertical propeller pumps and an emergency generator for backup power. The project included stormwater modeling utilizing XP-SWMM and permitting through Broward County Department of Natural Resource Protection and South Florida Water Management District.

Education

BS, Civil Engineering, North Dakota State University, 1996

MS, Environmental Engineering, North Dakota State University, 1998

MBA, Finance, University of Kansas, 2002

Certification/License

Professional Engineer: KS

Areas of Expertise

- Asset Management
- Utility / Organizational Optimization
- Strategic Business Planning
- Financial Studies

Experience

- 22 total years
- 2 years with Hazen

Professional Activities

American Water Works Association

Society of Professional Engineers

Virginia Water Environment Association, Strategic Planning Committee Chair and Utility

Management Committee Chair

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Ryan Nagel, PE, ENVSP

Multi-Criteria Parameter Decision Making

Mr. Nagel develops and implements full-scale asset management programs, strategic business plans, performance management programs and executive dashboard systems, workforce development initiatives, business process optimization, financial services and rate development, and workgroup facilitation for major municipal utilities.

Public Utilities Integration Evaluation, Lowell Regional Wastewater Utility, Lowell, MA

Lead consultant for a detailed study of the potential implications of a proposed integration of the Water and Wastewater Utilities in the greater Lowell Region. The study's purpose was to independently review, validate and assess the potential integration from a business perspective. The study included an administrative, staffing, and operational review to identify potential benefits, efficiencies, and challenges and quantify the projected annual cost impacts associated with the potential utility integration.

Asset Management Gap Analysis and Improvement Roadmap Development, Hampton Roads Sanitation District, VA

Asset Management Technical Lead responsible for conducting an ISO 55001 Maturity Assessment and Developing an Asset Management Improvement Roadmap for HRSD. Mr. Nagel assisted with a series of structured interviews and workshops to assess HRSD's approach to asset management to identify specific gaps and areas for improvement. Following the identification of initial improvement initiatives, corresponding scope, duration, resource requirements, and initiative owners were identified and defined to serve as an initial asset management strategic road map to guide HRSD's Asset Management Program for the next several years.

Asset Management Program Development and Implementation Support, Washington Suburban Sanitary Commission, MD

Program Manager responsible for providing comprehensive asset management services on a multifaceted program, including asset registry data collection, asset condition assessment, risk determination, level of service, operations & maintenance analysis, asset management modeling,

Hazen

asset management plan report preparation, asset management training, economic analysis, optimization analyses, asset management network and enterprise analysis, business logic development and configuration of WSSC's asset management decision support system, along with related uncertainty analyses.

Enhanced Capital Planning and Project Prioritization, Los Angeles Department of Public Works Bureau of Sanitation, Los Angeles, CA
Project Manager responsible for strengthening LA SAN's existing organization, processes, and practices by implementing an enhanced capital planning and project prioritization process. The goal of the project was to develop tools and templates for business case development as well as triple-bottom-line (social, financial, and environmental) prioritization and scoring criteria that can be used across treatment, collection, pumping and other assets, while aligning with existing asset management and capital planning programs.

Asset Evaluation, Department of Utilities, City of Norfolk, VA
Project Manager responsible for providing engineering and asset management services related to the evaluation of the Moores Bridges Water Treatment Plant assets to establish preliminary short and long-term renewal and replacement (R&R) needs for the Plant. The scope included conducting an asset inventory analysis, reviewing historical operating reports, and conducting site visits to develop a full inventory of all major/priority Plant assets; evaluating physical and performance conditions of Plant assets to identify any known process, hydraulic, or condition issues that impact cost, efficiency, or operations and identifying overall Plant asset criticality (consequence of failure); reviewing asset initial cost information, verifying useful life and remaining useful life of Plant assets, and determining overall replacement costs of Plant assets; and conducting a risk analysis of Plant assets and prioritizing necessary R&R projects.

Condition Assessment and Facilities Plan, North Regional Wastewater Treatment Plant, Broward County, FL
Technical Advisor responsible for providing engineering and asset management services for the establishment of short and long-term renewal and replacement (R&R) needs for the County's North Regional Wastewater Treatment Plant (NRWWTP). The scope included conducting a desktop asset inventory analysis, historical operating review, and site visits to verify plant asset inventory; utilizing Hazen's web-based, real time Facilities Asset Management and Decision Support (AMDS) tool for asset condition assessment and risk analysis; evaluating physical and performance conditions of NRWWTP assets to identify process, hydraulic, or condition issues impacting cost, efficiency, or operations; identifying overall plant asset criticality (consequence of failure); reviewing asset initial cost information, verifying useful life and remaining useful life of NRWWTP assets, determining overall replacement costs of plant assets, and prioritizing a long-term capital improvement program to address plant needs; and developing and integrating security and vulnerability assessments for facilities and infrastructure supporting the NRWWTP.

Steven Lamb, PG

Aquifer Modeling and Development

Steve Lamb, PG, serves as Principal Hydrogeologist in water resource and environmental consulting, and has more than 40 years of experience in groundwater and water use issues, including 30 years in environmental consulting in Florida.

He has conducted water supply and stormwater management projects; obtained consumptive use permits for public water supplies, agricultural, and industrial projects; and conducted modeling of complex groundwater and groundwater/surface water systems in both Florida and the Caribbean. His permitting experience includes major municipal water supplies including those with historical salt-water intrusion and wetland issues.

Previously, he served as Director of Regulation for the South Florida Water Management District (SFWMD) from 1991-1994, and Director of Water Use Permitting from 1987-1991. As Director of Regulation, he was responsible for all regulatory issues within SFWMD and was the leader in framing the regulatory strategies. He also addressed local and regional problems along with state and federal policy issues related to water supply. He was a key participant in the development of statewide water policy on topics such as wastewater reuse, minimum flows and levels, and permit streamlining.

With Federico, Lamb and Associates, Inc., he has worked with both public utilities and private industry in evaluating water supply needs, consumptive use permitting, and representing both public and private interests in regional and federal planning activities. Mr. Lamb's employment history is summarized below:

Grandusky Lamb and Associates (2016–present)
Principal Hydrologist. Manage, implement, and permit water supply and stormwater management projects; consumptive use permitting of public water supplies, agricultural, and industrial projects; modeling of complex groundwater and groundwater/surface water systems.

- Master water plans for major municipal water supplies, including groundwater modeling for potential saline water intrusion, safe yield determinations and contaminate movement.
- Permitting of major municipal water supplies including those with historical salt-water intrusion and wetland issues.

Education

BA, Geology, University of Louisville, 1975

Graduate Work, University of Kentucky, Geohydrology, 1979-1980

Certification/License

Professional Geologist: FL (PG 680)

Areas of Expertise

- Groundwater and Water Use Issues
- Water Supply
- Consumptive Use Permitting
- Modeling

Experience

- 41 total years

Company Address, Phone Number, and Email

8426 Waterway Drive
West Palm Beach, FL 33406
561.386.8219
lamb@fla-inc.com

Grandusky Lamb and Associates
Water Resource and Environmental Consultants

- Development of operational programs for existing wellfields utilizing groundwater modeling to evaluate regional surface water recharge and wetland impacts.
- Permitting and groundwater modeling of large-scale aggregate mines to evaluate seepage and water quality changes.
- Represent both private and public interests in rulemaking and state and federal planning processes
- Represent both private and public interests in Water Management District rulemaking including wetland impact and mitigation, environmental reservations, minimum flow and levels, and regional availability.

Project experience includes the following:

Conceptual Feasibility of a Sub Regional Lower East Coast Water Supply Solution – Phase 1, Fort Lauderdale, FL (2005-2012)
Hydrological modeling and conveyance analysis for a proposed reservoir serving the Lower East Coast. Groundwater modeling of offset requirements for all public water supply utilities in the service area.

Conceptual Feasibility of a Sub Regional Lower East Coast Water Supply Solution – Phase 2a Additional Investigations Compilation of Technical Memorandum, Fort Lauderdale, FL (2007- 2014)
Proposed certification process, direct conveyance alternatives for transfer to water in storage to permittees and geologic and hydrologic investigations for the proposed C-51 reservoir.

PBA Mine / L-8 and C-51 Reservoir Project, Palm Beach Aggregates (1998-Ongoing)
Permitting of project with South Florida Water Management District and Florida Department of Environmental Protection. Construction over site and coordination with SFWMD during construction.

Florida Department of Agriculture and Consumer Services (FDACS) (2008-Ongoing)
Consulting services for implementation of the Comprehensive Everglades Restoration Project, South Florida Water Management District Water Advisory committee, water supply issues in the Central Florida Water Initiative, water supply plan development and Regulatory Programs and rulemaking with the Water Management Districts.

Selected Previous Employment History

Federico Lamb & Associates, Inc.
Principal Hydrologist (2011–2016)

MacVicar Federico & Lamb, Inc.
Principal Hydrologist (1994–2011)

South Florida Water Management District
Director, Regulation Department (1991-1994). Provided direction and management of the District's regulatory programs. Technical and policy oversight of consumptive use permitting, well construction, deep well injection program, environmental (dredge and fill) permitting, surveillance and enforcement, water quality (Works of the District) permitting, surface water management permitting and administrative functions of the department. Developed the District's water supply policy document that compiled and interpreted State statutes and rules and provides guidance to the District's water supply planning process and regulatory programs. Modified the District's consumptive use permitting program to incorporate and implement the planning process. Assisted in developing water supply plans to resolve existing and future water resource problems.

Director, Water Use Division (1987–1991). Director of the consumptive water use program. Technical and policy oversight of the District's water use permitting program. Responsible for the issuance of consumptive water use permits for all major wellfields in south Florida. Evaluation of wellfield design, aquifer performance tests, and wellfield operation programs for compliance with state requirements for issuance of consumptive use permits. Analysis included an assessment of impacts on adjacent uses, environmentally sensitive areas, and saltwater intrusion. Reviewed and evaluated monitoring programs for all public water supply wellfields for salt water intrusion and water shortage determinations.

Supervising Professional – Water Use (1986). Technical supervision for Water Use Division.

Henry Thomas

Cost Impact Analysis

Mr. Thomas has over 37 years of utility industry rate and financial experience focusing on business issues facing water, wastewater, reclaimed water, solid waste, natural gas, electric, and stormwater utilities.

Mr. Thomas' experience includes directing financial consulting services for publicly-owned utilities and governmental entities. He has been responsible for preparing utility rate and cost of service studies, business plans, bond feasibility studies, designing innovative utility rates, connection and development fees, municipal impact fees, developing utility financial policies and assisting with the acquisition of utility properties and other management consulting services. During his career, he has served over one hundred clients including county and municipal governments and publicly-owned utility districts, authorities and cooperatives.

Cost of Service and Utility Rate Studies

Mr. Thomas has directed utility rate studies for electric, gas, water, wastewater and solid waste utility systems. These studies include evaluation of revenue requirements, cost of service analyses, retail and wholesale rate design, impact fees and miscellaneous service charges, and development of rate administrative policies.

Mr. Thomas has directed municipal impact fee studies for municipal services including public facilities, police and fire/rescue services, parks and recreation, and library services. These studies include the evaluation of level of service needs and requirements of the community, the capital investments required to serve new growth, and the allocation of such needs to appropriate residential and non-residential land uses.

Expert Testimony

Mr. Thomas presented testimony as an expert witness before the following regulatory jurisdictions:

State of Indiana Public Service Commission - IURC Case No. 41118, Wholesale Transmission Rates; State of Indiana Public Service Commission - Docket No. 40115, Wholesale Rates; Virgin Islands Public Service Commission - Docket No. 345,Tax Exempt Bond Issue; Virgin Islands Public Service Commission - Docket No. 481, Water Rates; Circuit of Cass County, State of Michigan - Case No. 97-879-CK, Capital Credit Allocation; State of Florida, Division of Administrative Hearings - Case No. 98-0449, Charlotte County Comprehensive Plan; State of Florida, Public Service

Education

MBA, Accounting, Rollins College, 1985

BSBA, Accounting, University of Central Florida, 1977

Certification/License

Certified Public Accountant: #15822

Areas of Expertise

- Environmental Consulting
- Water Supply Evaluation
- Consumptive Use Permitting

Experience

- 37 total years

Professional Activities

Water Environment Federation

American Water Works Association - Committees Rates and Charges, Finance, Accounting & Management Controls

Government Finance Officers Association

Florida Government Finance Officers Association

American and Florida Institute of Certified Public Accountants

Florida Stormwater Association

Company Address, Phone Number, and Email

341 North Maitland Avenue
Suite 300
Maitland, FL 32751
407.628.2600
PRMG@prmginc.com

Commission – Miami Corporation Utility Certification; Circuit Court of Okeechobee County, Florida – Testimony on behalf of the Okeechobee Utility Authority

Financial and Economic Feasibility Studies

Mr. Thomas has directed economic and financial feasibility studies associated with the issuance of long-term indebtedness and project feasibility. Representative project experience includes:

- Development of financial projections, official statements, certificates of compliance, additional bonds test certificates and other services associated with issuance of long-term indebtedness and project feasibility.
- Development of project feasibility analyses to evaluate customer and territory swaps, wastewater treatment facilities, water supply resources, reclaimed water systems and regional irrigation projects.

City of Stuart, FL

Mr. Thomas has served the City of Stuart, Florida since 2004 providing utility rate, financial planning, and management consulting services to the City's water, wastewater, and solid waste systems. As part of this ongoing engagement, Mr. Thomas has directed comprehensive water, wastewater, and solid waste rate studies in 2004, 2008, and 2012, impact fee studies, and assisted in the development of utility billing policies procedures and the evaluation of wholesale rates. Mr. Thomas is currently engaged by the City to update their water, wastewater, and solid waste rates.

Fort Pierce Utilities Authority, FL

Mr. Thomas has served the Fort Pierce Utilities Authority (FPUA) since 1989 directing utility rate, financial planning, and management consulting services for the Authority's water, wastewater, electric and natural gas systems. In addition to providing comprehensive utility cost of service and rate studies and revenue sufficiency updates, his experience includes developing innovative electric utility rates including economic development rates, rates for standby service, and interruptible/curtailable rates.

Regulatory / Litigation Experience

Mr. Thomas has directed regulatory rate cases for the Virgin Islands Water and Power Authority and Charlotte County, Florida and has testified before the Florida Public Service Commission, the Indiana Public Service Commission, the Virgin Islands Public Services Commission, and District Courts in Florida and Michigan.

Industry Presentations and Publications

- National Rural Electric Cooperative Association, "Electric Utility Rates in a Competitive Environment", NRECA Managers Conference; Denver, Colorado, 1995
- National Rural Electric Cooperative Association, "Innovative Electric Rates", NRECA Marketing, Member Services and Communication Conference; Portland, Oregon, 1995
- National Rural Electric Cooperative Association, "Electric Utility Rate Making", NRECA National Directors Conference; Nashville, Tennessee, 1996
- South Carolina Section of the American Water Works Association, "Water and Wastewater Impact Fees ", 2001 Management Forum, 2001
- Florida Water Resources Association, "Water Rates and Conservation Practices", 2007 Florida Water Resources Conference
- Florida Rural Water Association, "Communicating Water Utility Needs", 2010 Florida Rural Water Association's Annual Technical and Training Conference
- North Florida Section of the American Water Works Association, "Innovative Water Rates", July 2011
- American Water Works Association, "Utility Impact Fees: Practices and Challenges" with Bryan Mantz, Awarded the Management and Leadership Divisions Best Paper Award for 2013

Education

BSChE, University of New South Wales, Australia, 1990–1994; Graduate of CO-OP Scholarship Program

Certification/License

MIE (Aust)

Areas of Expertise

- Microfiltration
- Membrane Bioreactor
- Membrane Procurement
- Seawater RO
- Delivery of Operation of Membrane Facilities

Experience

- 21 total years
- 2 year with Hazen

Professional Activities

American Water Works Association

- Membrane Process Committee
- Membrane Systems Subcommittee

American Membrane Technology Association

Water Reuse Foundation

Company Address, Phone Number, and Email

1400 E. Southern Avenue
Suite 340
Tempe, AZ 85282
480.436.7959
twalker@hazenandsawyer.com

Hazen

Troy Walker, MIE (Aust)

Reverse Osmosis of Floridan Aquifer;
Desalination/Deep Floridan Aquifer

Troy Walker serves as Hazen's corporate Membrane Technology Lead and the West Region Reuse Water Practice Lead. He has over 20 years of experience with advanced water reuse projects including MF and MBR systems.

Watereuse Research Foundation (WRRF) Direct Potable Reuse Research Projects

Mr. Walker serves as the Principal Investigator for two key, operationally focused projects as a part of the WRRF Direct Potable Reuse Initiative. WRRF 13-03 "Critical Control Point Assessment to Quantify Robustness and Reliability of Multiple Treatment Barriers of a DPR Scheme" uses the principles of Hazard Analysis and Critical Control Points (HACCP), a food safety methodology, to manage microbiological and chemical hazards and ensure the safety of recycled water. This project engages with multiple indirect and direct potable reuse facilities worldwide and uses their operational and maintenance data to provide statistical evidence of process effectiveness, and to provide practical operational response procedures for integration into DPR plant operating plans. WRRF 13-13 "Development of Operation and Maintenance Plan and Training and Certification Framework for Direct Potable Reuse (DPR) Systems" is aimed at developing the key requirements for operations and maintenance and importantly capturing the training and certification requirements to underpin the skills and knowledge for operations teams that are engaged in direct potable reuse schemes.

West Basin Municipal Water District - Carson Plant

Project Manager for full design of a 2.0-mgd tertiary membrane bioreactor (tMBR) and a 2.64-mgd microfiltration (MF) system and ancillary processes at the Carson Regional Water Recycling Facility. These will upgrade the existing 5.0-mgd MF - Reverse Osmosis (RO) train and the 0.9-mgd biological aerated filtration (BAF) treatment train originally installed for nitrification.

Coachella Valley Water District – Chromium Treatment Options Study

Provision of preliminary design and technical options for chromium removal for numerous groundwater sites in the Coachella Valley. This has involved an evaluation of options for mobile ion exchange systems, centralized ion exchange resin regeneration, and operations implications. Detailed development of Theory of Operations reviewing operating

philosophy and staffing approaches for the future facilities.

City of Santa Monica – Reverse Osmosis Treatment Plant Optimization
Provision of expert technical advice and planning to troubleshoot and significantly improve the performance of the City's 8-mgd reverse osmosis facility. This included an economical design and retrofit to ameliorate severe membrane fouling.

Application of Hazard Analysis and Critical Control Point (HACCP) Process to DPR Scheme, Gwinnett County Department of Water Resources, Gwinnett County, GA
Mr. Walker provided technical support and risk assessment on a project to apply the HACCP methodology in selecting critical control points (CCP) for a direct potable reuse pilot system at the F. Wayne Hill facility. The project has provided valuable information in the selection of analytes for monitoring, the identification of CCPs, the identification of process monitors, and development of the monitoring and response procedures for pilot testing.

City of Beverly Hills – Reverse Osmosis Plant Optimization
Providing a detailed review of important mechanical completion and commissioning planning for the Carlsbad Desalination Facility, based in San Diego, CA. This leverages from his extensive commissioning and operational experience in seawater desalination.

Experience Prior to Hazen and Sawyer
Product Manager – MBR
Developed standardized MBR system design packages for the Australian and New Zealand markets including 30% detailed proposal-level design for several design and construct proposals. Included design development for both hollow fiber and flat sheet membrane systems.

Western Corridor Recycled Water Scheme, Brisbane, Australia
Led the technical operations team for a $2 billion dollar indirect potable reuse scheme built in Brisbane, Australia. The scheme provided highly purified recycled water to two coal-fired power stations in addition to availability for indirect potable reuse. Mr. Walker provided detailed design review during design phase, commissioning support and managed transition from commissioning through to long-term operations for each of the three advanced water treatment plants. Each plant consisted of microfiltration, reverse osmosis and advanced UV/peroxide oxidation. Mr. Walker took a lead role in the water quality management for the scheme, including extensive collaboration with power stations to optimize and increase cooling water cycles, manage limitations with cooling water blowdown, and identify impacts to power station high purity water boiler treatment circuits.

Kwinana Water Reclamation Plant, Perth, Australia
Completed detailed design, construction support, commissioning and transfer to operations of a 4-mgd advanced membrane recycled water plant near Perth, Western Australia. This plant provided highly purified water from recycled municipal effluent.

Wollongong Water Reclamation Plant, Australia
Completed detailed design, construction support, commissioning and transfer to operations of a 5-mgd advanced membrane recycled water plant south of Sydney, Australia. This plant provided highly purified recycled water from municipal effluent to a steel manufacturing plant.

St. Helens, Tasmania, Australia
Completed 50% detailed design of a 0.5-mgd MBR as an upgrade to the Town's wastewater treatment system. This involved development of a biological nutrient removal capability to meet stringent nitrogen targets.

Nicole Keon Blute, PhD, PE

Contamination Remediation via Air Stripping

Dr. Blute specializes in drinking water treatment and system planning particularly for impaired groundwater.

She is a leader in chromium-6 treatment, having led over a decade of technology testing forming the basis for the Best Available Technologies set by California. Dr. Blute also develops and leads a wide variety of water projects, notably facility planning, groundwater treatment projects, distribution system water quality projects, technology testing for emerging inorganic and organic constituents, and disinfection strategy evaluations.

Owner's Agent of the Groundwater Remediation in the San Fernando Basin, Los Angeles, CA

Project Manager and Technical Leader for the Los Angeles Department of Water and Power (LADWP) San Fernando Basin Groundwater Remediation. As the Owner's Agent, the team led by Dr. Blute is providing support to LADWP in a $30M, 10-year project to select and implement remediation, which in early estimates may cost between $300M and $600M for planning, design, and construction. Components include the following: Technical evaluation including providing input into hydrogeological modeling and conceptual design; Remedial Investigation/Feasibility Study (RI/FS) and baseline Human Health Risk Assessment; Regulatory permitting, including 97-005 reports; Design services ranging from 30% to 100% design depending on the project; Procurement assistance; Proposition 1 grant application preparation; Construction scheduling; Cost estimating and comparison of water supply options; and Evaluation of alternate delivery options. OA support will extend from the conceptual stage through one year beyond facility commissioning. Technologies being evaluated include advanced oxidation process (AOP), air stripping, granular activated carbon (GAC), pre-treatment, and others.

Chromium 6 Treatment Design, Palm Desert, CA

Technical Director and Permitting Lead for the design of 36 treatment facilities to remove chromium from groundwater at Coachella Valley Water District, representing a $200M program. The project was alternate delivery (Construction Manager at Risk), including close collaboration with the CMAR team member starting at 30% design. Treatment facilities include ion exchange at 23 water production facilities using strong-base anion exchange, 2 centralized IX treatment facilities using weak-base anion exchange for 7 wells including air stripping, a central regeneration facility for strong-base resin, a blending facility, upgrades to 3 existing

Education

PhD, Environmental Engineering, MIT, 2002

BS, Environmental Science, University of Rochester, 1996, Magna Cum Laude

BA, Chemistry, University of Rochester, 1996

Certification/License

Professional Engineer: CA

Areas of Expertise

- Project Management
- Business Development and Client Service
- Water Quality and Treatment
- Groundwater Treatment
- Advanced Treatment
- Concentrate Management
- Operational Optimization
- Source Water Integration

Experience

- 15 total years
- 4 years with Hazen

Professional Activities

American Water Works Association

Vice Chair, CA NV AWWA Recycled Water Committee

Society of Women Engineers

Company Address, Phone Number, and Email

1149 S. Hill Street, Suite 450
Los Angeles, CA 90015
213.234.1080
nblute@hazenandsawyer.com

Hazen

arsenic treatment facilities, and 10 miles of 18-24" pipelines.

Domestic Source of Supply/Treatment Evaluation, Palm Desert, CA
Project Manager and leader of the technology evaluation of possible Colorado River water treatment and groundwater treatment for a combined 165 mgd of treatment to achieve compliance with the new chromium-6 regulation and add water supply diversification. Treatment options and cost of technology combinations were thoroughly analyzed working with Coachella Valley Water District staff to identify and address all of their concern. Led a series of workshops with CVWD management, department directors, and staff to systematically alternative and build consensus on the treatment combination. The estimated cost of treatment is $200-300 million and includes several dozen groundwater treatment plans, and one or two surface water treatment.

Bench, Pilot and Full-Scale Testing of Chromium Removal, Palm Desert, CA
Co-Principal Investigator on an extensive bench, pilot and full-scale evaluation of treatment technologies for chromium in Coachella Valley Water District groundwater. Led the project conceptual development working together with CVWD and provided technical leadership in troubleshooting and development of the compliance planning tool. Prepared the successful grant application.

Demonstration and Pilot Studies of Hexavalent Chromium Treatment Technologies, Glendale, CA
Technical Lead and Project Manager for $10M of demonstration and pilot studies of hexavalent chromium removal technologies in the City of Glendale, CA. As Owner's Agent, led technology testing of seven potential approaches, recommended selection of two (weak base anion exchange and reduction coagulation filtration) and facilitated Project Advisory Committee final selection, managed 30% design, assisted the city in procurement services (Design Build), prepared the project report submitted to DDW, and provided optimization service for the past 3 years to reduce costs. Facilitated communications between the many involved parties, including regulatory agencies (CDPH, CDWR, and USEPA), additional funding agencies (USBR, Water Research Foundation), other utilities (MWDSC, LADWP, Burbank, and San Fernando), and engineering firms representing potentially responsible parties of the Superfund site and regulatory interests). The results of the over twelve years of study comprise the state-of-the-art knowledge about hexavalent chromium removal technologies and were used by the state in setting the new regulatory limit.

Treatment Alternatives Analysis, Santa Ynez, CA
Project Manager who provided analysis and recommendations on the treatment systems necessary for compliance with the chromium-6 MCL for the Santa Ynez River Water Conservation District #1. Evaluation included analysis of water quality data, development of costs and treatment requirements (e.g., chemical and waste volumes, operational attention of systems), preparation of site layouts, and ranking of treatment options using Decision Criterium Plus. Pilot testing was conducted of weak base anion exchange, and third-party evaluation of two other treatment technologies tested. The project is now at the 30% design phase.

Treatment Selection and Cost Development for a New Groundwater Well, Los Angeles, CA
Project Manager for an evaluation of treatment options and costs for a new well in the California Water Service Company East Los Angeles District. Constituents of concern in the groundwater include hydrogen sulfide, methane, ammonia, iron, and manganese, which present issues with primary MCLs (DBPs), secondary MCLs, and aesthetics. Technology evaluation included review of aeration, coagulation, filtration, breakpoint chlorination, nanofiltration, ferrate, and ozone. Footprints and cost estimates were developed for two leading treatment trains after a workshop with the District and Water Quality Staff. Sewer discharge limitations and costs were key drivers in the process selection and approach to minimizing wastewater. Subsequent pilot testing was conducted on several options, including catalytic GAC, dual ion exchange (cation/anion), aeration, and breakpoint chlorination to further assess options and costs.

Regulatory Technical Support for USEPA and HealthCanada
Provided technical review of proposed regulations for groundwater contaminants from a technical feasibility, literature review, and cost perspectives.

Cost Evaluation of Chromium 6 MCL Compliance, Washington, DC
Worked with a core team of Chromium 6 specialists to assess the cost implications of potential MCLs for the AWWA Water Industry Technical Action Fund (WITAF). Produced a peer-reviewed article in the Journal of the American Water Works Association to share the findings, entitled: "National and California Treatment Costs to Comply with Potential Hexavalent Chromium MCLs."

2 Task Approach

Section No. 2

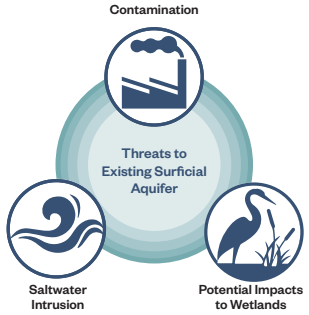
Task Approach

The Hazen team is an experienced, local, multi-faceted alternative water supply team, working exclusively for Stuart, to develop your sustainable solutions.

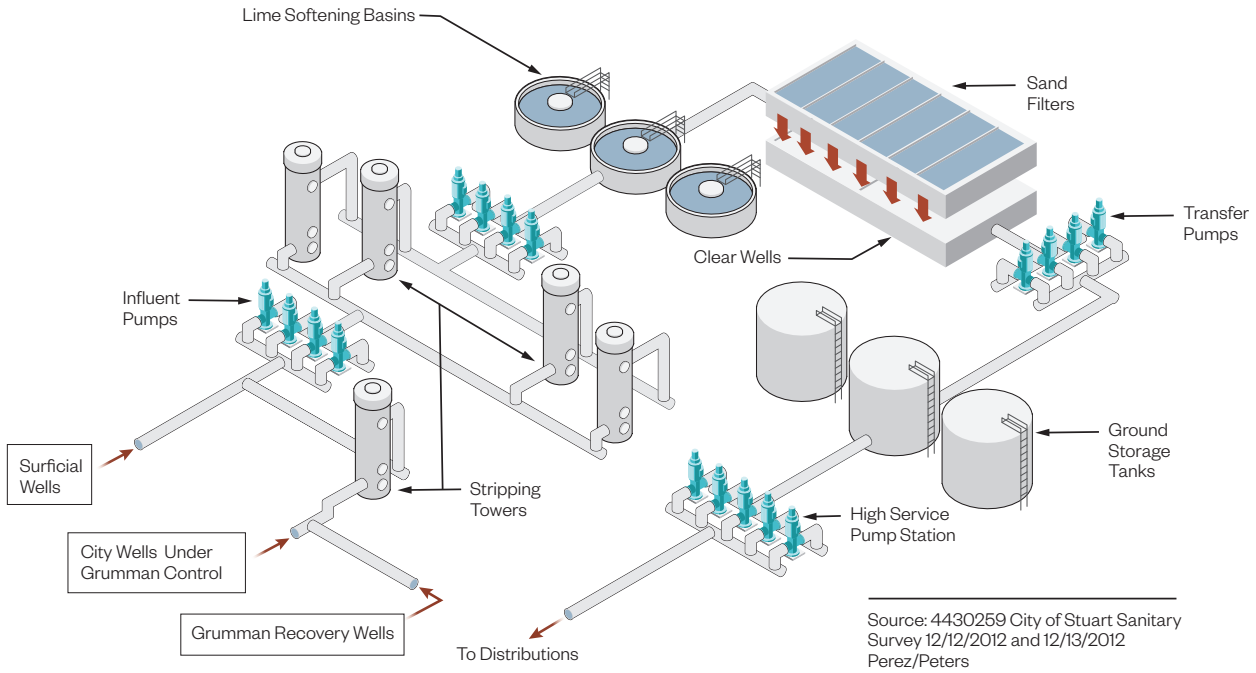
2.1 Scope of Work

2.1.1 Define Current Water Supply Issues

The City of Stuart (City) is nestled in a unique hydrogeologic strata within Martin County, where the surficial aquifer has been a reliable water source allowing for inexpensive lime softening treatment for production of high quality drinking water. However, raw water withdrawal from the existing surficial aquifer wells is currently limited by several social and environmental conditions (see aerial on page 2-3). The City has been fiscally responsible and proactive with the implementation and oversight of monitoring and remediation programs to maintain reliable and safe drinking water. This approach has enabled the City to plan for future investments while minimizing current expenditures.



Several environmental and social factors threaten the reliability of the City's water supply.



The City of Stuart's Water Treatment Plant overall process flow diagram shows the use of air stripping towers for contaminant removal followed by conventional lime softening and filtration for production of drinking water.

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The programs currently under implementation include:

MONITORING

Saline water intrusion monitoring program for the northern most wellfield.

MONITORING

Wetlands monitoring and contingency program.

REMEDIAL ACTION PLAN

Remedial action plan approved by the Florida Department of Environmental Protection (FDEP) for wells 1–15.

These wells are operated in a continuous and alternating mode based on consent agreement between the City and South Florida Water Management District. Air stripping is currently used as pre-treatment.

REMEDIAL ACTION PLAN

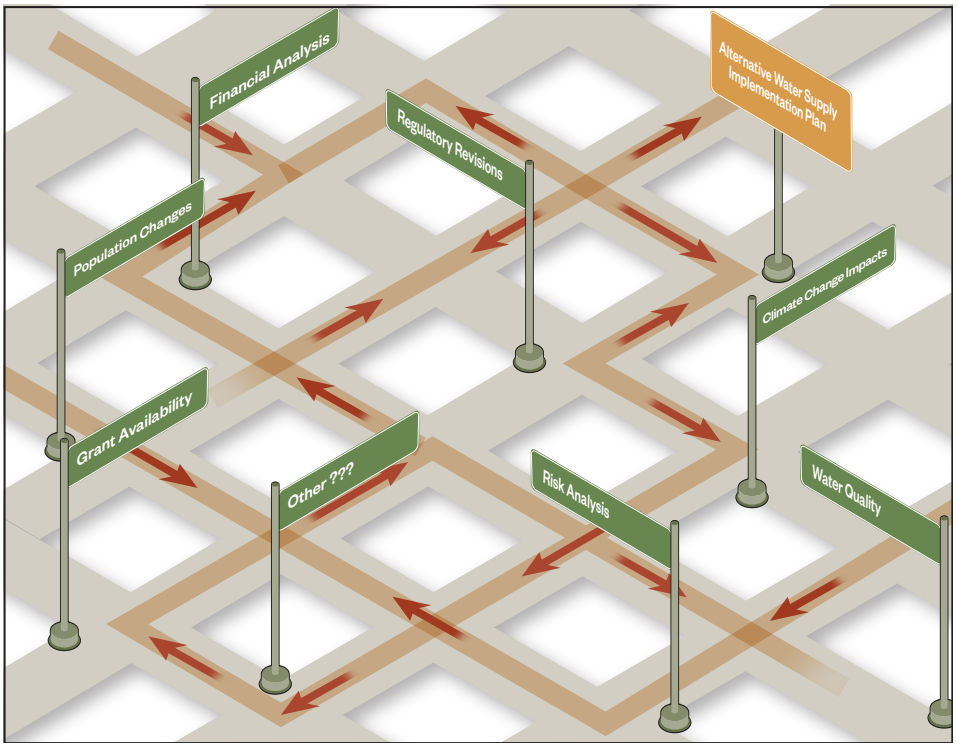
Wells 16–21 are under a remedial action plan approved by the U.S. Environmental Protection Agency (EPA).

These wells are currently inactive until the remediation program is completed.

REMEDIATION PROGRAM

Remediation program implemented by the City of Stuart landfill, which consists of a series of recovery wells.

Some of the wells are currently inactive. The remediation program is ongoing.



In response to the challenges presented above, the City has decided to undertake a significant effort to identify alternatives that can serve as a sustainable, environmentally reliable, economically feasible, and safe drinking water supply. As such, the City of Stuart has smartly allocated resources to select a consultant to navigate the pathway to the selection of an alternative water supply source(s). The Hazen team has driven this course previously for the City of Fort Lauderdale, City of Hallandale Beach, City of Naples, City of North Miami, and City of Margate, among others. The identification of alternatives and selection of one or more alternatives requires in-depth knowledge of the design of each alternative, intense analysis of the risks and benefits of each alternative, an understanding of the availability of grants and funding as well as the projection of financial rate impact on individual customers.

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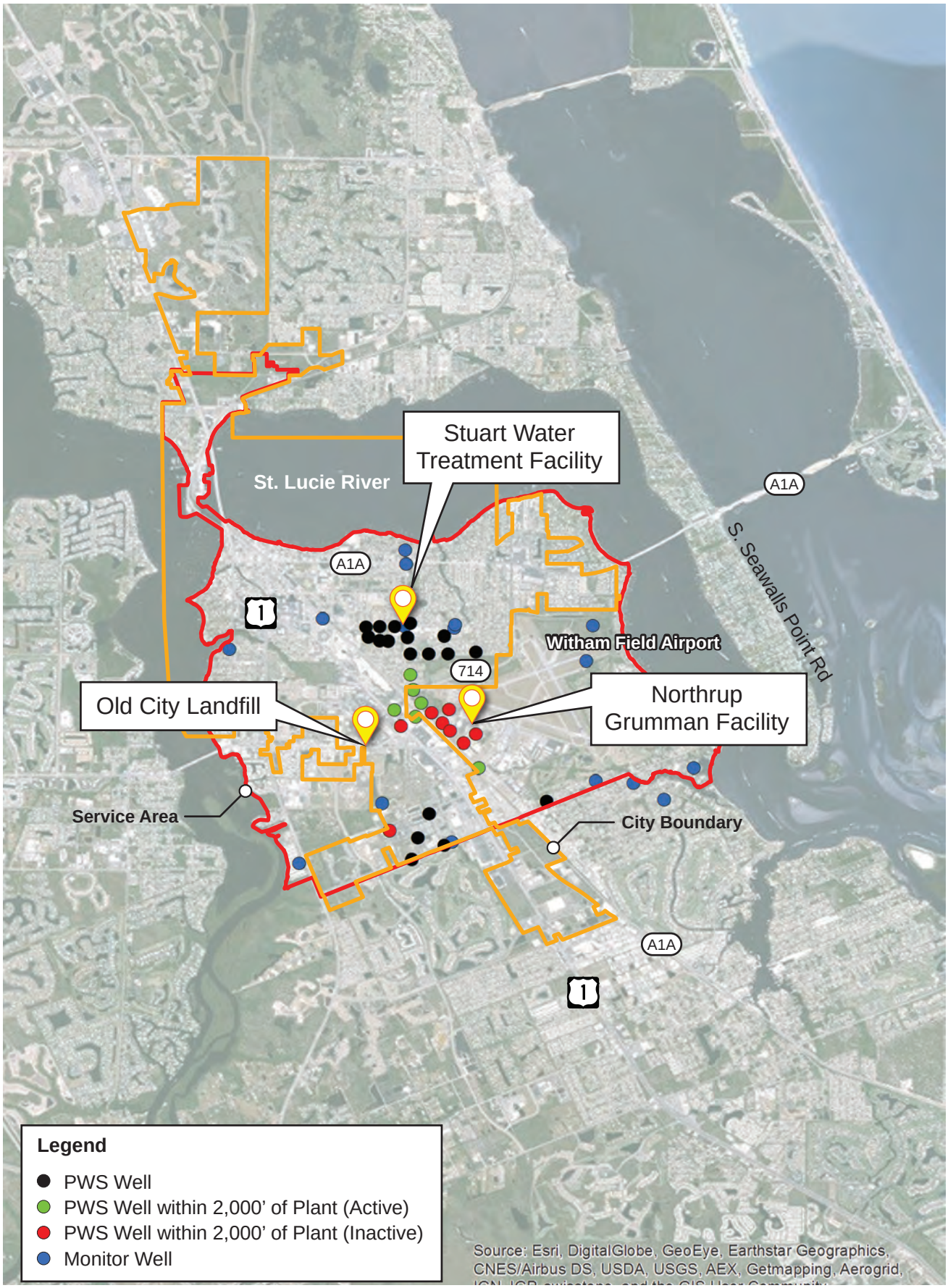
Stuart Water Treatment Facility
St. Lucie River
A1A
S. Seawalls Point Rd
A1A
1
Witham Field Airport
714
Old City Landfill
Northrup Grumman Facility
Service Area
City Boundary
A1A
1
Legend
PWS Well
PWS Well within 2,000' of Plant (Active)
PWS Well within 2,000' of Plant (Inactive)
Monitor Well
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid,

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The Hazen Team welcomes the opportunity and is prepared to journey with the City through this maze of options. Before this journey begins, it is important that we review the overall project objectives and establish a clear road map. We anticipate the following steps to be critical for the success of the project (see graphic below).

ANTICIPATED PROJECT STEPS

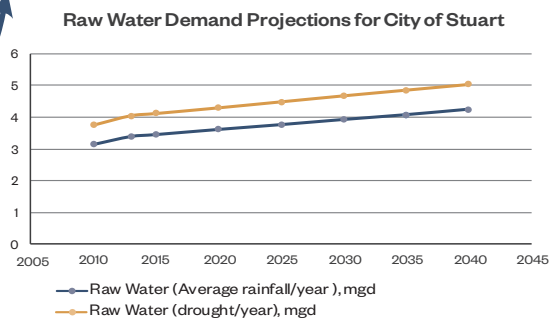
STEP 1

Current Conditions Baseline
Identify current stage of remediation programs, review groundwater monitoring results and contamination plume migration trends, review monitoring results for salt water intrusion (i.e., steady, increased over time, climate change impacts).

STEP 2

Future Drinking Water Needs
Perform an assessment of drinking water needs by reviewing historical, current, and projected water demands and determine the additional amount of source water required to meet future build-out projections.

STEP 2 - Preliminary Water Demand Projections



STEP 3

Finished Water Quality Goals
Establish the City's required finished water quality goals.

STEP 3 - Establish Finished Water Quality Goals For City

Example Finished Water Quality Goals
(to be established by City)

Parameter	Range
Calcium Hardness	40-65 mg/L as calcium carbonate
Total alkalinity	30-60 mg/L as calcium carbonate
Iron	0.02 to 0.15 mg/L
Color	0-15
ph	8 to 8.8

STEP 4

Develop Sustainable Alternative Supply Options
Once this quantity and quality is established, the City can move forward with developing potential water supplies and treatment options.

2.1.2 Develop Sustainable Alternative Water Supply Conceptual Options

The organizational chart presented under Tab 1 (page 1-12) shows the AWS options that the Hazen team preconceived as potential options for evaluation. Hazen will work closely with City staff to identify and evaluate the potential water supply alternatives.

These AWS options are the first blush of the brainstorming process for this project. Other AWS alternatives may be identified by to the team as it furthers investigates the aquifer data and the finished water goals for the City. These other options will be added to the sieve for analysis along with the previously established alternatives. The Hazen team encourages open thoughts during the brainstorming workshop—no alternative should be eliminated in the initial identification process. In addition, these options are not mutually exclusive, and the optimal solution (highest benefits and lowest risk) may be a combination of alternatives.

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GROUNDWATER-BASED OPTIONS

- Continue the use of existing surficial aquifer wells with air stripping
- New surficial wells
- New upper Floridan aquifer wells
- New deeper Floridan aquifer wells
- Dual aquifer strategy

SURFACE WATER-BASED OPTIONS

- Development and withdrawal from regional water supply (similar to C-51 reservoir project)
- Brackish water sources/desalination
- Surface water supplement

WATER REUSE OPTIONS

- Direct or indirect potable reuse/reuse aquifer replenishment
- Provide residential distribution for irrigation

POLICY OPTIONS

- Continue with well-field management, monitoring, and remediation
- Trade reclaimed water for finished water

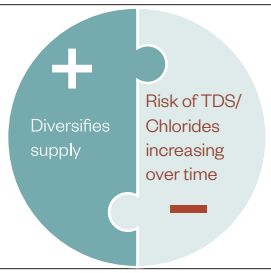
REGIONAL OPTIONS

- Bulk finished water purchase agreement with Martin County
- Bulk finished water purchase agreement with other utilities

The initial pros and cons associated with these options are identified below.

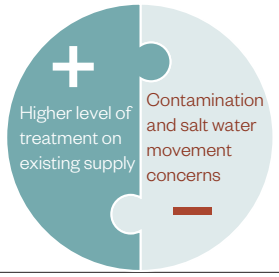
Floridan Aquifer + Reverse Osmosis Treatment

Development and construction of new upper Floridan aquifer water production wells along with a new reverse osmosis treatment facility, including 3-4 membrane skids, all supporting facilities (i.e., pre-treatment and post-treatment), and raw water infrastructure.



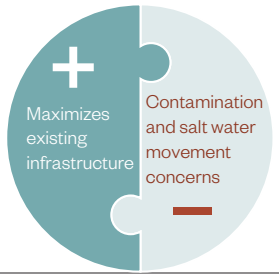
Surficial Supply + Nanofiltration Treatment

Use of existing water production wells and/or addition of new surficial aquifer wells. Construction of a new nanofiltration membrane treatment facility, including 3-4 membrane skids and all supporting facilities (i.e., pre-treatment and post-treatment). This option will include air stripping towers that can be sized for removal of volatile organic compounds, if required.



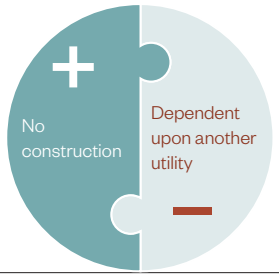
Surficial Supply + Enhanced Lime Softening + Additional Monitoring

Use of existing water production wells and existing water treatment facility. Enhanced lime softening process will require modifications to the existing treatment (addition of iron-based chemicals) and potentially a more stringent and frequent monitoring program. This option would also include air stripping as an additional safeguard.



Bulk Finished Water Purchase from Martin County

This alternative will not require the City to perform any addition of production wells or treatment processes. Currently, the City has a 20-year Service Agreement with Martin County, where the County will provide up to 1 mgd of drinking water to the City. Further evaluations are required to estimate the additional water demand required.



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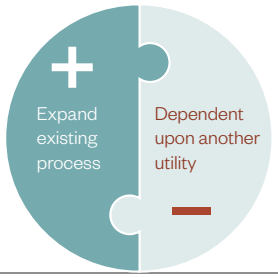
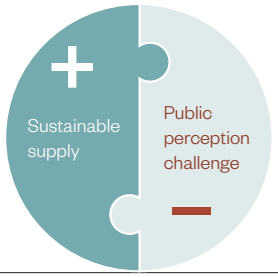
Trade Reclaimed Water Production for Finished Water

This will require an agreement with adjacent utilities to provide reuse water for irrigation in exchange of finished water. This alternative may require expansion of the City's water reclamation facility as well as the infrastructure for distribution.



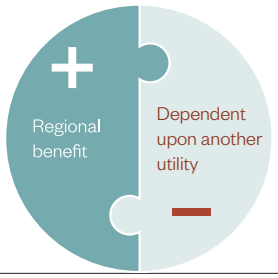
Direct Potable Reuse (DPR)

DPR consists of using reuse water treated to standards suitable as a drinking water supply without an environmental buffer. Further evaluation of the existing reclamation facility treatment processes and capacity will be required. Addressing regulatory agency permitting requirements and public perception are detrimental to this alternative.



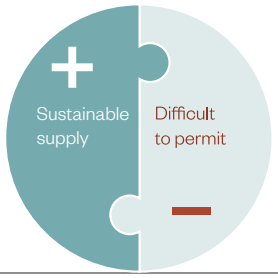
Regional Reservoir Supply

Work together with other utilities for the development of a reservoir water supply that is sustainable and affordable. Further evaluation will be required to determine required modifications to the existing treatment infrastructure, and construction of new raw water lines and pumping. This option may result in additional supply from the surficial aquifer and not from actual surface water.



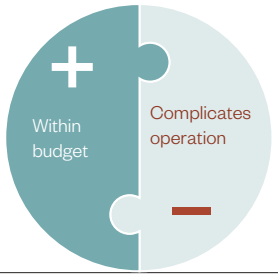
Desalination

Development and construction of new deeper Floridan aquifer water production wells along with a new desalination (reverse osmosis) treatment facility, including 3-4 membrane skids, all supporting facilities (i.e., pre-treatment and post-treatment), and raw water infrastructure.



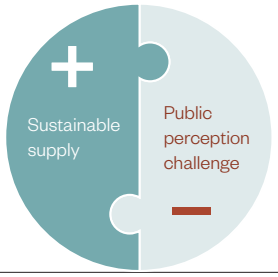
Combination of Surficial and Floridan

Use of existing surficial water production wells and lime softening treatment in combination with new upper Florida aquifer production wells and reverse osmosis treatment (including 1-2 membrane skids). Water blending ratios and monitoring will be key to maintain water quality goals.



Indirect Potable Reuse (IPR) – Aquifer recharge

Aquifer recharge, also known as IPR, is the injection of reuse water to the groundwater supply and its use as drinking water supply after it has spent sometime within an environmental buffer, in this case the aquifer.



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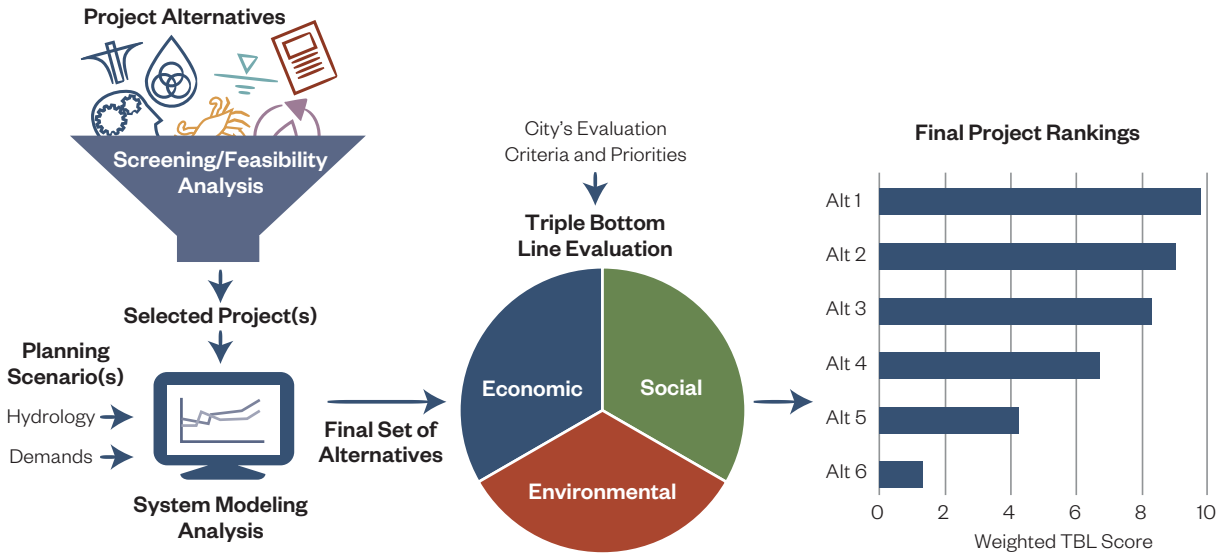
2.1.3 Perform Triple Bottom Line Evaluation

Once the alternatives are fully identified, Hazen recommends moving forward with an evaluation framework consistent with the Integrated Water Resources Management (IWRM) concept of water supply planning. This method seeks to better incorporate metrics of reliability, resilience, and sustainability as well as to balance water supply objectives with economic, social, and environmental benefits and impacts. Hazen is an industry leader in applying IWRM principles for water supply evaluation, both for utility clients (including New York City DEP; Tampa Bay Water; Raleigh, NC; and Harford County, MD) and for research institutions such as the Water Research Foundation.

Steps proposed for the evaluation of the water supply alternatives for meeting the City's long-term objectives:



1 SCREENING/FEASIBILITY ANALYSIS

Initial screening of project alternatives (as identified under 2.1.2) will focus on removing alternatives from further consideration that have conceptual weaknesses, such as **risk to public health and safety**, unproven performance or reliability, high cost, or insurmountable constructability or regulatory issues.

2 SYSTEM MODELING REVIEW

Surviving projects will be evaluated using existing aquifer models. Projects will be evaluated both as stand-alone options as well as **in combination with other projects.** Performance thresholds, determined in consultation with City staff, will be used to identify alternatives (individual or combined projects) that meet the City's water quality and supply objectives.

3 TRIPLE BOTTOM LINE (TBL) EVALUATION

A detailed evaluation will be performed for alternatives that meet water quality and supply objectives. This evaluation will include project costs and benefits using the Triple Bottom Line (TBL) framework, as described herein.

4 FINAL PROJECT RANKINGS

The output of the TBL evaluation will be a set of project rankings based on costs and benefits associated with the economic, environmental, and social benefits and impacts.

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Triple Bottom Line (TBL) Framework

Hazen will conduct a TBL evaluation for the final set of project alternatives. Our approach focuses on the economic, environmental, and social impacts (i.e., costs and benefits) directly applicable to the project alternatives of highest priority to the key stakeholders of the City.

A key challenge to comparing project impacts is that TBL criteria are typically measured using metrics that differ for each of the three categories of impacts. For example, economic criteria are usually measured in dollars, while environmental criteria are typically based on pollutant concentrations and discharge rates, and social criteria are often purely qualitative. For this reason, TBL evaluations using a standard cost-benefit analysis approach are rendered difficult, since many of the project impacts cannot be accurately or consistently converted into a single metric.

Various methods have been used to address these issues by normalizing and weighting the different evaluation criteria so that they can be compared on a similar (i.e., "apples to apples") basis. Alternatively, raw scores for both data-driven and subjectively developed criteria can be converted to ordinal rankings, with the final ranking of the projects based on a weighted cumulative or average score for all criteria.

Hazen proposes using the latter method as it involves fewer assumptions and is more transparent than the scaling method. Although, projects will be defined only at the concept level, their impacts can still be sufficiently estimated to compare and rank each project for each evaluation criteria. Hazen's proposed framework will strictly conform to the REI's requirement that the study provide a detailed cost analysis that includes a life-cycle cost assessment and disaggregation of operational and maintenance costs to include energy cost, waste disposal, and other side stream costs associated with each technology evaluated.

The comprehensive, transparent TBL framework will allow the City to make a highly informed decision, considering the most pressing concerns and priorities.

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Establish Criteria for Evaluation

Following the identification step, the next step is the criteria development. The criteria will be selected based on criteria used for previous similar projects as well as on criteria specific to the City of Stuart (e.g., alternative prevents movement of the saltwater front). As Hazen has experience with utilities in similar predicaments (Hallandale Beach also is under the imminent threat of saltwater intrusion and Fort Lauderdale required air stripping for volatile organics concerns), Hazen is well prepared to establish functional criteria for the evaluation process.

Develop Project Raw Scores for each Evaluation Criterion and Score Projects with Respect to each Criterion

Hazen will calculate the conceptual net present worth for each of the alternatives as well as energy costs and sidestream costs. These costs will be based on industry standards dollars per mgd of raw water and dollars per 1,000 gallons of water pumped/treated at this conceptual level of evaluation (see 2.1.6 for planning level cost development). For environmental criteria, Hazen will estimate greenhouse gas emissions. For social criteria, Hazen will estimate incremental impacts to ratepayer affordability based on treatment cost per thousand gallons, current rates, and household income levels. For subjective evaluation criteria, we will rely on best professional judgment, where no data are available, and a combination of data and best professional judgement when data or estimates are limited.

Weight Criteria for Evaluation

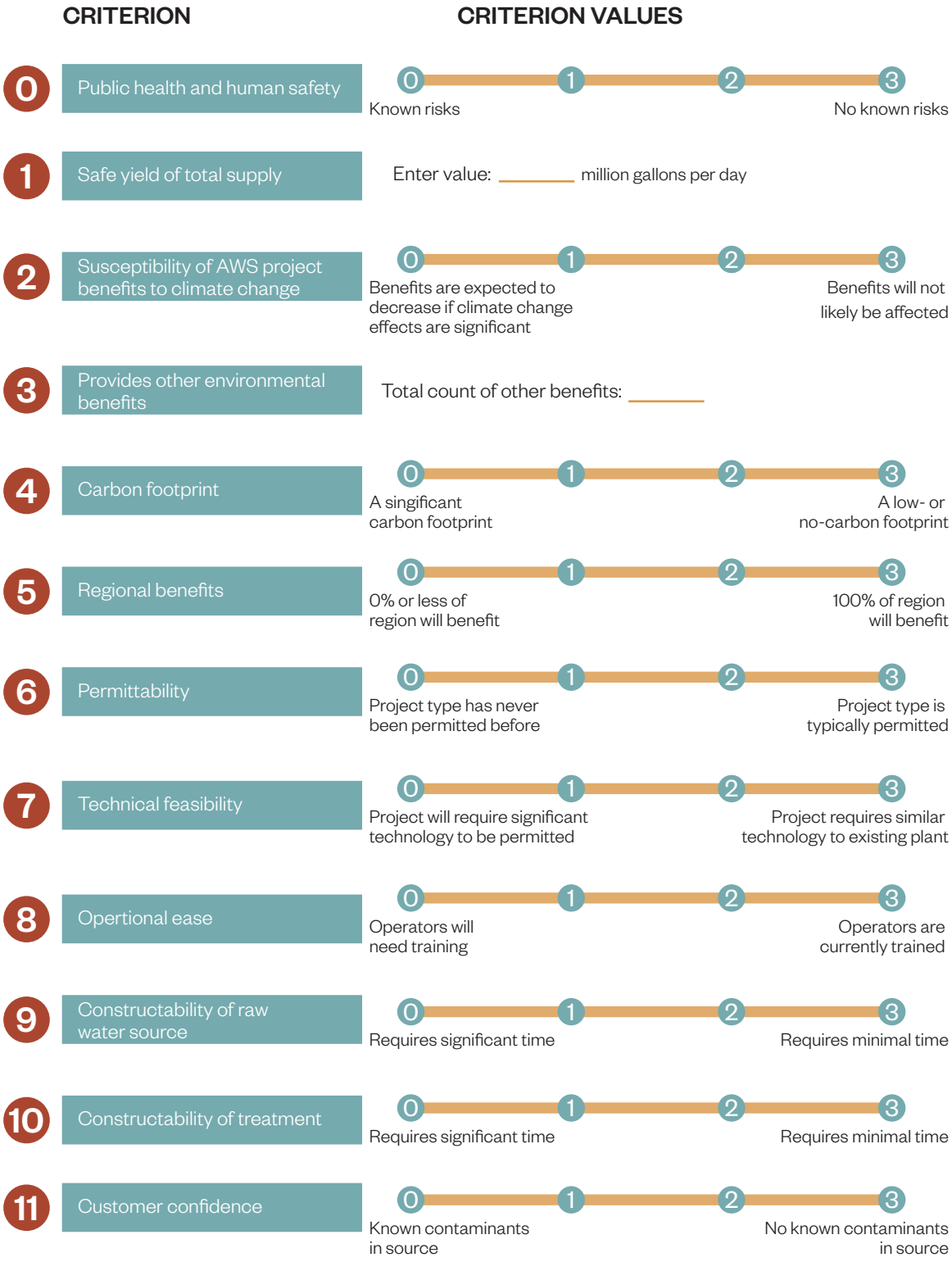
The ranking of alternatives must consider the relative importance factors of each criterion. The importance factors are determined by development of weights for each criterion. These weights may indicate, for example, that the City of Stuart values the safety of the finished water more than the cost of the raw water supply.

Steps for developing evaluation criteria for selected alternatives

Rank Alternative Water Supply Options

Following the selection of criteria and the weighting of criteria, the identified alternatives will be scored by the City of Stuart and Hazen team. Hazen recommends a workshop setting for this part of the drive. Often the ranking step occurs in more than one round; sometimes, the ranking reveals that the weighting of criteria needs to be revisited. In a workshop setting, the team collaborates on these revisions and re-performs the scoring of the alternatives. Once all alternatives have been sieved, the two or three alternatives with the highest scores will be considered viable alternatives to move forward in the analysis.

The figure on the next page represents a similar criteria matrix that was recently developed by Hazen for a similar utility.



Example of evaluation criteria and associated scoring which was used successfully by Hazen on previous alternative water supply projects.

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2.1.4 Develop Planning-Level Cost Estimates for Three Highest Ranked Options

Hazen typically utilizes industry standard costs per gallon for the alternative analysis in the ranking phase of the analysis. However, once the alternatives are fully vetted, then the top alternatives are analyzed in greater detail, primarily reviewing grant award potential, time frame for implementation, planning-level costs, and estimation of implementation time frame and effect on rates.

To drive this project towards the intended destination, Hazen will prepare a detailed technical memorandum, documenting the analysis steps and the detailed planning level costs and implementation requirements of the top two or three alternatives.

The figure below presents an example planning-level cost for reverse osmosis skid installation in an existing membrane facility.

HAZEN AND SAWYER

TECHNICAL MEMORANDUM APRIL 2008

Table 10
Engineer's Preliminary Opinion of Probable Project Cost – City of Hallandale Beach
6 MGD RO Addition
Ten Year Water Supply Plan

Item	Quantity	Unit	Installed Unit Cost	Total
Water Pretreatment				
Cartridge Filtration	2	each	$150,000	$300,000
Sulfuric Acid System	1	lump sum	$60,000	$60,000
Scale Inhibitor System	1	lump sum	$140,000	$140,000
Water Treatment				
RO Skids	2	each	$1,100,000	$2,200,000
RO Feed Pumps	2	each	$300,000	$600,000
Energy Recovery	2	each	$60,000	$120,000
Cleaning/Flushing System (piping)	1	lump sum	$50,000	$50,000
Postreatment/Pumping				
Sodium Hydroxide (pH adjustment)	1	lump sum	$90,000	$90,000
Sodium Hydroxide & Sodium Hypochlorite (odor control)	1	lump sum	$200,000	$200,000
Degasification System	1	lump sum	$300,000	$300,000
Odor Control System	1	lump sum	$500,000	$500,000
Recarbonation System and Hydrated Lime Systems	1	lump sum	$500,000	$500,000
Fluoride	1	lump sum	$50,000	$50,000
Transfer Pumps	2	each	$110,000	$220,000
High Service Pumps[1]	1	lump sum	$3,350,000	$3,350,000
Concentrate Disposal				
Concentrate Booster Pump	1	each	$60,000	$60,000
Injection Well[2]	1	lump sum	$7,000,000	$7,000,000
Pipelines (pipe/valves/fittings/etc)	1	lump sum		$500,000
Electrical	1	lump sum		$2,000,000
Instrumentation and Control	1	lump sum		$800,000
Building Modifications and Site Work	1	lump sum		$200,000
General Requirements	1	lump sum		$1,000,000
Construction Cost Subtotal	1	lump sum		**$20,240,000**
Estimating Contingency (estimated at 30 percent of subtotal)[4]				$3,930,000
Subtotal with contingency				$24,170,000
Testing/Design/Engineering/Oversight Services (estimated at 20 percent of subtotal with contingency)				$4,830,000
Engineer's Preliminary Opinion of Probable Project Cost (2008 Dollars)				**$29,000,000**

Notes:

[1] *High service pump costs were identified in the water/wastewater model updates report, 2007. These costs were not included in the previous conceptual cost estimate provided to the City in January 2007.*

[2] *The injection well cost is based on recent negotiated costs for a 24" diameter well.*

[3] *The electrical costs include the addition of one 2 MW emergency generator.*

[4] *The subtotal used to estimate the contingency does not include the Injection Well cost since the well drilling cost is a negotiated item based on recent well drillings.*

2.1.5 Determine Impact of Alternative Water Supplies on User Rates

Hazen and Sawyer has conducted numerous studies over the past 20 years that evaluated the impact of alternative water supply (AWS) development on water rates and household water bills in Florida. In summary, the AWS capital and finance costs, funding sources, and avoided costs, if any, are used to estimate the annual AWS revenue required from user rates. This estimated revenue requirement is divided by the total amount of water sold by the utility to obtain the additional AWS cost per unit of water sold. This per unit AWS cost is used to calculate the increase in the water bill for single-family, multi-family and commercial water accounts using the average or median water use of these customer types. An affordability analysis will be conducted to assess the ability of households to pay the higher water bills by adding this additional cost to the average or median household water bill. US EPA's two percent rule is typically applied to the ratio of the total water bill including AWS and the household income of each income quartile. The two percent rule is used by the U.S. EPA to assess affordability and means that the water bill as a percent of household income should not exceed two percent. Hazen and Sawyer has performed these evaluations for the Southwest Florida Water Management District during several economic impact evaluations associated with proposed changes to water use permitting requirements, the St. Johns River Water Management District associated with several proposed AWS projects, and Loudoun Water Virginia associated with wastewater programs and the production of saleable products from wastewater.

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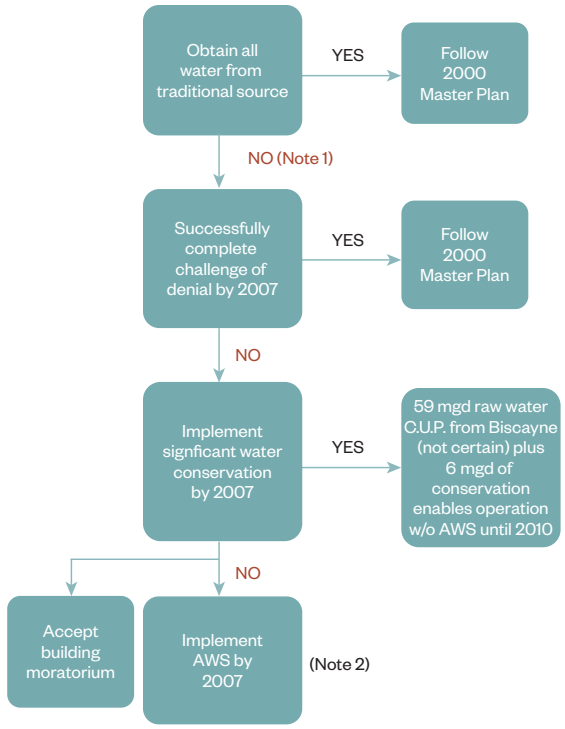
2.1.6 Prepare a Decision Pathway Guideline for Right-Timing Alternative Water Supply Investments

Once the selected AWS alternative(s) are established, the Hazen team provides an additional service for the City's long-term use as a road map—a decision pathway matrix to help the City adjust the planning and necessary funding elements if/when the criteria, constraints, and benefits of the primary AWS alternatives should change.

For example, for the City of Fort Lauderdale, the Hazen team provided a decision matrix that enabled them to delay further development of reverse osmosis once the population projections drastically declined and the existing Biscayne Aquifer was deemed to meet supply needs for ten years longer than anticipated.



NOTE 1: SFWMD denied 70-mgd request on February 27, 2004.

NOTE 2: Implementation of AWS by 2007 extremely difficult due to schedule constraints. Reuse unlikely. Seawater desalination unlikely. R.O. Floridan more likely, but difficult.

Example Fort Lauderdale AWS Decision Tree

2.1.7 Funding Options

Depending on the selected alternative(s), multiple funding options may exist. Hazen will assist the City in the evaluation of potential funding sources for the selected water supply alternative as well as preparation of application documents. The evaluation will include inventory and review of regional, state, and federal available funds/budgets to support alternative water supply projects. Some of these potential funding sources include:

SFWMD GENERAL COOPERATIVE FUNDING PROGRAM

The objective is to assist local governments, public and private water providers and other entities with construction or implementation of stormwater management, alternative water supply (AWS) and water conservation projects. AWS projects are associated with development of non-traditional water sources and/or storage to meet current and future demands for water.

FDEP DRINKING WATER STATE REVOLVING FUND PROGRAM

Provides low-interest loans to eligible entities for planning, design, and construction of public water facilities. Funds are available for pre-construction loans to rate-based public water systems.

FDEP WATER SUPPLY RESTORATION PROGRAM FOR CONTAMINATED POTABLE WATER WELLS

Provides for expeditious restoration or replacement of potable water systems where health hazards exist due to contamination caused by human activities. To qualify for funding, water sampling results must show that the contaminants in the potable water supply exceed a Maximum Contaminant Level, or Health Advisory Level, or be determined by the Florida Department of Health to be a health hazard. Approximately $4 million is spent annually to restore these sites. Restoration and replacement work has been conducted in 61 counties throughout the state.

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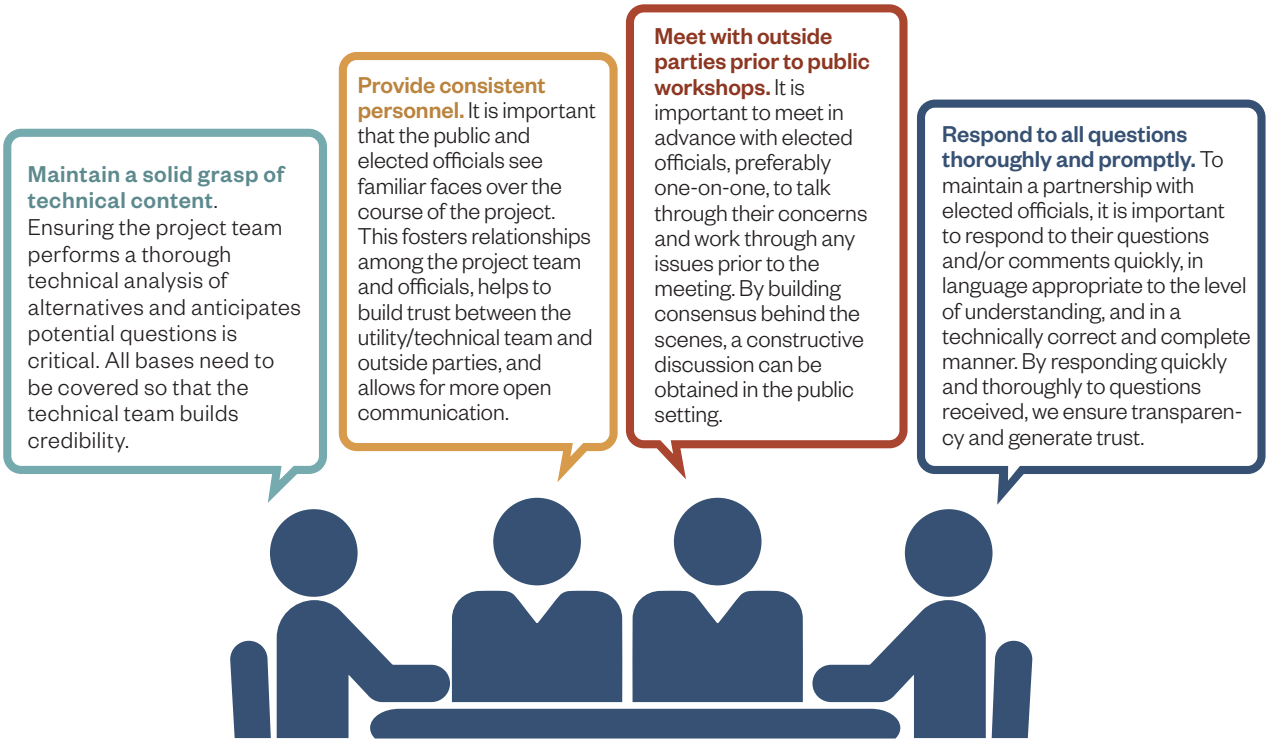
2.1.8 Reporting

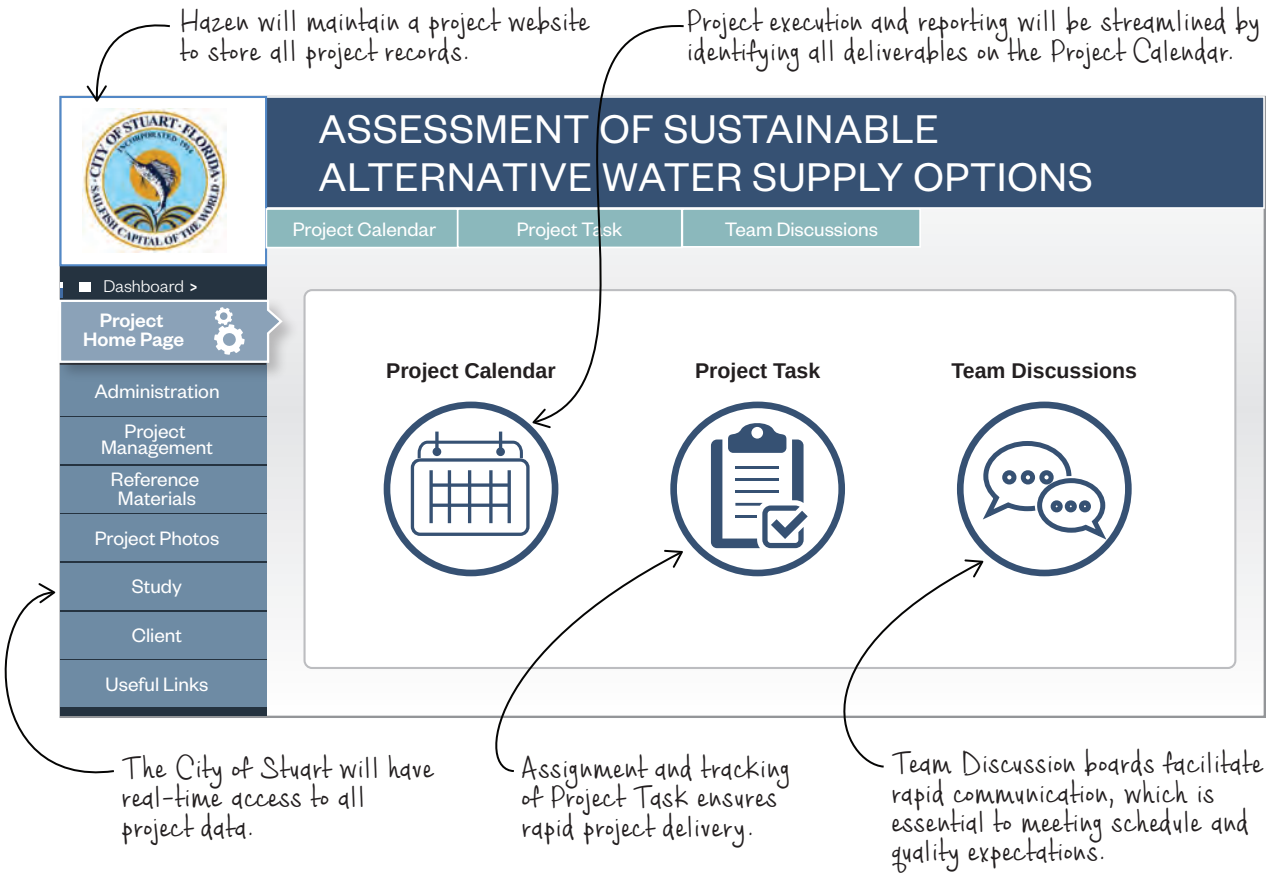
At the completion of the triple bottom line evaluation, Hazen will prepare a draft final report and deliver it to the City at a review workshop. The report will include the following key elements:

- User rate impact analysis
- Regulatory permit requirements
- Preliminary site layout
- Applicable grant applications and requirements

Key messaging statements from the report will be presented to solicit feedback from City staff. Upon receipt of review comments, Hazen will finalize the report and make presentation(s) to the City Commission.

Hazen has proven experience in providing appropriate messaging to a wide variety of audiences. We understand the importance of implementing a clearly defined public outreach strategy and establishing a consistent dialogue between stakeholders to ensure that the project is understood and accepted. Critical aspects of our messaging efforts are described in the figure below and on the next page.





2.2 Quality Control Procedures

Providing quality engineering services and products is a core element of Hazen's business practice and is inherent to our culture. At Hazen, Quality Assurance/Quality Control (QA/QC) is an integral component of our project implementation plan, and QA/QC is done continuously with a formal review at every stage. In support of this commitment and philosophy, we have developed a Company-wide Quality Assurance Policy (QAP) Manual to provide guidance to staff during execution of every project.

Hazen has earned a reputation for exceptional technical work and outstanding quality deliverables. This has been accomplished largely by our staff providing strong technical leadership, engineers at each level paying close attention to the details, and milestone QC reviews. All of these key factors are integral to the approach presented in the QAP Manual. Our firm uses a Chief Quality Officer (a senior owner of the firm), Regional Quality Coordinators (all partners in the firm), and local office liaisons to ensure adherence to QAP practices. Every project is required to have a QC Plan,

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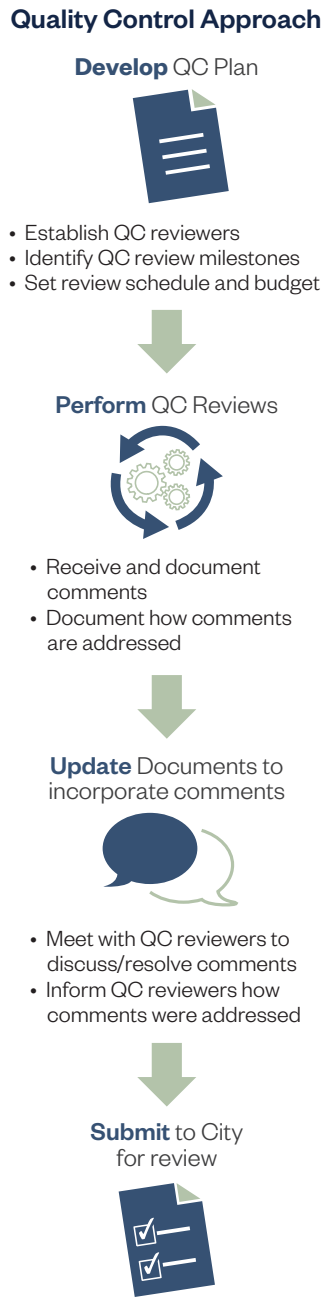


and QA/QC implementation is a daily practice that includes formal milestone reviews and quarterly auditing and reporting to the firm's President and Board. This puts the responsibility of QA/QC on Hazen's staff and not the City, ensuring the highest quality deliverables on this project. The in-house QA/QC program is designed to verify and ensure the quality, clarity, completeness, and constructability of all project deliverables.

Hazen's QA/QC policy also requires each subconsultant to conform to our quality control requirements, and we will complete reviews of the work and deliverables generated by our subconsultants as if it were our own.

2.3 Schedule Maintenance

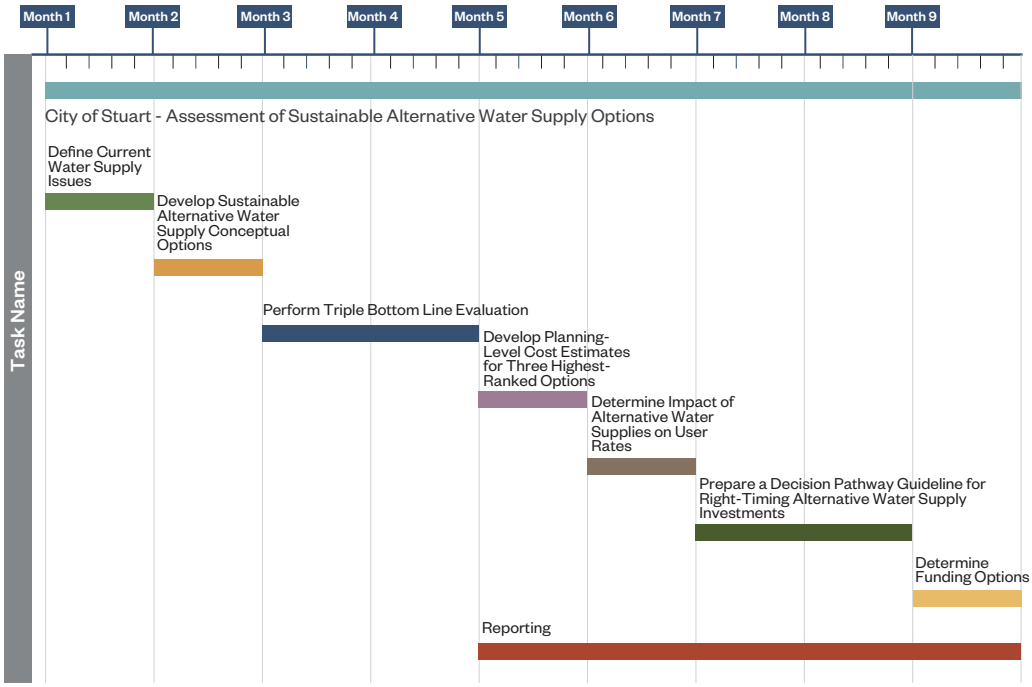
One of the cornerstones of Hazen's project approach is early planning. **George Brown, PE,** proposed Project Manager, will lead our Alternative Water Supply team, while pulling in discipline experts as-needed. Overall project oversight will be provided by Project Director, **Robert Taylor, Jr., PE.**

Our team will work with the City to understand the schedule and budget for each assignment. Prior to commencing work, we will set detailed milestones and stop gates appropriate for the scope of work and approved by the City. This will allow the City and our team to monitor the progress and budget to identify and resolve issues prior to them negatively impacting the project. We will facilitate early decision making to keep each assignment on schedule.

To ensure that schedules are met in accordance with the City's time frame, a detailed project schedule in Primavera or Microsoft Project will be developed immediately following the issuance of a notice to proceed, and will be maintained over the course of the project. The project schedule details the steps required to complete the project utilizing a critical path methodology. Using scheduling software provides a time management tool to better track progress of the project in real terms. These types of scheduling techniques are tailored to the complexity of the project and reporting preferences of our clients.

Hazen subscribes to a strong project manager approach where all lines of communication are via the Project Manager. The Project Manager is responsible for maintaining full knowledge of all aspects of the project. This approach is designed to provide one person answerable to the City at all times. If the Project Manager perceives a potential schedule issue, the Project Manager will work with the City to determine if additional time is warranted or if workload needs to increase.

Below is an example of a typical schedule for a similar AWS project.



Hazen is committed to providing the resources necessary to complete this contract in a timely fashion. Hazen takes the conservative approach of only pursuing work, which we are capable of supporting with the highest degree of success as evidenced with other local municipalities.

2.4 Project Management Systems

Hazen utilizes the firm's computerized, web-based tool (Deltek Vision) for project planning, monitoring, and reporting. By constantly monitoring progress, schedule, and budget, Mr. Brown will proactively make any necessary adjustments to keep the work moving forward effectively and efficiently.

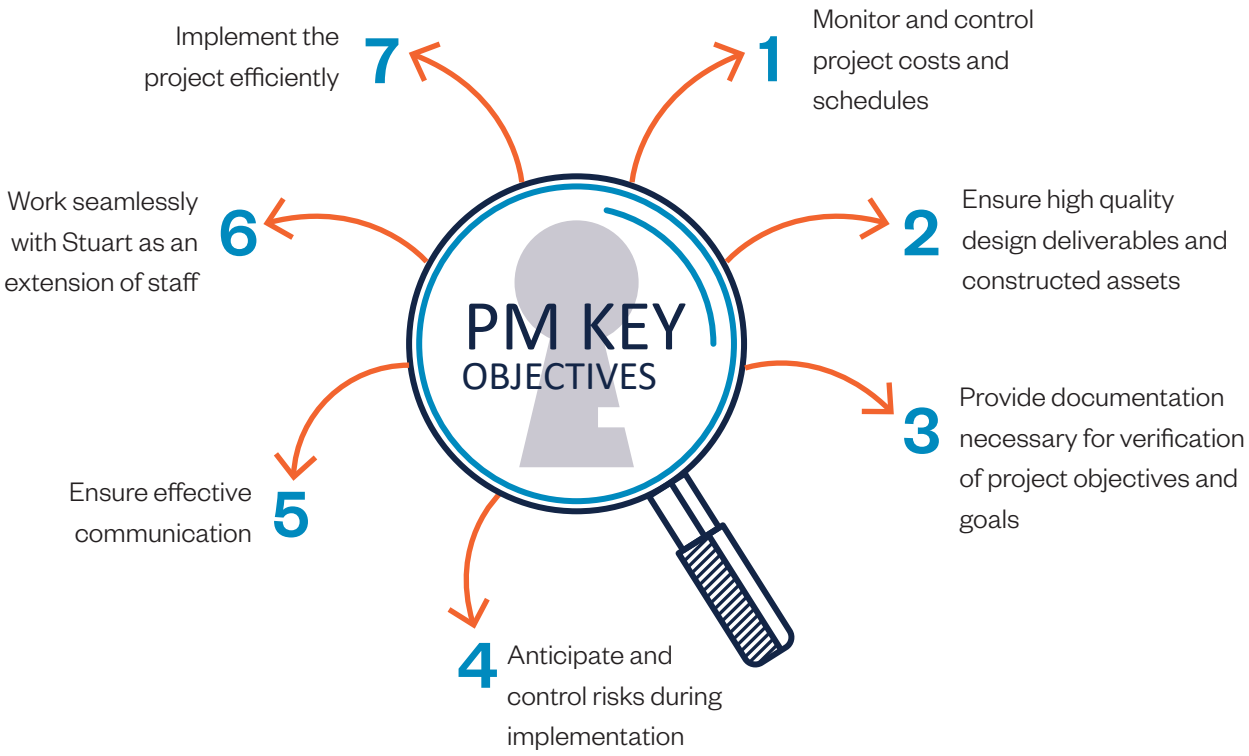
With Deltek Vision, he will also have the ability to check project costs and labor expenses on a daily basis if needed and will advise team members of the budget status to minimize the potential for any cost overruns. In addition, Mr. Brown will track progress of team members as tasks are performed to verify progress matches the budgeted hours for each task.

The key to successful projects is to develop a Project Management Plan (PMP), monitor the progress of the project in accordance with that plan, and adjust resources proactively before problems occur. The PMP identifies all team members and their contact information, defines each team member's responsibilities and budget assignments, includes a copy of the scope of work to define expectations, and provides a date-specific time line for milestones and deliverable deadlines.

Additionally, key aspects of our project management approach is the incorporation of specific controls and best practices to track and help prevent project issues, which include:

- **Conduct scoping meetings.** The Hazen team will work closely with the City to develop a concise scope of work to ensure that there's a clear understanding of the City's expectations. Deliverables and specific milestones will be identified to easily track progress and changes.
- **Perform early and regular QA/QC reviews.** Our Team will perform regular QA/QC reviews to in-

Our project management approach is based on our experience with similar management, design, and implementation assignments and focuses on several key objectives:



corporate any lessons learned from previous projects. These regular reviews include value engineering, which will save project costs by incorporating the most cost-effective design elements or concepts and avoiding costly changes late in the project.

- **Meet early with the regulatory agencies.** Early and regular regulatory meetings are critical to ensure that there are no permitting surprises that may delay design or construction activities.
- **Utilize project standards and tools.** Working with existing industry and detailed Hazen standards will eliminate "re-inventing" the wheel, saving time and money.
- **Conduct regular project team meetings/client workshops.** Internal staff team meetings with subconsultants are regularly scheduled as well as regular meetings and workshops with the City's PM as required. Our PM will issue a monthly "Project Status Summary" of all ongoing work, which ensures that the City's PM is always informed of any changes.
- **Use web-based document management system.** Hazen will maintain a web-based electronic document management systems accessible to the entire project team. This facilitates document access and storage which maximizes the team's efficiency.

Hazen also uses common available progress reporting/scheduling systems utilizing the critical path methodology to ensure up-to-date schedule techniques. The schedule details every element of the project, determines relationships between the various elements and their optimum sequence, and identifies and resolves coordination and acquisition problems before labor, materials, and facilities are committed. This unified project schedule and resource analysis is effectively maintained to ensure the projects progress on schedule and with minimal conflict.

2.5 Communications Procedures

The Hazen team's approach to effective communication begins with our Project Manager, Mr. Brown. He has fostered open and straightforward lines of communication on all of the projects he has been involved in. He will maintain full knowledge of all aspects of the project.

We believe Hazen's working relationship with the City has been an excellent one, based on mutual respect, honesty, and a commitment to service. We will continue to maintain the high level of this relationship, which we believe allows the City and the Hazen team to deal with challenges in the most efficient manner.

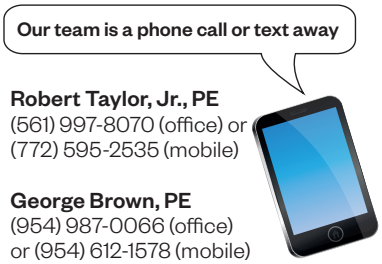
Effective communication is the hallmark of successful projects

Effective communication and interaction is key to successful team coordination. We understand that lasting team relationships are built on trust and the free flow of information through communications. Coordination and interaction with City staff during execution of this contract will include weekly or as-needed task meetings to review project status, one-on-one meetings, conference calls, online meetings, or emails.

Our team's service-oriented responsiveness is a key to success in meeting the City's needs:

- Our Project Director, Robert Taylor, Jr., has lived in the Stuart/Jupiter area for over five decades, and is available to meet with City staff at their convenience on almost all occasions.
- Our Project Manager and Deputy Project Manager, George Brown and Monica Pazahanick, respectively, will be available to meet with the City as needed.
- Our key team members are available via phone (office/mobile), text, and email on a daily basis.

We believe this type of service-oriented responsiveness is a key to success in meeting the City's needs.



Robert Taylor, Jr., PE
(561) 997-8070 (office) or
(772) 595-2535 (mobile)

George Brown, PE
(954) 987-0066 (office)
or (954) 612-1578 (mobile)

Monica Pazahanick, PE
(561) 997-8070 (office) or
(479) 871-2075 (mobile)

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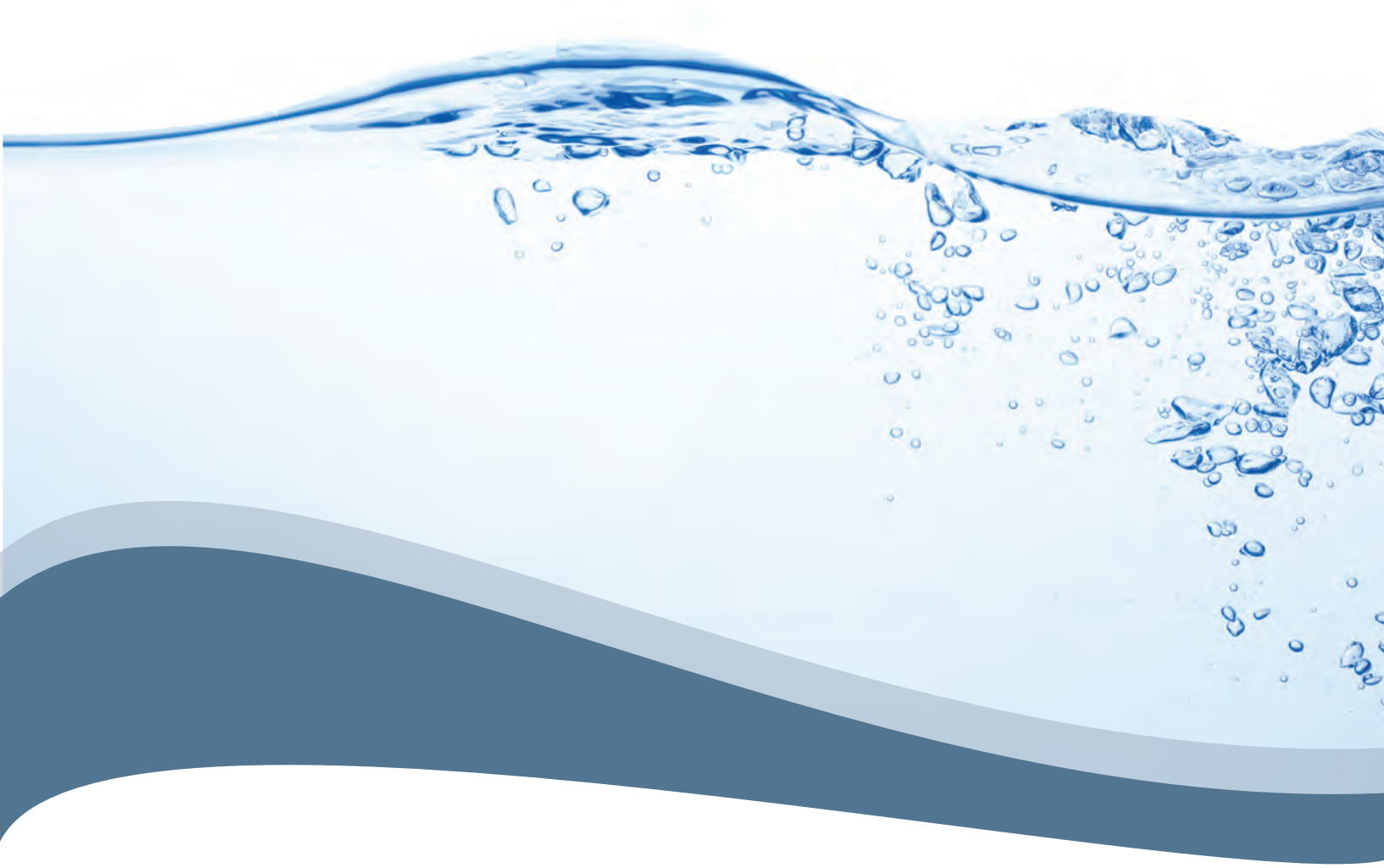


3 References/Past Performance

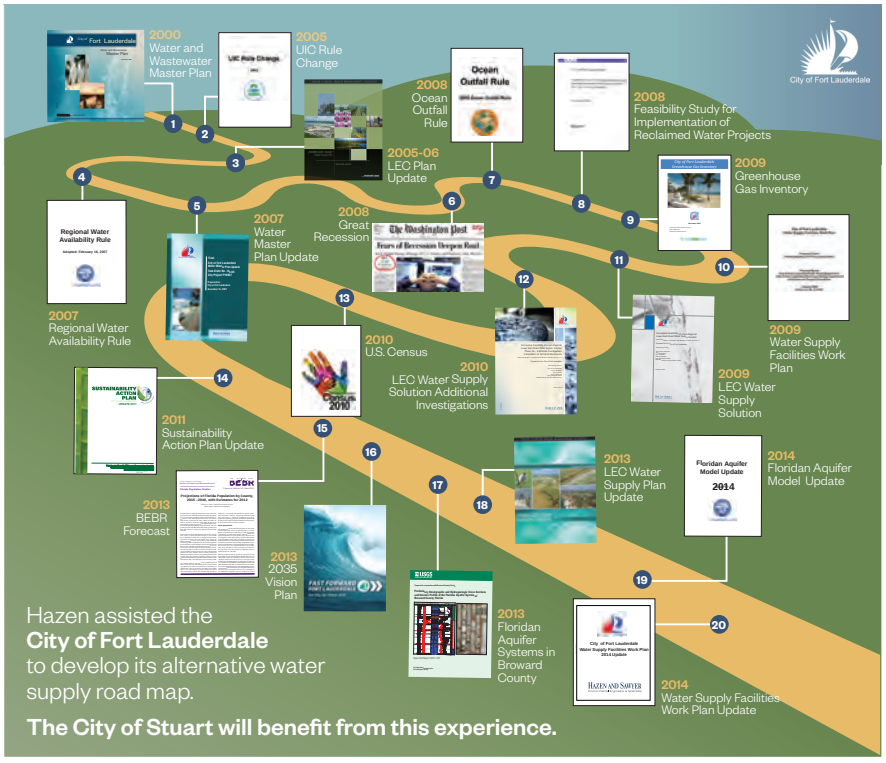
Section No. 3

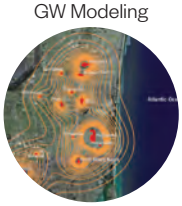
References/Past Performance

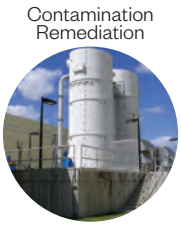
The Hazen team has extensive local experience working with and leading water supply planning efforts for various clients including the Cities of Fort Lauderdale, Hallandale Beach, North Miami, Naples, and Plantation.

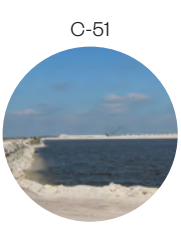
The Hazen team has extensive experience working with and leading water supply planning efforts for many South Florida clients including the Cities of Fort Lauderdale, Hallandale Beach, North Miami, Naples, and Plantation. We work with our clients to provide right-timed alternative water supply investments based on their needs and external influences (i.e., regulatory requirements, funding availability)

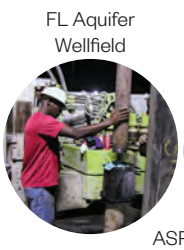
For example, since the 2000s, Hazen has assisted the City of Fort Lauderdale develop its alternative water supply road map. We prepared planning documents that provided the City with a road map to implement a Floridan Aquifer wellfield and add reverse osmosis treatment to the Peele-Dixie Water Treatment Plant in advance of a potential supply shortfall. Hazen also designed and provided services for construction of the two full-size Floridan Aquifer test wells such that data could be collected to serve as the design basis for the reverse osmosis design in the future.











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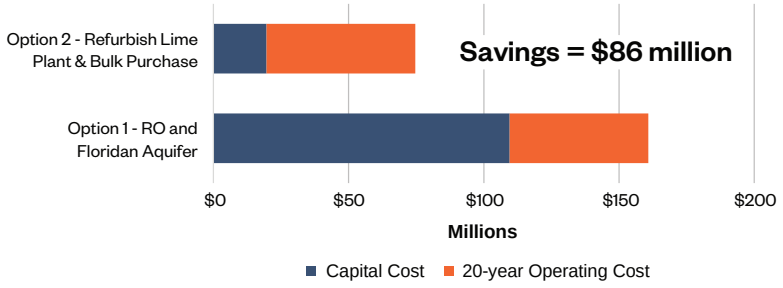
Additionally, we have worked with the City of Hallandale Beach with its Alternative Water Supply planning and design efforts since the 1980s to address source water alternatives and assist the City with determining the best next step in water supply and treatment. At the forefront of our mind is to "always look for a better way." For the City of Hallandale Beach, as well as our other clients, we have instituted a philosophy that mandates continuous questioning of our approach to ensure that the best alternatives are presented and justified—in essence, making investment decisions that maximize use of existing infrastructure and expending funds on capital improvements at the right time. We will do the same for the City of Stuart.



Hazen was instrumental in helping the City of North Miami realize an $86 million savings over 20 years by refurbishing its existing lime plant and continuing to purchase bulk finished water for meeting demand instead of investing in new reverse osmosis/Floridan Aquifer facilities as previously recommended in the City's 2007 Feasibility Study.

We also have recent water reuse experience that will provide cutting-edge perspectives on process selection and evaluation. Our in-depth experience in the evaluation of various water reuse options includes direct/indirect potable reuse considerations. For the City of Hollywood Indirect Potable Reuse Pilot Test project, Hazen investigated options for reuse in response to Open Ocean Outfall legislation and recommended aquifer recharge as the most cost-effective alternative to satisfy the regulation. Given the high dissolved chloride and solids present in the aquifer, Hazen developed a treatment approach that minimized the treatment requirements that are typically used in indirect aquifer recharge projects. This approach greatly reduced planned capital and operating costs. The pilot test program demonstrated that the water quality would consistently meet drinking water standards at a lower cost than other technologies.


Water Sources

Direct Potable Reuse: Widespread Implementation Requires Ready Operators

Research has been conducted on how to effectively control microbial hazards for an increasing number of water reuse projects in the United States and around the world. Operators play a vital role in today's ever-evolving water reuse management frameworks. BY TROY WALKER AND BEN STANFORD

Advanced Oxidation Process, Unique Hydrogeology Allow for Innovative Reuse Strategy

BENJAMIN D. STANFORD AND ABIGAIL ANTOLOVICH

FWRJ

Alternative Technologies for Indirect Potable Reuse in Southeast Florida

J. Philip Cooke, Benjamin J. Stanford, Enrique Vadiveloo, and Tara VanEyk

Our team is the right team to develop **right-timed solutions** for the City of Stuart. The City maintains a high level of service to the residents and requires that high quality water service be maintained without incidence.

The funding requirements for the alternative water supply option(s) must be established early in the project, minimizing the impact to residents throughout implementation. The Hazen team has performed these services effectively for prior utilities.

The Hazen team is aware that the selected alternative water supply option(s) must be **sustainable,** able to withstand our changing environment and regulatory framework. Furthermore, alternative water supply solutions must be flexible, built improvements that offer value for a wide array of plausible future conditions. Solutions must be pragmatic, but should embrace both conventional and innovative treatment approaches. The Hazen team is resourceful and has demonstrated successful performance in planning alternative water supply options for future changing conditions (refer to Fort Lauderdale Floridan Aquifer Alternative Water Supply Planning project sheet).

Hazen has developed complex and interconnected alternative water supply solutions for multiple south Florida clients. Each solution has been specifically tailored to each utility. Hazen, upholding all levels of professionalism, proposes non-design/non-construct options for utilities when such options exist and yield the lowest net present worth for the utilities (refer to North Miami bulk purchase options). Hazen invites the City of Stuart to review the following detailed project experience sheets and contact our current clients for additional input regarding our past performance.

EXPERIENCED STAFF

We are providing the most highly qualified field personnel in the industry, with past experience providing similar services on comparable projects for major South Florida municipalities.

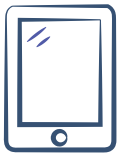
Our design team has extensive water supply planning and design experience.

PROVEN PROCEDURES

Our methodology includes determining baseline conditions, assessing future drinking water needs, establishing finished water quality goals, and developing sustainable alternative suppy options.

We have a clear communication plan for each project. Our teams understand how to move issues forward to resolution.

CUTTING-EDGE TOOLS



We are leveraging technology advancements in the field, making our work more efficient and effective.

These tools are part of our standard PM services that provide value at no additional cost to the City.

Project Experience

Per the REI, we have included the minimum five projects of a similar type that the Hazen team has completed within the last 10 years. We have also provided additional supplemental projects after our top five projects. The project experience matrix on the next page lists our top projects followed by our supplemental project experience. The table includes the project title; brief description of the project; total bid price, contract time limit, and final construction cost and time; owner reference; and date the project was completed. Project numbers 1 through 5 are the most directly relevant to the City of Stuart, followed by our supplemental project experience.

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References

The Hazen team's performance on similar alternative water supply projects, as well as experience with other municipalities and public entities, is best represented by our clients' satisfaction in our work. We encourage the City to contact our references below, as we are proud of our proven success in meeting the goals and objectives of our clients. We have also included representative client reference letters at the end of this section.

City of Hallandale Beach
Department of Public Works
630 NW 2nd Street
Hallandale Beach, FL 33009
Steven Parkinson, PE, Director
954.457.1611
sparkinson@cohb.org

City of Fort Lauderdale
6000 NW 21st Avenue, Suite 200
Fort Lauderdale, FL 33309
Julie Leonard
Transportation and Mobility Deputy Director
954.828.4955
JLeonard@fortlauderdale.gov

City of Fort Lauderdale
949 NW 38th Street
Fort Lauderdale, FL 33309
Miguel Arroyo
Water and Wastewater Treatment Manager
954.828.7806
marroyo@fortlauderdale.gov

Broward County
Environmental Planning & Community Resilence Division
115 S. Andrews Avenue, Room 329H
Fort Lauderdale, FL 33301
Jennifer Jurardo, PhD
Director of the Environmental Planning and Community Resilience Division; Chief Climate Resilence Officer
954.519.1464
jjurado@broward.org

Broward County
Water and Wastewater Services
2555 West Copans Road
Pompano Beach, FL 33069
Alan Garcia, PE, Director
954.831.0704
agarcia@broward.org

Town of Jupiter
201 Military Trail
Jupiter, FL 33458
David Brown, Director of Utilities
561.746.5134
davidb@jupiter.fl.us

City of Plantation
400 NW 73 Avenue
Plantation, FL 33317
Chuck Flynn, PE, Director of Utilities
954.797.2293
cflynn@plantation.org

Miami-Dade Water and Sewer Department
3071 SW 38th Avenue
Miami, FL 33146
James B. Ferguson, PE, Chief, Engineering and Design Division
786.268.5250
jferg@miamidade.gov

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Client/Project	Project Highlights	Alternative Water Supply Type Project	Total Bid Price, Contract Time Limit, and Final Construction Cost and Time	Project Owner Reference	Date Project Completed	Key Staff Involved
KEY PROJECTS						
City of Hallandale Beach Alternative Water Supply Planning and Design	Hazen and the City of Hallandale Beach have a shared vision of right-timed alternative water supply investments: • 1980s: Recommended bulk raw water purchase over City entry into Floridan Aquifer (saved City $$ and maximize existing infrastructure) • 2000s: Designed nanofiltration membrane plant that could be easily expanded with reverse osmosis and Floridan Aquifer. • 2010s: Designed reverse osmosis skid no. 1 and weighed AWS options.	• Floridan Aquifer + Reverse Osmosis • Bulk Finished Water Purchase • Regional Reservoir Supply • Desalination	• Total Bid Price: N/A • Final Construction Cost: N/A • Total Fee: < $25,000 (for current support activities) • Contract Time Limit: 01/2002–09/2004 (design/permitting) 03/2005–06/2008 (construction)	Steven Parkinson, PE Director City of Hallandale Beach Department of Public Works 630 NW 2nd Street Hallandale Beach, FL 33009 954.457.1611 sparkinson@cohb.org	06/2008	Patrick Davis, PE Geoffrey Hart, PE Janeen Wietgrefe, PE George Brown, PE Steve Lamb, PG Albert Muniz, PE Jorge Atoche, PE Grace Johns, PhD
City of Fort Lauderdale Floridan Aquifer Alternative Water Supply Planning	Hazen designed two full-size Florida Aquifer test wells and used the test data to model water quality and water quality changes over time. Based on the model results, conceptual plans were prepared provide the City a road map to quickly implement a Floridan Aquifer wellfield and add reverse osmosis treatment to its Dixie Water Treatment Plant in advance of forecasted Biscayne Aquifer shortfall.	• Floridan Aquifer + Reverse Osmosis	• Total Bid Price: $3.4 million • Final Construction Cost: $3 million • Total Fee: $582,155 • Contract Time Limit: 08/2007–03/2007 (design/permitting) 02/2007–08/2007 (construction)	Julie Leonard Transportation and Mobility Deputy Director City of Fort Lauderdale 6000 NW 21st Avenue Suite 200 Fort Lauderdale, Florida 33309 954.828.4955 JLeonard@fortlauderdale.gov	08/2007	Patrick Davis, PE Geoffrey Hart, PE Janeen Wietgrefe, PE George Brown, PE Steve Lamb, PG Albert Muniz, PE Jorge Atoche, PE
Conceptual Feasibility of a Lower East Coast Regional Water Supply Alternative	Hazen led an innovative multi-jurisdictional project, public-private partnership (P3) evaluation of alternative water supplies for the Lower East Coast of Florida. Evaluated financial feasibility of increasing water supplies to the southeast Florida via C-51 reservoir for wellfield recharge, aquifer recharge via reclaimed water treatment and Floridan Aquifer reverse osmosis. This project was recognized as a 2014 Grand Award Winner of Engineering Excellence.	• Regional Reservoir Supply	• Total Bid Price: N/A • Final Construction Cost: N/A • Total Fee: $445,000 • Contract Time Limit: 01/2007-01/2010 (study) N/A (design/permitting) N/A (construction)	Julie Leonard Transportation and Mobility Deputy Director City of Fort Lauderdale 6000 NW 21st Avenue Suite 200 Fort Lauderdale, Florida 33309 954.828.4955 JLeonard@fortlauderdale.gov	01/2010	Patrick Davis, PE Grace Johns, PhD George Brown, PE Steve Lamb, PG Albert Muniz, PE Jorge Atoche, PE
City of Fort Lauderdale Dixie Wellfield Contamination Assistance	Hazen assisted the City of Fort Lauderdale in its negotiations with the Environmental Protection Agency relative to volatile organic compound contamination of its Dixie Wellfield. Ultimately, Hazen and Sawyer successfully negotiated an agreement to compensate the City by $1.5 million to fund construction of air strippers at the City's planned Peele-Dixie Nanofiltration WTP to remove the volatile organic compounds.	• Surficial Supply + Nanofiltration Treatment	• Total Bid Price: Bid as part of a larger $42 million program • Final Construction Cost: $42 million • Total Fee: $4.6 million (overall fee, which also includes work at the Peele-Dixie Nano WTP) • Contract Time Limit: 01/2001–05/2004 (design/permitting) 01/2005–06/2008 (construction)	Miguel Arroyo Water and Wastewater Treatment Manager City of Fort Lauderdale 949 NW 38th Street Fort Lauderdale, FL 33309 954.828.7806 marroyo@fortlauderdale.gov	06/2008	Patrick Davis, PE Geoffrey Hart, PE George Brown, PE
City of Hollywood Indirect Potable Reuse Pilot Test	Hazen pilot tested a series of process schemes to treat wastewater effluent for recharge of the Floridan Aquifer. Testing demonstrated that biological activated filters and oxidation consistently produced water that is safely within primary and secondary drinking water standards that is suitable for recharge of brackish aquifers (TDS greater than 3,000 mg/L). This approach offers major cost savings and environmental benefits (reduced carbon emissions) relative to reverse osmosis treatment.	• Indirect Potable Reuse - Aquifer Recharge	• Total Bid Price: N/A • Final Construction Cost: N/A • Total Fee: $2.98 million • Contract Time Limit: 01/2013–03/2014 (Pilot Testing)	Steve Joseph, PE Director of Public Utilities City of Hollywood Post Office Box 229045 Hollywood, Florida 33022 954.967.4455 sjoseph@hollywoodfl.org	03/2014	Patrick Davis, PE Ben Stanford, PhD

Client/Project	Project Highlights	Alternative Water Supply Type Project	Total Bid Price, Contract Time Limit, and Final Construction Cost and Time	Project Owner Reference	Date Project Completed	Key Staff Involved
SUPPLEMENTAL PROJECTS						
Comprehensive Analysis of Alternative Water Supply Projects	Hazen is leading a Water Environment & Reuse Foundation (WE&RF) project to develop a specialized triple-bottom-line (TBL) tool along with a methodology that goes beyond conventional practices by separating the economic, social, and environmental evaluation from the multi-criteria decision analysis that often biases TBL outcomes. The independent TBL framework allows a truly comprehensive evaluation of the various water supply options.	• Floridan Aquifer + Reverse Osmosis • Surficial Supply + Nanofiltration Treatment • Surficial Supply + Enhanced Lime Softening + Additional Monitoring • Bulk Finished Water Purchase • Trade Reclaimed Water Production for Finished Water • Direct Potable Reuse • Regional Reservoir Supply • Desalination • Combination of Surficial and Floridan • Indirect Potable Reuse - Aquifer Recharge	• Total Bid Price: N/A • Final Construction Cost: N/A • Total Fee: $250,000 (Hazen fee) $457,000 (total project value) • Contract Time Limit: 04/2015–08/2017 (est.)	Justin Mattingly Research Manager Water Environment & Reuse Foundation 1199 N. Fairfax Street, Suite 410 Alexandria, VA 22314 703.548.0880 (ext. 107) jmattingly@watereuse.org	08/2017 (est.)	Ben Stanford, PhD Grace Johns, PhD
City of Fort Lauderdale AWS Grant Funding	Obtained $325,000 grant from the South Florida Water Management District for the City to design and construct two Floridan Aquifer test wells.	• Floridan Aquifer + Reverse Osmosis	• Total Bid Price: N/A • Final Construction Cost: N/A • Total Fee: $9,910 • Contract Time Limit: 07/2005–08/2005 • Construction Duration: N/A	Julie Leonard Transportation and Mobility Deputy Director City of Fort Lauderdale 6000 NW 21st Avenue Suite 200 Fort Lauderdale, Florida 33309 954.828.4955 JLeonard@fortlauderdale.gov	08/2005 (Grant Application Completion)	Patrick Davis, PE George Brown, PE Geoffrey Hart, PE Jorge Atoche, PE
City of North Miami Bulk Purchase Analysis	Recommended continuation of bulk purchase from Miami-Dade and refurbishment of 1960s era lime softening plant, resulting in $150 million savings over addition of Floridan Aquifer supply and treatment facilities recommended in the City's Winson Water Treatment Plant Feasibility Study.	• Bulk Finished Water Purchase	• Total Bid Price: N/A • Final Construction Cost: $19.7 million (estimate) • Total Fee: $2 million • Contract Time Limit: 03/2012–06/2014 (design/permitting); Construction pending	Wisler Pierre-Louis Public Works Director City of North Miami Public Works Department 776 NE 125 Street North Miami, FL 33161 305.895.9830, ext. 12247 WPierre-louis@northmiamifl.gov	06/2014	Patrick Davis, PE Jorge Atoche, PE
Town of Jupiter 14.5-mgd Nanofiltration Facility (Expandable to 17 mgd)	Hazen designed and permitted a 14.5 mgd capacity nanofiltration membrane plant (expandable to 17 mgd) for the Town of Jupiter. Startup was completed in October 2010.	• Combination of Surficial and Floridan	• Total Bid Price: $37 million • Final Construction Cost: $37 million • Total Fee: $2 million • Contract Time Limit: 01/2005–01/2007 (design/permitting) • 03/2007–10/2010 (construction)	David L. Brown Utilities Director Town of Jupiter 210 Military Trail Jupiter, Florida 33458 561.746.5134 davidb@jupiter.fl.us	10/2010	Robert Taylor, Jr., PE Janeen Wietgrefe, PE Geoffrey Hart, PE Jorge Atoche, PE

Client/Project	Project Highlights	Alternative Water Supply Type Project	Total Bid Price, Contract Time Limit, and Final Construction Cost and Time	Project Owner Reference	Date Project Completed	Key Staff Involved
Seminole Tribe of Florida Brighton Water Treatment Plant Reverse Osmosis	Pilot testing and design to switch existing 1.6-mgd reverse osmosis WTP from surfical supply to newly constructed Floridan Aquifer Wells.	• Floridan Aquifer + Reverse Osmosis	• Total Bid Price: $3.3 million (est.) • Final Construction Cost: $3.3 million (est.) • Total Fee: $691,600 $249,800 (pilot testing and Report) $441,800 (design fee) • Contract Time Limit: 06/2015–Ongoing (design/permitting) 06/2015–04/2016 (pilot testing and report)	Cynthia Fuentes, PE Seminole Tribe of Florida Public Works Department 3107 N State Road 7 Hollywood, FL 33021 954.894.1060 x10933	04/2016 (Pilot Testing Phase) Design phase is ongoing	Andre Dieffenthaller, PE Geoffrey Hart, PE
City of Naples Reclaimed Water/Surface Water Aquifer Storage and Recovery (ASR)	The City of Naples selected Hazen to investigate alternative water supply options to minimize potable water consumption. Based on the investigation, Hazen recommended maximizing use of reclaimed water by storage in an aquifer storage and recovery (ASR) well to meet irrigation demands. One 24-inch diameter ASR test well was permitted, constructed and tested. By providing reclaimed water to meet irrigation demands, the City can extend the useful life of its potable water system and defer capital expenditures.	• Trade Reclaimed Water Production for Finished Water	• Total Bid Price: $783,783 • Final Construction Cost: $824,902 • Total Fee: $249,586 • Contract Time Limit: 04/2009–07/2010 (design/permitting) 07/2009–04/2010 (construction)	Robert Middleton, PE Utilities Director City of Naples 380 Riverside Circle Naples, Florida 34102 239.213.4714 bmiddleton@naplesgov.com	02/2011	Albert Muniz, PE
City of Naples ASR Implementation, Phase 2	The City of Naples selected Hazen to design, permit, and oversee the construction and testing of a second ASR well for storage of reclaimed and surface water. The stored water provided an alternative source for irrigation and offset potable water demands. This project was the first to investigate the potential of a sailine storage horizon for reclaimed and surface water.	• Trade Reclaimed Water Production for Finished Water	• Total Bid Price: $1.53 million • Final Construction Cost: $1.52 million • Total Fee: $364,320 • Contract Time Limit: 03/2010–03/2011 (design/permitting) 05/2010–01/2011 (construction)	Robert Middleton, PE Utilities Director City of Naples 380 Riverside Circle Naples, Florida 34102 239.213.4714 bmiddleton@naplesgov.com	02/2011	Albert Muniz, PE
City of Plantation Advanced Wastewater Treatment Pilot Project	Hazen pilot-tested highest level of treatment technology in the United States to elevate Biscayne Aquifer recharge with highly treated reclaimed water.	• Indirect Potable Reuse - Aquifer Recharge	• Total Bid Price: $310,000 (pilot plant) • Final Construction Cost: $310,000 • Total Fee: $260,000 • Contract Time Limit: 10/2006–03/2008 (design/permitting) 10/2006-03/2007 (construction)	Chuck Flynn, PE Director of Utilities City of Plantation 400 NW 73 Avenue Plantation, Florida 33317 954.797.2293 cflynn@plantation.org	03/2008	Patrick Davis, PE Janeen Wietgrefe, PE

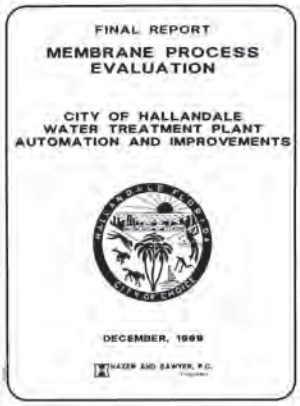
Alternative Water Supply Planning and Design

Hallandale Beach, Florida

The City of Hallandale Beach selected Hazen on multiple occasions since the 1980s to specifically address source water alternatives and assist the City with determining the best next step in water supply and treatment.

1980s

As early as 1989, the City retained Hazen to review Floridan Aquifer alternatives in comparison to the proposed regional solution to determine the most viable, economic, long-term sustainable alternative to supplement the City's well supply. At that time, the City treated withdrawals from the City's pristine Biscayne Aquifer supply wells. Due to pressure from the South Florida Water Management District because of concerns regarding saltwater intrusion into the City wells, the City was required to search for alternative water supplies. The proposed solution was a regional Biscayne Aquifer wellfield that was significantly higher in color and iron than the City supply. As such, the regional wellfield required membrane softening to meet the City's established finished water quality goals. Since one of the


FINAL REPORT

MEMBRANE PROCESS EVALUATION

CITY OF HALLANDALE WATER TREATMENT PLANT AUTOMATION AND IMPROVEMENTS

DECEMBER, 1999

HAZEN AND SAWYER, P.C.

Project Highlights

- Hazen has worked with the City of Hallandale Beach on its alternative water supply planning since the 1980s and has designed its water projects through today.
- The City of Hallandale Beach and Hazen share a common philosophy of making investment decisions that maximize use of existing infrastructure and expending funds on capital improvements at the right time.

Project Details

Total Bid Price: N/A

Final Construction Cost: N/A

Total Fee: < $25,000 (for current support activities)

Contract Time Limit:
01/2002–09/2004
(design/permitting)

03/2005–06/2008
(construction)

Date Project Completed:
06/2008

Reference

Steven Parkinson, PE
Director
City of Hallandale Beach
Department of Public Works
630 NW 2nd Street
Hallandale Beach, FL 33009
954.457.1611
sparkinson@cohb.org

City's motivating factors was to be in control of its own domain and destiny, the City requested that Hazen prepare a net present worth comparison of nanofiltration of the regional supply vs. reverse osmosis of a City-owned Floridan Aquifer wellfield supply. With Floridan Aquifer data from a test well, Hazen performed the analysis and determined at the proposed capital cost and O&M cost for the regional wellfield, participation in the regional wellfield was more economically favorable and the City moved forward with participation in the Regional wellfield. Years later, the City selected Hazen to plan, design, permit, and oversee construction of the membrane softening plant to treat the Biscayne Aquifer from the regional wellfield.

2000s

Twenty years later, during construction of the membrane plant for the Regional Wellfield, the City asked Hazen to conceptualize the design/construction of the RO skids that were planned by Hazen into the membrane plant for drought proofing of the membrane facility. The City was experiencing surges in population growth and was concerned that the additional potential supply from the Floridan Aquifer may be needed to provide for the significant growth that was projected for the City. Hazen preliminarily sited wells and prepared a planning-level cost estimate for the Floridan Aquifer wells, additional reverse osmosis skids, and associated infrastructure.

AGREEMENT FOR CAPACITY ALLOCATION
IN PHASE 1 OF THE C-51 RESERVOIR
BROWARD COUNTY WATER AND WASTEWATER SERVICE

THIS AGREEMENT FOR CAPACITY ALLOCATION IN PHASE 1 OF THE C-51 RESERVOIR ("Agreement") is made and entered into by and between Palm Beach Aggregates, LLC, a Florida limited liability company ("Company"), with its principal offices at 20125 State Road 80, P.O. Box 700, Loxahatchee, Florida 33470, and Broward County Water and Wastewater Services ("Participant"), a local governmental entity organized and existing under the laws of the State of Florida, whose address is 2555 W. Copans Road, Pompano Beach, Florida 33069. Company and Participant shall collectively herein be called the "Parties" and each be individually identified herein from time to time as a "Party."

WITNESSETH:

WHEREAS, since 2006, Broward County, Palm Beach County and other lower east coast area water providers ("LEC Utilities") have been collaborating in the development of the C-51 Reservoir, to serve as a regional alternative water supply by storing excess wet-season storm water runoff for later distribution and use during the dry season; and

WHEREAS, after extensive study and public discussion, the C-51 Reservoir has been advanced as an innovative public-private partnership whereby interested LEC Utilities and Company would jointly develop the project with clearly defined roles for each party including the pro rata contribution of capital costs by participating LEC Utilities, and following construction, of pro rata contribution of operating and maintenance costs based upon their respective storage allocations and contemplated use permits; and

WHEREAS, Company will be constructing a series of interconnected reservoirs (collectively, the "C-51 Reservoir") capable of receiving and storing water from areas under the jurisdiction of the South Florida Water Management District ("SFWMD") in South Florida ("Regions"), and discharging that water back to the Regions as an alternative water supply; and

2010s

Fast forward another ten years and the City has again requested Hazen's assistance for evaluating alternatives for water supply as the City's wells are still under the threat of saltwater intrusion and the SFWMD application of the Regional Water Availability Rule has reduced the allocation to the City from the Regional Wellfield. The City now has a regional reservoir participation option, multiple finished water bulk purchase options, a salty Biscayne well option, and the Floridan Aquifer option to consider. The City has requested Hazen's preparation of projected water requirements, economic evaluation of options, participation in meetings with SFWMD and regional participants. Hazen is providing these services through the ongoing general consulting services contract.

Floridan Aquifer Alternative Water Supply Planning

Fort Lauderdale, Florida

Hazen designed and provided services for construction of two full-size Floridan Aquifer test wells. Planning documents prepared by Hazen provided the City with a road map to quickly implement this alternative water supply in advance of a supply shortfall.

The City of Fort Lauderdale's traditional water source is the Biscayne Aquifer, a shallow freshwater supply extending about 200 feet below land surface. The City is limited to withdrawing 52.55 million gallons per day from the Biscayne Aquifer on an annual average day basis. Water demand forecasts indicated that alternative water supplies would be needed to meet future customer demand.

Hazen was retained to design and construct two Floridan Aquifer test wells, collect water quality data, and utilize the data to plan expansion of the Peele-Dixie Water Treatment Plant to treat the water via reverse osmosis membranes. Key elements of the project are summarized below.

Test Well Design and Construction

Hazen provided design and permitting services during construction of the two Floridan Aquifer System (FAS) Test Wells. Key water quality data collected during construction are presented in the graphic to the right.

Project Highlights

- Design and construction of two Floridan Aquifer test wells
- Utilize the data to plan expansion of the Peele-Dixie Water Treatment Plant to treat the water via reverse osmosis membranes

Project Details

Total Bid Price: $3.4 million

Final Construction Cost: $3 million

Total Fee: $582,155

Contract Time Limit: 08/2007–05/2008 (design/permitting)

06/2006–03/2007 (design/permitting)

02/2007–08/2007 (construction)

Date Project Completed: 08/2007

Reference

Julie Leonard
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City of Fort Lauderdale
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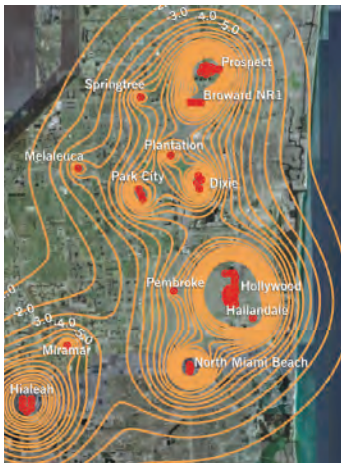
JLeonard@fortlauderdale.gov

Hazen

Floridian Aquifer Wellfield Modeling

Groundwater models of the Floridan Aquifer were completed in March 2008. The models assessed the impacts of drawdown on other users of the FAS and determined that the risk of water quality changes over time was present. These results were used to master-plan treatment facilities. FAS water quality was assumed to degraded with time.



Drawdown Contours

Planning Documents

The data collected from the test wells were used to create two planning documents:

1. Floridan Aquifer Conceptual Plan for the Dixie Wellfield
2. Reverse Osmosis Basis of Design Report

The documents present conceptual plans for the facilities needed to implement 6 mgd of reverse osmosis treatment at the Peele-Dixie WTP along with five FAS water supply wells at the Dixie Wellfield.

Dixie Wellfield Contamination Assistance

Fort Lauderdale, Florida

The City of Fort Lauderdale's Dixie Wellfield was found to be contaminated with volatile organic compounds based on a Record of Decision issued by the United States Environmental Protection Agency (EPA) in 2001 because of volatile organic compound (VOC) contaminants from a petroleum reprocessing site.

This wellfield supplies groundwater to the Peele-Dixie water treatment plant (WTP). Hazen assisted the City with this issue from 2001 through 2003. Key assistance included the following:

1. Participated in negotiations with the principal responsible parties and the EPA to be compensated for damage resulting from the contamination.
2. Provided technical support related to groundwater modelling and assessment of the movement and fate of the contaminants.
3. Conceptualized corrective action alternatives, such as relocating water supply wells and pump and treat technologies.
4. Developed feasibility-level construction cost estimates for corrective action alternatives.
5. Prepared engineering analyses of potential capital improvements to control damage to this critical water resource.

Project Highlights

- City received $1.5 million to fund construction of air strippers
- Advised the City of Fort Lauderdale during Record of Decision wellfield contamination negotiations with the EPA

Project Details

Total Bid Price: Bid as part of a larger $42 million program

Final Construction Cost: $2 million

Total Fee: $29,700

Contract Time Limit:
01/2001–05/2004
(design/permitting)

01/2005–06/2008
(construction)

Date Project Completed:
06/2008

Reference

Miguel Arroyo
Water and Wastewater Treatment Manager
City of Fort Lauderdale
949 NW 38th Street
Fort Lauderdale, FL 33309
954.828.7806
marroyo@fortlauderdale.gov

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Hazen

6. Assessed operational and maintenance issues associated with the corrective action alternatives.

Ultimately, Hazen successfully negotiated an agreement to compensate the City by $1.5 million to fund construction of air strippers at the City's planned Peele-Dixie Nanofiltration WTP to remove the VOCs. In 2003, Hazen designed the air strippers based on the VOC contaminates illustrated in the table below.

Volatile Organic Compounds (VOC) Measured at Contamination Site

VOC	Concentration (ug/L)
Benzene	2
Chlorethane	320
1,1-Dichloroethane	820
1,1-Dichloroethene	80
Cis-1,2-Dichloroethene	2,000
Trans-1,2-Dichlorethene	7.2
Toluene	14
Trichloroethene	71
1,1,1-Trichloroethane	130
Vinyl Chloride	1,500
VOC Summations	6,011

Indirect Potable Reuse Pilot Test

Hollywood, Florida

Pilot testing demonstrated that advanced oxidation provides effective treatment for recharging the aquifer with highly treated wastewater effluent at a lower cost than reverse osmosis.

In response to Florida's recently passed Open Ocean Outfall legislation, the City of Hollywood retained Hazen to investigate options for reuse required under the new law. After a review of the legislation, discussions with regulatory agencies and consideration of available options for reuse applications, aquifer recharge was identified as the most cost-effective alternative to satisfy the regulation.

Given the TDS present in the aquifer, Hazen developed a treatment approach that minimized the need for reverse osmosis treatment that is typically used in indirect aquifer recharge projects. This approach had the potential to greatly reduce capital and operating costs. The pilot test program developed was intended to demonstrate that the water quality generated by the proposed process train could produce water of a quality that was acceptable to regulators for this application.

The main water quality goals of the pilot test were to produce water that satisfied primary and secondary drinking water standards with the exception of certain constituents that were present in the Floridan Aquifer, such as chloride. Phosphate removal, which is regulated locally, was also pilot tested.

The test protocol included the following process components in two flow streams: diversion of secondary effluent from the wastewater treatment plant clarifier, deep bed media filtration, ultrafiltration, ion exchange (TOC, Ammonia, Phosphate), Ozone-AOP, UV-AOP and GAC filters operating in biological mode.

In addition to sampling for primary and secondary drinking water contaminants, the pilot program also monitored several emerging contaminants that may be regulated in the future. **The pilot test demonstrated that biological activated filters and oxidation treatment consistently produced water that is safely within primary and secondary drinking water standards at a lower cost than reverse osmosis treatment.**

Project Highlights

- Pilot tested advanced oxidation of wastewater effluent to recharge aquifer
- Demonstrated water quality would consistently meet drinking water standards at a lower cost than other technologies

Project Details

Total Bid Price: N/A

Final Construction Cost: N/A

Total Fee: $2.98 million

Contract Time Limit:
01/2013–03/2014
(Pilot Testing)

Date Project Completed:
03/2014

Reference

Steve Joseph, PE
Director of Public Utilities
City of Hollywood
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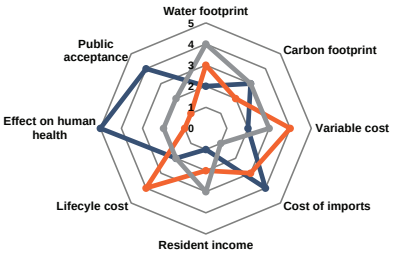
Hollywood, Florida 33022
954.967.4455
sjoseph@hollywoodfl.org

Hazen

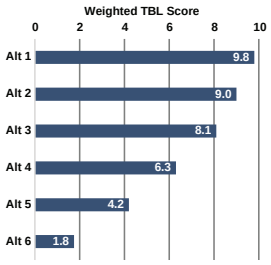
Comprehensive Analysis of Alternative Water Supply Projects

Water Environment & Reuse Foundation

Triple-Bottom-Line (TBL) Tool



Multi-criteria Analysis Visualization



Ranked Water Supply Alternatives

The Hazen team is developing a specialized triple-bottom-line (TBL) tool and a methodology that goes beyond conventional practices by separating the economic, social, and environmental evaluation from the multi-criteria decision analysis that often biases TBL outcomes.

The independent TBL framework allows a truly comprehensive evaluation of the various water supply options.

In many water-scarce areas, the imminent threat of water insufficiency has forced government officials and water utilities to consider alternatives to conventional water supplies. Indirect potable reuse (IPR) is already practiced in many areas of the country, both as part of intentional IPR projects and as part of de facto environmental processes whereby one community's effluent becomes the next community's drinking water supply. In contrast to IPR, the supply of highly treated reclaimed water directly to a drinking water treatment plant or distribution system is known internationally as direct potable reuse (DPR).

Many utilities and practitioners within the water community are recently finding an increasing number of potential benefits of DPR relative to IPR, including reduced energy requirements, reduced construction costs, reduced operational costs, and the ability to better control and maintain water quality within engineered buffer systems. Potential obstacles or

Project Highlights

- Hazen-led Water Environment & Reuse Foundation (WE&RF) research project

Web-based data visualization tool that provides a comprehensive evaluation of alternative water supply options on life-cycle costs and user-defined non-cost factors

Project Details

Total Bid Price: N/A

Final Construction Cost: N/A

Total Fee: $250,000 (Hazen fee)
$457,000 (total project value)

Contract Time Limit:
04/2015–08/2017 (est.)

Date Project Completed:
08/2017 (est.)

Reference

Justin Mattingly
Research Manager
Water Environment & Reuse Foundation
1199 N. Fairfax Street, Suite 410
Alexandria, VA 22314
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jmattingly@watereuse.org

Hazen

disadvantages for DPR, relative to IPR, are primarily related to public perception and acceptance rather than science or engineering.

Regardless of the obstacles, DPR remains one of many water supply options and needs to be considered in any serious water supply plan. For this reason, it was critical that a methodology for comparison be developed. The comparison needed to be transparent and publicly accessible to facilitate not only management-level decision making but also public engagement and education about the water supply options. This called for a comprehensive and objective evaluation methodology for comparing alternative water supply options: a triple bottom line (TBL) framework.

The Hazen team, along with research partners at the University of New South Wales in Sydney, Australia, are developing a specialized TBL tool along with a methodology that goes beyond conventional practices and engages stakeholders in the process. The TBL framework allows a truly comprehensive evaluation of the various supply options.

The analysis and calculations were carried out using the high-resolution economic, environmental and social accounting data offered by the Industrial Ecology Laboratory (IElab), an input-output lifecycle analysis database housed at UNSW. This wealth of data and water supply option comparisons formed the basis for a user-friendly Excel-based TBL tool and multi-criteria decision analysis package. These tools allow the user to seamlessly integrate a wide range of industry-specific needs in addition to broader environmental, economic and social indicators.

Conceptual Feasibility of a Lower East Coast Regional Water Supply Alternative

Fort Lauderdale, Florida

Hazen led an innovative multi-jurisdictional project, public-private partnership (P3) evaluation of alternative water supplies for the Lower East Coast of Florida.

To achieve sustainable water supplies that serve a growing population, seven water utilities in south Florida collaborated on an investigation of the potential to harvest and store stormwater currently lost to tide and use this water to recharge the surficial aquifer. This project was named the "C-51 Reservoir" Project and would be implemented as a public-private partnership. The utilities were the City of Fort Lauderdale, Palm Beach County, Broward County, City of Pompano Beach, City of Sunrise, City of Plantation, and City of Hollywood. The reservoir would be located in an area where unique geologic characteristics allow long-term water storage without significant seepage losses.

The stored water would be used to recharge the surficial aquifer to then enable water utilities to extend their existing water source, providing a cost-effective water supply to south Florida residents. Lake Worth Lagoon residents would also benefit because the reservoir would reduce environmentally harmful stormwater discharges into this estuarine ecosystem. Other project benefits include a lower carbon footprint relative to other water sources and the ability to mitigate saltwater intrusion as the sea level rises.

Project Highlights

- 2014 Winner of Engineering Excellence Grand Award from Florida Institute of Consulting Engineers
- Led to creation of the Regional C-51 Governance and Finance Work Group by participating stakeholders

Project Details

Total Bid Price: N/A

Final Construction Cost: N/A

Total Fee: $445,000

Contract Time Limit:
01/2007-01/2010 (study)

N/A (design/permitting)

N/A (construction)

Date Project Completed:
01/2010

Reference

Julie Leonard
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Mobility Deputy Director
City of Fort Lauderdale
6000 NW 21st Avenue, Suite 200
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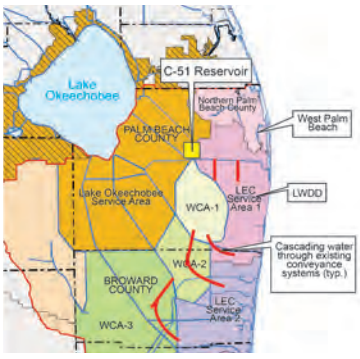
JLeonard@fortlauderdale.gov



Water from the C-51 Reservoir would be used to recharge the surficial aquifer

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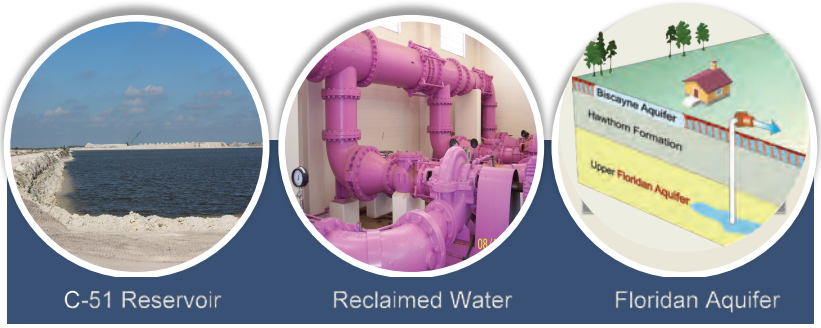
Hazen, in association with Federico, Lamb and Associates, conceptualized and evaluated this reservoir project. The team's professional engineering, hydrologic, and economic services moved this C-51 Reservoir Project forward into the design phase and resulted in the District's and local governments' approval of a Memorandum of Understanding in 2010 and the Regional C-51 Governance and Finance Work Group in 2013.

Tasks completed included projecting future water supply shortfalls to determine the demand for water from this reservoir. Additionally, hydrologic modeling and water conveyance analyses estimated the amount of groundwater that could be withdrawn by each utility as a result of C-51 Reservoir recharge. The study team developed the conceptual facilities plan and conducted a financial feasibility analysis that included comparing the C-51 Reservoir cost to the cost of increasing water supply through reclaimed water recharge and desalination of Floridan Aquifer water.



Alternative water supply costs were assessed

Hazen concluded that utilities will likely need additional water supplies in large enough quantities to successfully finance the project in partnership with the SFWMD (depending on the final cost allocation); that the reservoir can effectively store the needed water; that the SFWMD could permit this water while protecting the region's water resources; that the project can serve all utilities in the Lower East Coast and that it is likely to be more cost-effective for many utilities than other alternative sources. As a result of this work and collaboration with multiple entities, the Regional C-51 Governance and Finance Work Group was formally approved by the SFWMD and 9 local governments as they move forward with project planning. Engineering design of the project's Phase 1 has begun. This project was recognized by the Florida Institute of Consulting Engineers as a 2014 Grand Award Winner of Engineering Excellence.

Hazen's deliverables and advice met and exceeded the needs of the City of Fort Lauderdale and were completed on schedule and within budget.

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Alternative Water Supply Grant Funding

Fort Lauderdale, Florida

Friday, January 5, 2007 • SUN-SENTINEL.COM • SOUTH FLORIDA SUN-SENTINEL • 9B

Lauderdale to tap another water source

City accepts district grant to put two wells into second aquifer

FORT LAUDERDALE • The City Commission entered into an agreement Thursday with the South Florida Water Management District to help the City find alternative sources of drinking water.

Hazen successfully applied for a $325,000 grant from the South Florida Water Management District to implement alternative water supply via construction of two Floridan Aquifer test wells.

Water Shortage Predicted

Hazen was retained in 2005 by the City of Fort Lauderdale to forecast water demand through the year 2025 as part of its water master planning efforts. The raw water demand forecast prepared in 2005 predicted a Biscayne Aquifer water supply shortfall starting in 2008. Consequently, Hazen was retained to assist the City with alternative water supply planning.

Alternative Water Supply Planning

Hazen's assistance included the following:

- Assisted City staff present alternative water supply options to elected officials
- Initiated planning to assess the efficacy of utilizing the Floridan Aquifer as an alternative water supply
- Initiated planning on an innovative stormwater capture public-private-partnership that became known as the C-51 Reservoir project
- Identified potential grant opportunities

Alternative Water Supply Grant Awarded

Hazen applied for a grant under the South Florida Water Management District's Alternative Water Supply Funding Program in late 2005. The application was for construction of a Floridan Aquifer wellfield and reverse osmosis treatment facilities to be located at the Peele-Dixie Water Treatment Plant. The grant was awarded in late 2006.

Project Highlights

- Obtained $325,000 alternative water supply implementation grant from the State of Florida

Project Details

Total Bid Price: N/A

Final Construction Cost: N/A

Total Fee: $9,910

Contract Time Limit:
07/2005–08/2005

Construction Duration: N/A

Date Project Completed:
08/2005
(Grant Application Completion)

Reference

Julie Leonard
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JLeonard@fortlauderdale.gov

Water Supply Planning

City of North Miami, Florida

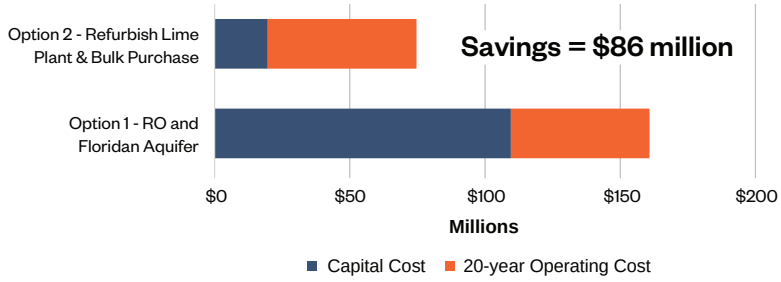
City's Feasibility Study Recommended Floridan Aquifer and Reverse Osmosis

The City of North Miami serves approximately 97,100 with a total demand of about 13.4 mgd. The Winson Water Treatment Plant (WTP), constructed in early 1960s, is a conventional lime softening treatment plant with a capacity of 9.3 mgd treating Biscayne Aquifer water. The difference between the demand and the capacity of the WTP is made up with bulk purchase via interconnects with Miami-Dade County. The City's 2007 Feasibility Study (prepared by another consultant) indicating that the existing lime softening treatment and wellfield infrastructure were at or near the end of their useful life. The Feasibility Study recommended design of a 12.5 mgd reverse osmosis treatment plant utilizing the Florida Aquifer as the water supply along with rehabilitation of the aging lime softening treatment facilities.

Recommended Bulk Water Purchase that Saved City $86 Million

In August, 2009 the City retained Hazen to design the reverse osmosis and Floridan Aquifer facilities recommended in the 2007 Feasibility Study. Given capital improvement budget limitations, Hazen had the opportunity to evaluate the proposed reverse osmosis and Floridan Aquifer improvements versus refurbishing the lime plant and continuing to purchase bulk finished water for meeting demand. The 20-year present worth of these options are presented in the figure below. The analysis indicated that refurbishing the lime plant and continued purchase of bulk finished water would result in a savings of $86 million over twenty years.

In March 2012, the City authorized Hazen to proceed with the design for the rehabilitation of the Winson WTP lime softening facilities. The design was completed in June 2014.



Project Highlights

- Recommended City abandon its plan to implement Floridan Aquifer and reverse osmosis in favor of refurbishing its lime softening plant. The City accepted this recommendation which saved the City $86 million.

Project Details

Total Bid Price: N/A

Final Construction Cost:
$19.7 million (estimate)

Total Fee: $2 million

Contract Time Limit:
03/2012–06/2014
(design/permitting)

Pending
(construction)

Date Project Completed:
06/2014

Reference

Wisler Pierre-Louis
Public Works Director
City of North Miami
Public Works Department
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WPierre-louis@northmiamifl.gov

Conceptual Plan of RO Plant

Jupiter 14.5-mgd Nanofiltration Facility (Expandable to 17 mgd)

Jupiter, Florida

Hazen provided design, permitting, and pilot testing oversight for the 14.5-mgd Nanofiltration Facility (expandable to 17 mgd).

The Town operated a water treatment plant with three independent treatment processes: lime softening, ion exchange, and reverse osmosis. The Town planned to add a nanofiltration (NF) facility to produce potable water from the surficial aquifer. The NF treatment will continue ongoing product water quality improvement and ultimately allow retirement of a portion of the lime softening treatment plant. The Town of Jupiter also requested the design to include the center port arrangement, an innovative technology not previously used in the U.S.

Predesign activities for the project included preparation of 22 separate technical memoranda and a review of the Town's pilot testing data. These documents were developed to identify design parameters for the new NF facility. The technical memoranda were developed with Town input and review concurrently with the Town's pilot testing of nanofiltration elements:

- Project Implementation Plan
- Site Development Requirements
- Stormwater Management
- Building Criteria
- Ancillary Systems
- Finished Water Quality Goals

Project Highlights

- Design and permitting of a 14-mgd capacity nanofiltration plant (expandable to 17 mgd)

Project Details

Total Bid Price: $37 million

Final Construction Cost: $37 million

Total Fee: $2 million

Contract Time Limit:
01/2005–01/2007
(design/permitting)

03/2007–10/2010 (construction)

Date Project Completed: 10/2010

Reference

David L. Brown
Utilities Director
Town of Jupiter
210 Military Trail
Jupiter, Florida 33458
561.746.5134
davidb@jupiter.fl.us

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- Product Blending Configuration
- Piping System Design Criteria
- Nanofiltration Treatment Plant Facility Control System
- Nanofiltration Pretreatment
- Membrane Array Recovery and Flux
- Raw Water and Feed Pumping Configuration
- Permeate Degasification and Odor Control
- Nanofiltrate Concentrate Treatment and Hydraulics
- Chemical Systems
- Major Process Pumps
- Electrical Distribution and Standby Power Generation
- Nanofiltration Treatment and Pretreatment Building Layouts
- Preliminary Site Plan
- Preliminary Process Flow Diagram
- Preliminary Cost Estimate
- Raw Water Main Hydraulics

The design included preparation of contract documents for construction of the new nanofiltration facility and ancillary facilities. This bid package included detailed design drawings and technical specifications which incorporated the following:

- Pretreatment facilities, including pressure media filters and booster pumps
- Raw water booster pump station and backwash waste pump station
- Cartridge filtration and membrane feed systems
- Nanofiltration skids
- Chemical storage and feed facilities
- Degasifiers and odor control system
- Clearwell and transfer pumps
- Nanofiltration building

The predesign technical memoranda were completed in January 2005. The design was completed in January 2007, with construction and start-up complete by October 2010. Total construction costs for the facility were $37 million. The center feed design has proven an annual 30% savings in electrical costs for the facility.

Brighton Water Treatment Plant Reverse Osmosis

Seminole Tribe of Florida

Hazen was selected to provide pilot testing of RO membranes for a 1.6-WTP upgrade based on a new water supply source, included evaluation of various membranes and antiscalants.

The existing facility is supplied by seven surficial aquifer wells and has a rated capacity of 1.6 million gallons per day (mgd). Water from the surficial wells is treated through degasification, membrane filtration, and reverse osmosis (RO). In its current configuration, the plant has experienced high membrane fouling events. To address these challenges, the Seminole Tribe of Florida (STOF) installed new Upper Floridian Aquifer (UFA) wells and plans to reconfigure the existing process to treat the new source water. Hazen pilot tested the new water source to determine the effectiveness of an alternate membrane. The specific objectives of the membrane pilot study included:

- Establish sustainable membrane system flux and recovery.
- Qualify the selected RO element type suitable for use at full-scale.
- Establish RO feed and suitable permeate blend ratios.
- Verify selected antiscalant performance.
- Determine permeate and blended (permeate and RO bypass) water quality.
- Determine projected finished water quality, including disinfection byproduct formation potential using Simulated Distribution System (SDS) Tests.

Project Highlights

- Pilot testing and design to switch 1.6-mgd reverse osmosis WTP from surficial supply to newly constructed Floridan Aquifer Wells

Project Details

Total Bid Price: $3.3 million (est.)

Final Construction Cost:
$3.3 million (est.)

Total Fee: $691.600

$249,800 (Pilot Testing and Report)

$441,800 (Design Fee)

Contract Time Limit:
06/2015–Ongoing
(design/permitting)

06/2015–04/2016
(pilot testing and report)

Date Project Completed:
04/2016 (Pilot Testing Phase)
Design phase is ongoing

Reference

Cynthia Fuentes, PE
Seminole Tribe of Florida
Public Works Department
3107 N State Road 7
Hollywood, FL 33021
954.894.1060 x10933

Testing was carried out in two phases. In the first phase, the pilot was operated continuously for approximately 3 months. During the second phase the pilot was operated intermittently to simulate full-scale conditions. Weekly raw, permeate, and concentrate samples were taken during both phases, and SDS testing was conducted during the first phase. Upon completion of the pilot test, autopsies were performed on the two lead membrane elements. Overall, the pilot performed well and the required data was obtained to proceed with the design modifications. This phase of work is complete.

Subsequent to the pilot testing, STOF requested that Hazen develop a conceptual design and a detailed design for the required process improvements.

Subsequent to the pilot testing, STOF requested that Hazen develop a conceptual design and a detailed design for the required process improvements, which is ongoing. To provide redundancy, the proposed design will allow either source to be operated during commissioning. Upon successful completion of commissioning, the surficial well treatment train will be decommissioned and then demolished. Demolition will occur after STOF determines that the proposed system is functional and reliable. Relevant components include the following:

- Interconnect piping from the new wells to the WTP influent
- Modifications to the RO skids as required for a functional system
- Installation of a bypass/blend line and control valve around the RO trains
- Installation of new permeate piping from the RO trains to the existing degasifiers
- A new alkalinity addition/recovery system to stabilize the finished water
- New transfer pumps to transfer water from the existing degasifier clearwell to the existing ground storage tank
- Interconnect piping between the WTP and the new concentrate disposal injection well
- New DIW well pumps or modifications to the existing concentrate disposal pumps
- Relocation or addition of chemical injection points and associated chemical piping Yard piping for required modifications
- Demolition of the microfiltration, neutralization tank, equalization tank, scour air blowers, and all associated piping, valves, chemical feed systems and injection points
- Associated electrical for above improvements
- Associated control system modifications for the above improvements
- Modifications and plan to maintain the treatment process operability during construction

Reclaimed Water/Surface Water Aquifer Storage and Recovery (ASR) Project

Naples, Florida

Faced with above-average irrigation demands, the City of Naples began an evaluation of options to reduce potable demands. The City selected Hazen to investigate concepts to minimize potable water consumption.

The City used a combination of reclaimed water and potable water to meet irrigation demands. Potable water is used to makeup shortages during periods when demands exceed supplies. On average, over 10.40 mgd is typically needed for irrigation while reclaimed water is limited to 7.32 mgd. The deficit is addressed with potable water. During wet weather conditions, the City uses surface water discharge for disposal of excess reclaimed water.

Alternative water supply options were evaluated and a feasible strategy was identified to maximize use of reclaimed water with supplemental excess surface water. The evaluation recommended maximizing the use of reclaimed water with the use of aquifer storage and recovery (ASR) to supplement on-site aboveground storage. Use of ASR would provide ample shortage at a relative low cost and would eliminate surface water discharge of a valuable resource to a sensitive ecosystem. Hazen worked cooperatively with the City and regulatory agencies to obtain permits from excess surface water sources to meet the irrigations demands.

Project Highlights

- Unique solutions to the City's high irrigation demands
- Provided additional storage to allow the use of reclaimed water that would otherwise be discharged to the Gordon River
- Provided a hybrid ASR system to utilize another unused resource
- Gathering of scientific information for future use in a hydrogeologic setting that was never before tested

Project Details

Total Bid Price: $1.53 million

Final Construction Cost: $1.52 million

Total Fee: $357,320

Contract Time Limit:
03/2010–05/2010
(design/permitting)

05/2010–01/2011
(construction)

Date Project Completed:
02/2011

Reference

Robert Middleton, PE
Utilities Director
City of Naples
380 Riverside Circle
Naples, Florida 34102
239.213.4714
bmiddleton@naplesgov.com

The Hazen team provided services ranging from studies and permitting through design and construction. The initial step in the reclaimed water/surface water ASR program was the preparation of a Water Use Permit (WUP) renewal application to secure existing supplies. This step was successfully accomplished and the South Florida Water Management District (District) renewed the City's WUP.

The second step included permitting of an ASR test well through the Florida Department of Environmental Protection (FDEP). A permit was prepared and issued to allow data collection and to confirm site specific hydrogeologic conditions. Hazen provided construction and testing oversight and prepared a well completion report to summarize findings. Testing resulted in selection of a storage horizon below the 10,000 mg/l TDS interface to facilitate permit.

One 24-inch-diameter ASR test well (i.e., ASR-1) was constructed as part of this project. The well has a total depth of 1,350 feet, with 1,080 feet of casing. Packer testing suggested that the 10,000 mg/L TDS interface occurs around 760 feet below land surface.

The solution to the City's high irrigation demands was unique in many respects. First, it provided additional storage to allow the use of reclaimed water that would otherwise be discharged to the Gordon River. Supplementing the reclaimed water was also unique and provided a hybrid ASR system to utilize another unused resource (i.e., use of excess surface water from the Golden Gate Canal which was previously discharged to tide).

A benefit of using excess available resources is the minimization of surface discharges to an environmentally sensitive area. By providing replacement water to meet irrigation demands, the City is able to significantly extend the useful life of the existing potable water system and defer capital expenditures. Another benefit is the gathering of scientific information for future use in a hydrogeologic setting that was never before tested.

Aquifer Storage and Recovery Implementation – Phase 2

Naples, Florida

The City of Naples selected Hazen to assist with the continued implementation of a reclaimed/surface water Aquifer Storage and Recovery (ASR) system in an effort to provide alternative sources of irrigation quality water to offset potable water demands.

The project consisted of design, permitting, construction, and testing of a second ASR well and two monitor wells. It also included permitting of surface water withdrawals from the Golden Gate Canal.

Challenged with addressing high irrigation demands, the City of Naples moved forward with a proactive approach to develop alternative water supplies based on results from Phase 1 of the ASR program. This project utilized an underground setting not previously contemplated for ASR in South Florida.

The Hazen team provided design, permitting, construction administration, construction oversight, and operational assistance. A surface water permit for withdrawals from the Golden Gate Canal was also included to allow the use of an otherwise lost resource. A withdrawal permit was prepared and submitted to the South Florida Water Management District (District) requesting withdrawal of 10 mgd from the Golden Gate Canal.

The second ASR well (ASR-2) is being constructed similar to the first ASR well, with casing set to 1,080 feet and a total depth of 1,350 feet. A dedicated storage zone monitor well has also been constructed to evaluate the storage horizon during testing.

Project Highlights

- Utilized an underground setting not previously contemplated for ASR in South Florida
- Project was the first to investigate the potential of a saline storage horizon to store reclaimed and surface water
- Results from testing at this site will provide invaluable data for future permitting of ASR systems below potential Underground Sources of Drinking Water
- This hybrid ASR system was the first system to test both reclaimed water and surface water, and to do so in a saline environment

Project Details

Total Bid Price: $783,783

Final Construction Cost: $824,901

Total Fee: $84,760

Contract Time Limit:
01/2009–07/2009
(design/permitting)

07/2009–04/2010
(construction)

Date Project Completed:
07/2010

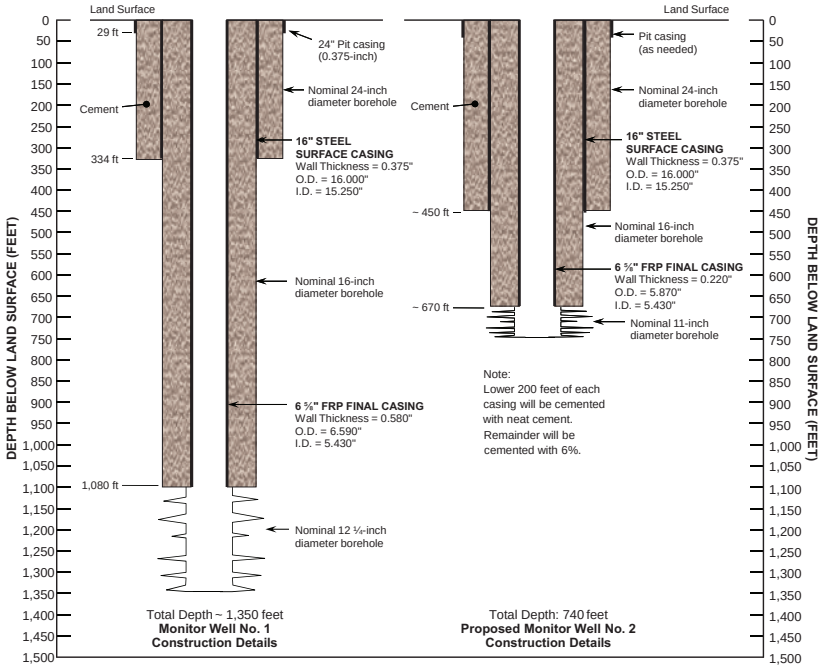
Reference

Robert Middleton, PE
Utilities Director
City of Naples
380 Riverside Circle
Naples, Florida 34102
239.213.4714
bmiddleton@naplesgov.com

The storage zone monitor well (MW-1) included conversion of an existing exploratory well. MW-1 was constructed with 6-5/8" casing set to 1,080 feet and an open hole to 1,350 feet. A second monitor well (MW-2) was constructed to monitor the first permeable zone near the 10,000 mg/L TDS interface. MW-2 was constructed with 6-5/8" FRP casing set to 670 feet and an open hole to 740 feet. Testing during Phase 2 included coring of the confining units and a series of packer tests to further refine the hydrogeologic setting.

This project is the first to investigate the potential of a saline storage horizon to store reclaimed and surface water. A deeper and more saline horizon was selected to facilitate permitting as coordinated with regulators from the Florida Department of Environmental Protection (FDEP).

Results from testing at this site will provide invaluable data for future permitting of ASR systems below potential Underground Sources of Drinking Water (i.e., waters with more than 10,000 mg/L TDS concentration). This hybrid ASR system was the first system to test both reclaimed water and surface water, and to do so in a saline environment.



Advanced Wastewater Treatment Pilot Project

Plantation, Florida

As an ongoing regional effort to identify alternative water supplies, the City of Plantation and the South Florida Water Management District (District) entered into a cooperative agreement to evaluate recharging the Biscayne Aquifer with highly treated reclaimed water through surface water discharge.

Discharging into the East Holloway Canal (EHC), which is part of the Old Plantation Water Control District, has been identified as a potential source of recharging of the Biscayne Aquifer. The work associated with this project included investigating the feasibility of such discharge under a phased approach:

Phase 1

a. Hazen performed a technical and economical desktop evaluation of potential process treatment schemes capable of meeting the required effluent water quality. The goal of this evaluation was to identify the most promising process scheme(s) for piloting.

b. A pilot plant for the selected process scheme was designed.

c. An Operation and Monitoring Plan for the pilot plant was prepared.

Project Highlights

- Pilot tested highest level of treatment technology in the United States to elevate Biscayne Aquifer recharge with highly treated reclaimed water
- All process schemes tested were successful

Project Details

Total Bid Price: $310,000 (pilot plant)

Final Construction Cost: $310,000

Total Fee: $260,000

Contract Time Limit:
10/2006–03/2008 (design/permitting)

10/2006–03/2007 (construction)

Date Project Completed:
03/2008

Reference

Chuck Flynn, PE
Director of Utilities
City of Plantation
400 NW 73 Avenue
Plantation, Florida 33317
954.797.2293
cflynn@plantation.org

Making crystal clear water from wastewater

Phase 2

a. The pilot plant was secured, installed, and operated/monitored with the goal of demonstrating the effectiveness of the process scheme with meeting the desired water quality to be discharged to the EHC.

b. A final report summarizing the operation and results of the pilot plant was prepared.

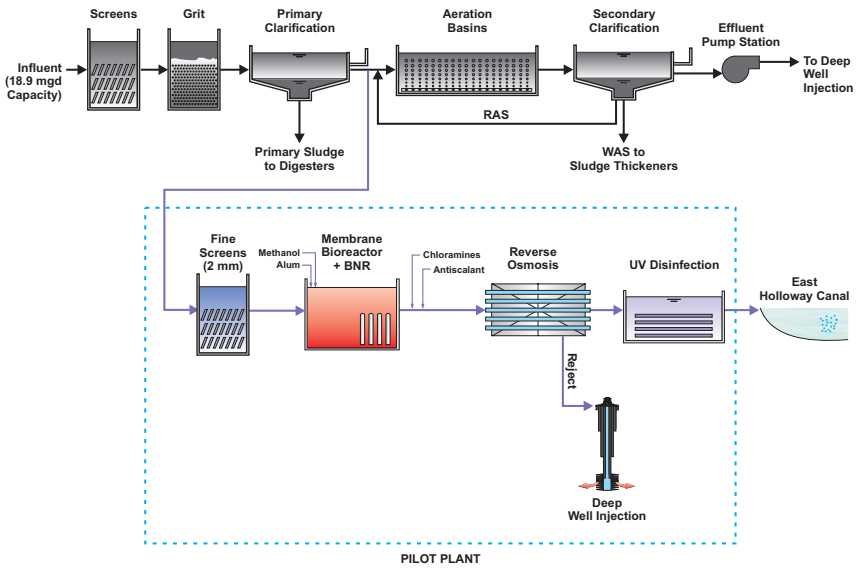
Stringent Criteria

Three process schemes were selected for piloting and must meet the anticipated effluent requirements, specifically Total Nitrogen < 1.5 mg/L and Total Phosphorous < 0.02 mg/L.

- **MBR Scheme:** Primary effluent, membrane bioreactor (MBR), reverse osmosis (RO), and ultraviolet (UV) disinfection.
- **Conventional Treatment Scheme:** Nitrified secondary effluent, denitrification filter, ultrafiltration (UF), RO, and UV disinfection.
- **RO Scheme:** Nitrified secondary effluent, UF, RO, and UV disinfection.

Status/Results

All three process schemes demonstrated the ability to meet the stringent nitrogen and phosphorous limits. This project was completed in 2008.



MBR Scheme

Consulting Services

City of Stuart, Florida

PRMG has provided utility rate, financial planning, and management consulting services to the City of Stuart on an ongoing basis since 1999.

In addition to preparing comprehensive water and wastewater rate studies in 2004, 2007 and 2012, we have assisted the City with developing impact fees for water and wastewater service, development of bulk water and wastewater rates, reclaimed water rates for both retail and bulk users, and are involved in ongoing annual water and wastewater financial compliance reviews. In addition to these rate and financial planning activities, we have assisted the City in a review of billing policies and procedures, including credit and collections activities, and establishment of financial policies regarding utility reserve fund levels. PRMG also recently assisted the City of Stuart develop an interlocal agreement to facilitate a wholesale supplemental capacity exchange with Martin County.

Water and Wastewater Rate Studies

In 2004, 2007 and 2012, PRMG assisted the City in developing comprehensive water and wastewater rate studies to address the utility system's financial needs.

The analyses included:

- Developing detailed customer and usage forecast and billing profiles;
- Identifying net revenue requirements of the System and allocation of costs among utilities;
- Developing a detailed capital improvement project funding analysis and a corresponding flow of funds evaluation;
- Evaluating compliance with rate covenants and financial targets; and
- Developing rate adjustment recommendations and assisting in drafting of revised rate resolution.

Highlights of the rate study services included:

- Establishing new rate structures significantly improving water conservation price signals and equity among customer classes;
- Designing new impact fees to recover cost of capacity from new development; and
- Preparing an annual review of the water and wastewater rate and financial forecast since 2012.

Project Highlights

- Utility Financial Planning and Rates

Project Details

Total Bid Price: $

Final Construction Cost: $

Total Fee: $

Contract Time Limit:
XX/XXXX–XX/XXXX
(design/permitting)

XX/XXXX–XX/XXXX
(construction)

Date Project Completed:
XX/XXXX

Reference

Dave Peters
Assistant Public Works Director
City of Stuart
121 SW Flagler Avenue
Stuart, FL 34994
772.288.1292 (ext. 1)
DPeters@ci.Stuart.FL.US

Review of Customer Service Policies, Billing Procedures, Credit and Collection Policies

In 2006, PRMG conducted a review of the Utility System's billing policies and procedures, including credit and collection activities, to help reduce bad debt write-offs. This review included evaluation of customer deposits, timing of billing cycles and invoicing procedures, and late payment notification and service disconnection policies.

Reclaimed Water Business Plan

PRMG recently completed a Reclaimed Water Business Plan for the City. The business plan included the development of recommended rates for both retail and bulk users, and an analysis of projected revenues and capital and operating costs to projected reclaimed program cash flows.

TOWN OF JUPITER

UTILITIES
PO BOX 8900
JUPITER FL 33468-8900
FAX (561) 747-5634

RE: Hazen and Sawyer Professional Engineering Services Performance

To whom it may concern,

This short letter is written to acknowledge the exceptional performance that has been provided to the Town and its utility systems by the professional engineering firm, Hazen and Sawyer. For nearly 20 years, through dedicated service, the firm has performed admirably on both a continuing services and special project basis providing high quality designs and professional studies in support of the capital expansion, asset renewal and replacement and general operations of both the Town's water and stormwater systems. Work efforts have focused on water treatment, water distribution, hydraulic modeling, master planning, high service/re-pump stations and storage facilities, and stormwater system upgrades (including pump stations, storm sewers, and BMP's). Hazen's assistance has also been instrumental in the Town's success in securing numerous grant opportunities to the benefit of our entire community.

In closing, I highly recommend the engagement of Hazen and Sawyer. To this date, the services provided by the firm have been remarkable and they have become an integral part of our operation's continued success.

Sincerely,

David L. Brown
Director of Utilities

THE CITY OF COOPER CITY
Someplace Special

DEPARTMENT OF UTILITIES
11791 Southwest 49th Street
Cooper City, Florida 33330
(954) 434-5519 • Fax: (954) 680-3159
Website: www.coopercityfl.org

October 3, 2014

TO WHOM IT MAY CONCERN

Hazen and Sawyer has been providing continuing professional engineering services for the City of Cooper City since 2009. I am pleased to recommend Hazen and Sawyer to anyone seeking to use the expertise of this company related to the design, permitting and services during the construction of civil, electrical, structural, mechanical (HVAC & plumbing), environmental, stormwater, potable water, wastewater, reuse water, conveyance, water treatment and water storage projects.

Hazen and Sawyer recently assisted the City of Cooper City with the design, permitting and successful construction of the Pine Island Road Water Pumping Station. The design included the following key features: 1) Three variable speed horizontal split case pumps with an estimated capacity of 2,800 gallons per minute at 160 feet total dynamic head; 2) telemetry and control system for monitoring and controlling the pump station from the water treatment plant; 3) new pump station building with architectural treatments to match the character of the neighborhood.

Additionally, Hazen and Sawyer recently completed the City's Effluent Reuse and Disposal Master Plan and has been assisting the City with the rehabilitation of several wastewater lift stations.

Hazen and Sawyer has been extremely reliable and responsive to the needs of the City. Hazen and Sawyer has performed very well and was able to keep the project on track and on budget. It should be noted that Hazen and Sawyer demonstrated an excellent working relationship with regulators, (including the Florida Department of Environmental Protection and the local health department), which enabled this project to proceed expeditiously.

We do not hesitate to recommend Hazen and Sawyer, P.C. on future similar projects. Please feel free to contact us should you have any questions.

If you have any questions or concerns, please don't hesitate to contact me.

Sincerely,

COOPER CITY UTILITIES

Michael F. Bailey, P.E.
Director of Utilities / City Engineer

CITY OF
FORT LAUDERDALE

Venice of America

October 7, 2013

Debbie Hall
Florida Institute of Consulting Engineers
125 South Gadsden Street
Tallahassee, Florida 32301-1525

2014 FICE Engineering Excellence Award Application
C-51 Reservoir P3
Category A: Studies, Research and Consulting

To achieve sustainable water supplies that serve a growing population, several water utilities in south Florida elected to collaborate on an investigation of the potential to harvest stormwater currently lost to tide. This project was named the "C-51 Reservoir" and would be implemented as a public-private partnership (P3). The utilities were the City of Fort Lauderdale as the contracting agency, Palm Beach County, Broward County, the City of Pompano Beach, the City of Sunrise, the City of Plantation and the City of Hollywood.

In 2007, this Engineer including sub-consultants began investigating the feasibility of developing the C-51 Reservoir to store water that would otherwise flow to the Lake Worth Lagoon estuarine system causing environmental degradation. The reservoir would be located in central Palm Beach County where unique geologic characteristics allow long-term surface water storage without significant seepage losses.

The stored water would be used to recharge the groundwater system traditionally used by south Florida water utilities so that additional water could be withdrawn from existing wellfields. This storage could also assist the South Florida Water Management District (District) in Everglades restoration and flood control activities. Because of the diversity of benefits from this reservoir identified by the Engineer, government agencies and water utilities have been working collaboratively to develop this reservoir in an environmentally, economically, and technically feasible manner.

This unique concept was first described by this Engineer several years prior to the start of this study. During the period 2007 through 2013, this Engineer provided valuable professional engineering; hydrologic; and economic services that has moved this C-51 Reservoir Project forward into the design phase and resulted in the District's and local governments' approval of a Memorandum of Understanding in 2010 and the Regional C-51 Governance and Finance Work Group in 2013.

This Engineer successfully evaluated the feasibility of this reservoir and clearly communicated the results to a diverse group of stakeholders. The Engineer projected future water supply shortfalls to determine the demand for water from this reservoir and performed hydrologic modeling and water conveyance analyses to estimate the amount of groundwater that could be withdrawn by each utility as a result of C-51 Reservoir recharge. The Engineer also developed a conceptual facilities plan and conducted a financial feasibility analysis that included comparing the C-51 Reservoir cost to the cost of increasing water supply through reclaimed water recharge and desalination of Floridan Aquifer water.

This study's deliverables and advice met and exceeded the needs of the City of Fort Lauderdale and were completed on schedule and within budget.

Sincerely,

Julie Leonard
Assistant Public Works Director – Sustainability

OFFICE OF SUSTAINABILITY
PUBLIC WORKS DEPARTMENT
101 NE 3 AVE - SUITE 1400
FORT LAUDERDALE, FLORIDA 33301
www.fortlauderdale.gov

ENVIRONMENTAL PROTECTION and GROWTH MANAGEMENT DEPARTMENT
NATURAL RESOURCES PLANNING & MANAGEMENT DIVISION
Mailing Address: 115 S. Andrews Avenue, Room 329H • Fort Lauderdale, Florida 33301
954-519-1270 • FAX 954-519-1496

October 3, 2013

Debbie Hall
Florida Institute of Consulting Engineers
125 South Gadsden Street
Tallahassee, Florida 32301-1525

2014 FICE Engineering Excellence Award Application
Countywide Reuse Master Plan
Category A: Studies, Research and Consulting

Dear Ms. Hall:

In 2010, the Broward County Water Resources Task Force published a report detailing prioritized goals and strategies for meeting the County's future water supply needs. This report included a recommendation for the development of a regional County-wide reuse master plan to identify reclaimed water expansion opportunities that best address the County's water resource issues and water supply needs, and as a basis for coordinated investments and funding requests. In 2012, Broward County's Environmental Protection and Growth Management Department/Natural Resources Planning and Management Division (NRPMD) solicited for consultants to prepare the reclaimed water master plan. This Engineer, including sub-consultants, was selected to perform the master planning effort and endeavored, with the County's NRPMD, to build a partnership effort with all utilities throughout the County.

The Engineer prepared the GIS files which serve as the base of analysis for this project. The Engineer recognized that the master planning effort would be substantially more useful if the document were a living, modifiable resource that could be updated based on future policy and legislation updates, water needs, and potential impacts of climate change. The Engineer transitioned the GIS database to include wastewater piping, reclaimed water piping, and the identified potential reclaimed water users and their associated potential demands. This information was incorporated into a Google Earth platform for use by the current master planning team and by each municipality over time. The Engineer included the utilities' infrastructure and the municipalities' planning efforts for public works projects, also identifying the year of implementation, in order to coordinate reclaimed water construction activities with these projects. Furthermore, the Engineer added several layers of roadway projects from the Florida Department of Transportation to identify potential cost savings opportunities through coordinated project construction. Wellfield protection zones, the saltwater intrusion line, sea level rise scenarios, and utility service areas were additional layers included in this analysis tool.

Additionally, the team developed a set of economic criteria tailored specifically to analyze the potential projects' cost impacts, public acceptance, benefits, implementation ease, and reliability. These criteria were assigned weights and scoring mechanisms that were integrated into an Excel-based evaluation model for utilities to conduct their own analyses of potential reclaimed water projects. Together with the utilities, the Engineer analyzed potential reclaimed water projects and selected the highest ranked projects for further evaluation.

During the course of this project, the Google Earth-based GIS platform and the Excel-based evaluation model identified utilities that could benefit from credit sharing of reclaimed water projects. Under credit sharing, one utility pays another utility for constructing a reclaimed water system in return for "credit" from the Florida Department of Environmental Protection for meeting the 2008 Ocean Outfall legislation requirement of 60% reuse. Utilities can use these tools to analyze future partnerships by readily identifying the location of potential large users, and estimating the transmission costs to the wastewater treatment plant producing the reclaimed water.

The Engineer has distributed these tools to the municipalities of Broward County for their future planning efforts. The tools are user friendly and easily modifiable, flexible enough to adapt to changing regulatory requirements as well as varying project drivers. This study's deliverables and advice not only met, but exceeded, the expectations of the Broward County Natural Resources Planning and Management Division and have been met with praise from our community of stakeholders, including municipal leaders and utility directors from across Broward County.

Sincerely,

Dr. Jennifer Jurado
Director of Natural Resources Planning and Management Division

MIAMIBEACH
City of Miami Beach, 1700 Convention Center Drive, Miami Beach, Florida 33139, www.miamibeachfl.gov

Jorge M. Gonzalez, City Manager
Tel: 305-673-7010, Fax: 305-673-7782

June 1, 2012

TO WHOM IT MAY CONCERN

Re: Reference for Hazen and Sawyer, P.C., Zarqa Program Management and Construction Supervision, MCA-Jordan

I am pleased to provide to MCA-Jordan an unqualified reference for Hazen and Sawyer, P.C. Hazen and Sawyer has provided program management services to the City of Miami Beach for our infrastructure improvement program between February 2001 and September 2009.

The Hazen and Sawyer managed program consisted of approximately 27 projects including three design-build projects with a total program value of $410 million. The program included the construction of new storm water conveyance, treatment and disposal facilities, underground utility construction of aging water mains and/or sanitary sewer infrastructure, and above ground improvements, such as landscaping, sidewalks, and lighting.

At the time that the City contracted for program management services with Hazen and Sawyer, the program was mostly undefined, with only general guidance to fully integrate and coordinate all of the different disciplines noted above. The highly complicated and complex task of ensuring that all improvements across disciplines were coordinated to occur in the same areas and on the same streets at the same time was amply handled by Hazen and Sawyer. It should be noted that the work was conducted in a very dense urban environment, which greatly added to the complexity of the program.

From my perspective, one of the most important elements that is necessary for a consultant to be successful is a smooth integration with the existing City staff. Hazen and Sawyer handled this transition very well and continued to be sensitive to the requirements of a municipal bureaucracy. This skill and understanding of municipal operations was of high value and has been instrumental to their success in Miami Beach. We would certainly recommend the firm to their potential clients.

We wish the very best for the Zarqa Program, a very important public health project for your citizens. You have made a sound choice to partner with Hazen and Sawyer, P.C. Please contact us if you need any further information about Hazen and Sawyer and their contribution to our City.

Sincerely,

Jorge M. Gonzalez
City Manager

JMG:pw

March 12, 2012

Mr. R.P. Paradkar
DGM (Co-ordination)
RCF Ltd.
7th Floor, Room No. 743
Priyadarshini,
Eastern Express Highway
Sion, Mumbai
India

South Collier Regional
12-mgd RO Desalination Expansion

Dear Mr. Paradkar:

Collier County has been a leader in the development of alternate water supplies through its long term commitment to the development of wastewater reclamation and alternate water supplies for drinking water. A key part of our strategy was the successful commissioning of a 20-mgd Reverse Osmosis (RO) Water Treatment Plant, for which Hazen and Sawyer provided detailed engineering design.

This US $26 million project, which involved the expansion of the RO facility from 8 to 20 mgd, was substantially complete by February of 2007. Hazen and Sawyer continued to provide operational assistance for the plant on an as-requested basis through 2009. Services performed by Hazen and Sawyer throughout the project included membrane pilot testing, preparation of pre-design technical memorandum, detailed design services, construction management services, and startup and testing support services.

Key features of the RO expansion project included six additional 2-mgd membrane treatment units, including energy recovery turbo pumps for inter-stage booster pumping; four pretreatment cartridge filters; two 5-mgd post-treatment degasifiers; two 2-stage odor control chemical; a new 32-mgd high service pumping station; and expansion of RO normal and standby power systems.

In 2009, the project won a WateReuse Award of Merit in recognition of excellent water reuse and desalination projects that have made significant contributions to water reuse.

Other work completed by Hazen and Sawyer for Collier County over the last twenty years includes several water reclamation facility expansions, water supply projects and the provision of general engineering services.

Sincerely,

COLLIER COUNTY GOVERNMENT

H P Schalt

H. Peter Schalt, PMP
Senior Project Manager
peterschalt@colliergov.net

City of Hialeah
Department of Water & Sewers

January 3, 2012

Mr. Shajan Joykutty, PE
Program Manager
Hazen and Sawyer, P.A.
4000 Hollywood Boulevard
750N, North Tower
Hollywood, Florida 33021

RE: City of Hialeah Department of Water and Sewer Letter of Reference

Dear Mr. Joykutty:

It gives me great pleasure to provide you and your firm with this letter of reference. Hazen and Sawyer, P.A. and its staff have been our general engineering consultants for well over twelve years. As our general consultant, the firm has successfully performed consulting services in a variety of projects including managing our sewer pump station upgrade program, the citywide smoke testing program, was contracted for special inspection services for the drilling of two deep injection wells for the 10 MGD Reverse Osmosis Water Plant currently under construction.

Hazen and Sawyer most recently provide construction management services and oversight for the preparation of the site for the water plant project. Shajan Joykutty is Program Manager was responsible for the oversight of these projects.

The City of Hialeah has been very pleased with the performance of the firm related to the many engineering services provided to the City of Hialeah. A testament to the City' satisfaction with the services of your firm is the fact that the firm has been retained for numerous years as our general engineering consultant. Based on our experience with the firm I would recommend your organization to anyone when it comes to engineering, environmental and construction management practices on complex projects that the end user would be satisfied with.

It is a pleasure to work with you and your staff. Thank you for your understanding of our needs on these very important projects to both our City and our Community.

Sincerely,

Armando Vidal, P.E.
Director

CC: Mayor Carlos Hernandez
William Grodnick, City Attorney

3700 W. 4TH AVENUE • HIALEAH, FLORIDA 33012-4298
TELEPHONE: (305) 556-3800

CITY OF
FORT LAUDERDALE

Venice of America

March 16, 2011

To Whom It May Concern:

I am pleased to recommend Hazen and Sawyer to anyone seeking to use the expertise of this company as it relates to the design, permitting and construction of Class I injection well systems and related specialty studies.

Hazen and Sawyer has assisted the City of Fort Lauderdale (City) with the design, permitting and successful construction of the Peele-Dixie Class I tubing and packer injection well system. The injection well system consist of one 16-inch diameter FRP tubing and packer (with cemented annulus) injection well and one 6-inch dual-zone monitor well. Hazen and Sawyer successfully completed the design, permitting and construction of the injection well system on budget and on schedule. The initial construction and testing included a mechanical integrity test (MIT) which was successfully completed in 2005. Hazen and Sawyer also prepared an operating permit, including an O&M Manual, as part of the permit application package. The operating permit is anticipated to be issued in April 2011.

A unique feature of the injection well system was the cemented annulus. This design consisted of a cement filled annulus which eliminated continuous monitoring of the annulus thus reducing operating costs. The Florida Department of Environmental Protection (FDEP) requires that wells with a cemented annulus perform an interim MIT which consist of a casing pressure test. Hazen and Sawyer assisted the City in successfully permitting and completing this task in 2009. A full-scale MIT was subsequently completed in November 2010 as part of the typical 5-year MIT.

During construction and testing of the injection well, an opportunity existed to conduct additional testing of the upper Floridan Aquifer System (FAS). Since little data is known about the upper FAS, the opportunity to evaluate the water supply potential of the upper FAS appeared prudent since equipment needed for testing was readily available. The City agreed and the FDEP was consulted and permission was granted to collect aquifer data. Testing was performed and water quality and hydraulic information from the upper FAS was collected. A report (Preliminary Testing of the Upper Floridan Aquifer System; April 2006) was prepared to summarize findings. This information was extremely useful as it provided the basis for evaluation of the upper FAS for water supply purposes. Data collected from the preliminary evaluation was used for a subsequent testing program which consisted of construction and testing of two Floridan Aquifer water supply wells (24-inch diameter PVC cased wells).

PUBLIC WORKS DEPARTMENT
949 N.W. 38TH STREET, FORT LAUDERDALE, FLORIDA 33309
TELEPHONE:(954) 828-8000, FAX (954) 828-7681
www.fortlauderdale.gov

Hazen and Sawyer has been extremely reliable and responsive to the needs of the City. Hazen and Sawyer is consistently able to perform very well and keep the projects on track and on budget.

If you have any questions, please do not hesitate contacting me at 954-828-7802.

Sincerely,

Julie Leonard
Assistant Utilities Services Director, Operations

OFFICE OF THE MAYOR
Diane Veltri Bendekovic,
Mayor

UTILITIES DEPARTMENT
Hank Breitenkam, Director

Plantation
the grass is greener®

March 16, 2011

To whom it may concern:

I am pleased to recommend Hazen and Sawyer, P.C. to anyone seeking to utilize the expertise of this company as it relates to management, inspection, analytical studies and permitting of deep injection wells (DIW) and the associated monitoring wells. They have performed services for all four of the City's injection wells which are located at three different sites within the city.

Hazen and Sawyer, P.C. was selected as the most qualified firm to assist us with engineering services related to the treatment plants, which included regulatory assistance, design, procurement and construction management of the repair and testing of the City's deep injection wells.

During the past eleven years, Hazen and Sawyer, P.C. has performed DIW engineering services including mechanical integrity testing, operational permit renewals and other related projects. At the Regional Wastewater Treatment Plant (RWWTP), they designed, permitted and performed construction management services for a new dual zone monitor well. At the Central Water Treatment Plant, they designed, permitted and performed construction management services to replace the corroded steel injection casing with a new fiberglass reinforced plastic casing. Both of these projects required significant coordination with the Florida Department of Environmental Protection (FDEP), recommendation on final selection of casing material, preparation of contract documents and permit applications, negotiations to procure the services of a well drilling contractor, field observations, reporting to FDEP during construction and the testing of the wells. Currently they are investigating a 20-year-old monitor well with corrosion concerns at the RWWTP.

It is without hesitation that I highly recommend Hazen and Sawyer, P.C. for any management, inspection and analytical studies of deep injection wells and associated monitoring wells. This firm performs in a timely manner, produces technically sound documents and works well with contractors to ensure that the City's interests are protected.

If you have any questions, please do not hesitate contacting me at (954) 797-2705.

Sincerely,

Larry Duemmling

Larry Duemmling
Assistant Director of Utilities

c: Hank Breitenkam, Director of Utilities

400 NW 73rd Avenue ◆ Plantation, Florida 33317
954.797.2237 ◆ sslattery@Plantation.org

Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration

2500 Jupiter Park Drive, Jupiter, Florida 33458-8964
Telephone (561) 747-5700 •Fax (561) 747-9929 • www.loxahatcheeriver.org

D. Albrey Arrington, Ph.D., Executive Director
March 14, 2011

To Whom It May Concern:

I am pleased to recommend Hazen and Sawyer to anyone seeking to use the expertise of this company as it relates to the preparation of special studies and operation / maintenance manuals, particularly on the subject of Deep Injection Wells (DIWs) and associated monitoring wells.

Hazen and Sawyer has assisted the Loxahatchee River District (LRD) with the successful permitting of a disposal system that allows use of concentrate to augment reuse supplies. LRD has been a reuse leader and continues to be on the "cutting edge" in the advancement of reuse opportunities. Faced with increase demands and limited reuse flows, LRD in conjunction with Hazen and Sawyer developed an innovative approach to supplement existing reuse volumes. This unique approach consisted of blending concentrate from the Town of Jupiter's newly constructed nanofiltration water treatment plant with existing high level irrigation quality water to meet the ever increasing reuse demands. A special study (i.e., letter report) was prepared and submitted as supporting data to the Florida Department of Environmental Protection (FDEP).

This innovative concept was approved by the FDEP and a permit was issued on November 2, 2009, allowing a blend of reclaimed water and concentrate. A unique monitoring program was developed as part of the operating protocol which includes continuous monitoring of flows to the injection well during wet periods. The monitoring program tracks water quality to ensure total dissolved solids remain below the compliance limit of 1,000 mg/L. Operation has been ongoing successfully since early 2010.

LRD also selected Hazen and Sawyer to assist with the design, permitting, bidding/contract negotiation, construction and testing oversight and operational assistance for the construction of LRD's deep injection wells. The project includes the drafting of operation and maintenance manuals for LRD's one Class I injection well and two monitor wells. Hazen and Sawyer also revised our O&M Manual to incorporate new operating protocols.

Hazen and Sawyer is currently involved in several other general consulting projects for LRD including mechanical integrity testing of our DIW and design of an odor control system.

Hazen and Sawyer has been reliable and responsive to the needs of LRD. Hazen and Sawyer has consistently performed very well and generally keep projects on track and on budget.

If you have any questions, please do not hesitate contacting me at 561-747-5700.

Sincerely,

D. Albrey Arrington, Ph.D.

City of Naples
UTILITIES
TELEPHONE (239) 213-4712 ● FACSIMILE (239) 213-4799
380 RIVERSIDE CIRCLE ● NAPLES, FLORIDA 34102-6796

November 10, 2010

To Whom It May Concern:

Subject: Hazen & Sawyer Recommendation

Hazen & Sawyer has provided professional services to the City of Naples Utilities Department since June 2009. Hazen & Sawyer staff has provided very good service in terms of meeting deadlines, providing accurate information, overall knowledge of current technology and regulatory agency guidelines.

Professional Services provided to the City of Naples include implementation of a 5-year Alternative Water Supply plan. The AWS project includes design, permitting and construction administration of an ASR wellfield as part of an overall Alternative Water Supply Plan. This project is currently underway. Hazen & Sawyer also assisted the City with renewing the Water Use Permit through the South Florida Water Management District that resulted in 20-year permit.

Other Professional Services include assistance various reports to the Florida Department of Environmental Protection and the South Florida Water Management District. I am pleased to provide a favorable recommendation to Hazen & Sawyer and would recommend them to our City Council for future projects.

Respectfully,

Robert Middleton,
Utilities Director

4 Familiarity

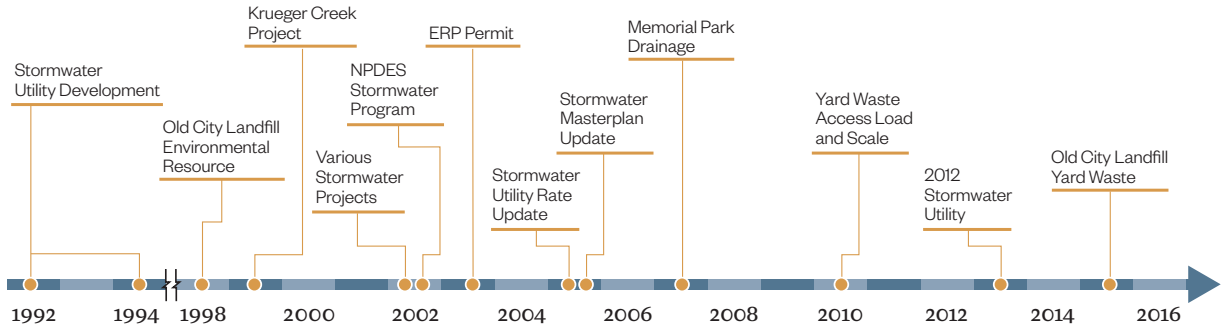
Section No. 4

Familiarity

The Hazen team has a long history of working with the City of Stuart (since 1992), which provides our team with an in-depth familiarity of the local conditions, community goals, processes, procedures, and municipal structure of the City.

Our work efforts on behalf of the City over the last three decades have focused largely on the protection and preservation of the City's water resources and natural amenities. Hazen's work for the City has included initial development and subsequent updates to the City's Stormwater Utility, closure and remediation of the Old City Landfill, establishment of the National Pollutant Discharge Elimination System (NPDES) permitting program for stormwater, stormwater management system capital improvements, downtown redevelopment, and conceptual design for a plan to expand yard waste processing capabilities and septage receiving at the Old City Landfill. A timeline with representative City projects we have worked on over the last 20-plus years is shown below.

Our team's knowledge and understanding of the City is a result of providing quality services for over **three decades.**



Many of our proposed team members have lived on the Treasure Coast for many years. Robert Taylor, Jr., PE, has lived in Stuart or Jupiter for over five decades (1966 to date). His family owned a business in downtown Stuart for almost 50 years, which provides him with an intimate knowledge of the area and relationships with numerous individuals (especially long-time community members) in both Stuart and Martin County. He has served as Project Manager or Project Director for numerous Stuart projects over the last 24 years.

1021-132

ROBERT TAYLOR, JR., PE

JOSEPH FRANKO, PE

Project Director, ROBERT TAYLOR, JR., PE, and Regulatory/Permitting Lead, JOSEPH FRANKO, PE, are well-acquainted with the STUART/MARTIN COUNTY AREA.

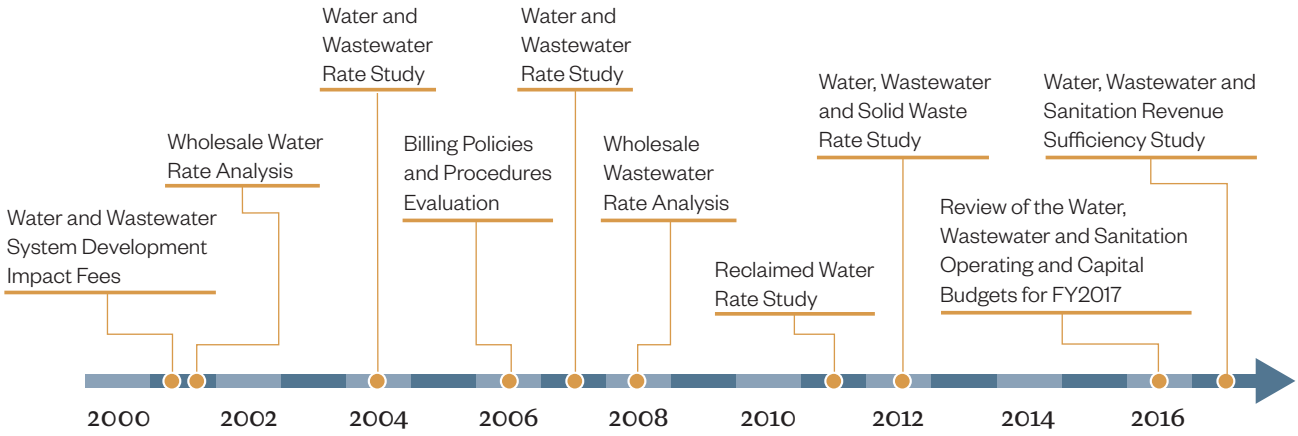
Mr. Taylor and/or Mr. Franko have been intimately involved with **EVERY PROJECT Hazen has performed for the City since 1992**, and have maintained their longstanding business relationships with various City staff over the years.

Our team has an in-depth familiarity of the City's processes and goals, which will result in NO LEARNING CURVE for this contract.

Mr. Franko has worked on key water resource-related projects for the City, including the closure and remediation of the Old City Landfill, where he served as Engineer-of-Record responsible for design, permitting, and implementation of the remedial action facilities. He also participated in the permitting and design of the closure and golf teaching facility located on the closed landfill. He is a long-time resident of the Treasure Coast (1990 to present).

Our subconsultant, PRMG, also has a long history of working with the City. The firm has provided utility rate, financial planning, and management consulting services to the City on an ongoing basis since 2001 (see timeline below). In addition to preparing comprehensive water and wastewater rate studies in 2004, 2007 and 2012, the firm has assisted the City with the development of utility business plans and impact fees for water and wastewater service, development of bulk water and wastewater rates and reclaimed water rates for both retail and bulk users, analysis of the sewer expansion program, and are involved in ongoing annual water and wastewater financial compliance reviews. In addition to these rate and financial planning activities, PRMG has assisted the City in a review of its billing policies and procedures. PRMG also recently assisted the City of Stuart to develop an interlocal agreement to facilitate a wholesale supplemental capacity exchange with Martin County.

Grandusky, Lamb and Associates also strengthens our team's familiarity and knowledge of the area. Steve Lamb, PG, provides over 40 years of experience in Florida groundwater and water use issues and extensive South Florida Water Management District (SFWMD) permitting experience. His SFWMD experience includes addressing local and regional challenges along with state and federal policy issues related to water supply. Steve Lamb's experience as a water permit regulator provides our team with unique insight into the fundamental considerations that the SFWMD will have regarding alternative water supply alternatives.



1021-132

Our team's knowledge of water supply regulations, long relationships with regulatory staff, along with our extensive experience with water use permitting and groundwater modeling, will serve the City's needs in future water resource and water supply planning efforts.

Due to our team's familiarity with the City, we understand the City's desire to provide opportunity and a sense of progress, while maintaining a sense of community and preservation of the natural systems which make Stuart such a desirable place to reside.

We also understand the City's strong sense of commitment to providing high quality municipal services and utilities, and the commitment to protecting the quality of the St. Lucie River/Estuary. These values are reflected in the Public Works Department's Mission Statement:

"Working in partnership with our employees and customers, we will continually provide outstanding, cost effective public services while protecting the environment as well as the health, safety and welfare of our partners."

These considerations and commitments are also reflected in the City's Values Statement:

- **"WE TREAT EACH OTHER WITH HONESTY, DIGNITY, CONSIDERATION AND RESPECT."**
- "We are committed to providing high quality service while keeping taxes and service charges reasonable."
- **"WE ALWAYS LOOK FOR A BETTER WAY."**
- "We know that active partnerships with the community are vital to our success."
- "We know that the City is in the business of customer service, and the citizens are our shareholders."
- "Laws and regulations are necessary to promote the health, safety and welfare of our community, and we apply them fairly and reasonably."
- "Recognize that employees are one of our greatest assets; we will select them with care, treat them with fairness, and promote their self and professional development."

2016
HAPPIEST
SEASIDE TOWN
in America!
COASTAL LIVING

SAILFISH CAPITAL OF THE WORLD

2008
Most Beautiful City
America in Bloom

Key project team members have long-standing relationships with City personnel, as well as an in-depth familiarity with City processes. This familiarity will help make us more effective and efficient consultants relative to the proposed project.

1021-132

5 Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 03/27/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Marsh USA, Inc.
1166 Avenue of the Americas
New York, NY 10036
Attn: NewYork.certs@Marsh.com Fax: (212) 948-0500

CONTACT NAME:
PHONE (A/C, No, Ext): **FAX (A/C, No):**
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Hartford Fire Insurance Company	19682
INSURER B : Hartford Casualty Insurance Company	29424
INSURER C : Twin City Fire Insurance Company	29459
INSURER D : N/A	N/A
INSURER E :	
INSURER F :	

INSURED
HAZEN AND SAWYER
498 SEVENTH AVENUE
NEW YORK, NY 10018

COVERAGES **CERTIFICATE NUMBER:** NYC-008749697-01 **REVISION NUMBER:** 3

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS		
A	X COMMERCIAL GENERAL LIABILITY			10 UUN UU0890	03/29/2016	03/29/2017	EACH OCCURRENCE	$	1,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$	
							MED EXP (Any one person)	$	10,000
							PERSONAL & ADV INJURY	$	1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$	2,000,000
	POLICY X PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$	2,000,000
	OTHER:							$	
B	**AUTOMOBILE LIABILITY**			10UENUU0960 (AOS)	03/29/2016	03/29/2017	COMBINED SINGLE LIMIT (Ea accident)	$	1,000,000
A	X ANY AUTO			10UENAN2667 (MA)	03/29/2016	03/29/2017	BODILY INJURY (Per person)	$	
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$	
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$	
							Comp./Coll. Deductible	$	1,000
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$	
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$	
	DED RETENTION $							$	
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N	N / A		10 WB AJ 7349	03/29/2016	03/29/2017	X PER STATUTE OTH-ER		
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N **(Mandatory in NH)**						E.L. EACH ACCIDENT	$	1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$	1,000,000
							E.L. DISEASE - POLICY LIMIT	$	1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
City of Stuart is included as additional insured (except workers' compensation) where required by written contract.

CERTIFICATE HOLDER
City of Stuart
121 SW Flager Ave.
Stuart, FL 34994

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE of Marsh USA Inc.
Manashi Mukherjee Manashi Mukherjee

HAZE&SA-01 NCHANDUVI

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
03/27/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Ames & Gough 8300 Greensboro Drive Suite 980 McLean, VA 22102	PHONE (A/C, No, Ext): (703) 827-2277	FAX (A/C, No): (703) 827-2279
	E-MAIL ADDRESS: admin@amesgough.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Continental Casualty Company (CNA) A, XV	20443
INSURED	INSURER B :	
Hazen and Sawyer 498 Seventh Avenue New York, NY 10018	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	☐ OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ (Mandatory in NH)	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Professional			AEH008231489	03/29/2017	03/29/2018	Per Claim	1,000,000
A	Liability			AEH008231489	03/29/2017	03/29/2018	Aggregate	2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
RE: REI 2017-170 – Assessment of Sustainable Alternative Water Supply Options

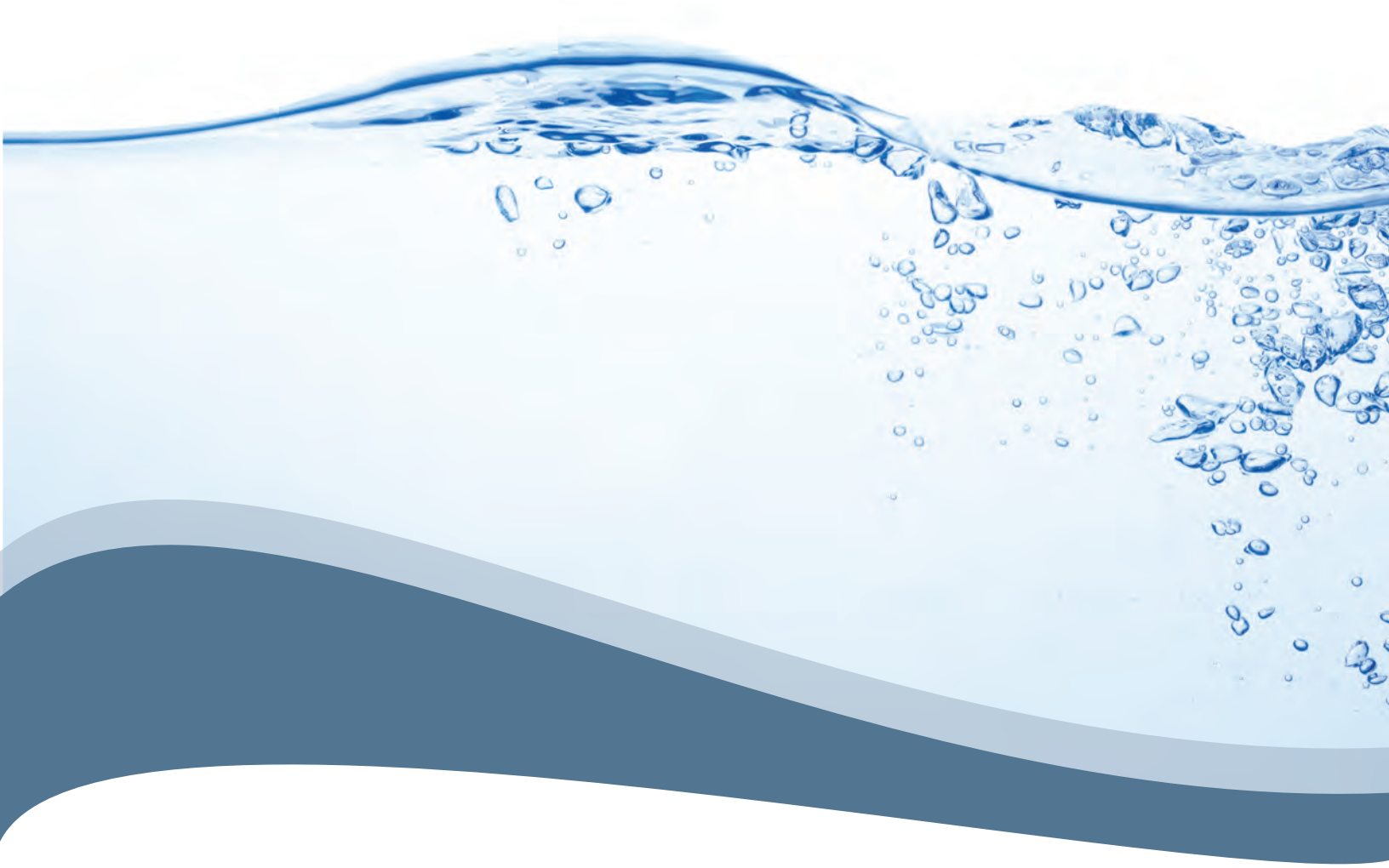
CERTIFICATE HOLDER

City of Stuart
121 SW Flager Ave.
Stuart, FL 34994

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



6 Submittal Forms & Requested Information

Section No. 6

Submittal Forms & Requested Information

Hazen and Sawyer's licenses to perform work in the State of Florida, registration with the State of Florida Division of Corporations, and local Business Tax Receipts appear below and on the following pages.

State of Florida

Board of Professional Engineers

Attests that

Hazen And Sawyer, P.C.

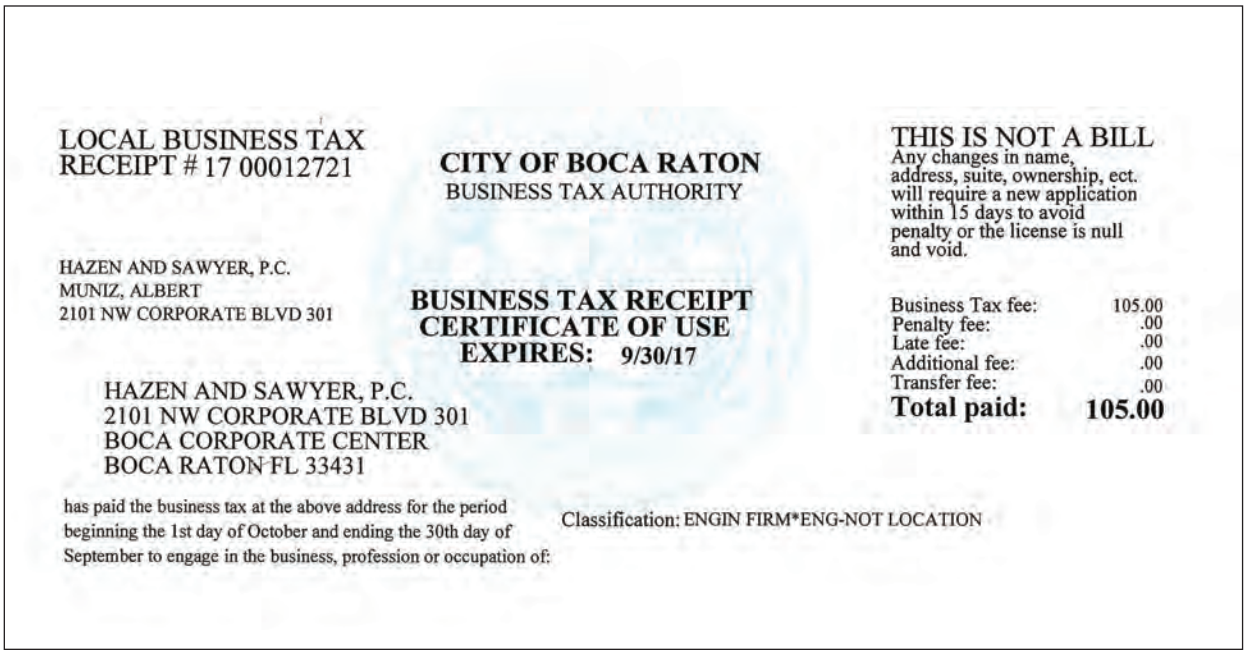
FBPE FLORIDA BOARD OF PROFESSIONAL ENGINEERS

Is authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes.

Expiration: 2/28/2019

Audit No: 228201904595 R

CA Lic. No: 2771



LOCAL BUSINESS TAX RECEIPT # 17 00012721

CITY OF BOCA RATON
BUSINESS TAX AUTHORITY

THIS IS NOT A BILL
Any changes in name, address, suite, ownership, ect. will require a new application within 15 days to avoid penalty or the license is null and void.

HAZEN AND SAWYER, P.C.
MUNIZ, ALBERT
2101 NW CORPORATE BLVD 301

BUSINESS TAX RECEIPT
CERTIFICATE OF USE
EXPIRES: 9/30/17

Business Tax fee:	105.00
Penalty fee:	.00
Late fee:	.00
Additional fee:	.00
Transfer fee:	.00
Total paid:	**105.00**

HAZEN AND SAWYER, P.C.
2101 NW CORPORATE BLVD 301
BOCA CORPORATE CENTER
BOCA RATON FL 33431

has paid the business tax at the above address for the period beginning the 1st day of October and ending the 30th day of September to engage in the business, profession or occupation of:

Classification: ENGIN FIRM*ENG-NOT LOCATION

1021-132

State of Florida
Department of State

I certify from the records of this office that HAZEN AND SAWYER, P.C. is a New York corporation authorized to transact business in the State of Florida, qualified on October 18, 1978.

The document number of this corporation is 841657.

I further certify that said corporation has paid all fees due this office through December 31, 2017, that its most recent annual report/uniform business report was filed on January 9, 2017, and that its status is active.

I further certify that said corporation has not filed a Certificate of Withdrawal.

Given under my hand and the Great Seal of the State of Florida at Tallahassee, the Capital, this the Thirteenth day of January, 2017

Ken Detzner

Secretary of State

Tracking Number: CU0752424330

To authenticate this certificate,visit the following site,enter this number, and then follow the instructions displayed.

https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication

ANNE M. GANNON
CONSTITUTIONAL TAX COLLECTOR
Serving Palm Beach County
Serving *you.*

P.O. Box 3353, West Palm Beach, FL 33402-3353
www.pbctax.com Tel: (561) 355-2264

****LOCATED AT****
2101 NW CORPORATE BLVD #301
BOCA RATON, FL 33431-7343

TYPE OF BUSINESS	OWNER	CERTIFICATION #	RECEIPT #/DATE PAID	AMT PAID	BILL #
56-0016 ENGINEER BUSINESS	HAZEN AND SAWYER P C	2771	U17,564 - 09/30/16	$66.00	B40114490

This document is valid only when receipted by the Tax Collector's Office.

STATE OF FLORIDA
PALM BEACH COUNTY
2016/2017 LOCAL BUSINESS TAX RECEIPT

B2 - 488

HAZEN AND SAWYER PC
HAZEN AND SAWYER PC
2101 NW CORPORATE BLVD STE 301
BOCA RATON, FL 33431-7343

LBTR Number: 199514009
EXPIRES: SEPTEMBER 30, 2017

This receipt grants the privilege of engaging in or managing any business profession or occupation within its jurisdiction and MUST be conspicuously displayed at the place of business and in such a manner as to be open to the view of the public.

1021-132

ATTACHMENT B

REQUEST FOR INFORMATION TO SUBMIT WITH IRS W-9 FORM

Federal Income Tax Law requires a Form 1099 with a valid taxpayer identification number to be filed for payments made in the course of conducting a trade or business. Further, these payments may be subject to Backup Federal Income Tax Withholding for all payees who have not submitted a correct Federal Tax Identification Number at the time of payment.

Please read this form and complete the information thereon before signing and **returning with a copy of your IRS W9 Form**. If you are a corporation, we will not issue you a Form 1099 (Reference: 1.6401-3(c)). However, kindly return this form to document your corporate status.

In order to avoid the possibility of future payments being held subject to Backup Withholding at a rate of 31%, please complete the form printed below and return this letter to the above address or E-mail request to: mcleighton@ci.stuart.fl.us.

VENDOR NAME Hazen and Sawyer

DBA: _____

CORPORATE ADDRESS: 498 7th Avenue, 11th Floor (Branch office: 2101 NW Corporate Boulevard, Suite 301, Boca Raton, FL 33431)

CITY: New York **STATE:** NY **ZIP:** 10018

TELEPHONE: (212) 777-8400 **FAX:** (212) 228-8369 **ALTERNATE PHONE:** (____)_____

"THE ABOVE INFORMATION WILL BE USED FOR PURCHASE ORDERS"

REMIT TO ADDRESS: 2101 NW Corporate Boulevard, Suite 301

CITY: Boca Raton **STATE:** FL **ZIP:** 33431

TELEPHONE: (561) 997-8070 **FAX:** (561) 997-8159 **ALTERNATE PHONE:** (____)_____

COMPANY CONTACT NAME: Robert Taylor, Jr., PE, Vice President

COMPANY/CONTACT EMAIL ADDRESS: rbtaylor@hazenandsawyer.com

TYPE OF ORGANIZATION

1. ☑ Corporation
2. ☐ Partnership
3. ☐ Sole Proprietor
4. ☐ Individual
5. ☐ Government Agency
6. ☐ Other: _____

1099 REPORTING STATUS (Check One): ☐ **Yes** ☑ **No**

TAXPAYER IDENTIFICATION NUMBER:

Employer Identification Number: 13 - 2904652 (Or) Social Security Number: ____ - ____ - ____

Print name of Taxpayer if using SS#: _____

Under penalties of perjury, I certify that this statement is accurate and complete.

Signature: _____ Title: Vice President

Date: 03/28/2017 Phone: (561) 997-8070

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
Hazen and Sawyer

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification; check only **one** of the following seven boxes:
☐ Individual/sole proprietor or single-member LLC ☑ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate
☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶
Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.
☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):
Exempt payee code (if any)
Exemption from FATCA reporting code (if any)
(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.)
2101 NW Corporate Boulevard, Suite 301

Requester's name and address (optional)

6 City, state, and ZIP code
Boca Raton, FL 33431

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number
			–			–				

or

Employer identification number
1	3	–	2	9	0	4	6	5	2

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here | **Signature of U.S. person** ▶ Helen R. Zumwalt | **Date** ▶ 03/28/2017

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Project Progress

Tuesday, March 28, 2017
1:56:37 PM

Hazen and Sawyer — For the period 3/1/2017 - 3/31/2017

	Current Hours	Current Billing	JTD Hours	JTD Billing	Budget Hours	Budget Billing	% Exp	% Rpt	Balance Hours	Balance Billing
Project Number: 40620-024 Hallandale Beach - WTP Operational Assis										
Principal:	Patrick Davis		% Complete:			Direct Labor:				25,000.00
Project Manager:	Jorge Atoche		Labor % Complete:			Direct Expense:				
Client:	City of Hallandale Beach		Expense % Complete:			Direct Consultant:				
Office:	21		Start Date:		10/1/2016	Reimbursable Expense:				
Status:	Active		Complete Date:		9/30/2017	Reimbursable Consultant:				
Type:	Regular					Total Fee:				25,000.00
Task Number: 001 WTP Assistance										
Principal:	Patrick Davis		% Complete:			Direct Labor:				25,000.00
Project Manager:	Jorge Atoche		Labor % Complete:			Direct Expense:				
Client:	City of Hallandale Beach		Expense % Complete:			Direct Consultant:				
Office:	21		Start Date:		10/1/2016	Reimbursable Expense:				
Status:	Active		Complete Date:		9/30/2017	Reimbursable Consultant:				
Type:	Regular		Unit Table:			Total Fee:				25,000.00
Revenue Method:	COST		Budgeted OH Rate:		191.3000	Multiplier/Amount:				3.1000
Labor										
02 ASSOCIATES			11.50	2,034.78						
04 PROFESSIONAL										
Total for Labor			**11.50**	**2,034.78**						
Total for 001			**11.50**	**2,034.78**						
Total for 40620-024			**11.50**	**2,034.78**						

Hazen *Weekly Status Report*

February 3, 2017

To: John Foglesong, PE – Seaport Engineering & Construction Division - Division Director

From: George A. Brown, PE – (Hazen)

Re: Port Everglades Study

Weekly Status Report

1/30/2017 through 2/3/2017

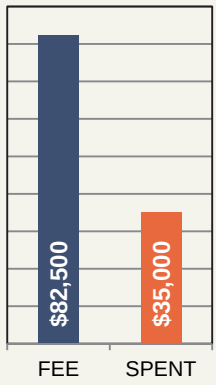
1. Work Accomplished During This Period

- The revised Corrosion Control Report was submitted to the Port on February 2, 2017.

2. Deliverable Status Log

Task	Status
1. Historical Data Collection:	
1.1. Obtain City Water Quality Data	Complete
1.2. Port to provide a map of lead joint pipe	Complete
1.3. Data collection status log	Updated 12/16
2. Port LCR Sampling Procedure: Document Port sampling procedures	Completed on 11/7/2016
3. Additional Water Quality Data Collection Plan:	
3.1. Submit draft plan to Port	Completed on 10/14/2016
3.2. Obtain Port input on draft plan, including selection of laboratory	Completed on 11/7/2016
3.3. Submit final plan	Completed on 11/21/2016
4. Sequential Sampling Protocol:	
4.1. Submit draft protocol to sequential sampling Port, including selection of laboratory	Completed on 10/21/2016
4.2. Submit final protocol to sequential sampling Port	Completed on 11/28/2016

Budget

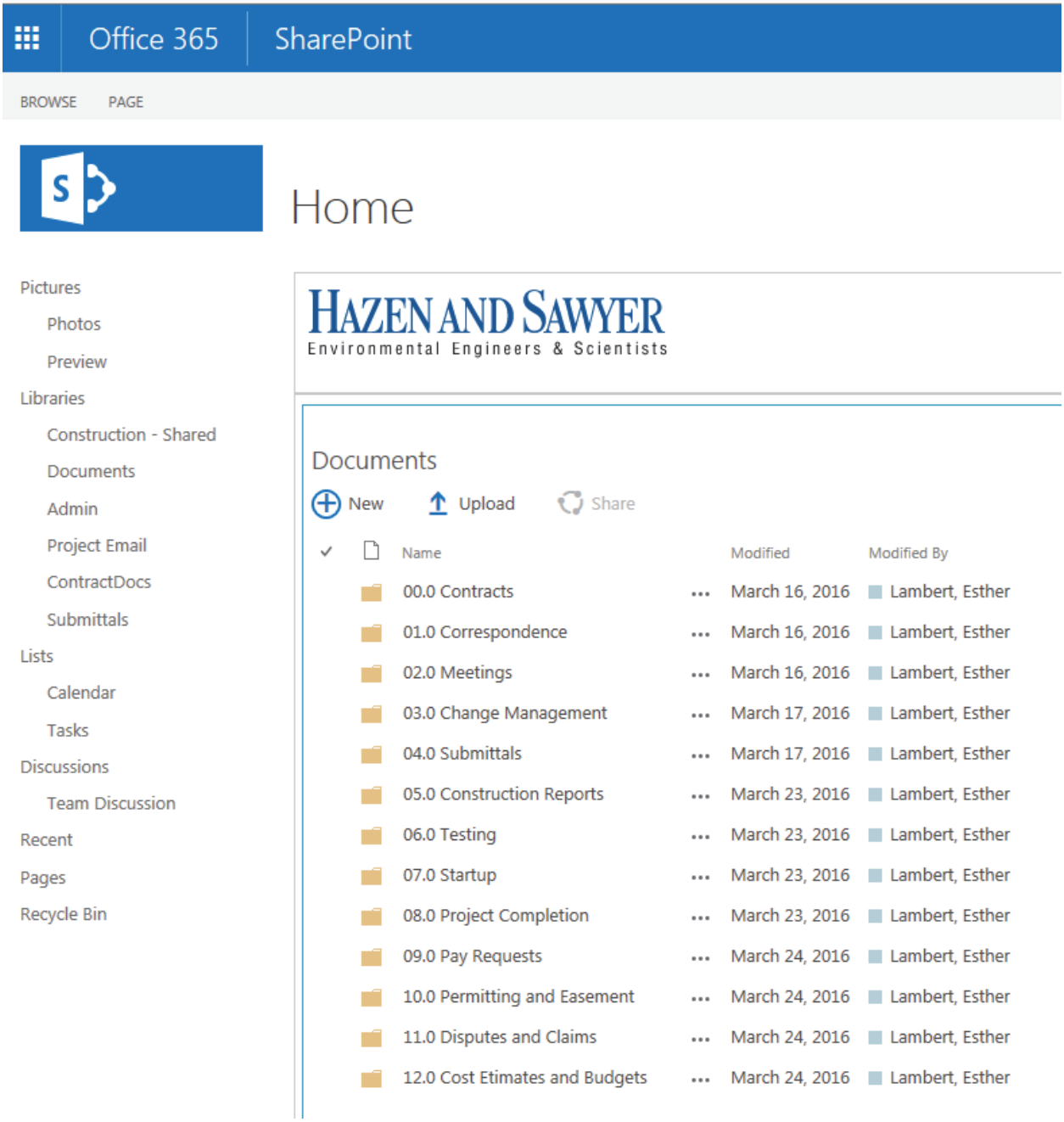


Schedule

Required Completion Date 3/31/17

Status: On Schedule

Example of Record Keeping Procedures – Typical Project Sharepoint Site



Hazen

Field Observation Report

Project Name:	**NRWWTP Updates** **Digester Cover No. 3 Replacement**	**Date:**	
Client:	**Broward County Water and Wastewater Services**	**Day:**	Choose an item.
Project No.:	**9042 (BCWWS) / 44228-742 (H&S)**	**Samples Taken:**	Choose an item.
Location:	**2401 North Powerline Road**	**Photos Taken:**	Choose an item.
Contractor:	**Kirlin Florida, LLC**	**Videos Taken:**	Choose an item.

Weather:	Choose an item.	**Wind:**	Choose an item.
Temperature:	Choose an item.	**Humidity:**	Choose an item.

LABOR		
Trade	**Company**	**No.**
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EQUIPMENT	
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Hazen

Field Observation Report

Construction Activities:

Distribution: G. Cunningham
E. Lambert

Signed: Ana M. Garcia

Title: Project Representative

City of Hallandale Beach

Salt Water Monitor Wells
SWMW-1 through SWMW-3

Construction Field Observation Reports April 2016 to May 2016

Hazen

City of Hallandale Beach

Field Observation Report

April 7, 2016

Hazen

Field Observation Report

Project Name:	**Salt Water Monitoring Wells**	**Date:**	**4-7-2016**
Client:	**City of Hallandale Beach**	**Day:**	Thursday
Client Prj No.:		**H&S Job No.:** **40620-018**	**Samples Taken:** No
Location:	**SWMW-3**	**Photos Taken:**	Yes
Contractor:	**Hausinger & Associates, Inc.**	**Videos Taken:**	No

Weather:	Sunny	**Wind:**	Still
Temperature:	71F-85F	**Humidity:**	Moderate

LABOR		
Trade	**Company**	**No.**
Foreman	Hausinger	1
Machine Operator	Hausinger	1
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Hazen

Field Observation Report

Observations:

Project Area Description: City of Hallandale Beach, Sludge Pit, SWMW-3 Drill Site

Arrived on site, contractor doing maintenance work on the drill. I Introduced myself, and took some pictures. Jeff Hausinger said they stopped at 140' below land surface. Jeff Hausinger stated that he will keep Hazen and the City of Hallandale Beach (Manga) informed of drilling status via email.

Photos:

Distribution: G. Brown

Signed: _____

Print Name: Chris Julien

City of Hallandale Beach

Field Observation Report

April 12, 2016

Hazen

Field Observation Report

Project Name:	**Salt Water Monitoring Wells**	**Date:**	**4-12-2016**
Client:	**City of Hallandale Beach**	**Day:**	Tuesday
Client Prj No.:		**H&S Job No.:** **40620-018**	**Samples Taken:** No
Location:	**SWMW-3**	**Photos Taken:**	Yes
Contractor:	**Hausinger & Associates, Inc.**	**Videos Taken:**	No

Weather:	Sunny	**Wind:**	Still
Temperature:	71F-85F	**Humidity:**	Moderate

LABOR		
Trade	**Company**	**No.**
Foreman	Hausinger	1
Machine Operator	Hausinger	1
Laborer	Hausinger	1
Choose an item.		
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Hazen

Field Observation Report

Observations:

Project Area Description: City of Hallandale Beach, Sludge Pit, SWMW-3 Drill Site

- 9:30 a.m. George Brown arrived on-site.
- Contractor tagged bottom of the hole early on the morning of 4/12/2016; reported that bottom was clean (no sand build-up overnight.
- 8:00 a.m to 9:00 a.m.: Tripped out drill string while circulating.
- 9:00 a.m. to 10:30 a.m.: Installed casing pipe.
- 10:30 a.m. to 11:00 a.m.: Installed treme pipe.
- Contractor plans to install sand and develop well for a short period to get sand compacted/settled.
- 11:30 a.m.: George Brown departed site.

Photos:

Distribution: G. Brown

Signed: George A. Brown

Print Name: George A. Brown, PE

7 Prohibition Non-Collusion/Conflict of Interest Disclosure Statements

Section No. 7

Prohibition Non-Collusion/Conflict of Interest Disclosure Statements

As requested in the REI, below are the Prohibition Non-Collusion/ Conflict of Interest Disclosure Statements.

Statement in Accordance with Florida Statute 287.055(6)(a)

Hazen and Sawyer warrants that the firm has not employed or retained any company or person, other than a bona fide employee working solely for the firm to solicit or secure this agreement and that the firm has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for Hazen and Sawyer any fee, commission, percentage, gift, or other consideration contingent upon or resulting from award or making of this agreement.

Statement of Non-Collusion

Hazen and Sawyer certifies that, in connection with this solicitation, the information provided has been arrived at independently, without consultation, communication, or agreement with any other respondent or with any competitor for the purpose of restricting competition, or in any other way influencing the competitive arena.

Conflict of Interest Disclosure

Hazen and Sawyer does not have any potential conflicts of interest, real or apparent, that the firm or any of its employees, officers, or agent of the firm may have due to ownership, other clients, contracts or interests associated with this project.

Authorized Representative's Signature

Our firm's authorized representative's signature on the transmittal letter certifies the veracity of these statements.

1021-132

8 Optional Information

Membrane Services

Navigating the Maze – Selecting the Best Membrane Treatment Process

Source water varies in terms of turbidity, color, organic content, mineral content, and algae, just to name a few of the parameters that need to be considered. Typical sources are lakes, reservoirs, rivers, creeks, and the water quality from these sources will likely vary on a daily basis and most certainly over the course of a year.

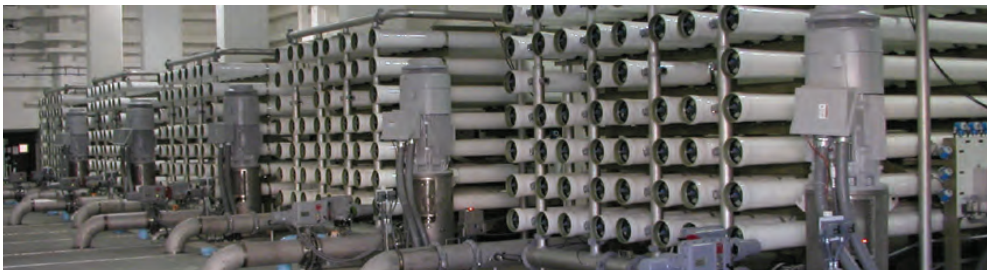
Membrane treatment is certainly a viable approach with many source waters, but it is rarely sufficient by itself—it is not a panacea. Depending on water quality pretreatment will almost certainly be required, which might be in the form of clarification. For example, settlement or by dissolved air flotation (DAF) might be chosen to reduce the load on the membranes in order to give longevity and trouble-free operation. Some ground waters may require removal of dissolved iron and manganese, which would foul the membranes if not removed or markedly reduced. Some membranes are more tolerant of solids loading than others. Some systems use pressure to create the driving force through the membrane, while others use vacuum. The permutations are endless and can be confusing.

How does a utility select the best process to suit their specific water quality? Hazen and Sawyer takes a holistic approach to selecting processes for treating water and will help guide, you, the end user, through the maze of options that are available, to finally select the most economical and effective treatment train to meet current and anticipated regulations.

Complete Project Services

Hazen and Sawyer offers a full range of services, from pilot testing through construction management, including:

- Raw water supply development and planning:
  - Hydrogeologic services, well development
  - Consumptive use permitting
- Pilot, bench scale, and full-scale testing:
  - Small scale single element membrane pilots
  - Two stage membrane pilots
  - Pretreatment requirement evaluations
  - Enhanced coagulation/flocculation
- Control programming
- Design and bidding services:
  - Site/civil
  - Process mechanical
  - Structural
  - Architectural
  - Instrumentation
  - Electrical
- Permitting
- Construction management:
  - Resident Project Representatives
  - Specialty inspectors
- Economics



RESOURCE CONTACTS

For more information, please contact:

Janeen Wietgrefe, PE
4000 Hollywood Boulevard
Suite 750 N
Hollywood, Florida 33021
954-987-0066
ghart@hazenandsawyer.com

Troy J. Walker
Senior Associate
60 East Rio Salado Parkway
Suite 900
Tempe, Arizona, 85281
480-340-3270
twalker@hazenandsawyer.com

David S. Briley, PE
Associate
4011 WestChase Boulevard
Raleigh, North Carolina 27607
919-863-9258
dbriley@hazenandsawyer.com

David M. Laliberte
4011 WestChase Boulevard
Raleigh, North Carolina 27607
919-833-7152
dlaliberte@hazenandsawyer.com

Membrane Services

Hazen and Sawyer has impressive and ever-growing qualifications, both locally, nationally and internationally relative to water treatment, water reuse and wastewater treatment. We offer experience in the planning, design, construction, start-up and trouble-shooting of membrane treatment facilities. The map below shows a sampling of recent membrane projects.

*WaterReuse Research Foundation Project

The experience gained in the successful execution of these projects provides direct value, including: (1) a significant amount of experience in the design of the various aspects of the plant, translating into efficient designs; (2) an extensive database of actual construction costs, which results in development of realistic cost estimates for all elements of the project; (3) a library of successful designs and specifications that have been proven in actual construction for various types of equipment; and (4) extensive experience in value engineering analysis for membrane designs.

9 Addenda

Section No. 9

Addenda

No addendum has been released for this REI.

EXHIBIT A

PROFESSIONAL'S PERSONNEL HOURLY RATE SCHEDULE

POSITION	HOURLY BILLING RATE
Project Director	$242
Project Manager//Enhanced Lime Softening with Additional Monitoring	$224
Deputy Project Manager	$150
Reservoir Participation/Bulk Purchase Analyses/Multi-Criteria Paramater Decision Making	$220
Nanofiltration of Surficial Aquifer/Enhanced Lime Softening with Additional Monitoring	$170
Contamination Remediation via Air Stripping	$224
Regulatory/Permitting	$190
Direct/Indirect Potable Reuse Considerations	$224
Nanofiltration of Surficial Aquifer/Multi-Criteria Parameter Decision Making	$224
Aquifer Modelling/Aquifer Recharge	$224
Multi-Criteria Paramater Decision Making	$224
Reverse Osmosis of Floridan Aquifer	$224
Technical Advisory Committee	$256
Desalination/Deep Floridan Aquifer/Technical Advisory Committee	$256
Technical Advisory Committee	$224
Associate	$165
Principal Engineer	$155
Senior Designer	$120
Assistant Engineer	$95
Administrative Assistant	$75

EXHIBIT B

"ORIGINAL RFP AS ISSUED BY CITY, INCLUDING ALL ADDENDA"

City of Stuart

121 SW Flagler Avenue • Stuart • Florida 34994
Department of Financial Services
Procurement & Contracting Services Division

Lenora Darden, CPPB
Procurement Manager
purchasing@ci.stuart.fl.us

Telephone (772) 288-5308
Fax: (772) 600-0134
www.cityofstuart.us

LEGAL NOTICE FOR REI# 2017-170

PROFESSIONAL ENGINEERING SERVICES
ASSESSMENT OF SUSTAINABLE ALTERNATIVE WATER SUPPLY OPTIONS

The City of Stuart Commission, Stuart, Florida, in compliance with Florida Statute 287.055, Consultants' Competitive Negotiation Act (CCNA), invites Expressions of Interest from qualified, experienced, licensed engineers involving the identification of sustainable water supply options with planning level cost estimates, a comparison of options, and recommended succession steps in developing long-term sustainable alternative water supply options to the City of Stuart.

A complete RFP package can be requested from Onvia DemandStar at http://www.demandstar.com, or by calling (800) 711-1712. A complete RFP package may also be obtained by contacting the City's Procurement Office at 772-288-5320 or by email at purchasing@ci.stuart.fl.us. The City of Stuart is not responsible for the content of any RFP package received through any 3rd party service or any source other than DemandStar by Onvia or the City of Stuart Procurement Division.

Firms desiring to provide the services described above shall submit one (1) original and five (5) copies with **one (1) electronic copy (PDF format preferred) on a CD or flash drive** of their proposals, containing all of the required information **no later than 2:30 pm, March 29, 2017.** Submittals will be accepted by hand delivery overnight delivery or by U.S. Mail to Procurement and Contracting Services Division, 121 SW Flagler Avenue, Stuart, Florida 34994. Submittals received after that date and time will not be accepted or considered and will be retained unopened. Submittals will be opened as soon as practicable thereafter.

In compliance with the Americans with Disabilities Act (ADA), anyone desiring to attend this proposal opening who needs a special accommodation should contact the City's ADA coordinator at 772-288-5306 or TDD at 772-288-5302 at least 48 hours in advance of the meeting, excluding Saturday and Sunday.

Mail/Overnight/Hand Deliver Submittal Responses to:
Stuart City Hall
Procurement & Contracting Services Office
121 S.W. Flagler Avenue
Stuart, Florida 34994

Mark outside of envelope: **REI# 2017-170 "Assessment of Sustainable Alternative Water Supply Options"**

Publish Date: February 26, 2017

Stuart City Commission
City of Stuart

Table of Contents

REI# 2017-170

PROFESSIONAL ENGINEERING SERVICES FOR
ASSESSMENT OF SUSTAINABLE ALTERNATIVE WATER SUPPLY OPTIONS

PART I GENERAL INFORMATION

1.1 OVERVIEW

The City of Stuart is seeking qualified experienced, licensed engineers capable of identifying sustainable water supply options. Engineering services include, but are not limited to, planning, field data collection, and analysis of alternatives.

1.2 DEFINITIONS

"Proposer" shall mean vendors, contractors, consultants, respondents, organizations, firms, or other persons submitting a response to this REI.

1.3 ISSUING OFFICE AND LOCATION OF PROPOSAL OPENING

Procurement & Contracting Services Division
City of Stuart Annex
121 S.W. Flagler Avenue
Stuart, Florida 34994

1.4 QUALIFICATION PROCESS

This REI shall qualify respondents based on such factors as the ability of professional personnel; past performance, willingness to meet time and budget requirements; location; recent, current and projected workloads of the firms; and the volume of work previously awarded to each firm. After the solicitation responses are opened, the submittals will be reviewed, rated and ranked to the top three highest firms that are deemed responsive and responsible, and qualified to provide the work as specified. Proposer should submit a complete package to be considered responsive in order for the City to fully evaluate the firm's qualifications.

City Commission shall authorize staff to enter scope and negotiations with the highest ranked firm. In the event the parties are unable to negotiate terms acceptable to the City, the City may determine to enter negotiations with the second, most responsive and responsible proposer determined by the selection committee, or it may re-solicit proposals.

The City reserves the right to reject all proposals, to waive non-material, technical variances in the proposal, to abandon the project or to solicit and re-advertise for other proposals. The City may in its discretion waive any informalities and irregularities contained in a proposal or in the manner of its submittal and award a contract thereafter.

1.5 DEVELOPMENT COSTS

Neither the City, nor its' representatives shall be liable for any expenses incurred in connection with preparation of a response to this REI. Proposers should prepare their proposals simply and economically, providing a straightforward and concise description of the proposer's ability to meet the requirements of the REI.

1.6 INQUIRIES

The City will not respond to oral inquiries. Interested proposers may contact the Procurement Division, City Hall, 121 SW Flagler Avenue, Stuart, FL 34994, email: purchasing@ci.stuart.fl.us or facsimile: (772) 600-0134 regarding questions about this solicitation. The Procurement Office will also receive written requests for clarification concerning the meaning or interpretation of this REI, until seven (7) days prior to the submittal date. Questions shall be faxed or emailed with reference to the REI number. All proposers are expected to carefully examine the proposal documents. Any ambiguities or inconsistencies should be brought to the attention of the City through written communication with the City prior to opening of the responses.

Respondents may not contact any member of the selection committee, City employee or City elected official during this solicitation process. All questions or requests for clarification must be routed through the Procurement and Contracting Services Division.

1.7 DELAYS

The City may delay scheduled due dates, if it is to the advantage of the City to do so. The City will notify proposers of all changes in scheduled due dates by written addenda submitted to the City.

1.8 QUALIFICATION SUBMISSION AND WITHDRAWAL

The City will receive all proposals at the following addresses:

Stuart City Hall
Procurement & Contracting Services Division
121 S.W. Flagler Avenue
Stuart, Florida 34994

To facilitate processing, please mark the outside of the envelope as follows: **REI# 2017-170 "Assessment of Sustainable Alternative Water Supply Options"** The envelope shall also include the proposer's return address.

Respondents shall submit one (1) original and five (5) copies with **one (1) electronic copy (PDF format preferred) on a CD or flash drive** of their proposal submittal in a sealed envelope marked as noted above. A proposer may submit the proposal by personal delivery, mail, or express shipping service.

THE CITY MUST RECEIVE ALL PROPOSALS BY
2:30 P.M. ON WEDNESDAY, MARCH 29, 2017

Due to the irregularity of mail service, the City cautions proposers to assure actual delivery of mailed or hand-delivered proposals directly to the City's Procurement and Contracting Services Division, as specified above, prior to the deadline set for receiving proposals. Telephone confirmation of timely receipt of the proposal may be made by calling (772) 288-5320, before proposal closing time. A proposal received by the City Procurement Office after the established deadline will be refused or retained unopened.

Proposers may withdraw their proposal submissions by notifying the City in writing at any time prior to the deadline for proposal submittal. Proposers may withdraw their submissions in person or by an authorized representative. Proposers and authorized representatives must

provide the letter of withdrawal, picture identification, proof of authorization (in the case of authorized representatives), and provide the City with a signed receipt for the withdrawn proposal. After the deadline, proposals once opened, become a public record of the City and are subject to the provisions of the Florida Public Records Law. As such they are subject to public disclosure in accordance with Chapter 119, Florida Statutes.

1.9 ADDENDA

If revisions become necessary, the City will provide written addenda to all respondents who received the Request for Qualifications. All addenda issued by the City of Stuart in regard to this REI shall be acknowledged. Failure to acknowledge all addenda may result in disqualification.

The City will make every effort to notify registered Proposers by email that an addendum has been made to the REI. The City shall not be responsible for providing notice of addenda to potential proposers who receive a REI package from sources other than the City or DemandStar by Onvia.

All addenda issued by the City must be acknowledged within the proposal at the time it is submitted to the City.

1.10 EQUAL OPPORTUNITY

The City recognizes fair and open competition as a basic tenet of public procurement and encourages participation by minority and women owned business enterprises.

1.11 INSURANCE

The respondent shall provide proof of insurance coverage reflecting the minimum amounts and coverages as required by the City (Attachment A).

1.12 PUBLIC ENTITY CRIMES

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit proposals or contract with the City for construction of a public building or public works; may not submit bids for leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity in excess of the threshold amount provided for in s. 287 for CATEGORY TWO for a period of 36 months from the date being placed on the convicted vendor list. Questions regarding this statement should be directed to the State of Florida, Bureau of State Procurement (850) 488-8440.

1.13 SUSPENDED VENDOR

An entity or affiliate who has been placed on the State of Florida Suspended Vendor List will not be considered for award. The Suspended Vendor List is available on the State's website at: http://dms.myflorida.com/business_operations/state_purchasing/vendor_information

1.14 PROPOSAL AS PUBLIC DOMAIN

All documents and other materials made or received in conjunction with this project will be subject to public disclosure requirements of chapter 119, Florida Statutes. The proposal will

become part of the public domain upon opening. **Vendors shall not submit pages marked "proprietary" or otherwise "restricted".**

1.15 PUBLIC RECORDS: Public Records Relating to Compliance, Request for Records; Noncompliance, & Civil Action

Note: If the Contractor has questions regarding the application of Chapter 119, Florida Statutes, to the Contractor's duty to provide public records relating to this contract, contact the office of the City Clerk as the custodian of Public Records for the City of Stuart, and all the respective departments at 772-288-5306 or cwhite@ci.stuart.fl.us , City of Stuart, City Clerk 121 SW Flagler Avenue, Stuart, Fl. 34994 per F.S. 119.12.

In compliance with F.S. 119.0701 the Contractor shall:

A. Keep and maintain public records required by the public agency to perform the service.

B. Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.

C. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.

D. Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

E. A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request, and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.

F. If a contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.

G. A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under F.S. 119.10.

H. If a civil action is filed against a contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:

1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and

2. At least 8 business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.

I. A notice complies with subparagraph 2 above, if it is sent to the public agency's custodian of public records and to the contractor at the contractor's address listed on its contract with the public agency or to the contractor's registered agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.

J. A contractor who complies with a public records request within eight (8) business days after the notice is sent is not liable for the reasonable costs of enforcement.

1.16 LICENSES & REGISTRATION

A. **Licenses:** Proposers, both corporate and individual, must be fully licensed and certified for the type of work to be performed in the State of Florida at the time of RFQ receipt. The proposal of any Proposer that is not fully licensed and certified shall be rejected.

B. **Sunbiz:** Proposers, both corporate and individual, must provide proof that their firm is registered with the Division of Corporations for the State of Florida.

C. **Business Tax Receipt:** Proposer shall comply with Business Tax Receipt requirements for **their** business location. A copy of the business tax receipt or proof of exemption shall be included with the submittal package.

1.17 BACKGROUND INFORMATION

As part of the evaluation process, the City reserves the right, to require a Proposer to submit such evidence of his/her qualifications as it may deem necessary, and may consider any evidence available to it as to the qualifications and abilities of the Proposer, including past performance (experience) with the City by the Proposer or any of their Owners.

1.18 REFERENCES/RECORD CHECK

As part of the evaluation process, the City may conduct an investigation of references, including but not limited to, a record check of consumer affairs complaints. Proposer's submission of their RFQ constitutes acknowledgment of the process and consent to investigate. City is the sole judge in determining Proposer's qualifications.

1.19 COMPETENCY OF RESPONDENTS

Proposals will be considered only from firms which are regularly engaged in the business of providing the services as described in this REI and who can provide evidence that they have established a satisfactory record of performance to insure that they can satisfactorily execute the services under the terms and conditions stated herein. The term "equipment and organization" as used herein shall be construed to mean a fully equipped and well established company in line with the best business practices in the industry and as determined by the proper authorities of the City.

PART II STATEMENT OF WORK

2.1 QUALIFICATIONS AND EXPERIENCE REQUIREMENTS

The City of Stuart, Florida is seeking qualified persons or firms to perform professional engineering services involving the identification of sustainable water supply options. Qualified persons or firms shall possess experience with the following:

- Development of planning level cost estimates
- Comparison of sustainable water supply options
- Providing recommendations on the development of long-term sustainable alternative water supply options.
- Professional capabilities of the proposing firm
- Adequacy and abilities of the personnel within the firm
- Past record of performance
- Prior experience of proposing firm
- Willingness and ability to meet City's time constraints
- Recent, current and projected workloads
- The volume of work previously awarded, with the intent of effecting equitable distribution of work among qualified firms
- Location of firm.

2.2 TIMETABLES

A. The City and respondents shall adhere to the following schedule in all actions concerning this REI:

1. On February 26, 2017 the City issues the REI.

2. From February 26, 2017 to March 22, 2017, the City will receive and answer all inquiries received by mail, facsimile transmission or email.

3. The City must receive response submittals by no later than 2:30 p.m. on Wednesday, March 29, 2017.

4. The City will review, evaluate, and rank the proposals in a timely manner.

5. The three highest ranked firms will be presented to the City Commission as the most qualified firms who submitted on the project.

6. Simultaneously, Commission shall authorize staff to enter scope and cost negotiation with the highest ranked firm.

7. The City may enter into a contract after obtaining appropriate approvals and conducting negotiations.

2.3 WORK OBJECTIVE

A. The exact scope of work shall be identified and payment schedules will be negotiated with the highest ranked firm based on the following tasks, which may involve one or more of the following:

1. Review of existing water supply and treatment processes.
2. Identification and evaluation of long term water supply needs.
3. Identification and evaluation of alternative water supply options.
4. Planning level estimated costs for each alternative water supply option.
5. Consideration of cost effective alternatives.
6. User rate impact analysis.
7. Regulatory permitting experience.
8. Preliminary site layout options for each alternative water supply option.
9. Presentations to numerous agencies on the selected alternatives.
10. Preparation of grant applications.
11. And other tasks as identified.

PART III INSTRUCTIONS FOR PREPARING SUBMISSIONS

3.1 RULES FOR SUBMISSIONS

The submission must name all persons or entities interested in the submission as principals. The proposal must declare that it is made without collusion with any other person or entity submitting a proposal pursuant to the RFQ. The interested firm or individual must submit one (1) original and five (5) copies of their proposal, including **one (1) electronic copy (PDF format preferred) on a CD** of the requested qualification data for evaluation. Please tab all support documents or attachments according to the order established in the following paragraph.

3.2 PROPOSAL FORMAT

Proposers should prepare their proposals using the following format. Proposers shall label, tab and organize proposal submittal documents utilizing the following format as outlined below. All attachments as requested shall be inserted in the back of each corresponding section.

In preparing your proposal, proposer should assume that the City has no previous knowledge of their product or capabilities. Proposals should clearly describe the services, specifying where it meets, exceeds or does not comply with the general specifications.

Letter of Transmittal:

The response format shall contain a letter of transmittal. The Letter of Transmittal will summarize in a brief and concise manner the Professional's understanding of the REI.

An agent authorized to negotiate for the respondent must sign the letter of transmittal. This signature shall certify the veracity of the contents of the submittal and bind the firm to this response to the City of Stuart's Request for Expressions of Interest. The transmittal letter shall not exceed two (2) pages in length.

Tab 1 ~ Company Qualifications:

Firms shall provide a brief profile of their company, which should include their history, and corporate structure, ownership interest, and the length of company's existence. Professional must identify all of their offices, including the location of the main office that will be responsible for the actual production of the work and the key personnel in that office who will be responsible for the completion of the work, including the resumes of the primary (key) individuals. Resumes of proposed key personnel shall include (name, company address, phone number, e-mail address) job skills, education, training, experience and professional affiliations/membership.

All proposed sub-consultants shall be identified, and the working relationship between the respondent and the sub-consultant shall be explained. Sub-consultants shall also provide key personnel resumes. Standard forms 254 & 255 or OMB Standard Form 330 may be submitted. Provide a list of disciplines offered by the firm (i.e. mechanical, electrical, hydrogeologic, land surveying, etc.).

Tab 2 ~ Task Approach:

Provide an outline of proposed manner in which a scope of work will be addressed and the manner in which the approach shall demonstrate the firm's capability to work within the City's budget and time constraints. Describe all quality control implementation procedures, sub-consultant supervision, contract compliance and enforcement of industry standards. Discuss ways to maintain schedules and ways to recover. Describe development of planning level cost estimates and value engineering. Describe any project management systems used to track and control project issues. Describe the communication procedures to be employed throughout the contract term and the plan to establish and maintain clear lines of communication with the City Project Manager and City staff. Provide recommendations on the development and comparisons of long-term sustainable alternative water supply options.

Tab 3 ~ References/Past Performance:

A. Provide a list minimum of five (5) projects of a similar type that the responsible office or individuals have completed within the last ten (10) years. Title and brief description of each project shall include:

- A brief description of the project.
- Total bid price, contract time limit, and final construction cost and time.
- Owner of the project.
- The name and telephone number of a contact person.
- The date the project was completed.

B. Include references and contact information of Past Performance and working relationships with the City of Stuart or other Florida municipalities and public entities.

Tab 4 ~ Familiarity:

Provide a description of the firm's familiarity with local conditions, community goals, etc., in the Stuart/Martin County area.

Tab 5 ~ Insurance:

Provide proof of ability to obtain insurance coverages as detailed in Attachment A. A certificate of insurance indicating that the firm has coverage in accordance with the requirements herein set forth may be furnished by the firm to the City along with their qualification data. A properly completed Accord Form is preferable. The City of Stuart being named as additional insured for General Liability shall be required **prior to entering into a contract**. The awarded firm shall either cover any sub-consultants on its policy or require the sub-consultants to conform to all requirements for insurance contained herein.

Tab 6 ~ Submittal Forms & Requested Information:

This section shall include samples of project management reports, inspection forms used by the field personnel, record keeping procedures, and other information the respondent wishes to include.

Florida license / certified for the type of work to be performed in the State of Florida; Florida registration with the Division of Corporations; Business Tax Receipt w/copy of IRS W-9 form or proof of exemption as identified in Item 1.16.

Request for Information to submit with IRS W-9 Form as identified in Attachment B.

Tab 7 ~ Prohibition Non-Collusion/Conflict of Interest Disclosure Statements:
In accordance with Florida Statute 287.055(6)(a), the following statement must be included in each submittal: "The respondent warrants that he or she has not employed or retained any company or person, other than a bona fide employee working solely for the respondent to solicit or secure this agreement and that he or she has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the respondent any fee, commission, percentage, gift, or other consideration contingent upon or resulting from award or making of this agreement."

Include the following Statement of Non-Collusion: "The respondent certifies, and in the case of a joint proposal, each party thereto certifies as to its own organization, that in connection

with this solicitation the information provided has been arrived at independently, without consultation, communication, or agreement with any other respondent or with any competitor for the purpose of restricting competition, or in any other way influencing the competitive arena."

Include a disclosure statement advising the City of any potential conflict of interest, real or apparent, that the Respondent, employee, officer, or agent of the firm may have due to ownership, other clients, contracts or interests associated with this project.

Signature on the transmittal letter shall certify the veracity of these statements.

Tab 8 ~ Optional Information: Provide any information pertinent to this project that will provide insight to the evaluators about the qualifications, fitness and abilities of the Respondent (please limit this information to two pages).

Tab 9 ~ Addenda (if applicable): All addenda issued pursuant to this solicitation must be acknowledged and submitted as part of the proposal package.

PART IV EVALUATION OF SUBMISSIONS

The City of Stuart reserves the right to request clarification on information submitted and to request additional information from one or more firms. The City will select the firms which it feels are most qualified and best serves interests of the City. The City shall be the sole judge and final arbiter of its own best interests; and the evaluation of submissions. In all instances the City's decisions will be final.

4.1 EVALUATION METHOD AND CRITERIA

A. **General:** Proposals will be reviewed, evaluated, and ranked as to the qualification to perform the services required by a Selection Committee, which shall consist of City staff. This criterion shall be utilized in the evaluation of the proposals.

EVALUATION CATEGORIES	POINTS POSSIBLE
Overall knowledge, & qualifications	20 pts
Project Experience and References	20 pts
Task Approach	20 pts
Past Performance	25 pts
Familiarity	15 pts

B. **Selection:** Proposals will be evaluated using the above criteria scored and ranked. The City will assign this task to a Selection Committee. The Selection Committee will make a recommendation for qualification to the City Commission of the top three (3) qualified firms and request authorization to negotiate with the highest ranked firm. The City of Stuart reserves the right to qualify individuals/firms solely from review of the packages which meets the best interests of the City. By submitting a proposal, the respondent agrees to this selection and evaluation procedure.

C. **Interviews:** The City may require oral and visual interviews from firms. This shall be done at the City's sole discretion when it feels interviews are essential as part of the evaluation process and are in the best interests of the City. The City shall be the sole judge and final arbiter of its own best interests in this matter. Individuals/firms

will be notified in writing if they are selected for interview. Notices for interviews will contain explicit instructions concerning location, date, time and length of interviews

D. **Negotiations:** After the City ranks the short listed three respondents, City staff will take the proposed ranking to the City Commission for approval and authorization to start negotiations with the top ranked firm. After staff concludes negotiations with the respondent(s) selected by the City Commission, staff will present the results of the negotiations to the City Commission with its recommendation. If the City Commission determines that staff is unable to negotiate a satisfactory contract with the respondent considered to be the most qualified at a price the City determines to be fair, competitive, and reasonable, negotiations with that respondent(s) shall be formally terminated. Should the City be unable to negotiate a satisfactory contract with the selected respondent(s), the City may select additional respondent(s) in order of their original ranking, competence and qualification; and will continue negotiations until an agreement is reached. However, as stated in Item 1.4 above, the City reserves the right to reject all proposals, to waive any irregularities, and to re-advertise and solicit for other proposals.

E. **Contact Person:** Questions or requests for additional information shall be directed to Lenora Darden, CPPB, Procurement Manager, at (772) 288-5308, fax (772) 600-0134, or email: purchasing@ci.stuart.fl.us between the hours of 8:30 a.m. and 5:00 p.m., local time, weekdays.

4.2 TERMS AND CONDITIONS

All prospective Contractors are hereby cautioned not to contact any member of the Stuart City Commission, the City Manager, the City Attorney (except to discuss grievance matters) or any member of the selection committee. All questions and contacts must be made through the Procurement Office. Attempts to lobby or persuade through other channels will result in disqualification.

Any actual or prospective Contractor who disputes the reasonableness, necessity or competitiveness of the terms and conditions of this request for proposals; selection or award recommendation shall file such dispute in writing with the City Manager, not later than close of business on the proposal opening date, as to the terms and conditions, and within ten (10) days of Commission action as to the selection or award recommendation.

The City reserves the right to reject any or all proposals without recourse, to waive technicalities and informalities or to accept the proposal which in its sole judgment best serves the interest of the City.

As required by FS Section 287.133; “A person or affiliate who has been placed on the convicted vendor list following conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or a Contractor under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount as stated in FS Section 287.017, for Category Two, for a period of thirty

six months from the date of being placed on the convicted vendor list." Questions regarding this statement should be directed to the State of Florida, Bureau of State Procurement (904) 488-8131.

4.3 PROPOSED AGREEMENT

Qualified contractors may enter into a master agreement for services with the City. The City shall solicit bids for various utility projects and work from all pre-qualified firms under contract with the City. Please review Attachment C, Professional Services Agreement, and note any objections, or revisions that would be required within the submittal. Should no revisions be noted, the City will assume and the contractor agrees that the terms and conditions of agreement are acceptable. The proposed Agreement does not authorize the performance of any work. The City makes no covenant or promise as to the number of available projects or that the firm shall perform any project for the City during the life of the Agreement.

Proposer(s) shall not assign or transfer any or all of its rights, duties or obligations under the contract without the prior, written consent of the City.

All work product, including but not limited to reports, plans, drawings, tracings, sketches, photographs, videos, illustrations, presentations, PowerPoint, specifications, models, maps, computer files, electronic data, and other documents (electronic or paper) prepared or created in the course of the performance of the services or obtained in the performance of the contract, as well as all data collected, together with summaries and charts derived therefrom, will be considered works made for hire and shall be the exclusive property of the City upon their creation without restriction or limitation on their use and will be made available, upon request, to the City at any time during the performance of the services. Proposer will not copyright any material or work product developed under the contract. Any reuse of Proposer's prepared documents by the City, except for the specific purpose intended hereunder, will be at City's sole risk and without liability or legal exposure to Proposer or its sub-proposers.

The agreement shall be construed and interpreted, and the rights of the parties hereto determined, in accordance with Florida law without regard to conflicts of law provisions. The City and Proposer shall submit to the jurisdiction of Florida courts and federal courts located in Florida. The parties shall agree that proper venue for any suit concerning this Agreement shall be Martin County, Florida, or the Federal Southern District of Florida. Proposer shall agree to waive all defenses to any suit filed in Florida based upon improper venue or *forum nonconveniens*. To encourage prompt and equitable resolution of any litigation, each party shall waive its rights to a trial by jury in any litigation related to the contract.

4.3 ATTACHMENTS

Attachment A: Insurance Requirements

Attachment B: Request For Information to Submit With Irs W-9 Form

Attachment C: Professional Services Agreement

ATTACHMENT A

INSURANCE REQUIREMENTS

1. The successful professional shall not commence any work in connection with this agreement until it has obtained all of the following types of insurance and the City has approved such insurance. Nor shall the successful professional allow any subcontractor to commence work on its subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All insurance policies shall be with insurers licensed and authorized to do business in the State of Florida. The successful professional shall maintain required insurance coverage for the full term of this agreement or for such longer periods as may be specifically required herein. All insurance policies shall be issued by companies authorized to do business under the laws of the State of Florida and rated no less than "B" as to management and no less than Class "VIII" as to strength in accordance with the A.M. Best Company Insurance Guide, or its equivalent as determined by the City in its sloe discretion.

2. **Loss Deductible Clause:** The City shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the professional and/or subcontractor providing such insurance.

3. **Worker's Compensation Insurance:** The professional/service provider shall maintain during the life of this Agreement, Worker's Compensation Insurance for all of its employees connected with the work of this project that complies fully with the State of Florida Worker's Compensation Law, SS 440.

4. **General Liability:** The Professional shall, during the life of this agreement take out and maintain broad form Commercial General Liability [including premises/operations; products/completed operations with the XCU hazards; personal /advertising injury; and fire damage (minimum $100,000)] for limits of not less than $1,000,000.00 per occurrence and $2,000,000.00 aggregate relative to any agreement resulting from a solicitation with the City of Stuart.

5. **Business Automobile:** The professional/service provider shall during the life of this agreement take out and maintain Business Automobile Liability form with coverage for symbol I (any auto) with limits of not less than $1,000,000.00 combined single limit or $500,000.00 per person/ $1,000,000.00 per accident bodily injury and $250,000.00 per accident property damage.

6. **Professional Liability:** The professional shall during the life of this agreement take out and maintain Professional Liability coverage with limits of not less than $1,000,000.00 per claim /$2,000,000.00 per job, per year aggregate relative to any agreement resulting from this solicitation for the City of Stuart. The professional further agrees to maintain like coverage for a minimum of five (5) years following the completion of the agreement.

7. **Owner's Protective Liability Insurance:** The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against claims which may arise from his operations under the Contract.

8. **Certificates of Insurance:** the Contractor, upon notice of award, will furnish Certificate of Insurance Forms. These shall be completed by the authorized Resident Agent and returned to the Purchasing Office. This certificate shall be dated and show:

   (a) The name of the insured contractor, the specified job by name and job number, the name of insurer, the number of the policy, its effective date, and its termination date.

   (b) Statement that the Insurer will mail notice to the City at least thirty (30) days prior to any material changes in provisions or cancellation of the policy.

   (c) City shall be named or additional named insured on General Liability Insurance and Business Automobile Liability Insurance.

NOTE: The City can decrease or increase these limits, depending on the project, in its sole discretion.

ATTACHMENT B

REQUEST FOR INFORMATION TO SUBMIT WITH IRS W-9 FORM

Federal Income Tax Law requires a Form 1099 with a valid taxpayer identification number to be filed for payments made in the course of conducting a trade or business. Further, these payments may be subject to Backup Federal Income Tax Withholding for all payees who have not submitted a correct Federal Tax Identification Number at the time of payment.

Please read this form and complete the information thereon before signing and **returning with a copy of your IRS W9 Form**. If you are a corporation, we will not issue you a Form 1099 (Reference: 1.6401-3(c)). However, kindly return this form to document your corporate status.

In order to avoid the possibility of future payments being held subject to Backup Withholding at a rate of 31%, please complete the form printed below and return this letter to the above address or E-mail request to: mcleighton@ci.stuart.fl.us.

VENDOR NAME _____

DBA: _____

CORPORATE ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

TELEPHONE: (____)_____ FAX: (____)_____ ALTERNATE PHONE: (____)_____

"THE ABOVE INFORMATION WILL BE USED FOR PURCHASE ORDERS"

REMIT TO ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

TELEPHONE: (____)_____ FAX: (____)_____ ALTERNATE PHONE: (____)_____

COMPANY CONTACT NAME: _____

COMPANY/CONTACT EMAIL ADDRESS: _____

TYPE OF ORGANIZATION

1. ☐ Corporation
2. ☐ Partnership
3. ☐ Sole Proprietor
4. ☐ Individual
5. ☐ Government Agency
6. ☐ Other: _____

1099 REPORTING STATUS (Check One): ☐ **Yes** ☐ **No**

TAXPAYER IDENTIFICATION NUMBER:

Employer Identification Number: _____ - _____ (Or) Social Security Number: _____ - _____ - _____

Print name of Taxpayer if using SS#: _____

Under penalties of perjury, I certify that this statement is accurate and complete.

Signature: _____ Title: _____

Date: _____ Phone: (____)_____

ATTACHMENT C

STANDARD AGREEMENT
BETWEEN
CITY OF STUART AND CONSULTANT
FOR PROFESSIONAL SERVICES

PROJECT: REI #2017-170: ASSESSMENT OF SUSTAINABLE ALTERNATIVE WATER SUPPLY OPTIONS

CONSULTANT:

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT, hereinafter "Contract," made and entered into the ____ day of _____, 2017 by and between _____, hereinafter referred to as "CONSULTANT" and the City of Stuart, Florida, a municipal corporation, 121 S.W. Flagler Avenue, Stuart, Florida 34994, hereinafter referred to as "CITY", for and in consideration of the following terms, conditions and covenants.

I. PURPOSE OF AGREEMENT

CITY intends to enter into a contract with CONSULTANT to identify sustainable water supply options with planning level cost estimates, a comparison of options, and recommended succession steps in developing long-term sustainable alternative water supply options; and the payment for those services by CITY as set forth below.

II. SCOPE OF SERVICES

CITY enters into this contract with CONSULTANT for provision of Professional Services associated with the project described above. The CONSULTANT agrees it will perform those professional services for the fees stipulated below. The detailed scope of services to be performed is as follows:

- Review of existing water supply and treatment processes.
- Identification and evaluation of long term water supply needs.
- Identification and evaluation of alternative water supply options.
- Planning level estimated costs for each alternative water supply option.
- Consideration of cost effective alternatives.
- User rate impact analysis.
- Regulatory permitting experience.
- Preliminary site layout options for each alternative water supply option.
- Presentations to numerous agencies on the selected alternatives.
- Preparation of grant applications.
- And other tasks as identified.

III. AGREEMENT PROVISIONS

Section 1. Time of Performance

Services under this Contract shall begin upon CONSULTANT's receipt of a formal Purchase Order and be completed no later than one hundred and eighty **(180)** calendar days from the date of commencement. In the event the services are not completed within the contemplated time frame through no fault of the CONSULTANT, the CONSULTANT may ask to re-negotiate the terms of this Contract.

Section 2. Compensation and Method of Payment

2.1 Fee Schedule

The City shall pay the CONSULTANT's for the performance of this Contract and satisfactory completion of the project in accordance with the terms and conditions of this Contract, the Lump Sum of **$_____**.

2.2 Invoices

CONSULTANT shall submit an invoice to the CITY upon completion of the Scope of Service. Payment may be made within thirty (30) days after submission of a proper invoice and approval by the Project Manager of the CITY.

Section 3. Reimbursable Expenses

CONSULTANT shall be reimbursed only for approved out pocket expenses directly chargeable to the Project, at actual cost incurred for standard office expense items, i.e., general copying, postage, routine long distance phone calls, regular size plots and prints; and additional expense items include, but are not limited to: express mail deliveries, large copy projects, extraordinary telephone charges, conference calls, signage, certified mail and title searches. Reimbursable expenses will include travel, lodging and meals when traveling at the CITY's request and on the ClTY's behalf. These expenses shall conform to rates and allowances set forth in Florida State Statute Sec 112.061, regarding per diem and traveling expenses. Identifiable communication expenses, reproduction costs, and special accounting expenses not applicable to general overhead shall be reimbursed at actual cost.

Section 4. Additional Services

4.1 Requests for Additional Services

The undertaking by the CONSULTANT to perform professional services defined within this Contract extends only to those services specifically described herein. If upon the request of the CITY, the CONSULTANT agrees to perform additional services hereunder, the CITY shall pay the CONSULTANT for the performance of such additional services an amount (in addition to all other amounts payable under this Agreement) based on an hourly fee in accordance with CONSULTANT's current professional fee schedule, Exhibit B, plus reimbursable expenses so incurred by the CONSULTANT; unless a lump sum addendum to this Contract is executed by the parties to this Contract which addresses the additional services.

4.2 Changes in Scope/Conditions

The undertaking by the CONSULTANT to perform professional services defined within this Contract extends only to those services specifically described herein. If upon the request of the CITY, the CONSULTANT agrees to perform additional services hereunder, the CITY shall pay the CONSULTANT for the performance of such additional services an amount (in addition to all other amounts payable under this Agreement) based on an hourly fee in accordance with CONSULTANT's current professional fee schedule, plus reimbursable expenses so incurred by the CONSULTANT; unless a lump sum addendum to this Contract is executed by the parties to this Contract which addresses the additional services.

Section 5. Use of Documents

5.1 Ownership of Original Documents

All deliverable analysis, reference data, survey data, plans and reports or any other form of written instrument or document that may result from the CONSULTANT'S services or have been created during the course of the CONSULTANT'S performance under this Contract shall become the property of and shall be delivered to the CITY after final payment is made to the CONSULTANT.

5.2 Photographs

Photographs of any completed project embodying the services of the CONSULTANT provided hereunder may be made by the CONSULTANT and shall be considered as its property, and may be used by it for publication.

Section 6. Termination

6.1 Termination for Convenience

Either party upon a seven (7) day written notice to the other party may terminate this Contract. In the event of any termination, CONSULTANT shall be paid for all services rendered to the date of termination including all reimbursable expenses.

6.2 Termination for Cause

The performance of the Agreement may be terminated by the CITY of Stuart in accordance with this clause, in whole or in part, in writing, whenever the CITY shall determine that the CONSULTANT has failed to meet performance requirement(s) of the Agreement. If the successful bidder should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should fail to provide properly skilled personnel or proper service in the sole discretion of the CITY, then the CITY can, after giving the successful bidder seven (7) days written notice, and without prejudice to any other right or remedy, terminate this agreement.

Section 7. ClTY's Obligations

7.1 Data to be Furnished

CITY shall provide the following information or services as required by CONSULTANT to complete the terms of the Agreement:

7.2 Designated Representative

The Designated Representative of the CITY to act with authority on the ClTY's behalf with respect to all aspects of the Project is _____. This designation may be delegated by the Public Works Director to another person provided such delegation is done in writing provided to the CONSULTANT.

Section 8. Persons Bound by Agreement

8.1 Parties to the Agreement

The persons bound by this Contract are the CONSULTANT and the CITY and their respective partners, successors, heirs, executors, administrators, assigns and other legal representatives.

8.2 Assignment of Interest in Agreement

This Contract and any interest associated with this Contract may not be assigned, sublet or transferred by either party without the prior written consent of the other party. The city may grant consent based upon the following factors: The qualifications of the assignee, the financial stability of the assignee, the likelihood of time to complete the contract, And other applicable factors as they relate to the service. Nothing contained herein shall be construed to prevent CONSULTANT from employing such independent consultants, associates and subcontractors as CONSULTANT may deem appropriate to assist in the performance of the services hereunder.

8.3 Rights and Benefits

Nothing herein shall be construed to give any rights or benefits arising from this Contract to anyone other than CONSULTANT and the CITY.

Section 9. Indemnification of CITY

The CONSULTANT and any of its agents, employees, subcontractors, sub-consultants, or anyone for whose act or acts any of them may be liable in the performance of the services under this Contract shall indemnify and hold harmless CITY, its agents, employees, elected officers and representatives from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the indemnifying party and persons employed or utilized by the indemnifying party in the performance of this Contract.

The CONSULTANT agrees to hold the CITY harmless from loss, damage, injury or liability arising directly from the negligent acts or omission of the CONSULTANT, its employees, agents, subcontractors and their employees and agents.

Section 10. Insurance.

10.1. General

CONSULTANT assumes the entire responsibility and liability for all damages or injury to all persons, and to all property, arising out of or in any manner connected with the execution of the work under this Contract by CONSULTANT, and to the fullest extent permitted by law, CONSULTANT

shall defend and indemnify the CITY from all such claims including without limitation claims for which the CITY may be, or may be claimed to be, liable in whole or in part and legal fees and disbursements paid or incurred to defend any such claims, as well as legal fees paid or incurred in connection with enforcing the provisions of this paragraph. CONSULTANT assumes the entire responsibility and liability for all damages and injury to all persons, whether their employees or otherwise, and to all property arising out of or in any manner connected with the execution of the work by CONSULTANT under this Contract. CONSULTANT shall obtain, maintain and pay for general liability insurance coverage as will insure the provisions of this paragraph and any other contractual indemnities assumed by CONSULTANT in this specific consideration for this indemnity is $10.00, the receipt and sufficiency of which are hereby acknowledged by CONSULTANT.

10.2 Workers' Compensation

The CONSULTANT shall procure and maintain, during the life of this Contract, Worker's Compensation insurance as required by Florida Statutes for all of employees of the CONSULTANT engaged in work on the Project under this Contract.

10.3 Insurance Policy Limits

CONSULTANT shall procure and maintain insurance policies as specified in Attachment A of the solicitation, (REI# 2017-170).

10.4 Insurance Cancellation

The CONSULTANT shall furnish to the CITY Certificates of Insurance stating the Insurer will grant the City the same notification rights that it provides to the first named insured as respects cancellation and nonrenewal. If the insurance policies expire during the terms of the Contract, a renewal certificate or binder shall be filed with the CITY fifteen (15) days prior to the renewal date.

10.5 CITY to be Named Additional Insured

The amounts of insurance shall be determined by the CITY. The CITY shall be named as "additional insured" with regard to the coverage of General Liability and Automobile Liability policies.

10.6 Status of Claim.

The CONSULTANT shall be responsible for keeping the CITY currently advised as to the status of any claims made for damages against the CONSULTANT resulting from services performed under this Contract. The CONSULTANT shall send notice of claims related to work under this Contract to the City. Copies of the notices shall be sent by fax, hand delivery or regular mail to:

Public Works Director
City of Stuart
121 S.W. Flagler Avenue
Stuart, Florida 34994
FAX: (772) 288-5381

Section 11. Professional Standards

11.1 Other Agreements

CONSULTANT is entering into this Contract with the understanding that the CITY has no agreements, either written or oral, for professional services relating to this specific Project which include any of those services within the Scope of Services defined herein.

11.2 Approvals Not Guaranteed

All work performed by CONSULTANT will be in accordance with the highest professional standards and in accordance with all applicable governmental regulations. However, CONSULTANT does not warrant or represent that any governmental approval will be obtained, only that the CONSULTANT will exercise its best efforts to obtain all such approvals contemplated under this Contract.

11.3 Governmental Regulations Affecting Land Use

Unless the Scope of Services of this Contract includes an investigation into the applicable land use, zoning and platting requirements for the Project, CONSULTANT shall proceed on the assumption that the Project as presented by the CITY, is in accordance with all applicable governmental regulations.

Section 12. Opinions of Cost

Since the CONSULTANT has no control over the cost of labor, materials, equipment or services furnished by others, or over methods of determining prices, or over competitive bidding, or market conditions, any and all opinions as to costs rendered hereunder, including but not limited to opinions as to the costs of construction and materials, shall be made on the basis of its experience and qualifications and represent its best judgment as an experienced and qualified CONSULTANT, familiar with the construction industry. The CONSULTANT cannot and does not guarantee that proposals, bids or actual costs will not vary from opinions of probable cost. If at any time the CITY wishes greater assurance as to the amount of any cost, the CITY shall employ an independent cost estimator to make such determination. Consulting services required to bring cost within any limitation established by the CITY will be paid for as additional services hereunder by the CITY.

Section 13. General Conditions

13.1 Venue in Martin County

Venue for any lawsuit to enforce the terms and obligations of this Contract shall lie exclusively in the County Court or the Circuit Court in and for Martin County, Florida.

13.2 Laws of Florida

The validity, interpretation, construction, and effect of this Contract shall be in accordance with and governed by the laws of the State of Florida.

13.3 Attorney's Fees and Costs

In the event the CONSULTANT defaults in the performance of any of the terms, covenants and conditions of this Contract, the CONSULTANT agrees to pay all damages and costs incurred by the CITY in the enforcement of this Contract, including reasonable attorney's fees, court costs and all expenses, even if not taxable as court costs, including, without limitation, all such fees, costs and expenses incident to appeals incurred in such action or proceeding.

13.4 Mediation as Condition Precedent to Litigation

Prior to the initiation of any litigation by the parties concerning this Contract, and as a condition precedent to initiating any litigation, the parties agree to first seek resolution of the dispute through non-binding mediation. Mediation shall be initiated by any party by serving a written request for same on the other party. The party shall, by mutual agreement, select a mediator within 15 days of the date of the request for mediation. If the parties cannot agree on the selection of a mediator then the CITY shall select the mediator who, if selected solely by the CITY, shall be a mediator certified by the Supreme Court of Florida. The mediator's fee shall be paid in equal shares by each party to the mediation.

13.5 Contract Amendment

No modification, amendment or alteration in the terms or conditions contained in this Contract shall be effective unless contained in a written documents executed with the same formality and of equal dignity herewith. No verbal agreement by the CITY or the CITY's representative identified herein shall be binding or enforceable against the CITY.

13.6 Contractual Authority

By signing this Contract the Contractor swears or affirms, under penalty of perjury, that this is a valid act of the Contractor, and that no later claim shall be made by the CONTRACTOR that the Contract is invalid or an *ultra vires* act, by reason of a failure to have the proper authority to execute the Contract. In the event that a court of competent jurisdiction later determines that the Contract is or would be null and void for failure of the signatory to have proper or complete authority, this Contract shall nonetheless be deemed valid under the theory of "apparent authority," or in the sole alternative of the City, shall be deemed to be the act of the signatory, as an individual, who shall be fully responsible for its complete performance.

13.7 Sovereign Immunity

Nothing contained herein shall be construed or interpreted as a waiver of the sovereign immunity liability limits established under chapter 768.20 Florida Statutes as amended.

13.8 Competitive Negotiation

CONSULTANT shall execute a truth-in-negotiation certificate stating that wage rates and other factual costs supporting the compensation are accurate, complete, and current. The original contract price and any additions thereto will be adjusted to exclude any significant sums by which the City determines the contract price was increased due to inaccurate, incomplete, or noncurrent wage rates and other factual costs. All such contract adjustments must be made within one (1) year following the end of the contract.

13.9 Prohibition Against Contingent Fees

CONSULTANT warrants that he or she has not employed or retained any company or person, other than a bona fide employee working solely for the Engineer to solicit or secure this agreement and that he or she has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the CONSULTANT any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this agreement. For the breach or violation of this provision, the City shall have the right to terminate the agreement without liability and, at its discretion to deduct form the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration.

CONSULTANT or partnership thereof, who offers to pay, or pays any fee, commission, percentage, gift, or other consideration contingent upon, or resulting from, the award or making of any City contract for professional services shall, upon conviction in a state court of competent authority, be found guilty of a first degree misdemeanor, punishable as provided in F.S. 775.082 or F.S. 775.083.

Section 14. Public Records

If the Contractor has questions regarding the application of Chapter 119, Florida Statutes, to the Contractor's duty to provide public records relating to this contract, contact the office of the City Clerk as the custodian of Public Records for the City of Stuart, and all the respective departments at 772-288-5306 or cwhite@ci.stuart.fl.us , City of Stuart, City Clerk 121 SW Flagler Avenue, Stuart, Fl. 34994 per F.S. 119.12.

Public Records Relating to Compliance, Request for Records; Noncompliance, & Civil Action with F.S. 119.0701 the Contractor shall:

Keep and maintain public records required by the public agency to perform the service.

Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.

Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.

Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable

requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request, and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.

If a contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.

A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under F.S. 119.10.

If a civil action is filed against a contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:

1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and

2. At least 8 business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.

A notice complies with subparagraph 2 above, if it is sent to the public agency's custodian of public records and to the contractor at the contractor's address listed on its contract with the public agency or to the contractor's registered agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.

A contractor who complies with a public records request within eight (8) business days after the notice is sent is not liable for the reasonable costs of enforcement.

Section 15. Exhibits

The following Exhibits are attached to and made a part of this Contract:

"Exhibit A" - "Professional's Personnel Hourly Rate Schedule."

"Exhibit B" - "Insurance and Indemnification."

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Signatures are on following page

IN WITNESS WHEREOF, the City has hereunto subscribed and the Contractor has signed his, its, or their name, or names the date aforesaid.

CITY OF STUART, FLORIDA

ATTEST:

CHERYL WHITE **CITY CLERK**	**PAUL NICOLETTI** **CITY MANAGER**

APPROVED AS TO FORM AND CORRECTNESS:

MICHAEL MORTELL
CITY ATTORNEY

WITNESSES:

CONTRACTOR

(Signature)	(Signature)
(Signature)	Printed Name
	Title

EXHIBIT C

"INSURANCE & INDEMNIFICATION"

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 03/28/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Marsh USA, Inc.
1166 Avenue of the Americas
New York, NY 10036
Attn: NewYork.certs@Marsh.com Fax: (212) 948-0500

CONTACT NAME:
PHONE (A/C, No, Ext): **FAX (A/C, No):**
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Hartford Fire Insurance Company	19682
INSURER B : Hartford Casualty Insurance Company	29424
INSURER C : Twin City Fire Insurance Company	29459
INSURER D : N/A	N/A
INSURER E :	
INSURER F :	

INSURED
HAZEN AND SAWYER
498 SEVENTH AVENUE
NEW YORK, NY 10018

COVERAGES **CERTIFICATE NUMBER:** NYC-008749697-02 **REVISION NUMBER:** 3

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY**			10 UUN UU0890	03/29/2017	03/29/2018	EACH OCCURRENCE	$ 1,000,000
	CLAIMS-MADE [X] OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$ 10,000
							PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	POLICY [X] PRO-JECT [ ] LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:							$
B	**AUTOMOBILE LIABILITY**			10UENUU0960 (AOS)	03/29/2017	03/29/2018	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
A	X ANY AUTO			10UENAN2667 (MA)	03/29/2017	03/29/2018	BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
							Comp./Coll. Deductible	$ 1,000
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N	N / A		10 WB AS4398	03/29/2017	03/29/2018	X PER STATUTE OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? [N] **(Mandatory in NH)**						E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
City of Stuart is included as additional insured (except workers' compensation) where required by written contract.

CERTIFICATE HOLDER
City of Stuart
121 SW Flager Ave.
Stuart, FL 34994

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE of Marsh USA Inc.
Manashi Mukherjee Manashi Mukherjee

HAZE&SA-01 NCHANDUVI

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 03/27/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Ames & Gough 8300 Greensboro Drive Suite 980 McLean, VA 22102	PHONE (A/C, No, Ext): (703) 827-2277	FAX (A/C, No): (703) 827-2279
	E-MAIL ADDRESS: admin@amesgough.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Continental Casualty Company (CNA) A, XV	20443
INSURED	INSURER B :	
Hazen and Sawyer 498 Seventh Avenue New York, NY 10018	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	CLAIMS-MADE OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	ANY AUTO						BODILY INJURY (Per person)	$
	OWNED AUTOS ONLY / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						PER STATUTE OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Professional			AEH008231489	03/29/2017	03/29/2018	Per Claim	1,000,000
A	Liability			AEH008231489	03/29/2017	03/29/2018	Aggregate	2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
RE: REI 2017-170 – Assessment of Sustainable Alternative Water Supply Options

CERTIFICATE HOLDER

City of Stuart
121 SW Flager Ave.
Stuart, FL 34994

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

EXHIBIT D

"SAMPLE WORK AUTHORIZATION"

EXHIBIT D

"SAMPLE"
WORK AUTHORIZATION
TO THE
AGREEMENT FOR PROFESSIONAL SERVICES
BETWEEN THE CITY OF STUART AND
THE FIRM OF
XXXXXXXX

PROJECT DESCRIPTION: Name of Project.

I. PURPOSE

This is an attachment to the Master Agreement for Assessment of Sustainable Alternative Water Supply Options, REI #2017-170 dated _____, between the City of Stuart (CITY) and the firm of _____. (PROFESSIONAL) and made a part thereof. The purpose of this Work Authorization is to specify the required services of the_____.

II. PROFESSIONAL'S SERVICES

The PROFESSIONAL shall provide _____.

III. GENERAL SCOPE OF WORK

The PROFESSIONAL's services shall include, but not be limited to, the following tasks:

TASK 1:

TASK 2:

IV. CITY RESPONSIBILITIES

The CITY will provide specific data for the project. Such data shall; include as a minimum available;

V. WARRANTY

The PROFESSIONAL warrants that the services provided as a result of this Work Authorization are complete, correct and suitable for the purpose intended.

VI. AMERICANS WITH DISABILITIES

The PROFESSIONAL shall ensure compliance with all applicable governmental accessibility standards, including without limitation those applicable under Section 35.151 CFR.

VII. DELIVERABLES

The project deliverables associated with the work effort provided in Exhibit "B" will be delivered to the CITY in accordance with the schedule provided above.

VIII. PLAN AND DOCUMENT OWNERSHIP

The original documents will become the property of the City upon completion of this Project.

IX. SCHEDULES AND TIME CONSTRAINTS

Anticipated submittal times for the deliverables described in this scope of service will be completed as follows:

X. COMPENSATION

Payment for all services will be in accordance with the Standard Agreement for professional Services. Total compensation shall be based on the hourly rate schedule shown on Exhibit A for all services material, supplies and any other items or requirements necessary to complete the work as described herein to include actual salary costs, overhead and profit in an amount equal to 100% of actual salary cost shall not exceed _____ Dollars ($_____.__).

Out of pocket expenses including postage, printing, and copying and long distance phone calls shall be billed as a reimbursable expense at the PROFESSIONAL's actual cost. Reimbursable expenses shall not exceed the sum of _____ ($_____.__), therefore total compensation for all work shall not exceed _____ Dollars ($_____.__).

XI. ADDITIONAL TERMS

All exclusions and additional provisions agreed to in the original Agreement are to remain in full effect during the implementation of the project.

"Remainder of Page Intentionally Left Blank"

IN WITNESS WHEREOF, the parties have made and executed this Agreement, the day and year first above written.

PROFESSIONAL: **FIRM** (SEAL)

By:_____
(Signature)

BY _____ Date:_____
Corporate Officer Name & Title

Date _____ ATTEST:

_____

==========

APPROVED AS TO COMPLIANCE WITH PURCHASING & CONTRACTS POLICIES AND PROCEDURES

_____ Date _____
Procurement and Contracting Services Manager

==========

TECHNICAL PROVISIONS OF CONTRACT AND BUDGETARY REQUIREMENTS APPROVED

_____ Date _____
Public Works Director

==========

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND BENEFIT OF STUART CITY ONLY

_____ Date _____
City Attorney

==========

CITY OF STUART

_____ Date _____
City Manager

==========

CITY OF STUART

_____ Date _____
City Clerk

==========