

1580 Sawgrass Corporate Parkway, Suite 400  
Sunrise, Florida 33323  
Tel: 954.200.7234

www.brownandcaldwell.com



September 26, 2023

Mr. Feng Jiang, PE  
Assistant Director - Engineering Support Services  
City of Hollywood Department of Public Utilities  
P.O. Box 229045 Hollywood, FL 33022-9045

Subject: Membrane Replacement & Water Quality Support Services

Dear Mr. Jiang:

As requested, Brown and Caldwell is pleased to prepare this professional engineering and administrative services work order that provides engineering support for the procurement and replacement of existing nanofiltration membranes, as well as various operational performance and compliance consulting activities associated with water quality improvements and compliance with the Ocean Outfall Legislation.

#### **BACKGROUND**

Since 2009, Brown and Caldwell has served as one of the City's engineering consultants and is well aware of the City faces wide-ranging challenges that need to be addressed appropriately in order to continue to move the City forward. Current Brown and Caldwell staff has a long history (prior to 2009) of successfully supporting the City's needs in a variety of areas directly related to this work order and will leverage that history to assist the City in addressing the following identified needs:

- Replacement of membrane elements in seven nanofiltration skids.
- Ocean outfall legislation compliance - focus on status review/development of outstanding requirements yet to be addressed.
- Continuing engineering/project management support.

The existing nanofiltration (NF) and reverse osmosis (RO) membranes in service at the WTP are approaching the end of their functional useful life, which is typically seven to 10 years for NF membranes and typically longer for RO membranes. The City plans to replace membranes and pressure vessels in seven nanofiltration skids and competitively procure the services of a contractor who will oversee delivery efforts.

Consistent with this objective, the primary objectives of this task authorization are to procure professional engineering services for the preparation of contract documents for the replacement of membrane elements and associated peripherals (connectors, end caps) replacement, provide bidding support, as well as engineering support during the replacement of pressure vessels and membrane elements, and prepare a procurement specification for soliciting bids to furnish and install. Additional objectives include:

Consistent with this objective, the primary objectives of this task authorization are to procure professional engineering services for the preparation of contract documents for the replacement of membrane elements and associated peripherals (connectors, end caps) replacement, provide bidding support, as well as engineering support during the replacement of pressure vessels and membrane elements, and prepare a procurement specification for soliciting bids to furnish and install. Additional objectives include:

1. Provide support services during installation efforts.
2. Assess the adequacy of the existing cleaning regimen and identify improvement considerations.
3. Provide technical support for additional water quality improvement efforts.

## **SCOPE OF SERVICES**

Brown and Caldwell will provide professional engineering and administrative support in support of the project objectives. Anticipated tasks are summarized below.

### **Task 1 – Membrane Replacement Design and Bidding Services**

Objective: Support City's effort to competitively procure a contractor to replace the existing NF elements together with pressure vessels and appurtenant components where necessary. Consultant's role will be the preparation of the technical specifications and bid documents to define the project requirements. Consultant shall assist the City in coordinating the technical specifications with the City-provided front-end documents (bidding requirements, contract forms, and conditions of the contract). The proposed level of effort for this task is based on the assumption that membrane elements in a total of seven NF skids will be replaced. **Warranty period support services are not included in this task authorization.**

#### Activities:

1. Prepare for and participate in project meetings (three) to facilitate coordination and review activities.
2. Prepare technical specifications and bid documents for procurement of replacement membranes and associated peripherals (end caps, connectors, etc.). Progress submittals (electronic) of the bid documents will be submitted at the 90%, and 100% complete stages of development.
3. Prepare an estimate of probable construction cost for each submittal (90% and 100% completion).
4. FDEP Notification - It is not anticipated that a permit will be required. However, Consultant shall prepare and submit a letter to FDEP notifying them of the planned membrane replacement and the general scope of the project.
5. Bidding Phase – Consultant will attend a pre-bid meeting and site walkthrough with prospective bidders and shall prepare written responses to written questions from prospective bidders during the bid phase and review and evaluate Contractor's bid for material delivery, storage, replacement schedule and cost. It is assumed that the City will be responsible for preparation and reproduction of the bid sets, bid advertisement, distribution and administration of bid sets, preparation of addenda, bid opening, bid evaluation, contract award, and other activities during the bid phase.

## Task 2 – Membrane Replacement Services During Construction

Objective: Provide engineering support services during the replacement, commissioning, and close-out of membrane replacement construction activities. Support includes the City's preparation for de-commissioning, temporary piping modifications, recommissioning and testing of replacement nanofiltration membranes and pressure vessels.

### Activities:

1. Review baseline project schedule and schedule of values.
2. Prepare conformed technical specifications to incorporate changes made to the bid documents.
3. Prepare for and attend preconstruction meeting, and compile, prepare and distribute a summary of the meeting to attendees and the City's contract representative.
4. Provide contract administration support services including the review of payment applications, substitution requests, rendering interpretations of the contract and technical specifications, negotiating proposed contract changes, and shop drawing submittals,
5. Review and respond to requests for information (RFIs) related to technical interpretation of the specifications (5 assumed).
6. Participate in monthly progress meetings and site visits. A summary of each progress meeting will be prepared and distributed to meeting attendees and the City's representative. Progress meetings will be coordinated with site visits where feasible or conducted via teleconference. Anticipated site visits are assumed as follows:
  - a. Inspection of membranes on delivery (3 shipments)
  - b. Observation of pressure testing (7 events).
  - c. Membrane loading
  - d. Observation of startup
  - e. Observation during performance testing
  - f. Four general progress site visits and support of troubleshooting activities.
7. Review MEM report for replacement membranes in each skid including membrane serial number mapping, initial start-up data, and steady state data.
8. Completion Milestones and Project Closeout Activities - Perform milestone site visits for Substantial Completion and Final Completion contract milestones. Consultant shall organize and participate in final project reconciliation meeting with City and Contractor and prepare a close-out recommendation letter.

## COMPENSATION

Brown and Caldwell will perform the noted services for a total fee of **\$234,393.36** to be billed on an hourly rate basis. The specific level of effort for the noted potential services cannot be predicted given the nature of this work order; however, the anticipated allocation of budget among the tasks is summarized below. Depending on the specific needs of each task that arise during the performance of the work, budget may be reallocated among the tasks subject to availability of adequate resources.

Task	Description	Estimated Allowance
1	Membrane Replacement Design and Bidding Services	\$66,404.78
2	Membrane Replacement Services During Construction	\$167,988.58
	TOTAL	\$234,393.36

The terms of compensation shall be in conformance with our Professional Services Agreement for General Engineering Consultant Services dated October 25th, 2017, between the City of Hollywood and Brown and Caldwell.

**ASSUMPTIONS:**

1. One substantial completion milestone is assumed for the overall project.
2. Level of effort required to support construction observation is difficult to predict and some individual tasks may take for or less that estimated. Underlying assumptions that guide level of effort determination for select activities include:
  - a. Membrane loading inspection – 8 hours per skid
  - b. Startup observation - 8 hours per skid
  - c. Performance testing observation – 16 hours per skid
3. Warranty period support services are not included.

We appreciate the opportunity to serve the City. Please let us know if you require additional information. We look forward to continuing to work for the City of Hollywood. Please contact us with any questions.

Very truly yours,

**Brown and Caldwell**



Celia D. A. Earle, PhD, BCEEM

Vice President

cc: Albert Perez, PE, Brown and Caldwell  
Nigel Grace, PE, Brown and Caldwell  
Diego Herrera, PE, Brown and Caldwell

## EXHIBIT B-1

### Summary of Engineering Fees - City of Hollywood - Membrane Replacement and Water Quality - Support Services

Description	Amount
Direct Labor Costs	\$ 105,623.36
Subcontracts and Other Direct Costs	\$ 128,770.00
<b>Total Fee</b>	<b>\$ 234,393.36</b>

**EXHIBIT B-2  
LABOR COST ESTIMATE  
CITY OF HOLLYWOOD  
MEMBRANE REPLACEMENT AND WATER QUALITY SUPPORT SERVICES**

		<b>CSM/PDO</b> Vice President	<b>PM/Sr. Eng</b> Design PM	<b>Support</b> Engineer III	<b>Estimator</b> Principal Engineer Eng	<b>PA</b> Project Administrator		
	<b>Billing Labor Rate</b>	<b>\$292.10</b>	<b>\$251.84</b>	<b>\$156.05</b>	<b>\$209.52</b>	<b>\$113.70</b>		
<b>TASKS</b>								
<b>TASKS NOS. 1 and 2</b>								
<b>1.0</b>	<b>Membrane Replacement Design and Bidding Services</b>							
1.1	Project meetings	18	18			24	\$	12,519.72
1.2	Finalize Technical Specifications	2	16	30			\$	9,295.14
1.3	Preparation of EOPCC	4	8		24		\$	8,211.60
1.4	FDEP Notification	4	2	4			\$	2,296.28
1.5	Bidding phase services	2	16	8			\$	5,862.04
<b>2.0</b>	<b>Membrane Replacement Services During Construction</b>							
2.1	Review baseline schedule and SOV	2	4				\$	1,591.56
2.2	Conform technical specifications		2	8			\$	1,752.08
2.3	Pre-construction meeting	4	8				\$	3,183.12
2.4	Contract administration	8	24	40			\$	14,622.96
2.5	Request for information	4	8	16			\$	5,679.92
2.6	Monthly progress meetings and site visits	30	30	50			\$	24,120.70
2.7	Report for each NF unit and start-up data, steady state data	20	8	16			\$	10,353.52
2.8	Completion Milestone and closeout	4	8	16		4	\$	6,134.72
	Hour Subtotal	102	152	188	24	28		494
	<b>Labor Cost Subtotal</b>	\$29,794	\$38,280	\$29,337	\$5,028	\$3,184		\$105,623.36
<b>TOTALS</b>								
	<b>Total Labor Hours</b>	102	152	188	24	28		494
	<b>Total Labor Cost</b>	\$29,794	\$38,280	\$29,337	\$5,028	\$3,184		\$105,623.36
<b>TOTAL</b>								<b>\$105,623.36</b>

**EXHIBIT B-3**

**OTHER DIRECT COSTS SUMMARY  
Membrane Replacement and Water Quality  
SUPPORT SERVICES**

	UNIT	NO. OF UNITS	UNIT COST	TOTAL COST
1.0 COPYING AND PRINTING	LS			\$1,000.00
2.0 TRAVEL	LS			\$0.00
			<b>SUBTOTAL OTHER DIRECT COSTS</b>	<b>\$1,000.00</b>
3.0 SUBCONTRACTS	HR			\$127,770.00
M&B	LS			
			<b>SUBCONTRACTS SUBTOTAL</b>	<b>\$127,770.00</b>
<b>TOTAL ODCS</b>				<b>\$128,770.00</b>

**City of Hollywood**  
**NF Membrane Element and Pressure Vessel Replacement**  
**Preliminary Project Schedule**

Milestone	Days from Prev Task	Days from NTP	Estimated Date
Notice to Proceed (NTP) to Engineer	0	0	1-Nov-23
Submittal of 90% Documents	30	30	1-Dec-23
Receipt of City Comments on 90% Submittal	30	60	31-Dec-23
Submittal of 100% Documents	30	90	30-Jan-24
Advertisement for Bids	30	120	29-Feb-24
Bid Opening	30	150	30-Mar-24
Notice of Award to Contractor	30	180	29-Apr-24
NTP to Contractor	30	210	29-May-24
Review/approval of major shop drawings	60	270	28-Jul-24
Release of pressure vessels and membrane elements	15	285	12-Aug-24
Shipping/arrival of first shipment	150	435	9-Jan-25
Pressure vessel, membrane replacement, Unit 1	45	480	23-Feb-25
Pressure vessel, membrane replacement, Unit 2	45	525	9-Apr-25
Pressure vessel, membrane replacement, Unit 3	45	570	24-May-25
Pressure vessel, membrane replacement, Unit 4	45	615	8-Jul-25
Pressure vessel, membrane replacement, Unit 5	45	660	22-Aug-25
Pressure vessel, membrane replacement, Unit 6	45	705	6-Oct-25
Pressure vessel, membrane replacement, Unit 7	45	750	20-Nov-25
Substantial Completion:	30	780	20-Dec-25
Final Completion:	30	810	19-Jan-26

Estimated Substantial Completion Contract Time (days): 570 days = 81 weeks = 18.8 months

Estimated Final Completion Contract Time (days): 600 days = 86 weeks = 19.7 months

Contingency: 45 days

Contractual Substantial Completion Contract Time (days): 615 days

Contractual Final Completion Contract Time (days): 645 days





**McCAFFERTY BRINSON**  
*consulting*

September 7, 2023 [Revised September 21, 2023]

Mr. Diego M. Herrera, P.E.  
Project Manager  
Brown and Caldwell  
1580 Sawgrass Corporate Parkway  
Suite 400  
Sunrise, Florida 33323

**Subject: City of Hollywood  
Nanofiltration (NF) Membrane Element and Pressure Vessel Replacement  
Proposal for Professional Engineering Services**

Dear Nigel:

McCafferty Brinson Consulting, LLC (MBC) is pleased to submit to Brown and Caldwell (B-C) this proposal for professional engineering services for the above-referenced project. This proposal is based on the draft professional engineering and administrative services work order entitled Membrane Replacement & Water Quality Support Services dated September 5, 2023. As you requested, MBC proposes to provide professional engineering services in accordance with the draft work order and the attached engineering budget estimate, on a per-task basis, as follows:

Tasks 1 and 2: MBC will have primary responsibility for execution of all activities and preparation of deliverables to the Owner. B-C will provide limited support including coordination and interfacing with the Owner, attendance at selected meetings (to be determined by B-C), review and comment on MBC's work products (at B-C's discretion), and observation of field activities (at B-C's discretion).

MBC proposes to provide the above services for a not-to-exceed fee of \$127,770. Please review this proposal and attached engineering budget at your convenience and call me if you have questions or would like to discuss it. We are looking forward to working with B-C on this important and interesting project.

Sincerely,

Frank A. Brinson, P.E., BCEE  
Vice President  
**McCafferty Brinson Consulting, LLC**  
[fbrinson@mccaffertybrinson.com](mailto:fbrinson@mccaffertybrinson.com)

cc: Nigel Grace, B-C  
Celia Earl, B-C

\\\\MBC\MBC Public\Shared\Project Files\Brown and Caldwell\Hollywood\18-06 Hollywood Membrane Element Replacement\Project Mgmt\Engineering Scope and Budget\Proposal Cover Letter.docx

**Exhibit A**

**City of Hollywood  
Water Treatment Plant Nanofiltration Membrane Element and Pressure Vessel Replacement**

**Engineering Budget Estimate**

Task Description	<i>Principal Engineer</i> \$230 per hour		<i>Engineer II</i> \$130 per hour		<i>Engineer Intern</i> \$110 per hour		<i>Total Labor</i>	
	hours	budget	hours	budget	hours	budget	hours	budget
1.0 Membrane Replacement Design and Bidding Services								
1.1 Project meetings	18	\$4,140	18	\$2,340	6	\$660	42	\$7,140
1.2 Finalize technical specifications	16	\$3,680	16	\$2,080	8	\$880	40	\$6,640
1.3 Estimates of probable construction cost (90%, 100%)	8	\$1,840	16	\$2,080	8	\$880	32	\$4,800
1.4 FDEP notification	4	\$920	8	\$1,040	0	\$0	12	\$1,960
1.5 Bidding phase services	20	\$4,600	16	\$2,080	0	\$0	36	\$6,680
2.0 Membrane Replacement Services During Construction								
2.1 Review baseline schedule and SOV	8	\$1,840	4	\$520	0	\$0	12	\$2,360
2.2 Conformed technical specifications	2	\$460	4	\$520	16	\$1,760	22	\$2,740
2.3 Preconstruction meeting	8	\$1,840	8	\$1,040	0	\$0	16	\$2,880
2.4 Contract administration	48	\$11,040	64	\$8,320	32	\$3,520	144	\$22,880
2.5 Requests for Information	10	\$2,300	10	\$1,300	0	\$0	20	\$3,600
2.6 Monthly progress meetings and site visits	122	\$28,060	122	\$15,860	15	\$1,650	259	\$45,570
2.7 Report for each NF unit and SDs	40	\$9,200	40	\$5,200	20	\$2,200	100	\$16,600
2.8 Completion milestones and closeout	8	\$1,840	16	\$2,080	0	\$0	24	\$3,920
<b>Totals:</b>	<b>312</b>	<b>\$71,760</b>	<b>342</b>	<b>\$44,460</b>	<b>105</b>	<b>\$11,550</b>	<b>759</b>	<b>\$127,770</b>

**Total Not-to-Exceed Fee: \$127,770**

**Estimated Construction Contract Times**

Contract Time (Substantial Completion) =	615 days =	88 weeks =	20.2 months
Contract Time (Final Completion) =	645 days =	92 weeks =	21.2 months