

Ms. Wilhelmina Montero, P.E., M.S. Project Manager  
City of Hollywood – Public Utilities  
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Subject:  
Chlorine and Ammonia Feed Systems Assessments for Implementation of  
Four-Log Disinfection – Basis of Design Report

Water South

Dear Ms. Montero:

Date:  
July 22, 2019

In accordance with your request for professional services for the implementation of four-log treatment of groundwater 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 preparation of a Basis of Design Report to determine necessary modifications to the WTP's chlorine and ammonia systems.

Contact:  
Chris Barlow, 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. Services related to Articles 2.3 (Engineering Design Phase), 2.4 (Bidding) and 2.5 (Construction Phase) are excluded.

Phone:  
561.236.2858

Email:  
[chris.barlow@arcadis.com](mailto:chris.barlow@arcadis.com)

## PROJECT BACKGROUND

Our ref:  
00361338

The City received conceptual approval from Broward County, Florida Department of Health (BCFDH) on November 29, 2017 for achieving four-log virus treatment of source water by using free chlorine for disinfection. As part of the conceptual approval, BCFDH requires an evaluation of chlorine feed and storage system capacity along with the implementation of any needed improvements to satisfy four-log virus treatment and requirements of FAC Chapter 62-555.320. Since the City attained the conceptual approval of implementing four-log disinfection at the WTP, the Southeast District of the Florida Department of Environmental Protection (SED FDEP) has become the Authority Having Jurisdiction (AHJ) over these improvements to the WTP.

### Florida License Numbers

**Engineering**  
7917

Geology  
GB564

Surveying  
LB7062

The purpose of this project is to provide the basis of design report (BODR) for the improvements to the WTP, necessary to achieve four-log virus treatment and the conversion of the existing on-site hypochlorite generation system (OSG) to a system that utilizes bulk sodium hypochlorite throughout the WTP.

The WTP presently utilizes the standby bulk storage system of the currently out of service OSG to store purchased sodium hypochlorite used to chlorinate the raw water entering the lime treatment process. The process includes diluting bulk sodium hypochlorite from a concentration of 12% to 0.8% chlorine. The finished water is chlorinated from a second chlorine system that dilutes bulk sodium hypochlorite from a concentration of 12% to 0.8% chlorine. The City has decided to change these chlorine systems to feed 12% sodium hypochlorite. This will increase the effective existing storage capacity of the chlorine systems in anticipation of the additional chlorine demand necessary for the conversion to four-log virus treatment.

This project will investigate the potential to repurpose the existing bulk storage tanks and piping where feasible to convert the chlorine feed systems from a 0.8% concentration solution of sodium hypochlorite to a 12% concentration solution of full-strength bulk sodium hypochlorite. Arcadis will identify and preliminarily design the modifications required within the existing systems for the new 12% concentration feed plan.

The existing anhydrous ammonia system will be evaluated as well for potential modifications required for this treatment process change. Like the chlorine system, this system requires an assessment and evaluation of this existing infrastructure condition and compatibility to determine the components that may remain in operation and the components that require replacement for this conversion.

This BODR to implement four-log virus treatment of the water using free chlorine will consider the following anticipated modifications at the WTP:

- Relocation of the ammonia injection point to a segment of existing pipe downstream of the transfer pump station by installing a new static mixer on this section of pipe to provide a free chlorine zone necessary for primary disinfection. The static mixer will include a new chlorine injection point, necessary for the formation of the necessary concentration of chloramines.
- Installation of an online free chlorine analyzer and sampling port at the end of the disinfection segment.
- Installation of an online free ammonia, mono-chloramine, and total chlorine analyzer after ammonia injection and before entrance to the storage tanks.
- Addition of low free chlorine residual alarms to SCADA dependent on peak flow readings from blend tank.
- Replacement of existing transfer pumps at the OSG facility.
- Installation of new sodium hypochlorite meeting pump skids to replace the 0.8% chlorine feed systems.
- Modifications to the existing sodium hypochlorite storage tanks and piping at the OSG facility.
- Containment for the chlorine storage tanks holding 12.5% sodium hypochlorite.

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- Replacement of the existing liquid ammonia storage tanks to provide additional storage of this chemical.
- Electrical, Instrumentation, Ventilation, and Structural modifications include improvement to the two existing new chemical containment areas, located in the OSG building and the chemical room near the high service pump room. A condition assessment will be performed for all the areas requiring modifications. The engineer disciplines will provide the description of the of the areas that require modification necessary to meet the needs of this project.

## SCOPE OF WORK

Services include evaluation of the WTP's existing chlorine and ammonia systems and determination of modifications necessary to meet requirements for the implementation the four-log virus inactivation via free chlorine.

### Task 1 – Data Collection

Arcadis shall perform the following tasks described herein:

1. Prepare a draft Project Schedule to be submitted to the City.
2. Submit a Request for Information (RFI) to the City for operational parameters and data associated with flow and chemical dosage as well as the chlorine to ammonia ratio to be considered for this design.
3. Schedule, attend and lead a Kick-Off Meeting with the City to establish project goals and objectives, identify project contacts and communication expectations, review the draft Project Schedule, review the submitted RFI, and planned project deliverables.
4. Coordinate and attend a pre-application meeting with the SED FDEP. The purpose of this meeting is to discuss the background of the project with the AHJ, including the previous conceptual approval from the BCFDH. This meeting will establish the permitting requirements for this AHJ, and these details will be incorporated into the BODR.

### Task 1 Deliverables:

- Kick-Off Meeting Minutes
- Project Request for Information
- Update Project Schedule
- SED FDEP Meeting Minutes

### Task 1 Assumptions:

1. The City will provide comments on the draft schedule and draft Kick-Off Meeting notes within five (5) business days of receipt.

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2. The City will provide as built drawings for existing facility.
3. The City will provide all information requested in the RFI within ten (10) business days of receipt.

## **Task 2 – Assessment and BODR**

### **Task 2.1 – Existing Chemical Systems Assessments and Evaluations**

Arcadis shall determine the best approach for converting the existing sodium hypochlorite systems from systems designed to feed 0.8% sodium hypochlorite to systems that will utilize and feed full strength bulk (12% concentration) sodium hypochlorite. The approach will seek to maximize the repurposing of as much existing equipment as possible in the new system.

Arcadis shall provide an analysis of the existing ammonia system to determine the extent that the system needs to be modified to provide for the additional ammonia chemical anticipated by this process change. The process will continue to utilize anhydrous ammonia for disinfection.

Arcadis shall provide a condition assessment of the existing sodium hypochlorite and anhydrous ammonia chemical storage and feed systems, and shall complete the following analysis:

1. Overall system description of the existing sodium hypochlorite chemical storage and feed systems (including out of service OSG system) to show an (1) overall layout, (2) pipe routing, and (3) identification of the major system components described below.
  - a. Existing OSG system currently utilized as bulk sodium hypochlorite storage, transfer, and feed after dilution.
  - b. Existing sodium hypochlorite storage and feed system dedicated to the finished water clearwell for final disinfection, including the system that supplies sodium hypochlorite to the odor control system.
  - c. Existing sodium hypochlorite feed system dedicated to chlorinating the raw water entering the lime softening process. Existing anhydrous ammonia storage and feed system that feeds the finished water clearwell.
2. Chemical injection points to identify the equipment associated with the six (6) existing injections points, including isolation valves, injection quills, water softeners for carrier water, electro-mechanical control valves, and structural integrity of the chemical injection area. These injection points include:
  - a. Finished water final disinfection chlorine injection into the finished water blend tank.
  - b. Finished water chlorination trim point downstream of the high service pumps, east.
  - c. Finished water chlorination trim point downstream of the high service pumps, west.
  - d. Raw water chlorination of the lime treatment process, near parking lot.
  - e. Raw water chlorination of the lime treatment process, on aerial piping.
  - f. Ammonia injection point.

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3. Tank systems to identify the size and location of each tank, construction materials, compatibility with sodium hypochlorite, condition and estimated remaining useful life, regulatory compliance for containment, instrumentation, and structural integrity of the storage area. The tanks to be considered include:
  - a. Sodium hypochlorite storage tanks at the OSG system
  - b. Sodium hypochlorite storage tanks in the treatment plant that feed the lime softening process
  - c. Sodium hypochlorite storage tanks at the membrane process facility that feed the finished water injection point(s)
  - d. Sodium hypochlorite storage tanks that supply the odor control facility
4. Sodium hypochlorite transfer pumps to identify the pump capacities and requirements, physical conditions, containment, controls and instrumentation, SCADA integration, electrical panel, electrical power supply, and structural integrity of the pump installation area.
5. Sodium hypochlorite conveyance systems to identify the pipe sizes, pipe routing, pipe material and compatibility, and limits of containment piping.
6. Chemical feed and delivery systems to seven (7) injection points to identify the pump capacities and requirements, physical conditions, ancillary devices (pressure sustaining valves, and calibration columns) and piping, controls and instrumentation, SCADA integration, electrical panel, electrical power supply, and structural integrity of the following pump installation area(s).
  - a. Finished water final disinfection chlorine injection into the finished water blend tank.
  - b. Finished water chlorination trim point downstream of the high service pumps, east.
  - c. Finished water chlorination trim point downstream of the high service pumps, west.
  - d. Raw water chlorination of the lime treatment process, near parking lot.
  - e. Raw water chlorination of the lime treatment process, on aerial piping.
  - f. New chlorine injection point and static mixer downstream of blend tank.
  - g. New ammonia injection point and static mixer downstream of blend tank.

### **Task 2.2 – Basis of Design Report Preparation**

Arcadis shall provide an analysis that determines the design parameters of the improvements necessary to implement four-log virus inactivation and the changes to the chemical demands for these modifications to the treatment process. These improvements will be based on the following:

1. Arcadis shall calculate the required hypochlorite and ammonia feed rates using historical WTP data to determine the usability of all existing feed, piping and injection systems, and use historic plant flows and the determined feed data to assess the validity of existing storage tanks for use in the future system.
2. The findings of Task 2.1 determine the physical capability of any of the existing storage and feed

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equipment for reuse ion the future systems.

3. A draft BODR will be prepared and submitted to the City for review. The BODR shall provide a summary of the conceptual design modifications required to implement four-log virus disinfection at the WTP, specifically including:

- A chemical feed system process and instrumentation (P&ID) diagram showing the existing chlorine and ammonia feed and storage systems for the existing and proposed systems.
- A summary of flows required to each injection point to be determined based upon historical chemical and required feed data.
- A summary of the feed and storage system capacity of the existing sodium hypochlorite system.
- An analysis demonstrating any additional equipment requirements necessary to meet the new chlorine demands for four-log virus inactivation solely utilizing sodium hypochlorite. This analysis shall also account for additional chlorine demand necessary to oxidize naturally occurring ammonia.
- A review of the electrical load and control connectivity requirements for all new process equipment and instrumentation for the new chemical systems.
- Verification of the CT ((Chlorine) Concentration x Time) calculations previously provided by the City to the BCFDH.
- An outline of provisions of building codes, including design criteria, applicable to proposed modifications necessary for the implementation of four-log virus disinfection using bulk sodium hypochlorite.
- A preliminary estimate of operation and construction costs of the recommended conceptual design.

Arcadis will participate in a Design Review Meeting with the City to review comments to the BODR. Subsequent to the meeting, Arcadis will make final edits and issue final copies of the BODR to the City.

#### **Task 2 Deliverables:**

- Draft and Final BODR
- Site plan showing the locations of the existing and proposed improvements.

#### **Task 2 Assumptions:**

1. The City will provide all documents related to installation, repair and maintenance of the sodium hypochlorite and ammonia systems within ten (10) days of request by Arcadis.

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2. The City shall provide Arcadis access upon request to secured facilities as necessary to conduct field visits, visual observations, or other project-related efforts.
3. The City shall coordinate with Arcadis to perform any testing as may be required to complete this SOW.
4. The analyses completed to determine recommended improvements to the WTP's chlorine and ammonia systems shall utilize established parameters as determined by the City or in accordance with regulatory requirement or best industry practice, specifically:
  - Storage tanks shall be sized based upon the WTP's projected maximum daily capacity of 45 MGD
  - The chemical feed rates will be based on 59.5 MGD
  - Storage requirements for the sodium hypochlorite will be based upon the industry standard of 14 days of storage
  - As required by 10-States Standards, storage requirements for the ammonia system will be based on 30 days of storage
5. Typical plant operations consist of 50% water from the nanofiltration process, 10% water from the reverse osmosis process, and 40% water from the lime softening process.
6. Applications and supporting documents for grants or advances under Federal or State programs are not provided as part of these services.
7. Preparation of a design presentation for the City Commission is not provided as part of these services.
8. The sodium hypochlorite feed system that serves the odor control system is not included in this analysis.
9. Detailed design of the improvements will be shown in Phase 2 of this project and are excluded from these services.
10. The results from Task 3 are necessary to calculate the chemical feed rates that will form the results of Task 2.
11. Electrical and Instrumentation evaluation and design shall be provided in the Engineering and Design Phase (Article 2.3)

### **Task 3 – Bench Testing to Assess Chemical Dosing and DBP Formation**

Arcadis will conduct bench-scale testing to more accurately determine the chemical dosing requirements and potential for increased disinfection byproduct (DBP) formation under four-log operation. Specifically, Arcadis shall:

1. Prepare a bench testing plan to evaluate:
  - a. Disinfectant residual decay and chlorine and ammonia dose requirements under four-log operation.
  - b. DBP formation under four-log operation as compared to current operations.A draft testing plan will be submitted to the City for review and comment prior to finalization.
2. Conduct bench testing in accordance with the final bench testing plan.
3. Prepare a letter report summarizing the results of the bench testing, including chlorine and

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ammonia dose assumptions and impacts to the facility design (i.e., storage and dosing requirements), as well as potential issues related to DBP formation.

**Task 3 Deliverables:**

- Bench testing plan to evaluate disinfection and DBP formation (draft and final) in electronic format
- Letter report presenting results of the bench testing (draft and final) in electronic format

**Task 3 Assumptions:**

1. Bench testing will be completed on filtered water (filtrate) from only one of the City's three treatment processes based on historic chlorine demand and total organic carbon concentrations. Arcadis recommends that this be filtered water from the lime softening train and shall be confirmed with the City during preparation of the testing plan.
2. Bench tests will be conducted in duplicate.
3. Arcadis will conduct the bench testing.
4. Arcadis will provide the necessary bottles for the simulated distribution system (SDS) tests, volumetric flasks for standards, pipettes, pipette tips, chlorine and ammonia reagent packets and pH standard solutions.
5. The City will provide the necessary chemicals (i.e., chlorine, ammonia); equipment for measuring pH, temperature, free and total chlorine, and free and total ammonia; and a water bath or incubator (if necessary) to maintain DBP samples at a constant temperature for the SDS tests.
6. The City will be responsible for the cost of DBP analyses, including shipping costs. Arcadis will package the samples at the City's laboratory for shipment.
7. The City will provide space in their water quality laboratory for Arcadis to conduct the bench testing.

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## SCHEDULE

Arcadis estimates that the BODR will be completed in approximately 18 weeks from receipt of the City's Authorization to Proceed (ATP). Estimates for completion of key milestones are as follows:

Project Milestones	Estimated Duration to Completion from ATP
Task 1 – Data Collection	2 weeks
Task 2.1.3 – Detailed Description of Existing Systems	6 weeks
Task 3 – Bench Testing to Assess Chemical Dosing	8 weeks*
Task 2.2 – Basis of Design Report – Draft	16 weeks
Task 2.2 – Basis of Design Report – Final	18 weeks

\*The water analysis will occur during the development of the BODR

## BUDGET AND INVOICING

The proposed lump sum fee for this project is \$97,496.00. This lump sum fee has been prepared in accordance with the terms and conditions of the Agreement by and between the City and Arcadis. A breakdown of this lump sum fee is enclosed as Attachment A.

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

Task	Fee
Task 1 – Data Collection	\$6,790.00
Task 2 – Assessment and Basis of Design Report	\$67,900.00
Task 3 – Bench Testing to Assess Chemical Dosing	\$22,806.00
Total	\$97,496.00

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Wilhelmina Montero  
City of Hollywood – Public Utilities  
July 22, 2019

Arcadis is excited about this opportunity to assist the City in implementing four-log treatment and the conversion to bulk hypo at your WTP. Should you have any questions regarding this work order proposal, please do not hesitate to contact me via email ([chris.barlow@arcadis.com](mailto:chris.barlow@arcadis.com)) or telephone (561-236-2858).

Sincerely,

Arcadis U.S., Inc.



Chris Barlow, P.E.  
Principal Water & Wastewater Engineer

Copies:

Clèce Aurélus (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.*

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	Labor Category	Contract Labor Category	Hours	Billing Rate (\$ / hr)	Cost	Fee / Task	Total Fee
							\$ 97,496.00
						Arcadis Labor	\$ 84,760.00
						Subconsultant (McKim & Creed) Costs	\$ 10,450.00
						Other Direct Expenses	\$ 2,286.00
						Contingency	\$ -
<b>1</b>	<b>Data Collection</b>						<b>\$ 6,790.00</b>
<b>Labor Subtotal</b>							<b>\$ 4,700.00</b>
	Rebecca Slabaugh, PE	Lead Engineer/Technical Expert		Principal Engineer 1	\$ 220.00	\$ -	
	Housam Hobi, PE	Lead Engineer/Technical Expert		Principal Engineer 1	\$ 220.00	\$ -	
	Vincent Vitale, PE	Lead Engineer (HVAC)		Senior Associate	\$ 220.00	\$ -	
	Chris Barlow, PE	Project Manager	7	Senior Associate	\$ 200.00	\$ 1,400.00	
	Stephanie Bishop, PE	Senior Engineer II	10	Project Engineer 4	\$ 160.00	\$ 1,600.00	
	Sean Chaparro, PE	Principal Engineer		Project Engineer 3	\$ 150.00	\$ -	
	Judy Ford	Project Assistant	2	Chief Technician	\$ 150.00	\$ 300.00	
	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	10	Project Engineer 2	\$ 130.00	\$ 1,300.00	
	Sean Pitcher	Engineer		Project Engineer 1	\$ 115.00	\$ -	
	Shantanu Dandane	Engineer		Project Engineer 1	\$ 115.00	\$ -	
	Andrea Guzman	Senior CADD Technician		Senior Technician	\$ 115.00	\$ -	
	Seul (Kevin) Chung	Billing Specialist	1	Administrative 3	\$ 100.00	\$ 100.00	
	Katie Kasperek	Drafter II		Technician	\$ 90.00	\$ -	
	Lisa Ciacco	Administrative/Clerical		Administrative 2	\$ 70.00	\$ -	
<b>Subcontractor Labor Subtotal</b>							<b>\$ 2,090.00</b>
	McKim & Creed	Electrical / I&C				\$ 2,090.00	
<b>Other Direct Expenses</b>							<b>\$ -</b>
	Travel	(mileage or airfare)	1	\$ -	\$ -	\$ -	
	Miscellaneous Expenses	(reproduction)	1	\$ -	\$ -	\$ -	
<b>2</b>	<b>Assessment and Basis of Design Report</b>						<b>\$ 67,900.00</b>
<b>Labor Subtotal</b>							<b>\$ 59,540.00</b>
	Rebecca Slabaugh, PE	Lead Engineer/Technical Expert		Principal Engineer 1	\$ 220.00	\$ -	
	Housam Hobi, PE	Lead Engineer/Technical Expert	4	Principal Engineer 1	\$ 220.00	\$ 880.00	
	Vincent Vitale, PE	Lead Engineer (HVAC)	16	Senior Associate	\$ 220.00	\$ 3,520.00	
	Chris Barlow, PE	Project Manager	81	Senior Associate	\$ 200.00	\$ 16,200.00	
	Stephanie Bishop, PE	Senior Engineer II	96	Project Engineer 4	\$ 160.00	\$ 15,360.00	
	Sean Chaparro, PE	Principal Engineer	6	Project Engineer 3	\$ 150.00	\$ 900.00	
	Judy Ford	Project Assistant	16	Chief Technician	\$ 150.00	\$ 2,400.00	
	Steve Zeid, PE	Senior Designer (Structural)		Project Engineer 2	\$ 130.00	\$ -	
	Sopeark Chhea, PE	Staff Engineer (HVAC)	52	Project Engineer 2	\$ 130.00	\$ 6,760.00	
	Lia Dombroski	Staff Engineer	66	Project Engineer 2	\$ 130.00	\$ 8,580.00	
	Sean Pitcher	Engineer		Project Engineer 1	\$ 115.00	\$ -	
	Shantanu Dandane	Engineer	36	Project Engineer 1	\$ 115.00	\$ 4,140.00	
	Andrea Guzman	Senior CADD Technician		Senior Technician	\$ 115.00	\$ -	
	Seul (Kevin) Chung	Billing Specialist	8	Administrative 3	\$ 100.00	\$ 800.00	
	Katie Kasperek	Drafter II		Technician	\$ 90.00	\$ -	
	Lisa Ciacco	Administrative/Clerical		Administrative 2	\$ 70.00	\$ -	
<b>Subcontractor Labor Subtotal</b>							<b>\$ 8,360.00</b>
	McKim & Creed	Electrical / I&C				\$ 8,360.00	
<b>Other Direct Expenses</b>							<b>\$ -</b>
	Travel	(mileage or airfare)	0	\$ -	\$ -	\$ -	
	Miscellaneous Expenses	(reproduction)	1	\$ -	\$ -	\$ -	
<b>3</b>	<b>Bench Testing to Assess Chemical Dosing</b>						<b>\$ 22,806.00</b>
<b>Labor Subtotal</b>							<b>\$ 20,520.00</b>
	Rebecca Slabaugh, PE	Lead Engineer/Technical Expert	14	Principal Engineer 1	\$ 220.00	\$ 3,080.00	
	Housam Hobi, PE	Lead Engineer/Technical Expert		Principal Engineer 1	\$ 220.00	\$ -	
	Vincent Vitale, PE	Lead Engineer (HVAC)		Senior Associate	\$ 220.00	\$ -	
	Chris Barlow, PE	Project Manager	15	Senior Associate	\$ 200.00	\$ 3,000.00	
	Stephanie Bishop, PE	Senior Engineer II		Project Engineer 4	\$ 160.00	\$ -	
	Sean Chaparro, PE	Principal Engineer		Project Engineer 3	\$ 150.00	\$ -	
	Judy Ford	Project Assistant	6	Chief Technician	\$ 150.00	\$ 900.00	
	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	24	Project Engineer 2	\$ 130.00	\$ 3,120.00	
	Sean Pitcher	Engineer	88	Project Engineer 1	\$ 115.00	\$ 10,120.00	
	Shantanu Dandane	Engineer		Project Engineer 1	\$ 115.00	\$ -	
	Andrea Guzman	Senior CADD Technician		Senior Technician	\$ 115.00	\$ -	
	Seul (Kevin) Chung	Billing Specialist	3	Administrative 3	\$ 100.00	\$ 300.00	
	Katie Kasperek	Drafter II		Technician	\$ 90.00	\$ -	
	Lisa Ciacco	Administrative/Clerical		Administrative 2	\$ 70.00	\$ -	
<b>Subcontractor Labor Subtotal</b>							<b>\$ -</b>
	McKim & Creed	Electrical / I&C				\$ -	
<b>Other Direct Expenses</b>							<b>\$ 2,286.00</b>
	Travel	(mileage or airfare)	1	\$ 1,406.00	\$ 1,406.00	\$ -	
	Equipment		1	\$ 880.00	\$ 880.00	\$ -	
	Miscellaneous Expenses	(reproduction)	1	\$ -	\$ -	\$ -	