



***REQUEST FOR PROPOSAL – DESIGN BUILD SERVICES FOR
WATER RECLAMATION FACILITY (WRF) ONSITE IMPROVEMENTS***

ADDENDUM NO. 2

March 27, 2018

Proposers are hereby informed the Request for Proposals issued January 24, 2018, by the City of Morro Bay (City) for the above project has been amended by the following information. A signed copy of this sheet acknowledging the receipt of this addendum shall be included with Proposals.

1. **Schedule:** Revise the proposal submission deadline to: **May 8, 2018 at 2:00 PM**
2. **Fire Flow Availability:** The City is in the process of preparing the OneWater Morro Bay Plan. A water main replacement (from existing 8-inch to a 10-inch) is planned on Quintana Road between La Loma Avenue and South Bay Boulevard, which will improve fire flow availability for the new WRF. Assume the following flows and pressures at the point of connection to the City's water line (near Teresa Road at South Bay Boulevard

at an elevation of 54.6 feet) to determine any required improvements to meet the fire flow criteria for the WRF:

Available fire flow (gallons per minute)	Residual Pressure (psi)
1,500	65.5
2,240	20

- Design Flows:** Preliminary collection system modeling has recently been completed for the City’s One Water Plan. Wastewater flows in the collection systems have been estimated for both existing and future flow conditions with and without recommended improvements. The model used data from the 2017 Sewer Flow Monitoring and Inflow/Infiltration Study (V&A Consulting Engineers, January 2018). The design for the influent lift station and offsite pipelines for the WRF and are currently using these flows. No additional storage or flow dampening in the collection system is anticipated based on preliminary analysis. In order to ensure the WRF and influent lift station and pipelines are designed to operate without conflict, assume the following existing and future influent flows for the WRF:

Estimated Morro Bay WRF Influent Wastewater Flows (MGD)				
Flow Condition	Existing	Existing with Collection System Improvements	Future (2040)	Future (2040) with Collection System Improvements
Average Dry Weather Flow (ADWF)	0.90	0.90	1.00	1.00
Peak Dry Weather Flow (PDWF)	2.08	2.08	2.74	2.74
Peak Wet Weather Flow (PWWF)	5.85	7.90	8.14	8.14

- IPR Travel Time:** Assume a minimum of 4 months travel time (modeled) between injection and extraction wells. The City is in the process of initiating the next steps related to injection and extraction in the Morro Valley groundwater basin, including a siting study, pilot testing for injection and extraction, and preliminary design recommendations for the injection wells. For the proposal, DB may assume 4 months of modeled travel time is available between recycled water injection and extraction. Assume 2 months of actual subsurface response retention time.
- Attachment A Performance Criteria Report (PCR), Part 2.2 Influent (Coarse) Screening:** Delete the following sentence: “Conveyance, compaction, dewatering, and screening systems shall be provided by the same manufacturer.”
- PCR, Figure 1-2 Conceptual Layout:** There are facilities on the site plan that are not explicitly described in the PCR, including vehicle storage, open storage, wash rack, WRF Parking Canopy, and other elements. Structural and architectural requirements for buildings and structures not specifically defined are per Section 4.3 Item 5. Assume the following additional space and functional criteria.

Facility	Area Dimensions, DB to confirm	Type	Notes
General Laydown Area	100' x 25'	Uncovered	Preferred location is on outskirts of site. Provide sufficient laydown area for staging WRF, water, and wastewater maintenance and construction equipment
Outdoor Storage Aisles	(4) 75' x 25'	Outdoor materials storage bins, 3 of 4 covered	Preferred location is on outskirts of site
Wash Rack	20' x 40'	Uncovered	See section 4.5 for construction requirements
WRF Parking Canopy	Adequate for 10 large vehicles	Covered Parking	Provide covered parking for large sewer cleaning vehicles, minimum 30 feet deep
WRF Parking	DB to determine	Asphalt	Parking shall be adequately sized to accommodate anticipated staff and visitors
Collection Vehicles Equipment Storage	50' x 50'	Covered parking	Provide sufficient parking/storage area for City's Collection Vehicles
Water Vehicles Equipment Storage	50' x 56'	Covered parking	Provide sufficient parking/storage area for City's Water Vehicles
Water Supply Storage	25' x 30'	Building	Provide sufficient space for water equipment (meters, fittings, pipe, etc.). Install adjacent to Water Vehicles Equipment Storage
Collection Supply Storage	25' x 30'	Building	Provide sufficient space for collections equipment (flow meters, fittings, pipe, etc.) as part of the Maintenance Shop Building
Standby emergency power	DB to determine	Equipment on pad	Generator on concrete pad on grade meeting requirements of section 8.6.8

7. **PCR, Part 2.2 Influent (Coarse) Screening:** Delete the following sentence: "Conveyance, compaction, dewatering, and screening systems shall be provided by the same manufacturer."
8. **PCR, Part 2.3 Grit Removal:** Delete the following sentence: "Conveyance, dewatering, and grit removal systems to be provided by the same manufacturer."
9. **PCR, Part 2.4 Flow Equalization Basin,** design criteria table, Item 1 Geometry: Revise from "... at least 4 equivalent sized bays..." to "... at least 2 equivalent sized bays..."
10. **PCR, Part 2.5 Fine Screening:** Delete the following sentence: "Conveyance, compaction, dewatering, and screening systems to be provided by the same manufacturer."

11. **PCR, Part 2.5 Fine Screening**, design criteria table, Item 1 total number of units: Revise to Screens: N+1; Washer Compactors: 1 dedicated washer/compactor for each screen.
12. **PCR, Part 2.6 Membrane Bioreactor (MBR)**: Delete the following sentence: “Pumps, control valves, compressors, blowers, instrumentation, controls, and other equipment necessary for operation shall be furnished as part of a single MBR manufacturer’s package.”
13. **PCR, Part 2.6, MBR**, design criteria table, item 9 Biological Nutrient Removal Redundancy Requirement: Revise redundancy criteria at MMF to 1 train out of service.
14. **PCR, Part 2.6, MBR**, design criteria table, item 10 Membrane Bioreactor Redundancy requirement: Revise to remove requirement for PDF and to require 1 train out of service for maintenance at AAF and MMF for redundancy.
15. **PCR, Part 2.7 Aerobic Sludge Digester**, design criteria table, Item 3 minimum volume: Revise to change the flow condition from MMF to AAF: “14 days of storage at AAF conditions.”
16. **PCR, Part 2.7 Aerobic Sludge Digester**, design criteria table, Item 1 Total number of units: Revise to reduce the total number of blowers from 3 to 2: “1 Digester, 2 Blowers: 1 duty and 1 standby”
17. **PCR, Part 2.8 Sludge Dewatering**: Delete the following sentence: “Pumps, conveyance, polymer storage and feed system, and dewatering systems to be provided by the same manufacturer”.
18. **PCR, Part 2.8, Sludge Dewatering**, design criteria table, Item 1 Total Number of Units: Revise to 1 total.
19. **PCR, Part 2.8, Sludge Dewatering**, design criteria table, Item 7 Minimum Solids Concentration: Revise to 17% total dry solids.
20. **PCR, Part 2.8, Sludge Dewatering**, design criteria table, Item 10 Odor Control: Revise as follows:

Item	Parameter	Criteria	Notes
10	Odor Control	Provide Dewatering Building with full ventilation and provisions to connect to odor control in future for dewatering unit, conveyance, and rolloff container/truck loading area for containment	

21. **PCR, Part 2.10, UVAOP**, design criteria table, Item 2 Oxidant and Item 12 Project Water Quality Requirements: Replace with the following:

Item	Parameter	Criteria	Notes
2	Oxidant	Hydrogen peroxide or sodium hypochlorite	
12	Product Water Quality Requirements	<ul style="list-style-type: none"> Meet Recycled Water Requirements in Waste Discharge Order Meet requirements in CCR Title 22 for GRRP subsurface injection pH = 7.0 to 8.5 	

22. **PCR, Part 2.11 Chemical Storage and Feed Facilities**: Tanks may be allowable for chemicals with larger use volumes, so long as there are installed provisions to connect and use chemical totes for operational flexibility.

23. **PCR, Part 2.11, Chemical Storage and Feed Facilities**: Decentralized chemical storage and feed is acceptable for optimized operations and maintenance. Minimize locations of chemical storage to the extent feasible. Ensure containment and other performance requirements are met for each chemical storage/feed area as indicated in the Performance Criteria Report.

24. **PCR, Part 2.11, Chemical Storage and Feed Facilities**, design criteria table, Feed Pumps, Item 11 Chemical piping: Revise as follows.

Item	Parameter	Criteria	Notes
Feed Pumps			
11	Chemical Piping	<ul style="list-style-type: none"> Use CPVC piping with PVC secondary containment with electronic low point leak detection and alarm tied to SCADA The Discrete Point Monitoring System (DPMS) shall detect the presence of liquids in contact with a sensor probe connected to a monitoring panel. The system shall not detect vapors or gases in the atmosphere present at the probe location. When a liquid is detected an audible alarm shall sound and a visual indication shall be visible from the front of the panel. The Monitoring Panel shall 	

		<p>be modular in design and accept up to 64 input signals from the sensors. The Panel shall have an audible alarm mounted on the front door and a membrane keypad. An LCD shall be visible with the front door closed. Enclosure shall be NEMA 4X. The DB shall also integrate alarms from the DPMS panel(s) into the plant SCADA system.</p> <ul style="list-style-type: none"> The DPMS shall be supplied by a manufacturer with a minimum of 10 years experience in Leak Detection Systems. The supplier shall be PermAlert Environmental Specialty Products, Inc., Niles, Illinois, or equal. 	
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25. **PCR, Part 2.12 Odor Control**, design criteria table, Item 1 Treatment Type, Item 2 Hydrogen Sulfide Removal, and Item 3 Negative Pressure: Replace with the following:

Item	Parameter	Criteria	Notes
1	Treatment Type	Non-chemical Scrubber, Biobed, Biofilter, or Bio-trickling Filter	
2	Hydrogen Sulfide Removal	More stringent of either 99% minimum, or 0.1 ppm max discharge for biofilter, biobed, or bio-trickling filter and 0.025 ppm max discharge for activated carbon system	
3	Negative Pressure	Under equipment covers and decks: Confirm a tight seal and that air is being drawn continuously into ventilation system	

26. **PCR, Part 4.4 Tanks and Basins**, design criteria table, Item 1 Material: Revise criteria as follows:

Item	Parameter	Criteria	Notes
1	Material	<ul style="list-style-type: none"> • No steel or aluminum tanks shall be allowed for the storage of any water, sludge or other materials, unless specifically noted otherwise herein. • Process tanks and facilities shall be of reinforced concrete, unless specifically noted otherwise herein. Process chemical tanks may be of FRP or similar materials. • Recycled Water Storage Tank shall be reinforced concrete or glass-lined bolted steel. • RO Feed Tank shall be reinforced concrete, HDPE, FRP, or similar material. 	

27. **PCR, Part 4.5 Non-Building and Miscellaneous Structural Elements**, design criteria table, Item 1 Headworks and Equalization Basin: Revise criteria to “If the Headworks and Equalization Basin are proposed as partially buried, then they shall be reinforced concrete with concrete slabs on grade, and concrete walls/retaining walls and a concrete lid where specified. Headworks structure may be reinforced concrete or Type 316 stainless steel construction.”

28. **PCR, Part 5.8 Grading and Drainage**, design criteria table, Item 12 Detention Basins: Revise second bullet to: Detention basins that receive runoff in the immediate vicinity of unit process basins and treatment equipment shall also serve as emergency spill containment for untreated or partially treated wastewater, and provide the City the ability to evacuate the entire pond by pumping stormwater or untreated/partially treated wastewater back into the headworks.

29. **PCR, Section 8.5.1 Raceways**, design criteria table, Item 1. Exposed: Revise criteria as follows:

Item	Parameter	Criteria	Notes
1	Exposed	<ul style="list-style-type: none"> • PVC coated rigid steel conduit shall be used for all exposed locations around process areas, in vaults, and in corrosive locations. • Cable trays shall not be used in Hazardous Classified locations or in other locations that have a corrosive environment. • Cable trays shall be ladder type construction and shall be metallic and bonded in a manner to allow the cable tray to serve as an equipment grounding conductor. • Power conductors and low voltage conductors (less than 50V) shall not occupy the same cable tray. • Where cable tray is used for emergency system conductors, it shall be dedicated to emergency system circuits only. • Wire basket cable tray may be used in office and/or in non-hazardous and non-corrosive locations for communication system conductors only. • The design of the cable tray shall be performed using software dedicated for the purpose. 	

30. **PCR, Section 10.3 Fuel Storage for Emergency Generator**: Delete Section 10.3. See Section 8.6.8 for emergency generator and fuel storage criteria.

31. **PCR, Section 11 Demolition and Removal of Existing WWTP**, Part 11.1 General: Add the following sentence to the end of the paragraph: Completion of the WWTP demolition will not be a condition for substantial completion of the WRF Onsite Improvements.

32. **Attachment B: Proposed Design-Build Agreement**, paragraph 1.18 is removed and replaced with:

Cost Plus: Cost Plus has two components the first is the Fee which is no more than ___ percent (___%) over the Design/Build Entity’s actual costs paid by the Design./Build Entity (i) for its direct labor costs and (ii) to procure each type of labor, materials, tools, equipment, and services provided through its subcontractors of any level and material providers, when

(i) or (ii) are required to be performed by or on behalf of the Design/Build Entity pursuant to the provisions of the Contract Documents, as more fully described in Article 3, Design/Build Entity's Duties and Responsibilities. The Second component is the Overhead which is no more than ___percent (___%) over the Design/Build Entity's actual costs for business related expenses necessary to perform contract work (i.e. office rent, office supply, communication expenses, mileage, and reproduction costs).

- 33. Attachment B: Proposed Design-Build Agreement:** Replace Paragraph 3.18.1 with the following:

The Design/Build Entity unconditionally guarantees the Work will be completed in accordance with the requirements of the Contract Documents, and will remain free of defects in workmanship and materials for a period of one year after the date of Final Completion, unless a longer guarantee period is specifically called for in the Contract Documents. For equipment or building components started in operation prior to Final Completion, the Design/Build Entity shall, at no additional cost to the City, provide guarantees such that the guarantee period will be in force for the full year after Substantial Completion as detailed in sections 1.29 and 6.11.4 of this Design Build Agreement.

The Design/Build Entity shall repair or replace any and all work, together with any adjacent work that may have been damaged or displaced, which was not in accordance with the requirements of the Contract Documents, or that may be defective in its workmanship or material within the guarantee period specified in the Contract Documents, without any expense whatsoever to the City; ordinary wear and tear and abuse by other than the Design/Build Entity or its officers, employees, agents or subcontractors of any tier excepted.

- 34. Attachment B: Proposed Design-Build Agreement, Part 6.13 Shared Cost Savings:** Add the following paragraph:

In addition to the project modifications and associated cost savings/sharing detailed in the paragraph above, any further cost savings realized at the conclusion of the project will be shared between the City and the DB team. These realized savings will be shared between the Design/Build Entity and City through the disbursement of the final payment per the following. Design/Build Entity will receive up to 50% of the net savings not to exceed \$2,000,000.

- 35. Attachment B: Proposed Design-Build Agreement, Part 6.16 Compensable Cost Escalation:** Replace Paragraph 6.16.1 with the following:

6.16.1 After the award of this Design-Build Agreement, the construction start date is anticipated to be delayed for up to twelve months until financing is approved. The Design/Build Entity will not be compensated for increases in pricing within that delay, unless the Engineering News-Record (ENR) Construction Cost Index (CCI) for San Francisco, CA exceeds 3.0%

annual average for twelve months. If the financing is not approved and/or the construction start date is not approved by the City within eight months after this Design-Build Agreement award, then the Cost Plus with Guaranteed Not To Exceed Amount will be increased as provided below. Any increase, if any at all, in the amount of the Cost Plus with Guaranteed Not To Exceed Amount that would be adjusted because of the delayed construction start date is to be equal to the increase in the ENR CCI for San Francisco, CA in excess of 3.0% annual average over the first twelve months of that delay and equal to the increase in the ENR CCI for San Francisco, CA for any additional delay in the issuance of the NTP as applicable beyond that twelve-month period.

36. **Attachment C Price Proposal and Life Cycle Cost Instructions** of the RFP has been revised. Replace Attachment C with the attached.

Clarifications:

1. **Project Goals:** Project goals are goals, and not performance criteria. City acknowledges some goals may be conflicting. Proposers shall identify components of their proposal that may result in a deviation from an established goal. The most critical goal is cost effectiveness of the project, including capital and life cycle costs. Interim process goals are intended for compatibility between systems and protection of equipment. DB is ultimately responsible for providing a complete and operable system, regardless of stated water quality goals.
2. **Equipment manufacturers and models:** Provide up to three manufacturers/models for systems with submitted proposal to clearly indicate quality and functionality.
3. **Performance Guarantees:** RFP Section 3.4.8 Performance Guarantees: WRF Wastewater Influent & Effluent Maximum/minimum process inputs: The City is requesting a performance guarantee over the anticipated range of flow and loading conditions for each treatment unit process.
4. **Price Proposal:** Consider changing to lump sum.
Response: The City is requesting a cost plus proposal with a guaranteed maximum price. See changes to price proposal terms provided with this addendum.
5. **Price Proposal:** How will the price proposal and life cycle costs be evaluated?
Response: The price proposal and life cycle cost will be awarded up to 60 points per Section 2.7 of the RFP. The price proposal and life cycle cost analysis shall follow the instructions included in Attachment C of the RFP, revised as indicated in this addendum item #36. The price proposal and life cycle costs will be evaluated based on the Project 30-year Life-Cycle Total Present Value, calculated as indicated in Attachment C of the RFP.

Attachments:

1. City of Morro Bay Request for Proposals for Design-Build Services of the Water Reclamation Facility (WRF) Onsite Improvements Attachment C: Price Proposal and Life Cycle Cost Instructions



Rob Livick, PE, Public Works Director/City Engineer

27 March 2018

Date

Acknowledgement of Addendum No. 2

Date



**City of Morro Bay
Request for Proposals
for**

**DESIGN-BUILD SERVICES of the
WATER RECLAMATION FACILITY (WRF)
ONSITE IMPROVEMENTS**

**Attachment C:
Price Proposal and Life-Cycle Cost Instructions**

January 2018

**Rob Livick, PE/PLS
Public Works Director/City Engineer
955 Shasta Avenue
Morro Bay, California 93442**

Proposer's Name: _____

Price Proposal Form for
Design-Build Services of the
City of Morro Bay
WATER RECLAMATION FACILITY (WRF) ONSITE IMPROVEMENTS

TO THE PUBLIC WORKS DIRECTOR

COST PROPOSAL

Having carefully examined the Request for Proposal, attachments and related documents the undersigned proposes and agrees to provide to the City of Morro Bay, in accordance with the Performance Criteria Report annexed hereto and made a part thereof, the following materials and labor not to exceed the following guaranteed maximum price at the rates attached hereto (attach all parts and labor rate list):

BASE BID AMOUNT

Item	Qty	Description	GMP Total Cost
1	Lump Sum	Design-Build of onsite improvements at the Water Reclamation Facility (subtotal of direct costs excluding those included in item 2)	\$
2	Lump Sum	Allowance for Unanticipated EIR Mitigation Measures*	\$1,000,000
3	Lump Sum	Fee (__ % of Direct Cost items 1+2)	
4	Lump Sum	Overhead (__ % of Direct Cost Items 1+2)	

*This is an allowance for all unanticipated work associated with EIR Mitigation Measure implementation. It has been determined to be \$1,000,000.

TOTAL COST PLUS WITH GUARANTEED NOT TO EXCEED OF BASE AMOUNT: \$ _____

PROPOSAL SUMMARY FOR BASE BID COST PROPOSAL

The Total Cost Plus with Guarantee Not to Exceed of Base Amount is _____

_____ Dollars and _____ Cents.

ADD ALTERNATE:

Item	Qty	Description	GMP Total Cost
A1	Lump Sum	Demolition of existing WWTP per Section 11 of "Attachment A" to the Request for Proposals	\$
A2	Lump Sum	Fee (__ % of Direct Cost items A1)	
A3	Lump Sum	Overhead (__ % of Direct Cost Items A1)	

TOTAL COST PLUS WITH GUARANTEED NOT TO EXCEED OF ADD ALTERNATE AMOUNT:

\$ _____

PROPOSAL SUMMARY FOR ADD ALTERNATE COST PROPOSAL

The Total Cost Plus with Guarantee Not to Exceed of Add Alternate Amount is _____

_____ Dollars and _____ Cents.

The price proposals set forth herein shall include any and all applicable taxes. The City reserves the right to reject any and all proposals. If the City awards the contract, then it would be for the base cost proposal with or without the add alternate. However, the price comparison will be based on the base cost proposal. To be considered complete the cost proposal must include the tables on pages 1 through 5 of this of this document. Provide additional pages as required to submit a complete cost proposal.

Proposer's Name: _____

Cost Plus Proposal Table

DESCRIPTION OF ITEM	TOTAL COST
Design and Preconstruction Activities	
Project Management and City Coordination	
TREATMENT PROCESS AREAS	
Influent (Coarse) Screening	
Grit Removal	
Flow Equalization	
Fine Screens	
Membrane Bioreactor	
Aerobic Sludge Digester	
Sludge Dewatering	
Reverse Osmosis	
Ultraviolet Advanced Oxidation Process	
Chemical Storage and Feed Facilities	
Odor Control	
Effluent Pump Station	
Recycled Water Pump Station	
Recycled Water Storage Tank	
On-site Reclaimed Water system	
General Structural and Foundations	
General Mechanical	
Other (list)	
Subtotal	
ARCHITECTURAL AND LANDSCAPING	
Buildings, including Operations Building, Administration Building, all equipment, furnishings, finishes, and other non-process buildings	
General Mechanical/HVAC	
General Structural and Foundations	
Landscaping and Irrigation	
Decorative fences and gates	
Other	
Subtotal	
GENERAL SITE AND CIVIL	
Site Work including earthwork and grading	
Site access road	
Offsite water line connection and extension	
Fire protection	
Construction dust control, SWPPP development, and compliance	
Dewatering of excavations during construction	
Post-construction stormwater controls including detention	

facilities	
Miscellaneous yard piping	
Other (list)	
Subtotal	
ELECTRICAL, INSTRUMENTATION, AND CONTROLS	
Utility Electrical Service	
Data Service	
Planning and provisions for alternative solar power (by others)	
General Electrical including lighting and alarms	
Electrical System Studies	
Electrical Testing	
General instrumentation and controls including SCADA and Security	
Emergency Generator	
Other (list)	
Subtotal	
STARTUP, TESTING, COMMISSIONING, AND DEMOBILIZATION	
Startup	
Testing and commissioning	
Training	
Support during performance testing	
Demobilization	
Subtotal	
GENERAL	
Miscellaneous work items and other prices not included in the previous items as required to complete the Work (list)	
Unanticipated EIR Mitigation Measures	\$1,000,000
Subtotal – Direct Costs (Sum of all above Direct Costs)	
FEE (___ % of Direct Cost)	
Overhead Costs (___ % of Direct Cost)	
Base Guaranteed Maximum Price (Sum of Direct Costs + Fee + Overhead Costs)	

ADD ALTERNATE	
Demolition of WWTP per Section 11 of “Attachment A” to the Request for Proposals	
FEE (___ % of Direct Cost of Add Alternate)	
Overhead Costs (___ % of Direct Cost of Add Alternate)	
Add alternate Guaranteed Maximum Price (Sum of Add Alternate direct costs + Add Alternate Fee + Add Alternate Overhead Costs)	

Proposer's Name: _____

Life-Cycle Cost Analysis

The Offeror shall provide a present worth life-cycle cost for the proposed project. The purpose of the Life-Cycle Cost Analysis (LCCA) is to provide a standardized basis to compare overall costs of proposed project alternatives. The LCCA shall be based on a 30-year life assuming an average flow rate 0.97 MGD, electrical power costs of \$0.12/kwh, natural gas costs of \$0.10/therm, an annual inflation rate of 2%, and a discount rate of 2%. The LCCA shall include initial cost, replacement costs, energy costs, chemical costs, operation (not including operator time), maintenance (not including operator time), repair costs, and labor costs. Assume \$100 per hour fully burdened labor. The LCCA shall include the replacement frequencies, replacement cost, and escalation cost for consumables (i.e. Membranes, odor control media...). The table below is intended to provide a template for the Offeror to develop the LCCA. The sum of the initial cost for all equipment/systems shall equal the Base Guaranteed Maximum Price.

Equipment / System	Initial Cost	Replacement Cost	Energy Cost			Chemical Cost			Operation & Maintenance & Repair Cost (not incl. labor)	Labor Costs (@ \$100/hr)	Total Cost
			Type	Qty	Cost/Qty	Type	Qty	Cost/Qty			
Project 30-year Life-Cycle Total Present Value =											

The Offeror shall also prepare a detailed table of operator hours required to perform all typical staff operations activities at the WRF, including a breakdown of maintenance, operation, and repair hours per activity for a typical week, month, year, and over the 30-year LCCA period. This should include routine activities as well as those that are less frequent (such as membrane clean-in-place cycles, reverse osmosis clean-in-place cycles, diffuser replacement, pump seal replacement, for example). Include frequency and costs for replacement items such as but not limited to MBR membranes, RO membranes, and fine bubble diffusers. Include any cost escalation factors used in calculations.

In addition to the life-cycle costs above the Offeror shall prepare a 5-year total energy cost, 5-year maintenance cost, and 5-year replacement cost for the entire project based on startup flows and loads for the WRF, assuming 1% annual flow and load increases.

Description	Operator hours	Consumables/Energy	Totals
5-Year Energy Cost			
5-Year Maintenance Cost			
5-Year Replacement Cost			