

Mr. Clece Aurelus, PE
Acting Assistant Director, ECSD
City of Hollywood – Public Utilities
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Hollywood, FL 33022-9045

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Subject:
Steel Vessel Filters and Spiractor Evaluations – Condition Assessment and
Feasibility Study

Water South

Dear Mr. Aurelus:

Date:
May 7, 2020

In accordance with your request for professional services for the evaluation of elements within the existing Lime Softening system at the City of Hollywood's (City) Water Treatment Plant (WTP), Arcadis U.S., Inc. (Arcadis) is pleased to provide you with this Work Order proposal for the condition assessment of the existing steel vessel filters and Spiractors supports.

Contact:
Tung Nguyen, PE

This Work Order proposal covers services outlined in Article 2.2 (Pre-Design) of the Professional Services Agreement (PSA) (Number 17-1324) executed by and between the City and Arcadis on November 11, 2017. The Terms and Conditions of the PSA shall apply to this Work Order.

Phone:
954.246.0936

Email:
tung.nguyen@arcadis.com

BACKGROUND

Our ref:
10401790

The City currently treats raw water from multiple wellfields in the Biscayne and Floridan aquifers using three major treatment processes which are lime softening (LS), membrane softening (MS), and reverse osmosis (RO). The treated water is blended, disinfected, and pumped into the service area. The LS system was originally constructed in 1967 with additional treatment capacity added in phases as the WTP was expanded. This system treats water using a process known as fluidized bed crystallization which softens raw water with treatment units referred as spiractors, which are conical shaped tanks filled with sand, followed by 12 sand/anthracite steel vessel filters or six traditional dual media (open) filters. The major equipment/structures included in this train are lime silos, spiractors, and steel vessel filters which have provided reliable, high-quality water treatment for nearly 50 years. However, as the units are located outside and exposed to the environment, the ferrous metal elements require routine and continued

Florida License Numbers

Engineering
7917

Geology
GB564

Surveying
LB7062

maintenance. In recent years, several of the steel vessel filters have required increased repair efforts and costs and the need for potential improvements have been identified at the structural supports for the spiractors.

SCOPE OF WORK

The purpose of this project is to evaluate the condition of the WTP's 12 existing steel vessel filters (also referred to Automatic Valveless Gravity Filters (AVGFs) or self-backwashing filters) and assessing the feasibility of replacement of the filters (in-kind) and ensuring equipment is still readily available. In addition, an evaluation of the City's assets in September 2019 resulted in potential improvements and validation requirements for the anchors and supports at the spiractor units. The approach for this evaluation is divided into tasks as follows:

- Task 1 –Kick-off Meeting; Data Collection & Review
- Task 2 – Filter Evaluation – Steel Vessel Filters
- Task 3 – Structural Evaluation - Spiractors

Task 1 –Kick-off Meeting; Data Collection & Review

Arcadis shall coordinate, schedule, and complete the kick-off meeting to review the scope, schedule, budget, and roles and responsibilities for the project. In addition, Arcadis shall review the existing plant records and submit one request for information within 14 days from receipt of the Authorization to Proceed (ATP). The kick-off meeting shall be scheduled within two weeks of receipt of ATP.

Task 1 Deliverables:

1. Draft and Final Kick-off Meeting Minutes
2. Request for Information

Task 1 Assumptions:

1. The City will provide comments on the draft schedule and draft Kick-Off Meeting notes within five business days of receipt.
2. The City will provide data requested within 10 business days of receipt of the request for information.
3. Data regarding filter operation and history (backwash frequencies, backwash rates, turbidity profile, media replacement or depths, etc.) will be provided by the City.

Task 2 – Filter Evaluation – Steel Vessel Filters

Arcadis shall coordinate, schedule, and complete a site visit to perform a condition assessment of the existing filters. This task includes provisions for one site visit to assess the condition of the 12 filters. The condition assessment will be limited to visual inspections and photo-logging of accessible and non-confined space portions of the filters. It is anticipated that the results of the field condition assessment will

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be used to support the justification for potential expedited replacement of the filters. In addition, Arcadis will provide a recommended replacement sequence for each filter based on the observed field conditions and feedback from the City.

Arcadis shall develop a technical memorandum (TM) evaluating the replacement of the existing AVGFs including considerations for initial capital cost of construction, 20-year life-cycle cost, preliminary construction schedule, preliminary construction priority and sequencing, and maintenance of plant operations (MoPO).

Following the draft TM submittal and review period by the City, Arcadis shall schedule a conference call to review the draft TM with the City. Following the draft review conference call, a final TM shall be developed and submitted.

Task 2 Assumptions:

1. The City will provide Arcadis records related to maintenance and maintenance costs of past repairs for the filters.
2. The City will provide Arcadis records and documents relating to standard operating procedures, operator training, plant operating data and Operations and Maintenance Manuals.
3. The City will provide comments on the draft TM within 10 business days of receipt.
4. The City will select the preferred filters for evaluation and prepare filters for access by Arcadis during the field condition assessment and testing.
5. All work will be completed in non-confined spaces and access to the tanks will be provided by the City and/or using existing ladders/walkways. Access to areas requiring tie-off and safeties are not planned.
6. Development of basefile drawings in CAD is not included in this scope. Conceptual layouts will be prepared in AutoCAD 2019 or later on 11x17 figure borders if original drawings are available in AutoCAD format. If not, conceptual layouts will be limited to markups (hand-draft or digital) on scans of existing as-builts.

Task 2 Deliverables:

1. Draft and Final Filter Replacement TM
2. Draft TM Review Conference Call Summary

Task 3 – Structural Evaluation - Spiractors

Based on a visit to the WTP in September 2019 conducted as part of the City's Risk and Resilience Assessment, Arcadis and the City documented potential improvements and modifications related to the existing spiractor supports. As a result, Arcadis recommended that the existing supports be evaluated for design integrity and compliance with current code and industry standards. Arcadis shall assess the spiractors' anchorage by performing a site investigation, collecting related data, performing calculations, and shall recommend an appropriate course of action needed to mitigate any identified deficiencies.

Arcadis proposes to complete the following activities as part of this task:

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- Task 3.1 - Site Assessment Work
- Task 3.2 – Structural Evaluation Memorandum

Task 3.1 – Site Assessment - Spiractor Anchors and Support

Arcadis will review the existing drawings, available records, and general layout as part of data gathering. Prior to visiting the site, Arcadis will submit a request for additional information to the City that is required to complete the evaluation.

During the site visit, Arcadis will document the existing conditions with photographs and take measurements of the spiractors. In addition, anchorage field details/conditions will be assessed. Arcadis will enlist the services of a third-party metal corrosion evaluation contractor to obtain non-destructive samples and provide assessment of the extent of corrosion of the Spiractors base plates and support columns.

Task 3.2 – Structural Evaluation Technical Memorandum

Arcadis will prepare a technical memorandum recommending the action and preliminary sequencing needed to repair or modify the existing spiractors' anchorage to meet current code requirements including wind loading requirements.

Based on review of available data and findings from the site visit, corrosion evaluation and structural calculations, a draft structural evaluation memorandum will be prepared by Arcadis and submitted to the City for review. Prior to issuing the final memorandum, a review meeting via teleconference will be conducted and feedback /comments from the City will be incorporated into the final memorandum.

Task 3 Deliverables:

1. Draft and Final Structural Evaluation TM
2. Draft TM Review Conference Call Summary

Task 3 Assumptions:

1. The City will provide available existing drawings, standard specifications, safety requirements, and other applicable documents, upon request.
2. Arcadis will validate details and conditions of existing supports and structures based on existing design and construction records. If original records are not available, Arcadis will attempt to collect and validate dimensions of supports and structures where feasible. The effort under this task is not intended to be recreating a detailed "as-built" of the existing spiractors' details and layouts. For example, field data collection will be limited to measuring nominal plate size and thickness at the base, support diameters within reach of ground, and anchor/bolt pattens that are accessible from the ground. Field data collection would not attempt to collect information of elevated beams and members, detailed gauge measurements, exact size of steel shapes, welds, etc.

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SCHEDULE

Arcadis estimates that this work task will be completed in approximately 10 weeks from receipt of the City's ATP. Estimates for completion of key milestones are as follows:

Project Milestones	Estimated Duration to Completion from ATP
Task 1 – Kick-off Meeting; Data Collection & Review	4 weeks
Task 2 – Filter Evaluation – Steel Vessel Filters	10 weeks
Task 3 – Structural Evaluation - Spiractors	10 weeks

Note: The preliminary project milestones are based on normal working schedules. Travel and schedule restrictions caused by national, state, and local government directives (e.g. Covid-19) may impact this schedule.

BUDGET AND INVOICING

The proposed lump sum fee for this project is \$72,850. A breakdown of this lump sum fee is enclosed as Attachment A. Arcadis shall invoice monthly in accordance with the terms and conditions of our PSA.

The task breakdown for the lump sum fee is as follows:

Task	Fee
Task 1 – Kick-off Meeting; Data Collection & Review	\$ 12,310.00
Task 2 – Filter Evaluation – Steel Vessel Filters	\$ 36,180.00
Task 3 – Structural Evaluation - Spiractors	\$ 24,360.00
Total	\$ 72,850.00

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Mr. Clece Aurelus, PE
City of Hollywood – Public Utilities
May 7, 2020

Arcadis is excited about this opportunity to assist the City in evaluating the filters and spiractors at the City's WTP. We understand that these elements are part of e critical processes that are essential to serving the City's customers and we have dedicated staff ready to start this important project. Should you have any questions regarding this work order proposal, please do not hesitate to contact me via email (tung.nguyen@arcadis.com) or telephone (954.246.0936).

Sincerely,

Arcadis U.S., Inc.



Tung Nguyen, PE, PMP
Senior Water and Wastewater Engineer

Copies:

Wilhelmina Montero, PE, MS (City of Hollywood)
Plantation Files (Arcadis)

Enclosures:

1 Attachment A - Detailed Lump Sum Fee Breakdown

This proposal and its contents shall not be duplicated, used, or disclosed — in whole or in part — for any purpose other than to evaluate the proposal. This proposal is not intended to be binding or form the terms of a contract. The scope and price of this proposal will be superseded by the contract. If this proposal is accepted and a contract is awarded to Arcadis as a result of — or in connection with — the submission of this proposal, Arcadis and/or the client shall have the right to make appropriate revisions of its terms, including scope and price, for purposes of the contract. Further, client shall have the right to duplicate, use or disclose the data contained in this proposal only to the extent provided in the resulting contract.

	Labor Category	Contract Labor Category	Hours	Billing Rate (\$ / hr)	Cost	Fee / Task	Total Fee
							\$ 72,850.00
						Arcadis Labor	\$ 66,470.00
						Subconsultant (Testing Sub) Costs	\$ 5,000.00
						Other Direct Expenses	\$ 1,380.00
						Contingency	\$ -
1	Task 1 – Kick-off Meeting; Data Collection & Review						\$ 7,310.00
	Labor Subtotal						\$ 7,310.00
	Frank Sidari III, PE	Lead Engineer/Technical Expert	Principal Engineer 1		\$ 240.00	\$ -	
	Housam Hobi, PE	Lead Engineer/Technical Expert	Principal Engineer 1	1	\$ 220.00	\$ 220.00	
	Vincent Vitale, PE	Lead Engineer (HVAC)	Senior Associate		\$ 220.00	\$ -	
	Tung Nguyen PE	Project Manager	Senior Associate	18	\$ 200.00	\$ 3,600.00	
	James O'Shaughnessy, PE	Senior Engineer II	Project Engineer 4	6	\$ 200.00	\$ 1,200.00	
	Sean Chaparro, PE	Principal Engineer	Project Engineer 3		\$ 150.00	\$ -	
	Judy Ford	Project Assistant	Chief Technician		\$ 150.00	\$ -	
	Steve Zeid, PE	Senior Designer (Structural)	Project Engineer 2		\$ 130.00	\$ -	
	Sopeark Chhea, PE	Staff Engineer (HVAC)	Project Engineer 2		\$ 130.00	\$ -	
	Lia Dombroski	Staff Engineer	Project Engineer 2	8	\$ 130.00	\$ 1,040.00	
	Seth Finnicum	Engineer	Project Engineer 1		\$ 180.00	\$ -	
	Shantanu Dandane	Staff Engineer	Project Engineer 1	1	\$ 130.00	\$ 130.00	
	Andrea Guzman	Senior CADD Technician	Senior Technician		\$ 115.00	\$ -	
	Seul (Kevin) Chung	Billing Specialist	Administrative 3		\$ 100.00	\$ -	
	Katie Kasperek	Drafter II	Technician		\$ 90.00	\$ -	
	Mindy Mondesir	Administrative/Clerical	Administrative 2	16	\$ 70.00	\$ 1,120.00	
	Subcontractor Labor Subtotal						\$ -
	Testing Sub (TBD)	Specialty Testing (UTM)			\$ -		
	Other Direct Expenses						\$ -
	Travel	(mileage or airfare)			\$ -	\$ -	
	Miscellaneous Expenses	(reproduction)			\$ -	\$ -	
2	Task 2 – Filter Evaluation – Steel Vessel Filters						\$ 36,180.00
	Labor Subtotal						\$ 35,600.00
	Frank Sidari III, PE	Lead Engineer/Technical Expert	Principal Engineer 1	12	\$ 240.00	\$ 2,880.00	
	Housam Hobi, PE	Lead Engineer/Technical Expert	Principal Engineer 1		\$ 220.00	\$ -	
	Vincent Vitale, PE	Lead Engineer (HVAC)	Senior Associate		\$ 220.00	\$ -	
	Tung Nguyen PE	Project Manager	Senior Associate	31	\$ 200.00	\$ 6,200.00	
	James O'Shaughnessy, PE	Senior Engineer II	Project Engineer 4	44	\$ 200.00	\$ 8,800.00	
	Sean Chaparro, PE	Principal Engineer	Project Engineer 3		\$ 68.00	\$ -	
	Judy Ford	Project Assistant	Chief Technician		\$ 150.00	\$ -	
	Steve Zeid, PE	Senior Designer (Structural)	Project Engineer 2		\$ 130.00	\$ -	
	Sopeark Chhea, PE	Staff Engineer (HVAC)	Project Engineer 2		\$ 130.00	\$ -	
	Lia Dombroski	Staff Engineer	Project Engineer 2	108	\$ 130.00	\$ 14,040.00	
	Seth Finnicum	Engineer	Project Engineer 1		\$ 180.00	\$ -	
	Shantanu Dandane	Staff Engineer	Project Engineer 1		\$ 130.00	\$ -	
	Andrea Guzman	Senior CADD Technician	Senior Technician	32	\$ 115.00	\$ 3,680.00	
	Seul (Kevin) Chung	Billing Specialist	Administrative 3		\$ 100.00	\$ -	
	Katie Kasperek	Drafter II	Technician		\$ 90.00	\$ -	
	Mindy Mondesir	Administrative/Clerical	Administrative 2		\$ 70.00	\$ -	
	Subcontractor Labor Subtotal						\$ -
	Testing Sub (TBD)	Specialty Testing (UTM)			\$ -		
	Other Direct Expenses						\$ 580.00
	Travel	(mileage or airfare)	1	\$ 580.00	\$ 580.00		
	Miscellaneous Expenses	(reproduction)		\$ -	\$ -		
3	Task 3 – Structural Evaluation - Spiractors						\$ 29,360.00
	Labor Subtotal						\$ 23,560.00
	Frank Sidari III, PE	Lead Engineer/Technical Expert	Principal Engineer 1	1	\$ 240.00	\$ 240.00	
	Housam Hobi, PE	Lead Engineer/Technical Expert	Principal Engineer 1	40	\$ 220.00	\$ 8,800.00	
	Vincent Vitale, PE	Lead Engineer (HVAC)	Senior Associate		\$ 220.00	\$ -	
	Tung Nguyen PE	Project Manager	Senior Associate	5	\$ 200.00	\$ 1,000.00	
	James O'Shaughnessy, PE	Senior Engineer II	Project Engineer 4		\$ 200.00	\$ -	
	Sean Chaparro, PE	Principal Engineer	Project Engineer 3		\$ 150.00	\$ -	
	Judy Ford	Project Assistant	Chief Technician		\$ 150.00	\$ -	
	Steve Zeid, PE	Senior Designer (Structural)	Project Engineer 2		\$ 130.00	\$ -	
	Sopeark Chhea, PE	Staff Engineer (HVAC)	Project Engineer 2		\$ 130.00	\$ -	
	Lia Dombroski	Staff Engineer	Project Engineer 2	8	\$ 130.00	\$ 1,040.00	
	Seth Finnicum	Engineer	Project Engineer 1		\$ 180.00	\$ -	
	Shantanu Dandane	Staff Engineer	Project Engineer 1	96	\$ 130.00	\$ 12,480.00	
	Andrea Guzman	Senior CADD Technician	Senior Technician		\$ 115.00	\$ -	
	Seul (Kevin) Chung	Billing Specialist	Administrative 3		\$ 100.00	\$ -	
	Katie Kasperek	Drafter II	Technician		\$ 90.00	\$ -	
	Mindy Mondesir	Administrative/Clerical	Administrative 2		\$ 70.00	\$ -	
	Subcontractor Labor Subtotal						\$ 5,000.00
	Testing Sub (TBD)	Specialty Testing (UTM)			\$ 5,000.00		
	Other Direct Expenses						\$ 800.00
	Travel	(mileage or airfare)		\$ 800.00	\$ 800.00		
	Equipment			\$ -	\$ -		
	Miscellaneous Expenses	(reproduction)		\$ -	\$ -		