GNHWPCA Protecting the Environment
Greater New Haven Water Pollution Control Authority
260 East Street New Haven, CT 06511
203.466.5280 p 203 772.1564 f www.gnhwpca.com

REGULAR MEETING OF THE GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY BOARD OF DIRECTORS WEDNESDAY, DECEMBER 14, 2022 6:00 P.M. 260 EAST STREET NEW HAVEN, CONNECTICUT

AGENDA

1. Approval of minutes of November 9, 2022 – Regular Meeting.
2. Public participation relating to agenda items.
3. Consideration and approval of a resolution authorizing the Executive Director, Sidney J. Holbrook, to negotiate, execute and deliver an agreement with Lawrence Brunoli, Inc. for the construction of a new garage building at the East Shore Water Pollution Abatement Facility, for an aggregate amount not to exceed $3,991,900.00.
4. Consideration and approval of a resolution authorizing the Executive Director, Sidney J. Holbrook, to negotiate, execute and deliver a task order with Christopher Williams Architects LLC for professional services relating to the East Shore Water Pollution Abatement Facility Collections Maintenance Facility, for an aggregate amount not to exceed $88,252.27.
5. Consideration and approval of a resolution authorizing the Executive Director, Sidney J. Holbrook, to negotiate, execute and deliver a task order with Hazen and Sawyer, P.C. for professional services relating to an odor assessment and control services study of the East Shore Water Pollution Abatement Facility, for an aggregate amount not to exceed $44,040.00.
6. Executive summary and department updates and presentations.
7. Consideration and approval, as necessary, of any other new business of the Authority.
8. Call to the public.

9. Adjournment.

GNHWPCA Protecting the Environment Greater New Haven Water Pollution Control Authority
260 East Street New Haven, CT 06511
203.466.5280 p 203 772.1564 f www.gnhwpca.com

MEMORANDUM

DATE: December 6, 2022

TO: Sidney J. Holbrook

FROM: Gary Zrelak
Director of Operations

RE: Contract Award Recommendation
Project No. SSF 2018-01
ESWPAF Collections Maintenance Facility

Sid:

I request that the above-mentioned recommendation be added to the December 14, 2022, Board Meeting Agenda for resolution.

This project involves the construction of a new building at the East Shore Water Pollution Abatement Facility (ESWPAF). The building will provide two garage bays to house and perform light maintenance on the Authority's large vehicles used by the Collection's Department and a partially enclosed area to be used to dump debris removed from the collection system and move it to dumpsters to be hauled for disposal.

The project bids were opened on 11/16/22 and the lowest responsible bidder was Lawrence Brunoli, Inc. I recommend approval of low bidder, **Lawrence Brunoli, Inc.**, in the amount shown on the attached bid list summary **$3,629,000** plus a 10% contingency **$362,900** for a total amount of **$3,991,900**.

The project is budgeted 100% from the Authority's Dedicated Infrastructure Capital Funds.

Gary Zrelak
Director of Operations

e-copy: Gabe Varca, Director of Finance & Administration
Lou Criscuolo, Deputy Director of Finance & Administration
Tom Sgroi, Director of Engineering
Joseph Megale, Deputy Director of Asset Management

CWA

CHRISTOPHER WILLIAMS ARCHITECTS LLC

December 2, 2022

Mr. Joseph Megale
Greater New Haven Water Pollution Control Authority
260 East St
New Haven, CT 06511

Re: Collections Maintenance Facility SSF 2018-01
East Shore Water Pollution Abatement Facility
345 East Shore Parkway
New Haven CT 06512

Joseph:

I have reviewed the five bids received on November 16, 2022, for the above referenced project. Below is a summary of the bids from the apparent low to high:

BID SUMMARY			
Bidders	Bids	Diff from Average	Percent of Average
Brunoli	**$ 3,629,000.00**	$ (190,025.40)	95.02%
Epifano	$ 3,639,000.00	$ (180,025.40)	95.29%
Prete	$ 3,714,627.00	$ (104,398.40)	97.27%
Banton	$ 3,829,500.00	$ 10,474.60	100.27%
Sunrise	$ 4,283,000.00	$ 463,974.60	112.15%
Average	$ 3,819,025.40		

I have reviewed the submitted bid of the apparent low bidder, Lawrence Brunoli Inc., which appears to fulfill the submission requirements of the bid. In addition to a list of reference projects, they included twenty-two in-progress or completed reference projects, many of which were delivered via the design-bid-build delivery method for state and municipal entities.

By submitting the lowest qualified and on their experience and complete bid submission, I recommend awarding this project to Lawrence Brunoli Inc.

Sincerely,

Christopher Williams, AIA

GNHWPCA
Protecting the Environment

Greater New Haven Water Pollution Control Authority
260 East Street New Haven, CT 06511
203.466.5280 p 203 772.1564 f www.gnhwpca.com

DATE: December 7, 2022

TO: Sidney J. Holbrook, Executive Director

FROM: Gary Zrelak, Director of Operations

RE: Task Order Recommendation
Christopher Williams Architects LLC
Project SSF 2018-01 Construction Administration Services

Sid:

I request that the above-mentioned recommendation be added to the December 14, 2022 Board Meeting Agenda for resolution.

This request is to provide the Authority with professional services for the construction related to the East Shore Water Pollution Abatement Facility (ESWPAF) Collections Maintenance Facility. This project will involve basic Contract Construction Phase services including architectural, structural, geotechnical and MEP related services, special inspections and material testing, environmental testing and inspections, soil testing, vibration monitoring and land surveying.

I recommend approval of the attached Christopher Williams Architects LLC proposal dated December 2, 2022. The amount of these services shall not exceed Eighty-Eight Thousand Two Hundred Fifty-Two Dollars and Twenty-Seven Cents (**$ 88,252.27).**

This project is funded 100% from the Authority's Dedicated Infrastructure Capital Funds.

Gary Zrelak
Director of Operations

e-copy: Gabe Varca, Director of Finance & Administration
Lou Criscuolo, Deputy Director of Finance and Administration
Tom Sgroi, Director of Engineering
Joseph Megale, Deputy Director of Operations

CWA

CHRISTOPHER WILLIAMS ARCHITECTS LLC

December 2, 2022

Mr. Joseph Megale
Greater New Haven Water Pollution Control Authority
260 East St
New Haven, CT 06511

Re: Collections Maintenance Facility SSF 2018-01
East Shore Water Pollution Abatement Facility
345 East Shore Parkway
New Haven CT 06512

Dear Joseph:

I am pleased to submit this proposal for construction phase services related to the above referenced project. This proposal is based on the anticipated construction scope and duration of the recently bid ESWPAF at the above referenced address.

PROJECT OVERVIEW:
The apparent low bidder for the project is Lawrence Brunoli Inc. The stipulated construction period is 450 days.

SCOPE OF SERVICES:
The scope of work required for this phase of the project includes basic Contract Administration Phase services including architectural, structural, geotechnical and MEP related services, special inspections and material testing, environmental testing and inspections, soil testing, vibration monitoring and land surveying.

1. **Architectural Services**
   - **1.1.** Overall administration of the contract for construction, including owner-contractor communications and sub-consultant coordination and management.
   - **1.2.** Submittal management, including processing, distribution, and review.
   - **1.3.** Review and respond to RFI's.
   - **1.4.** Prepare and issue supplemental sketches and instructions.
   - **1.5.** Evaluations of the Work.
   - **1.6.** Application for payment review and recommendations for approval.
   - **1.7.** Construction phase administration including issuance of Construction Change Directives, Proposal requests, Proposed Change Order review, and Owner-Contractor Change Orders.
   - **1.8.** Coordinate and administer sub-consultant services and activities.
   - **1.9.** Attendance of Owner-Architect-Contractor meetings on a bi-weekly basis.
   - **1.10** Exclusions and Assumptions
     - 1.10.1 Monitoring of the contractor's safety practices and compliance with OSHA Standards.

2. **Structural and MEP Construction Administration Services**
   - **2.1.** Submittal review, relative to each applicable discipline.
   - **2.2.** Review and respond to RFI's.
   - **2.3.** Prepare and issue supplemental sketches and instructions.
   - **2.4.** Evaluations of the Work, including periodic site visits.
   - **2.5.** Review of special inspection and test results and reports.

3. **Surveying Services**
   - **3.1.** As-built foundation survey.
   - **3.2.** As-built final survey.
   - **3.3.** Exclusions and Assumptions:
     - 3.3.1. Construction Stakeout.
     - 3.3.2. Property line corner pinning.

4. **Geotechnical Construction Phase Engineering Services**
   - **4.1.** Review submittals, RFI's and Change Requests prepared by the Rigid Inclusion Ground Improvement (RIGI) contractor.
   - **4.2.** Observation and documentation during rigid inclusion installation.
   - **4.3.** Observation of prepared foundation and slab subgrades and removal/replacement.
   - **4.4.** Evaluation of on-site soils planned for reuse
   - **4.5.** Consultation to facilitate design changes if field conditions deviate from those assumed during design of unsuitable materials at footing/slab subgrades, as necessary.

5. **Geotechnical Construction Phase Vibration Monitoring**
   - **5.1.** Provide vibration monitoring services during aggregate pier installation. To this end, one seismograph to evaluate and document vibrations associated with aggregate pier installation and other construction activity will be deployed.
   - **5.2.** The assumption is that two trips will be required: one for initial set-up, and second trip for breakdown and pickup.
   - **5.3.** The equipment will allow the geotechnical engineers to remotely access the data being recorded by the monitors via modem. The equipment will also include a warning light to provide timely alerts to on-site personnel when predetermined vibration thresholds are exceeded.
   - **5.4.** The geotechnical engineer will provide remote daily review of the data and forward a summary report summarizing the data at the conclusion of vibration monitoring. Threshold trigger levels should be reviewed and discussed with the design team for comparison to actual vibration levels. An alarm level can be set up to alert members of the team.

   - **5.5. Exclusions and Assumptions:**
     - 5.5.1. The geotechnical consultant assumes that the contractor will provide a tamper-resistant enclosure for the monitoring equipment (e.g., jobsite lockbox), securely fastened with locks and chains or steel cables. to permanent existing features such as fenceposts. The location of the monitoring equipment will be determined based on discussions with the project team.

6. **Geotechnical Construction Phase Environmental Consulting**
   - **6.1.** Provide construction-phase environmental consulting services which are anticipated to consist of reviewing contractor submissions and questions relating to site soil and groundwater quality and management.
   - **6.2.** Evaluate and respond to submissions on behalf of the Owner and for compliance with Connecticut regulations.

6.3. Additionally, site visits and inspections by a GEO-Design environmental professional may be required as site conditions are revealed during excavation, to assess environmental quality of fill/soil being stockpiled.

6.4. Exclusions and Assumptions:

6.4.1.Sampling, laboratory analysis, or management of offsite disposal.

7. Structural Engineering-Special Inspection Coordinator

7.1. The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Structural Engineer of Record.

7.2. Prepare and submit reports shall be submitted to the Building Official and the Structural Engineer of Record.

7.3. Prepare and submit a Final Report of Special Inspections documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

8. Special Inspections and Testing

8.1. Provide inspections and testing of the materials included in the Statement of Special Inspections in accordance with the rate schedule included herein.

9. Environmental Soil Testing

9.1. The general list includes VOCs, SVOCs, ETPH, PCBs pesticides, metals (15), TCLP metals (5), reactivity, corrosivity, ignitability, paint filter and waste disposal fee. This this list may need to be modified depending on the particular offsite facility that would accept the material (if this disposal method becomes a preference).

EXCLUDED SERVICES:

- Hazardous Materials Inspection, Inventory and Abatement - Specifications and Drawings: Considering that there is no building on the site, this risk is minimal but may exist in the subsurface utilities suspected to exist on the site. Potential hazardous materials could include pipe ACM pipe, pipe insulation, etc.
- Location and mark-out of underground utilities, including related backhoe / hand excavating services. Although underground utilities have been marked-out by the Owner and documented on the survey map, it is the Contractor's responsibility to initiate CBYD for utilities within the ROW and to verify and protect underground utility locations on site.
- Building permit and associated filing fees.
- Monitoring of the contractor's safety practices and compliance with OSHA Standards.
- Consultants not included herein.

REIMBURSABLE EXPENSES:

- Reimbursable Expenses will be billed at cost plus 10% and include the following:
  - Out of town automobile travel at the standard IRS rate per mile.
  - Shipping charges and overnight delivery.
  - Reproduction costs of bid and permit documents. It is anticipated that bid documents shall be issued electronically in PDF format.

CONSULTANTS:

Land Surveyor
Criscuolo Engineering LLC
420 East Main Street, Bldg.1, Suite 9
Branford CT 06405
James M. Pretti Jr. PE, LS

Geotechnical & Environmental Engineers:
Geo design Inc.
984 Southford Rd.
Middlebury CT 06762
Theodore von Rosenvinge PE

Mr. Joseph Megale
Re: Collections Maintenance Facility SSF 2018-01
December 2, 2022

Material Testing and Inspections
Materials Testing, Inc.
55 Laura Street
New Haven, CT 06512
203-468-5216
Mr. Bill Soucy

Structural Engineers:
Michael Horton Associates Inc.
151 Meadow Street
Branford CT 06405
Alfred Lombardi, PE

M/E/P Engineering Consultant:
Engineering Design Group
114 South Main Street
Cheshire CT 06410

Proposed Compensation: We propose to provide the above-described deliverables for an estimated combined fee of **$88,252.27**. The itemized fee is a combination lump sum, not to exceed totals (NTE) and allowances based on an estimate of tests and inspections necessary given the size and duration of the project and is itemized the following way:

	1, & 2.	3	4	5	6	7	8	9	9	
	BASIC CA SERVICES	Survey	Geotech Observation	Vibration Monitoring	Environmental Consulting	Special Inspection Coordinator	Special Inspections	Environmental Soil testing	Reimbursable Expenses	TOTAL
	LS	ALLOWANCE	NTE	NTE	ALLOWANCE	NTE	ALLOWANCE	ALLOWANCE	ALLOWANCE	
CA SERVICES, SPECIAL TESTING & INSPECTIONS	$ 39,919.00	$ 3,000.00	$ 7,000.00	$ 3,550.00	$ 6,000.00	$ 1,980.00	$ 16,803.27	$ 9,000.00	$ 1,000.00	**$ 88,252.27**

Form of Agreement: The GNHWPCA's standard form of consultant agreement.

Thank you for this opportunity. We look forward to continuing our relationship with the GNHWPCA.

Sincerely,

Christopher Williams, AIA

Attachments: MTI's Rate Sheet

Christopher Williams Architects 12/02/22
ESWPAF Collections Maintenance Facility
Estimate

Discipline	Unit	Rate	Quantity	Total	Hours
Soils	1/2 day	292.50	2	585.00	8
	Day	450.00	2	900.00	16
Sieve Analysis	ea	138.00	2	276.00	
Proctor Analysis	ea	168.00	2	336.00	
Bearing Capacity Check	ea	650.00	1	650.00	
Concrete	1/2 day	292.50	10	2925.00	40
	Day	450.00		0.00	
	Cyls	18.50	70	1295.00	
Masonry	1/2 day	292.50	5	1462.50	24
	Day	450.00	2	900.00	
Mortar Compression Tests	Per	18.50	18	333.00	
Grout Compression Tests	Per	19.50	20	390.00	
Prims	Per	75.00	6	450.00	
p/u*	Hour	48.00	6	288.00	
Welding	1/2 day	487.50	3	1462.50	12
	Day	750.00		0.00	
Precast Concrete	1/2 day	292.50	4	1170.00	16
	Day	450.00		0.00	
PM	Hour	80.00	5.8	464.00	
			Total	**13887.00**	116

10% Contingiency:	1388.70
Grand Total:	15275.70

GNHWPCA
Protecting the Environment

Greater New Haven Water Pollution Control Authority
260 East Street New Haven, CT 06511
203.466.5280 p 203 772.1564 f www.gnhwpca.com

DATE: December 7, 2022

TO: Sidney J. Holbrook, Executive Director

FROM: Gary Zrelak, Director of Operations

RE: Task Order Recommendation
Hazen and Sawyer, P.C.
Odor Control Study

Sid:

I request that the above-mentioned recommendation be added to the December 14, 2022 Board Meeting Agenda for resolution.

This request is to provide the Authority with professional services for an odor assessment and control services study. This project will involve a study to investigate sources of odors within the ESWPAF and surrounding areas to enable the Authority to implement the appropriate odor abatement measures under a future project.

I recommend approval of the attached Hazen and Sawyer proposal dated December 7, 2022. The amount of these services shall not exceed Forty-Four Thousand Forty Dollars (**$ 44,040.00).**

This project is funded 100% from the Authority's FY 2022-2023 Operating Budget.

Gary Zrelak
Director of Operations

e-copy: Gabe Varca, Director of Finance & Administration
Lou Criscuolo, Deputy Director of Finance and Administration
Tom Sgroi, Director of Engineering
Joseph Megale, Deputy Director of Operations

Hazen and Sawyer
498 Seventh Avenue, 11th Floor
New York, NY 10018 • 212.539.7000

December 7, 2022

Mr. Gary Zrelak
Director of Operations
Greater New Haven Water Pollution Control Authority
260 East St New Haven, CT 06511

Re: Request for Proposal – Odor Control Study

Dear Mr. Zrelak:

Hazen and Sawyer (Hazen) is pleased to present our proposal to provide professional engineering odor assessment and control services for the Greater New Haven Pollution Control Authority (GNHWPCA) at the East Shore Water Pollution Abatement Facility (ESWPAF) located at 345 East Shore Parkway, New Haven, CT. The odor control study will investigate sources of odors within the ESWPAF, a limited section of the collection system adjacent to a neighborhood school, as well as the surrounding industrial park areas, to identify possible sources of recent nuisance odor complaints, and enable GNHWPCA to implement the appropriate odor abatement measures under a future project.

Hazen has considerable experience in odor abatement for wastewater treatment facilities, as discussed in the Relevant Experience section of our proposal. Our proposed Task Leader, Richard Pope, PE is a nationally-recognized expert in odor control, and has developed immediate and long-term odor control and corrosion plans for more than 250 facilities across the US and abroad. He served as the Technical Director for the Odor and HVAC evaluation and design at the MWRA's 360-mgd Nut Island Headworks Facility, and led the odor control assessment and design efforts for the 310-mgd Newtown Creek WWTP, including odor control strategies for the plant's Influent Pump Station. He will be supported by a cadre of wastewater professionals who have assisted him on other odor control projects.

We have prepared a thoughtful approach to the scope of work outlined in the RFP, based on our detailed discussions and site visit with Plant Operations, coupled with our project team members extensive experience on similar projects. We are confident that our proposed approach will achieve the project objectives discussed in the RFP and provide GNHWPCA with a sound basis for determining the appropriate mitigation measures to control odors within and around the ESWPAF.

The attached proposal is organized as follows, in accordance with the requirements of the Request for Proposals:

- Work Plan
- Cost Proposal
- Project Team
- Relevant Experience

Job no

The Cost Proposal section provides an estimated level of effort, not-to-exceed budget, and schedule for Phase 1, with a breakdown of the costs and labor hours by the tasks discussed in the Work Plan. While we are providing an initial work plan for Phase 2, we have not included budget or schedule information for this second phase of work, since its scope will be determined by the results and recommendations from Phase 1. We will provide a detailed estimate for Phase 2 at the conclusion of Phase 1.

We trust that this proposal is acceptable, and we look forward to continuing our work with GNHWPCA under our current On-Call Engineering Services contract. If you have any questions or require additional information, please do not hesitate to call either of the undersigned at (860) 936-3902 (Benjamin), or (914) 450-6735 (Richard).

Very truly yours,

Richard J. Pope

Benjamin Levin, PE, PMP, Assoc. DBIA
Associate Vice President

Richard Pope, PE, BCEE
Vice President

cc: J. Megale – GNHWPCA
I. Schroeder – GNHWPCA
R. Pope – Hazen
S. Bonett – Hazen

1. Work Plan

This section presents our overall understanding of the proposed project and describes our approach to the scope of work outlined in the Request for Proposals.

1.1 Project Understanding

The driver for this Odor Control Study is the unexplained increase in nuisance odor complaints from the community that may be attributed to the ESWPAF, the collection system, and/or other sources in the areas surrounding the facility. Under this study, Hazen will assess the effectiveness of the existing odor control systems and practices at the facilities, determine whether the collection system and the air vent at the intersection of Pope Street and Townsend Avenue contribute to odor impacts in the community, evaluate whether any currently uncontrolled process areas at the plant may contribute to off-site nuisance odors, study whether outside odor sources contribute to the perception of odors from the ESWPAF, and develop recommendations for the mitigation of wastewater related odors in the community within a one-mile radius of the plant.

The GNHWPCA has received an increase in odor complaints beginning in the late summer (August) and continuing through November of 2022. Twenty-three of the 28 odor complaints received through November 18, 2022 were logged in from August through November. The odor complaints appear to be centered around the ESWPAF and surrounding community. Management and staff are uncertain as to the potential cause of the increase in odor complaints, and have noted that they are unaware of any recent modifications to either the plant/collection system facilities or operations that could be attributed to the recent increase.

Some of the complaints allege that nuisance odors have been observed in the vicinity of a nearby local elementary school (Nathan Hale School), located at the intersection of Pope Street and Townsend Avenue. At this intersection, the GNHWPCA has a sewer air vent that relieves any air pressure build-up in the headspace of the sewer below. In this area of the collection system, an upstream pump station force main breaks to a gravity line. It is not unusual for the release of odors from the wastewater as it exits the enclosed environs of the force main and enters the open atmosphere of a gravity sewer. However, from this location the sewer flows downhill as it makes its way to the nearby ESWPAF. Typically, the flow of the wastewater downhill would drag, by friction, the air found at the point of that break to gravity, as long as the force main pump is operating and pushing the wastewater through the pipes. There may be times during the pump station/force main pump cycle, however, that a positive air pressure builds up at the air vent without the force main wastewater flow being present. The dynamics of the wastewater and release of nuisance odors at this location should be evaluated to better understand the degree of community odor impact this structure may have on odors in the community.

GNHWPCA has historically been a good neighbor by taking the steps necessary to control the release of nuisance odors from its wastewater facilities. With the last plant upgrade in 2016, GNHWPCA covered and contained the typical odor sources at the plant, and installed three vertical, packed tower, chemical wet scrubbers in a centralized system to treat the odors collected from these sources. As originally designed, two of the three wet scrubbers operating in parallel were considered sufficient to mitigate the odors from the key plant odor sources. Each of the wet scrubbers was designed to treat 57,000 cubic feet

per minute (cfm) of odorous air, for a total of 114,000 cfm when both are operating. GNHWPCA has since determined that they are better able to reduce community odor complaints when they operate all three wet scrubbers simultaneously, increasing the treatment capacity to 171,000 cfm.

While increasing the odor control treatment capacity by 50% to reduce odor complaints may be a positive and calculated move to maintain a good neighbor status and demonstrate to the public that they are listening to their voices, it does also increase the amount of O&M time servicing the wet scrubbers (which are mechanically intensive), the energy to run an additional fan and recirculation pump, the chemical needed for the additional unit and flow, and their associated costs. GNHWPCA noted that the odor control network connected to the wet scrubbers was to undergo an air balancing evaluation to determine the effectiveness of the design and operation of the odor control system. Air balancing should be done under the two modes of operations – with two and with three wet scrubbers in service – to assess the differences/advantages of each mode.

GNHWPCA also operates a multiple hearth sludge incinerator, which processes sludges produced at the ESWPAF, as well as sludges imported from other communities in Connecticut. The incinerator has a regenerative thermal oxidizer (RTO) that acts as an afterburner to reduce emissions from the incinerator exhaust stack. The RTO is intended to mitigate any nuisance odors from the incinerator exhaust, which is subsequently discharged out a tall stack. Although wastewater-related nuisance odors are thermally eliminated from the exhaust, other residual emissions such as NOx (nitrous oxides that are a product of combustion) have sometimes been detected as an irritant or identified as pungent when a person stands in the downwind plume of the incinerator stack discharge. This is why it is helpful to record the wind direction and speed when receiving an odor complaint, as well as the location of the caller making the observation, to assess whether the odor may be attributed to the stack exhaust or another source.

As previously mentioned, all of the key process unit odor sources at the plant are under a control strategy whereby the odors are captured and treated. However, this does not include all the process units. The largest process unit, activated sludge and nutrient removal, remains open to the atmosphere and has the potential to generate odors that may be perceived off-site. These tanks remain open at most of the plants across the country, since the odors released are mostly earth, musty, and moldy; they are not typically associated with the foul, reduced sulfur-focused odors found at upstream process units that are controlled. These odors, when diluted, are generally not perceived as associated with a wastewater treatment plant. Those plants around the country that have covered and controlled these tanks are generally located in high-density populated urban settings, where residences sit adjacent to the plant fence line where these tanks are located. Nevertheless, because these tanks are a very large and open odor source, they should not be automatically discounted as a potential source of odors.

The wet scrubber odor control system employed at ESWPAF is a proven, physical-chemical, automatic-operating technology that uses a chemical scrubbant solution of water, sodium hydroxide, and sodium hypochlorite to absorb, treat, and reduce odors. This technology has been used successfully to treat wastewater related odors for over 40 years, and although it may be a less sustainable operating system, it remains an effective odor control technology, with the additional advantage of being the technology with the smallest operating footprint. The heart of the ESWPAF odor control strategy rests on the ability of this system to perform as designed. Monitoring of key performance indicators (e.g., inlet and outlet H_2S and odor levels, make-up water rate, recirculation rate, differential pressure drop, distribution nozzle

performance, air flow, etc.) assures that the wet scrubbers are optimized and performing as designed. The question remains – does placing the third wet scrubber in service have any impact on the overall odor control system, other than eliminating system redundancy? Part of our initial review will examine the wet scrubber design and current operating conditions to evaluate these key performance indicators.

The ESWPAF is located in a very busy industrial park-like setting that could contain other, outside sources of odors perceived by the community and attributed to the plant. The community generally does not discern the differences between wastewater odors and other nuisance odors, but because the plant is their closest neighbor and it is a municipal facility, we have found that most of the odor complaint calls will be directed to the plant. A review of the facilities in the area will identify their potential odor footprint and determine whether additional steps may be needed to assess their odor impact on the community of concern.

Marine soils of the New Haven Harbor and Long Island Sound, when exposed at low tide, can be a natural odor source. The odors connected with some low tides where benthic deposits are present have similar reduced sulfur compounds, such as H_2S, which are produced under anaerobic conditions in the benthic zones. These odors are unavoidable. It is also very difficult to impossible to convince the community that what they are smelling is not the plant but low tide. If the odors that can sometimes be attributed to low tide are an important issue for GNHWPCA, the best initial strategy would be public education to engender an awareness of the timing and nature of these odors.

1.2 Approach to the Scope of Work

Hazen proposes a two-phased approach to the Odor Control Study gleaned from our experience in the field, and which has been finely tuned over four decades of conducting odor assessment and control studies at hundreds of wastewater treatment plants in Connecticut and 36 other states by our Corporate Odor and Air Emissions Services Group leader, Richard Pope, PE, BCEE. This approach has proven effective in creating recommendations that mitigate off-site nuisance odors while also protecting the health and safety of staff and against the potential corrosion impacts to the plants' infrastructure.

Hazen's approach follows a tried and proven road map that consists of the following steps:

- Establishing goals and objectives;
- Reviewing existing information and facilities;
- Reinforcing our understanding through meetings with operating staff;
- Field monitoring to characterize the current conditions from both an odor compound and physical system perspective;
- Data compilation and review;
- Alternatives evaluation; and
- Development of recommendations to address the identified cause(s) of odor complaints.

In following with the tenets of the above study "roadmap," Hazen is proposing the following two-phased approach to address the odor complaint issues at the ESWPAF:

- Phase 1 – an initial stage where work is focused on the review of existing documents and data, identifying data gaps, odor complaints and procedures, plant operations, O&M procedures, operating strategies, and site inspections.

- Phase 2 – a follow-up to Phase 1, involving further investigation of the Phase 1 findings through the collection of additional plant data and information.

The prime reason for performing the project in two phases is its timing. The cooler/colder fall and winter months are not consistent with identifying representative worst case odor conditions at wastewater facilities (including the collection system and the plant). The microorganisms that are responsible for generating nuisance odors are significantly more active in the warmer summer months, and their activity slows down in the colder winter months. This is the main reason that odor complaints associated with wastewater operations drop in winter and spike in the summer and early fall. As a result, planning to collect odor data from plant operations in the winter would not be truly representative of worst-case conditions that could result in community complaints. We therefore propose to conduct Phase 1 immediately upon Notice to Proceed, and hold off on any Phase 2 field sampling until the warmer weather returns. Each of these phases and their specific tasks are discussed below.

1.2.1 Phase 1: Initial Evaluations

Task 1.1 – Kick-Off Meeting

Hazen will attend a kick-off meeting with GNHWPCA at project commencement. In addition to introducing the key Hazen project team members and reviewing the scope of services with GNHWPCA, we will facilitate a discussion to identify and clarify the goals and objectives of the project. It is important that these goals and objectives are clearly identified at the start of the project, to ensure that the final odor control plan that Hazen will develop and implement is crafted with them in mind, and to confirm that they are satisfied at the end of the project.

Before the discussion of goals and objectives at the kick-off meeting, it is important to recognize that there are no federal regulations regarding odors. During the major revisions to the Clean Air Act, the Amendments of 1990, the USEPA made a conscious decision not to include odor. They concluded that they were obligated to develop regulations concerning public health, and not public nuisance. Thus, the burden to regulate nuisance odors was left to the states and local entities. Connecticut regulations, *Connecticut Agencies Regulations Section 22a-174-23- Control of Odors*, have three criteria that are important to nuisance odors at facilities. The first criterion is quality of life. The second criterion is a dilution standard of 7:1 (7 parts of clean air to one part of sample air). The 7:1 dilution level shall not be exceeded by three observations over the course of an hour separated by 15-minute intervals. The third criterion refers to individual compounds whose concentration shall not exceed specific 15-minute averages. The compounds associated with wastewater collection and treatment facilities include (along with their concentration limits): ethyl mercaptan (0.00040 ppm), hydrogen sulfide (0.0045 ppm), and methyl mercaptan (0.0010 ppm). Proposed goals and objectives, as well as monitoring plans to be developed for Phase 2 must consider these regulations and how they apply to this project.

Prior to the kick-off meeting, Hazen will prepare and submit to GNHWPCA a list of requested information and data that will be reviewed in Task 1.2. We anticipate that most if not all the available information and data will be delivered to us at the kick-off meeting. Some of the information and data will include:

- Design drawings
  - Collection System Connected to the Air Vent at Pope Street and Townsend
    - Upstream Pump Station
    - Hydraulic Profiles of Force Main and Downstream Gravity Line
  - Plant Unit Processes, Particularly the HVAC and Odor Control Units
  - Odor Control Wet Scrubbers
- Odor Complaints & Standard Procedure
- Odor Data Collected
  - Wastewater Parameters
  - Vapor phase Parameters
  - Other Data
- Previous Odor Reports
  - Plant Conducted
  - Independent Consultant/Vendor
- Odor Control System
  - Performance Test When Constructed
  - Modifications
  - Operating Performance Data
  - Standard Operating Procedures
- Chemicals Added
  - Collection System
  - Treatment Plant
- Industrial Pretreatment Program
- List of Outside Properties in the Plant Vicinity
- Title V Air Permit
- Odor Control Inlet and Exhaust Monitoring Data
- Plant Influent Daily Wastewater Data

Task 1.2 – Review Existing Information

Under this task, we will gain a more informed historical and current understanding of the plant process units under consideration, how they are operated, concentrations of odorous compounds, regulatory framework, odor control technologies including chemical addition and vapor phase systems implemented by GNHWPCA and their effectiveness, odor complaints, and any planned plant upgrades or modifications that could impact odors in the community. This review process is essential to establishing a background as to odor conditions at the plant that will help lead us to recognize and learn from the work that has been completed; it will also identify potential odor sources (both plant-based and external) and help determine where to focus our odor assessment and control efforts, while identifying existing data gaps to be addressed in Phase 2.

Part of our review of existing conditions will focus on the ability of the odor control system to do more than just treat odors. Hazen's philosophy on vapor phase odor control of wastewater facilities consists of five key elements:

- **Cover** the odor source to limit the spread and impact of nuisance odors.
- **Contain** the odors at the source by providing negative air pressure under the cover/enclosure.

- **Convey** the odors in a conduit to a treatment device under negative air pressure, to prevent fugitive odor leaks along the way.
- **Treat** the odors in a cost-effective technology selected to mitigate the specific odor parameters that are present.
- **Discharge** the treated air from an exhaust stack designed to take advantage of the dilution and dispersion characteristics of the ambient atmosphere.

Hazen considers each of these five key elements as individual links in an odor control chain that will only be as effective/strong as the weakest link. A weak link is tantamount to a compromised odor control system. Accordingly, Hazen will pay close attention to each critical element in our review, to ensure that the odor control chain is as strong as it should be and that nuisance odors are not filling the atmosphere.

Another part of our review of existing systems review will consider the *National Fire Protection Association (NFPA) 820 - Standard for Fire Protection in Wastewater Treatment and Collection Facilities* requirements for areas that may be modified or replaced as part of our recommendations. This standard provides requirements for protection against fire and explosion hazards specific to wastewater treatment facilities and their associated collection systems, and is quickly becoming the standard of care for ventilation at wastewater treatment facilities. With any modifications to or installation of new process units and/or odor control equipment, the application of NFPA 820 is recommended. Nevertheless, NFPA 820 ventilation rates are intended to address fire and explosion conditions, and not for health and safety from dangerous compounds nor worker environments. As a result, staff and infrastructure must also be taken into consideration when determining the ultimate design ventilation rates.

Task 1.3 – Meet with Operating Staff

Subsequent to reviewing the data provided by the Authority, Hazen proposes to schedule a meeting with the plant's operating staff. These are the front line people who operate the plant on a daily basis and understand better than anyone how the plant functions, where odors can be found, what they have done to try and mitigate the odors, and how successful these steps have been. This task is intended to find out who, what, when, where, why, and how they do things, particularly with regards to odors. Operating staff are also key to understanding how the process units are run. Odors can be managed as well as exacerbated by the way a process unit is operated, particularly when solids are part of the process. For example, operating a primary or secondary settling basin or a gravity thickening tank with relatively shallow sludge blankets, especially during warm summer weather conditions, may not enhance the solids percentage, but would reduce the detention time within the tank and the tendency to go septic and create an odor-producing sludge. Staff can also help identify if current odor control equipment is operated and maintained differently from the original design intent and/or as shown in the original O&M manual. Interviews are the best way to quickly understand the odor control systems and the idiosyncrasies of the equipment for each technology and the overall odor control system itself. Each plant modifies their equipment and operations to satisfy the needs of the community nearby. It is important that Hazen review existing materials and information prior to engaging with staff, to gain a more thorough knowledge and understanding of basic plant systems before interviewing staff as to how these systems operate. A similar process will be implemented with the collection system staff, particularly with regards to the air vent by the Nathan Hale School.

Task 1.4 – Inspect Facilities

Fortified with the intelligence achieved from reviewing the background information in Task 1.2 and the subsequent discussion with GNHWPCA staff in Task 1.3, an in depth inspection of the air vent at the intersection of Pope Street and Townsend Avenue and at the plant process units with odor control in mind will be conducted.

In the collection system, Hazen will consider the information collected from the data review and in particular, the issues listed below, to provide insight into the odor generating potential of the force main:

- The length of the force main
- The hydraulic detention time of the wastewater in the force main
- The make-up and extent of the sewer network upstream of the pump station wet well
- The representative 24-hour daily pump cycle routine
- Correlation of pump cycles and odor complaints from the vicinity of the air vent

This information will help us better understand what we can expect when conducting the inspection, which will involve:

- Conditions at the vent that would allow for odors from the sewer to escape;
- Conditions in the force main pump station wet well;
- Corrosive conditions at the wet well, manhole upstream and downstream of the air vent, and at the air vent as possible;
- Observations of odor intensity and odor character; and
- Differential pressure in the headspace of the manhole closest to the air vent, at the air vent, and one manhole downstream, as necessary.

At the ESWPAF, the on-site inspections will focus on the following elements:

- Ability of the odor controlled process units to capture and contain the odors effectively.
- HVAC in the odor controlled building spaces, to observe whether effective negative air pressure is present to capture and contain the odors.
    - Are the HVAC systems working?
    - Is there air movement in the worker space?
    - Are there dead zones within the building?
    - Is the make-up air provided by passive louvers, ceiling/wall fans, or a forced air supply system and where are they located?
    - Where are the exhaust registers located?
    - Does the observed ventilation appear to match the design intent?
- Ventilation in the covered channels and tanks
    - Is the ventilation system working?
    - Is there air being sucked into the covered surface area, indicating the headspace under the cover is negative?
    - Are there signs of corrosion on the concrete or exposed metal surfaces under the covers?
    - Are any odors detected while walking on/around the covers?
- Is the odor control duct work conveying the odors under negative pressure
- Does the duct work have a way to remove condensate build-up whether through duct drains or sloping to the odor source or the odor control technology
- Observe the operation of the wet scrubbers:

  - Note the number of distribution nozzles in service
  - Evaluate the condition of the media through the inspection ports
  - Evaluate the distribution pattern of the scrubbant solution through the media by observing the pattern of water as it falls into the sump
  - Record the pH and ORP readings and the differential pressure across the scrubber media bed as available
  - Monitor the exhaust from the wet scrubber exhaust stack
  - Sample the blowdown of the wet scrubber to check for residual chlorine odor
  - Check the fan for steady and balanced operation
  - Note how many wet scrubbers are in service
- Inspect the wet scrubbers when they have been turned off and the top and sump access ways have been opened up
  - Inspect the condition of the media, distribution arm and nozzles, and under side of the mist eliminator support grating
  - Inspect the underside of the media support grating, the overflow weir, and the scrubber sump for any potential accumulation
- Observe the stack design
- Inspect non-odor controlled process units to qualitatively assess their potential to impact the community based on experience from other treatment facilities

We will also conduct a dashboard survey of local industries/facilities after reviewing the Industrial Pretreatment Program, to evaluate their potential to cause an odor impact on the adjacent community. Although conducted in the cold weather, these surveys will form an initial assessment of their odor potential that would need to be followed up in the warmer summer months.

Task 1.5 – Develop Recommendations

The results of the data review and the field inspections will drive the development of the immediate odor control actions and the recommendations for conducting additional monitoring and inspection during the warm weather months. The immediate odor control actions will consist of items that Hazen found, based on our many years of odor assessment and control experience, to be clear and obvious corrections to the odor control system that will enhance the mitigation of odors and reduce the impact on the community.

Task 1.6 – Present Findings and Conclusions

After reducing the data, developing the recommended immediate actions, and developing the follow-up recommended monitoring activities for Phase 2, Hazen will meet with GNHWPCA staff and present our findings, conclusions and recommendations both for the immediate actions and Phase 2 monitoring activities. Discussions will focus on the scope of the Phase 2 activities and to assess what may be needed to achieve the project goals and objectives. Decisions derived from this meeting will provide the main narrative for the development of the Technical Memorandum

Task 1.7 – Prepare Technical Memorandum 1 (TM1)

Hazen will prepare a Technical Memorandum for Phase 1, summarizing the work conducted in each of the tasks, highlighting the results of the data gap analysis and the recommended field monitoring steps to take in Phase 2. The TM will identify any observed weaknesses in the existing odor control systems, including capturing, conveying, treating, and discharging the foul air from the odor sources, and

recommend any perceived viable odor mitigating measures in the collection system and/or at the plant. A draft TM will be submitted for GNHWPCA to review and comment. Hazen will review the comments and develop a revised and final Phase 1 TM.

Task 1.8 – Project Management

Under this task, we will provide general project management, invoicing, activity and meeting coordination, schedule management, and staff/personnel administration required over the period to complete this work.

Task 1.9 – Optional Services

Although the field monitoring to be recommended in Phase 1 will be implemented in Phase 2, there are some monitoring activities that could be started during the Phase 1 facilities inspection, since they are generally considered to be somewhat independent of the ambient temperature. Those monitoring activities include differential pressure monitoring and smoke testing, as discussed below.

Differential pressure – Continuous data logging monitors that are intrinsically safe to use in sewers and wastewater enclosed environments can be placed at strategic locations in the collection system (e.g., manholes upstream and downstream and at the air vent) and within the plant (e.g., odor-controlled building spaces and under channel and tank covers), to assess whether the airspace under odor control is actually under negative, positive, or neutral pressure. Positive pressure would indicate that the odors would not be contained and would be seeking somewhere to vent to atmosphere. Monitors can be deployed for up to two weeks (and checked after a week to ensure they are operating and collecting data). The resulting data will be very useful in judging the effectiveness of the existing odor control system in capturing and containing odors from the odor controlled areas. For the interceptor and air vent, the differential pressure data will indicate if and when, during the two weeks of deployment, the headspace air pressure within the sewer line by the Nathan Hale School would allow odors to vent to atmosphere.

Smoke testing – Smoke testing of odor-controlled building spaces and covered channels and tanks is a more visual aid to assess the ability of the odor control system to capture and contain the odors released by the process unit. Smoke testing reveals additional information about the area being examined, including the location of leaks, how the ventilation within a building moves or does not move the air, the time it takes to expel the smoke (indicating the number of air changes it takes to be smoke free), and where the dead zones are within the enclosed structure.

Both of these monitoring activities provide valuable insight into the ability of the odor control system and/or sewer to contain the odors and prevent them from escaping to the atmosphere. The question is whether to conduct these monitoring activities in Phase 1 or defer them to Phase 2, with the rest of the monitoring activities. We will address this question during our work under Phase 1. At this time, Hazen has not included these Optional Services in our proposed level of effort and cost to perform Phase 1.

Phase 2: Field Monitoring

The following preliminary steps are proposed for Phase 2, which will be performed during the warmer spring-summer months. This is an initial work plan; the final scope and cost for Phase 2 will be based on the findings and recommendations of Phase 1.

Task 2.1 – Kick-off Meeting

Attend a kick-off meeting for Phase 2. The key discussion will focus on the results of the gap analysis conducted in Phase 1 and the recommendations for the additional monitoring to be implemented in Phase 2. The meeting will clearly define and reach an agreement on the scope of work to be undertaken in this second phase.

Task 2.2 – Develop Field Monitoring Plan

According to the agreement reached on the scope of work including the field monitoring activities, Hazen will develop a detailed monitoring plan including locations to be sampled, the parameters to be monitored, the number of samples to be collected, the timing of the sampling, coordination between Hazen and the ESWPAF staff, and a schedule. To assist with collecting samples during the most odorous time of the day, continuous data logging H_2S monitors will be deployed at the proposed sample locations before the field monitoring activities begin. The results of the diurnal H_2S trends, keying in on the timing of the peak conditions, will be used to identify the time of day to conduct the monitoring activities to coincide with worst case odor conditions. When completed, the draft monitoring plan will be shared with GNHWPCA for review. Hazen will meet with GNHWPCA to discuss the draft monitoring plan and coordination with plant staff. We will incorporate the comments by GNHWPCA staff and prepare a final monitoring plan.

Task 2.3 – Conduct Field Monitoring

Hazen will implement the final monitoring plan. Our team will be prepared to adjust to field conditions, as plant operations may change during the course of the monitoring activities.

Task 2.4 – Present Results and Conclusions

We will reduce the data collected in the field by summarizing the information and using tables and figures to simplify the data analysis. Once the monitoring data has been reduced, we will meet with GNHWPCA staff to present the results, findings, conclusions and recommendations.

Task 2.5 – Prepare Technical Memorandum 2 (TM2)

Hazen will prepare a TM that summarizes Phase 2 activities, conclusions and recommendations and submit it to GNHWPCA for review and comment. We will review and incorporate comments provided by GNHWPCA and submit a final TM.

Task 2.6 – Project Management

Under this task, we will provide general project management, invoicing, activity and meeting coordination, schedule management, and staff/personnel administration required over the period to complete this work.

2. Cost Proposal and Project Schedule

This section presents our estimated not-to-exceed fee (project budget) and labor hours (level of effort) for Phase 1, broken down by the Work Plan tasks discussed in Section 1, along with a Project Schedule depicting the duration of each task. We are not providing a fee estimate or schedule for Phase 2 at this time, pending further definition of the scope of work for this phase; that will occur at the completion of Phase 1.

2.1 Estimated Fee and Level of Effort

As shown in Table 1, we estimate a total not-to-exceed cost of **$44,040** for the scope of work described for Phase 1 of the Odor Control Study. A total of **262 labor hours** is anticipated. Hourly rates were provided in our proposal for the On-Call Engineering Services contract, dated July 1, 2020.

Table 1: Estimated Level of Effort and Fee for Phase 1 of the Odor Control Study

Phase 1: Initial Evaluations	Labor Hours	Fee	Other Direct Costs	Total Cost
Task 1.1: Kick-off Meeting	8	$1,420	$500	$1,920
Task 1.2: Review Existing Information	50	$7,180	------	$7,180
Task 1.3: Meet with Operating Staff	12	$1,900	$500	$2,4000
Task 1.4: Inspect Facilities	48	$7,680	$500	$8,1800
Task 1.5: Develop Recommendations	58	$9,100	------	$9,100
Task 1.6: Present Findings and Conclusions	8	$1,420	$500	$1,920
Task 1.7: Prepare TM1	62	$9,660	------	$9,660
Task 1.8 Project Management	16	$3,680	------	$3,680
Total, Phase 1	**262**	**$42,040**	**$2,000**	**$44,040**

Work will be invoiced monthly based on actual work performed, and in accordance with the terms of our current On-Call Engineering Services contract. Other direct costs include reimbursable expenses, such as transportation, which we will bill at cost, with no administrative markup.

2.2 Project Schedule

As shown in the Project Schedule on the next page, we anticipate completion of the Phase 1 scope of work discussed in Section 1 within 16 weeks of Notice to Proceed. As the figure shows, work on each task will be sequential with little overlap, with Task 1.8 Project Management spanning the entire Phase 1 duration.

While Hazen is proposing 16 weeks to complete this project, we can work with GNHWPCA if the schedule needs to be adjusted to address any unforeseen time constraints.

Proposed Phase 1 Project Schedule