

**RESOLUTION 20-78**

**A RESOLUTION TO AUTHORIZE THOMAS AND HUTTON ENGINEERING FOR BIDDING AND CONSTRUCTION ENGINEERING AND INSPECTION SERVICES FOR WASTEWATER TREATMENT PLANT OXIDATION BASINS AND FILTER BASINS**

**WHEREAS**, the City of Spring Hill Board of Mayor and Aldermen approved a Professional Services Agreement with Thomas and Hutton Engineering (formerly Dempsey Dilling and Associates) for variety of professional engineering, design, and municipal support services; and

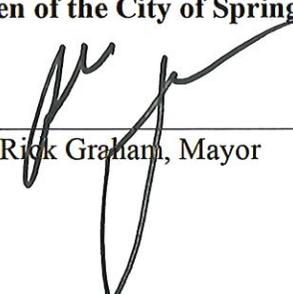
**WHEREAS**, the Spring Hill Wastewater Treatment Plant Oxidation Basins and Filter Basins have experienced cracks and leakage since construction and is in need of repairs; and

**WHEREAS**, the customary practice of the City of Spring Hill for major projects is to retain the services of a professional engineer to assist in preparation of bidding documents and perform construction engineering and inspection services to ensure quality control and proper completion of the project; and

**WHEREAS**, Thomas and Hutton Engineering has provided the City with a proposal to perform bidding and construction engineering and inspection services for Oxidation Basins and Filter Basins as outlined more specifically in the attached Scope of Services.

**NOW, THEREFORE, BE IT RESOLVED**, that the Board of Mayor and Aldermen of the City of Spring Hill authorize Thomas and Hutton Engineering to provide Bidding and Construction Engineering and Inspection Services for Oxidation Basins and Filter Basins at a cost not to exceed \$297,400.00

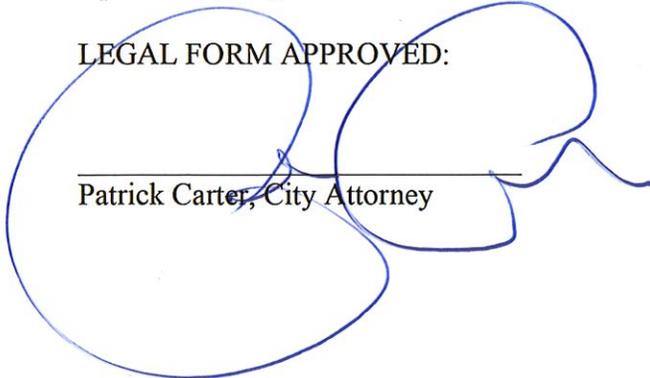
**Passed and adopted by the Board of Mayor and Aldermen of the City of Spring Hill, Tennessee on this 15<sup>th</sup> day of June, 2019.**

  
\_\_\_\_\_  
Rick Graham, Mayor

ATTEST:

  
\_\_\_\_\_  
April Goad, City Recorder

LEGAL FORM APPROVED:

  
\_\_\_\_\_  
Patrick Carter, City Attorney



**REQUEST:** Staff Report  
**SUBMITTED BY:** Chip Moore, Infrastructure Director  
**DATE:** April 3<sup>rd</sup>, 2020  
**RE:** Oxidation Ditch and Denite Filter Coating Repairs

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**ATTACHMENTS:** ---

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**PURPOSE:**

To discuss the Request for Qualifications for Construction Engineering Inspection (CEI) and Request for Proposals (RFP) for Construction.

**BACKGROUND:**

In 2018, the City of Spring Hill sought methods for concrete crack repair and lining with exterior coating for Oxidation Channel 1 & 2 including their corresponding Clear wells and Mud wells. This also includes the removal and new media replacement in all 4 of the WWTP Effluent (Denite) Filters after they are protective coated / corrected of failures. After reviewing several alternatives, the City sought to invest in repairs to coat the interior and exterior of the tanks and Denite Filters.

There are two oxidation ditches are approximately 210 feet long by 110 feet wide and 20 feet deep. There are four (4) Denite Filters approximately 10 feet wide by 47 feet long and 17 feet deep and associated Clear Well and Mud Well. Additional work required to perform in order to coat the Denite filters is to remove and replace with new filter media. This is a task to be performed by the contractor while the City purchases the media and coordinates the installation with the media representative and CEI to ensure proper placement of the material.

Staff has consulted several professionals from various disciplines to determine the most effective solution to facilitate the repairs. These investigations have led staff to a product used in several industrial applications that would provide the required repairs while being durable enough to maintain integrity over the course of all normal operations.

The processes for these repairs are very environmentally dependent. As such, a contract for a project of this scale and complexity would be required to be constructed during the summer / fall of 2020 and spring / summer of 2021 construction periods. Additionally, during summer months, the work period would be mostly at night due to excessive heating of the concrete and the viscosity of the material being placed. Installers of the coatings are familiar with contracts spanning lengthy period and downtimes due to winter conditions.

**FINANCIAL IMPACT:**

Staff anticipates the project construction costs to include application of coating for Oxidation Ditches and Denite Filters including incidental work only for the coating application to be: **\$2,100,000 (quoted)**

Purchasing of Filter media: **\$200,000 (quoted)**

Removal and Installation of Filter Media: **\$350,000 (quoted)**

Removal and Disposal of Sludge: **\$500,000 (est)**

Design of details to address walkway connection failure details: **\$7,500 (quoted)**

Corrective Work on Walkways and Handrails: **\$50,000 (est)**

CEI services are estimated to be approximately 10% of construction costs - **\$325 000**

Contingency for the project is estimated to be **\$350,000**

Total project costs of construction, CEI and contingency is estimated at: **\$3,882,500**

**STAFF RECOMMENDATION:**

One oxidation ditch is not in use except during rain events which overburden the system requiring the use of the second oxidation ditch in order to prevent a release. Due to the critical need to utilize both oxidation ditches, staff recommends approval to proceed with the advertising of the RFQ to be able to utilize their professional expertise to finalize the RFP and have their support during the advertising process. The CEI consultant can assist in a more accurate estimate of the sludge removal and walkway repairs. If approved, the following schedule is presented:

RFQ Advertise – April 9<sup>th</sup>, 2020

Budget Amendment - CEI services for WWTP Oxidation Ditch – April 20<sup>th</sup>, 2020

RFQ Open - April 23<sup>rd</sup>, 2020

RFQ selection – May 7<sup>th</sup>, 2020

RFQ Contract Approval and second reading of Budget Amendment– May 18<sup>th</sup>, 2020

RFP Advertise – June 4<sup>th</sup>, 2020

RFP Bid Date – June 25<sup>th</sup>, 2020

RFP Contract Approval – July 20<sup>th</sup>, 2020

One Oxidation Ditch can be completed before weather conditions may influence the product placement. If schedule permits, the Denite filters may be able to be done before the environmental conditions force work to stop. Otherwise, the Denite Filters and the other Oxidation Ditch would be completed in 2021 as the environmental conditions allow. Staff would also work with the CEI consultant and consultant for opportunities to achieve a more desirable schedule.

# CIM 1000

## HIGH PERFORMANCE COATINGS AND LININGS

### OVERVIEW

**DESCRIPTION** CIM 1000 is a liquid applied urethane coating that cures in hours to form a tough elastomeric coating that adheres to most substrates, forming a chemical and abrasion resistant barrier for waterproofing, corrosion protection, and containment of water and most aqueous chemicals.

**ADVANTAGES** CIM 1000 has over 30 years of proven performance in demanding environments. It remains flexible and resilient and provides exceptional service in a broad range of applications.

- Ideal for coating concrete.
- Forms a tough elastomeric liner able to bridge cracks.
- Tested to ANSI 118.10-199, "Standard Specification for Load Bearing, Bonded, Waterproof Membrane for Thin-Set Ceramic Tile and Dimension Stone Installation".
- Impervious to water and most aqueous chemicals, providing a long lasting tank and pond liner.
- Asphalt extended urethane formula provides superior wear and weatherability for parking decks and containment areas.
- Adheres to and bridges between common construction materials such as concrete, steel and other metals, asphalt pavement, glass, wood, and most coatings.
- Environmentally sound, complying with the toughest VOC regulations.
- Can be repaired when damaged.
- Excellent abrasion resistance for severe wear applications.
- UV stable.
- Liquid, two-component urethane can be applied to complex shapes, multiple penetrations or to most geotextiles.

### SURFACE PREPARATION

- GENERAL:** Substrates must be **clean and dry** with no oils, grease or loose debris. CIM Bonding Agent is recommended on all non-porous substrates. Perform adhesion tests to confirm adequacy of surface preparation. See C.I.M. Industries' specific substrate Instruction Guide for specific guidelines.
- CONCRETE:** ICRI-CSP 4-6 surface profile exposing aggregate. Concrete must exhibit minimum 3,000 psi compressive strength and be free of release agents and curing compounds. The substrate must be clean and dry (see CIM Instruction Guide IG-2), and free of contaminants.
- STEEL:** Minimum 3 mil profile.  
Immersion service – SSPC-SP10 / NACE No. 2 Near White Blast.  
Non-Immersion service – SSPC-SP6 / NACE No. 3 Commercial Blast.  
Use CIM Bonding Agent for greater adhesion.
- OTHER METALS:** SSPC-SP1 solvent clean and abrasive blast to roughen and degloss the surface. Use CIM Bonding Agent for greater adhesion.
- GLASS:** Thoroughly clean. CIM Bonding Agent must be used for increased adhesion. For immersion service roughen the surface.
- WOOD:** Substrate must be clean, dry and free of surface contamination.
- PREVIOUS COATINGS AND LININGS:** CIM 1000 may be applied over some existing coatings and linings and achieve acceptable performance. CIM Bonding Agent is recommended for greater adhesion. Finished system results vary due to a variety of project specific factors, including the service conditions to which the system is exposed. Therefore, C.I.M. Industries does not accept responsibility for determining the suitability of an existing coating and lining as a substrate for CIM products. Owner shall perform adhesion tests on any existing coating or lining to determine suitability.
- EARTH:** Use CIM Scrim.
- COLOR** CIM 1000 is initially shiny black, turning dull over 3 to 6 months when exposed to direct sunlight. For a colored or reflecting surface finish, see C.I.M Industries' Instruction Guide, "Topcoats" (IG-7) for further instructions.
- SOLIDS BY VOLUME** 88% (1413 dry mils x sq. ft./gal.)
- VOC** 92 g/l (0.76 lb./gal.). CIM 1000 complies with the toughest VOC regulations.



# CIM 1000

## HIGH PERFORMANCE COATINGS AND LININGS

All information presented in this publication is believed to be accurate, but it is not to be construed as a guarantee of minimum performance. Test performance results are obtained in a controlled laboratory environment using procedures that may not represent actual operating environments.

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### TYPICAL PROPERTIES

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|  |   |  |  |
|--|---|--|--|
| Abrasion Resistance—Wt. Loss,<br>Taber Abraser CS-17 Wheel<br>1000 gr./1000 rev.<br>ASTM D4060 | 1.2 mg. Loss  | Liner Performance<br>Crack Bridging<br>10 cycles @ -15°F<br>After heat aging | greater than 1/8"<br>greater than 1/4" |
| Adhesion to Concrete (dry)<br>Elcometer  | 350 psi   | Liner Weight<br>(60 mil wet film thickness)                                  | 31 lbs./100 sq. ft.                    |
| Deflection Temperature<br>ASTM D648  | below -60°F   | Mix Ratio<br>Weight<br>Volume  | 7:1<br>9:1                             |
| Density (Approx.)<br>Premix<br>Activator<br>Mixed & Cured                                      | 8.0 lbs./gal.<br>10.1 lbs./gal.<br>8.3 lbs./gal.      | Mullen Burst Strength<br>ASTM D751, 50 mil                                   | 150 psi                                |
| Elastomeric Waterproofing<br>ASTM C836<br>ASTM C957  | exceeds all criteria<br>exceeds all criteria          | Permeability to Water Vapor<br>ASTM E96 Method E, 100°F,<br>100 mil sheet    | 0.03 perms                             |
| Extension to Break<br>ASTM D412  | 400%  | Recovery from 100% extension:<br>after 5 minutes<br>after 24 hours           | 98%<br>100%                            |
| Flammability<br>ASTM D2859<br>UL790  | pass/combustible<br>substrate<br>Class A <sup>1</sup> | Salt Spray<br>ASTM B117  | pass 2000 hrs.                         |
| Flooring and Shower Lining<br>UPC/IBC ANSI 118.10  | Pass  | Service Temperature  | -60°F to 220°F                         |
| Green Roof Membrane/Root Barrier<br>FLL, 2002  | Pass  | Softening Point, Ring & Ball<br>ASTM D36                                     | >325°F                                 |
| Hardness, Shore A<br>ASTM D2240 @ 77°F   | 60  | Tear Strength<br>ASTM D624 (Die C)   | 150 lbs./in.                           |
| Jet Fuel Resistance<br>FS SS-S-200D  | pass for joints                                       | Tensile Strength<br>ASTM D 412, 100 mil sheet                                | 900 psi                                |
|  |   | Weathering<br>ASTM D822  | pass 5000 hrs.                         |

<sup>1</sup>Contact C.I.M. Industries for details regarding UL fire ratings

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### CHEMICAL RESISTANCE

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CIM 1000 is resistant to a broad range of acids and alkalis. Consult C.I.M. Industries for additional information regarding chemical resistance after reviewing CIM 1000 Chemical Resistance Chart.

**THE INFORMATION PRESENTED IN THIS PUBLICATION IS SUBJECT TO CHANGE WITHOUT NOTICE.  
 CONTACT C.I.M. INDUSTRIES FOR CURRENT INFORMATION.  
 www.cimindustries.com**

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### GENERAL APPLICATION INFORMATION

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#### FOR PROFESSIONAL USE ONLY.

- PRECAUTIONS** Avoid contamination with water or moisture. Keep all pails and jugs tightly closed until ready for use. All equipment, air supplies, and application substrates must be **ABSOLUTELY DRY**. Do not apply in wet weather or when rain is imminent or when the CIM 1000 or the substrate may become wet within 4 hours after coating. Use caution when applying CIM 1000 in confined spaces. See C.I.M. Industries' Instruction Guide, "Applying CIM Within Confined Spaces" (IG-9).
- TEMPERATURE** Surface should be at least 50°F (10°C) and must be 5°F (3°C) above the dew point. **DO NOT APPLY WHEN THE SUBSTRATE OR AMBIENT TEMPERATURE IS RISING OR COATING IS IN DIRECT SUNLIGHT.** CIM 1000 should be at least 60°F (15°C) when mixed and applied. CIM 1000 may be preheated to facilitate application at low temperatures, but working time will be reduced. See C.I.M. Industries' Instruction Guide "Applying CIM Coatings in Cold Weather" (IG-11).
- EQUIPMENT** Spray equipment requires large diameter hose and air supplied mastic gun or plural component spray equipment. See "Spray Application of CIM" (IG-12) or contact C.I.M. Industries for specific recommendations. Roller, squeegee, and trowel may also be used.
- POT LIFE** About 30 minutes. Working time depends on temperature and method of application. Working time for spray application will be significantly shorter.
- PRIMING** Porous substrates such as wood and concrete may be primed with CIM 61BG Epoxy Primer to minimize outgassing. The maximum recoat window for CIM 61BG Epoxy Primer is 48 hours. See CIM 61BG Epoxy Primer Technical Data Sheet for additional information. Perform adhesion tests to confirm adequacy of adhesion to primer.
- MIXING** **DO NOT THIN. DO NOT HAND MIX.** Begin mixing each pail (4.5 gal.) of CIM 1000 Premix using a power mixer (e.g. ½" drill and an eight inch mud mixer). Do not draw air into the mix. While mixing, slowly add one jug (0.5 gal.) of CIM 1000 Activator to the pail. Once the CIM 1000 Activator has been added, mix thoroughly for **3 FULL MINUTES**. The proportions are premeasured. **DO NOT ESTIMATE.** Mixing Jigs and Timers from C.I.M. Industries help eliminate mixing errors and increase productivity on the job. See C.I.M. Industries' Instruction Guide, "Mixing CIM Premix and Activator" (IG-8).
- APPLICATION** Apply CIM 1000 directly to a clean and dry substrate. Vertical surfaces will require multiple coats. See C.I.M. Industries' specific substrate Instruction Guide for additional guidelines.
- RECOATING** CIM 1000 may be recoated in 1 hour and must be recoated soon after the coating no longer comes off on polyethylene (typically within 4 hours of mixing). If the liner has cured longer than this time, the surface must be severely abraded using surface grinder or other mechanical means, and be free of dust and debris. Use CIM Bonding Agent for better adhesion. For immersion conditions, all coats shall be applied within 4 hours of each other, except at joint lines.
- RECOMMENDED MINIMUM THICKNESS** Recommended minimum thickness of the coating is 60 wet mils. Contact C.I.M. Industries for detailed cure time information. Refer to CIM 1000 Coverage Chart for coverage rates.
- CURING TIME** CIM 1000 may be placed in service within 24 hours for non-aggressive service. Severe service applications may require a cure time of 72 hours or more. Contact C.I.M. Industries for specific recommendations.
- CLEAN-UP** Use mineral spirits for clean-up of uncured material. Spray equipment must be flushed regularly during application to prevent material from setting up in the hose and pump. Cured material is very difficult to remove. Soaking in solvent will soften the material and may assist in its removal.

**CONTACT C.I.M. INDUSTRIES FOR SPECIFIC RECOMMENDATIONS AND INSTRUCTION GUIDES.**

[www.cimindustries.com](http://www.cimindustries.com)



# CIM 1000

## HIGH PERFORMANCE COATINGS AND LININGS

### SHIPPING, STORAGE AND SAFETY DATA

- WARNING** Flammable. Use only in well ventilated areas. Do not store or use near open flame, sparks or hot surfaces. Keep tightly closed. Avoid contact with moisture or water. Keep out of reach of children.
- SAFETY INFORMATION** This product contains petroleum asphalt, petroleum distillates, amine compounds and/or other chemical ingredients. Adequate health and safety precautions should be observed during the storage, handling, application and curing. Refer to C.I.M. Industries' Material Safety Data Sheets for further details regarding the safe use of this product.
- PACKAGING** CIM 1000 is available in mixed units of 5 gallons. Each unit consists of a container of premix and a smaller container of activator. Quantities have been premeasured to provide the proper mixing ratio, leaving sufficient room in the premix container to facilitate adequate mixing. **Do not estimate proportions.**

| SHIPPING          | Premix                  | Activator                    |
|-------------------|-------------------------|------------------------------|
| <b>Weights</b>    |                         |                              |
| 5.0 gallon units  | 40 lb/pail              | 5.5 lb/jug (33 lb/case of 6) |
| <b>Properties</b> |                         |                              |
| Flash Point       | 101°F                   | >400°F                       |
| Shipping Name     | Coating Solution        | Not Regulated                |
| DOT Class         | Class 3, UN1139, PG III | Not Regulated                |
| <b>STORAGE</b>    |                         |                              |
| Temperature       | 20°F to 110°F           | 70°F to 95°F                 |
| Shelf Life        | 2 years                 | 6 months                     |
| NFPA              | Class II                | Class III B                  |

#### WARRANTY & LIMITATION OF SELLER'S LIABILITY

C.I.M. Industries Inc. (C.I.M.) warrants that for a period of five (5) years from the date of shipment to the initial purchaser, the products, when mixed in proper ratios for the proper length of time, (a) will not become brittle or crack and (b) will provide a water barrier. Due to application variables beyond C.I.M.'s control which may affect results, C.I.M. makes no warranty of any kind, expressed or implied, including that of merchantability, other than that the products conform to C.I.M.'s current quality control standards at time of manufacture. If breach of warranty is established, the buyer's exclusive remedy shall be repayment of the purchase price of the non-conforming CIM membrane product or, at C.I.M.'s option, resupply of conforming product to replace the non-conforming product. The buyer expressly waives any claim to additional damages, including consequential damages.

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CONTACT C.I.M. INDUSTRIES FOR CURRENT INFORMATION.

FOR PROFESSIONAL USE ONLY.

[www.cimindustries.com](http://www.cimindustries.com)



A Chase Corporation Company  
23 Elm St., Peterborough, NH 03458  
Tel: (800) 543-3458 (603) 924-9481  
Fax: (603) 924-9482  
Web site: [www.cimindustries.com](http://www.cimindustries.com)

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DEMPSEY, DILLING & ASSOCIATES

an affiliate of

 THOMAS & HUTTON

ENGINEERING | SURVEYING | LANDSCAPE ARCHITECTURE | GIS | CONSULTING



May 12, 2020

Mr. Victor Lay, City Administrator  
City of Spring Hill, TN  
P.O. Box 789  
Spring Hill, Tennessee 37174

**RE: CITY OF SPRING HILL, TENNESSEE  
PROPOSAL FOR THE WASTEWATER TREATMENT PLANT  
OXIDATION BASINS AND DEEP-BED FILTER BASINS INTERIOR COATING SYSTEM  
CONSTRUCTION ENGINEERING AND INSPECTION SERVICES**

Dear Mr. Lay:

As discussed, Dempsey, Dilling & Associates (DDA), an affiliate of Thomas and Hutton is submitting a proposal, under our current contract, to provide Construction Engineering and Inspection (CEI) services for assistance in the above referenced project.

**PROJECT BACKGROUND:** The oxidation basins and filter basins have experienced some cracks and leakage since being constructed. The City of Spring Hill has reached an agreement with both the engineering firm (CTI) and contractor (P.F. Moon), who designed and constructed these basins, respectively. Based on that agreement, the City has researched methods to repair the leaks and have selected a certain coatings system which is to be applied to the inside of the basins. The oxidation basin consists of two operational trains, train 1 has been active and train 2 has been inactive due to the cracks. The filter basins consist of four individual cells (1-4).

Our understanding of the sequence of work is as follows:

- Oxidation Basin Train 2: Remove solids, clean basin and apply coating system.
- Oxidation Basin Train 1: Divert flow to coated basin, remove solids, clean basin and apply coating system
- Filter Basins 1 & 2: Remove filter media, clean the basins, apply coating system and install filter media.
- Filter Basins 3 & 4: Remove filter media, clean the basins, apply coating system and install filter media.

Based on discussions with the WWTP Manager (Travis Massey), the work on one train of the oxidation basin can take place simultaneously with work on two of the filter cells. However, the coatings system application can only take during certain temperature ranges as recommended by the coatings manufacturer. The coatings system which has been reviewed and recommended by the City for this project is as follows:

- a. Tnemec Series 218 Mortar-clad (base system)
- b. CIM 1000 Lining (top-coat system)

Based on the project requiring coordination with the operations of the WWTP, as well as being dependent on ambient weather conditions, the project construction time is estimated to be no more than 12-months. This work may span two years in which work takes place in the Summer-Fall month of 2020 and the Spring months of 2021. During the hottest Summer months, some work may require to be performed during the night time cooler temperature hours as opposed to the daylight's higher temperature hours. The coatings system will require specific temperature ranges for application.

**CEI SERVICES SCOPE:** Our Bidding Assistance and CEI Services will consist of the following tasks:

1. Provide assistance to finalize the Request for Proposals (RFP's) from contractors.
2. Provide assistance during the contract bid proposal solicitations from contractors in answering questions or providing additional information or an addendum.
3. Assist in reviewing all proposals, references and bid documents.
4. Make a recommendation for approval and acceptance of the selected proposal/bid.

5. Provide a letter of "Notice-Of-Award" to contractor.
6. Coordinate the preconstruction meeting.
7. Provide a letter of "Notice-to-Proceed" to the contractor listing start date, time of contract, end date and liquidated damages.
8. Review all shop drawings and materials submittals for the project.
9. Review the contractors proposed schedule.
10. Provide a coatings specialist to assist in periodic project inspections at determined critical stages.
11. Provide an onsite construction representative for preapplication, real time applications, and post-application inspections as required.
12. Coordinate monthly progress meetings.
13. Review and recommend approval of pay requests and any change orders that may arise.
14. Conduct final inspections with Spring Hill staff.
15. Provide a letter to the contractor and Spring Hill of deficiencies, if any, identified during the final inspection of the project.
16. Conduct project close requirements in receiving and reviewing items from the contractor.

**PROPOSED FEES:**

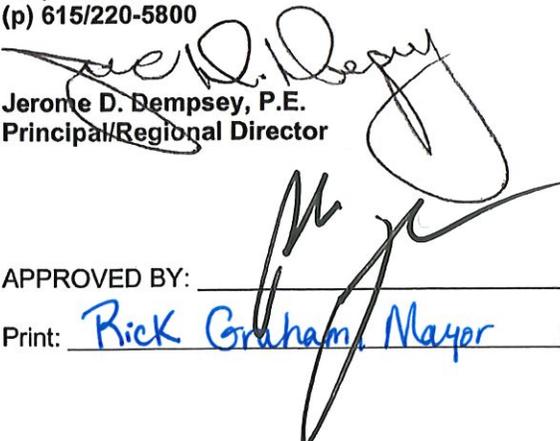
**RFP Finalization Assistance, Bidding Assistance, and Award Recommendation:** We propose to provide services to complete tasks 1-7, as listed above, for a lump sum cost of \$15,400.00.

**CEI Services:** We propose to provide services to complete tasks 8-16, as listed above, at a lump sum cost of \$282,000.00 for a project construction period not to exceed a 10-months.

Total Proposed Fee: \$297,400.00.

We will invoice our services on an equal monthly basis. If the City of Spring Hill is in agreement with this proposal, we ask that a copy be signed by an authorized representative and returned to us as our authorization to proceed. One copy should be retained for your file. Again, we appreciate the opportunity to work with the City of Spring Hill on this important project. Should you have any questions or comments please give me a call.

Sincerely,  
**DEMPSEY, DILLING & ASSOCIATES**  
an affiliate of THOMAS AND HUTTON  
502 Hazelwood Drive  
Smyrna, TN 37167  
(p) 615/220-5800

  
Jerome D. Dempsey, P.E.  
Principal/Regional Director

APPROVED BY: \_\_\_\_\_, CITY OF SPRING HILL, TN

Print: Rick Graham, Mayor DATE: 6-15-2020

**SPRING HILL, TN WASTEWATER TREATMENT PLANT**  
**OXIDATION BASINS AND FILTER BASINS**  
**BIDDING ASSISTANCE AND CEI SERVICES COST BREAKDOWN**

Bidding Assistance:

|   |                       |               |
|---|-----------------------|---------------|
| • Engineer:                                     | 40 hours @ \$100/hr = | \$4,000.00    |
| • Principal Engineer:                           | 40 hours @ \$125/hr = | 5,000.00      |
| • Structural Engineer: (Walkway Repair Drawing) |                       | 5,900.00      |
| • Expenses (mileage, printing, etc)             |                       | <u>500.00</u> |
| Sub-total                                       |                       | \$15,400.00   |

Construction Engineering and Inspection Services:

|                                     |                                |                     |
|-------------------------------------|--------------------------------|---------------------|
| • Engineer Intern:                  | 40 weeks x 45 hours @ \$90/hr= | \$162,000.00        |
| • Engineer:                         | 40 weeks x 8 hours @ \$100/hr= | 32,000.00           |
| • Principal:                        | 40 weeks x 6 hours @ \$125/hr= | 30,000.00           |
| • Expenses (mileage, printing, etc) |                                | 10,000.00           |
| • Coatings Specialist:              |                                | <u>48,000.00</u>    |
| Sub-total:                          |                                | <u>\$282,000.00</u> |

Total (Bidding Assistance and CEI Services): \$297,400.00

*Cost based on percent of construction estimate plus 10% contingency: \$3,520,000 x 8.5% = \$299,200.00*



# MORTARCLAD™ SERIES 218

## PRODUCT PROFILE

**GENERIC DESCRIPTION** Epoxy Modified Cementitious Mortar

**COMMON USAGE** A high-performance, aggregate reinforced material for surfacing, patching and filling voids and bugholes in concrete substrates. Generally topcoated with a variety of high-performance epoxies and polyurethanes for use in mild to aggressive exposures.

**COLORS** Greenish Gray

## COATING SYSTEM

**PRIMERS** **Concrete:** Self-priming  
**CMU:** Self-priming

**TOPCOATS** Series 1, 20, 22, FC22, 30, 46H-413, 61, 66, L69, N69, 84, 104, 120, L140, N140, 151-1051, 161, 201, 205, 222, 223, 224, 237, 238, 239, 262, 264, 270, 273, 280, 281, 282, 406, 434, 435, 436, 446.  
**Note:** Refer to the applicable topcoat data sheet for color availability and additional information.

## SURFACE PREPARATION

Prepare surfaces by method suitable for exposure and service. Refer to the appropriate topcoat product data sheet for specific surface preparation recommendations.

**CONCRETE** Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

**CMU** Allow mortar to cure for 28 days. Level protrusions and mortar spatter.

**PAINTED SURFACES** Not recommended.

**ALL SURFACES** Must be clean, dry and free of oil, grease and other contaminants.

## TECHNICAL DATA

**VOLUME SOLIDS** 100% (mixed)

**RECOMMENDED DFT** **Parge Coat:** 1/16"-1/4" per lift; maximum 1/2" thickness  
**Feather-edge Capable:** 1/32"

| CURING TIME | Temperature               | To Touch  | To Recoat with Itself | To Topcoat       |
|-------------|---------------------------|-----------|-----------------------|------------------|
|             | 75°F (24°C)<br>& 50% R.H. | 3-4 hours | unlimited †           | 15 hours minimum |

† **Note:** When the first application is equal to or greater than 1/4", or the second application is equal to or greater than 1/4", then the maximum recoat window with itself is 2 hours.

**VOLATILE ORGANIC COMPOUNDS** **Unthinned:** 0.15 lbs/gallon (19 grams/litre)

**NUMBER OF COMPONENTS** Three—Liquid: Part A and Part B Powder: Part C

**PACKAGING** KIT CONSIST OF:

|           | PART A (Liquid)   | PART B (Liquid) | PART C (Cement-Sand) | When Mixed           |
|-----------|-------------------|-----------------|----------------------|----------------------|
| Large Kit | 1 gal plastic jug | 1 qt can        | 42.75 lb bag         | 2.8 gallons (10.6 L) |

**NET WEIGHT** Large Kit: 51.53 lbs (23.37 kg)

**STORAGE TEMPERATURE** Minimum 40°F (4°C) Maximum 110°F (43°C)  
For optimum handling and application characteristics, all material components should be stored or conditioned between 70°F to 90°F (21°C to 32°C) 48 hours prior to use. Protect Parts A & B from freezing; discard if frozen. Protect Part C from moisture; store in dry environment off ground.

**TEMPERATURE RESISTANCE** (Dry) Continuous 170°F (77°C) Intermittent 200°F (93°C)

**SHelf LIFE** 12 months at recommended storage temperature.

**FLASH POINT - SETA** N/A

**HEALTH & SAFETY** This product contains chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product.  
**Keep out of the reach of children.**

# MORTARCLAD™ | SERIES 218

## APPLICATION

| COVERAGE RATES | Thickness                                  | Large Kit                                  |
|----------------|--|--|
|                | 1/16" (1.6 mm)                             | 72 sq ft (6.7 m <sup>2</sup> ) theoretical |
| 1/8" (3.1 mm)  | 36 sq ft (3.3 m <sup>2</sup> ) theoretical |  |
| 1/4" (6.4 mm)  | 18 sq ft (1.7 m <sup>2</sup> ) theoretical |  |

Allow for application losses due to surface irregularities and substrate porosity.

**MIXING** Pour liquid Part B into new empty bucket. Any remaining Part B shall be removed by adding 3-5 ounces of liquid Part A, re-sealing lid and shaking quart can for 5-10 seconds; pour contents into bucket. Add remaining liquid Part A into bucket and blend for 30 seconds. Under agitation, slowly sift Part C powder into the mixed liquids taking care not to deposit entire contents of Part C at once. Mix for two minutes or until the cement-sand is thoroughly wetted and a smooth consistency is achieved. **Important: Do not add additional Part C.**  
**Note:** For repair of large bugholes, honeycomb and other cavities deeper than the recommended maximum thickness, 20-25 lbs of multi-purpose clean sand (conforming to ASTM C 33) or 15-18 lbs of locally purchased pea gravel (coarse aggregate) can be post added to create "dry-pack" mortar. One half inch to No. 8 size (12.5 mm to 2.36 mm) pea gravel conforming to ASTM C 33 is recommended. Contact your Tnemec representative or Tnemec Technical Services for additional information.

**THINNING** Normally not required. For low-pressure spray application to transfer the Series 218, may thin up to 6 oz. for large kit. Use only potable water.

**POT LIFE** 1 hour at 75°F (24°C).  
**Caution: Thinning with high temperature water will significantly reduce the pot life. For best results, water temperature should not exceed 80°F (27°C).**

**SUBSTRATE CONDITIONING** The concrete substrate surface should be "pre-wet" or dampened with potable water to a Saturated Surface Dry (SSD) condition; the concrete is darkened by water but there is no pooling of water on the concrete. This can be done by using a Hudson pump-up sprayer or heavy nap roller cover dampened with potable water. **Note:** Do not over saturate the surface.

**APPLICATION EQUIPMENT** Mortar Hawk, steel, stiff concrete finishing trowels, broad knives and rubber floats are recommended. For troweling inside and outside corners, the use of a radius or margin trowel is recommended. Material can be transferred to the surface by utilizing hydraulic spray equipment (i.e. WIWA 410 9:1 or 600 12:1 pump) followed by troweling to seal the material. No special ACI 308 curing requirements - ambient cure only. For a smoother finished appearance, trowel licks may be reduced by using a 1/4" nap roller cover lightly dampened with water over the sealed Series 218 material. **Note:** If white liquid is brought to the surface during this process, the Series 218 material is being overworked and/or oversaturated. Overworking or oversaturating the surface may have an adverse effect on the adhesion of subsequent coatings applied. Let Series 218 cure and remove surface deposit using concrete rub brick.

**SURFACE TEMPERATURE** Minimum of 45°F (7°C), optimum 65°F to 80°F (18°C to 27°C), maximum of 90°F (32°C). The substrate temperature should be at least 5°F (3°C) above the dew point.

**MATERIAL TEMPERATURE** For optimum application, handling and performance, the material temperature during application should be between 70°F and 90°F (21°C and 32°C). Temperature will affect the workability. Cool temperatures increase viscosity and decrease workability. Warm temperatures will decrease viscosity and shorten pot life.

**CLEANUP** Flush and clean all equipment immediately after use with warm water.

WARRANTY & LIMITATION OF SELLER'S LIABILITY: Tnemec Company, Inc. warrants only that its coatings represented herein meet the formulation standards of Tnemec Company, Inc. THE WARRANTY DESCRIBED IN THE ABOVE PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The buyer's sole and exclusive remedy against Tnemec Company, Inc. shall be for replacement of the product in the event a defective condition of the product should be found to exist and the exclusive remedy shall not have failed its essential purpose as long as Tnemec is willing to provide comparable replacement product to the buyer. NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, ENVIRONMENTAL INJURIES OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO THE BUYER. Technical and application information herein is provided for the purpose of establishing a general profile of the coating and proper coating application procedures. Test performance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests or any other tests, accurately represent all environments. As application, environmental and design factors can vary significantly, due care should be exercised in the selection and use of the coating.

Tnemec Company Inc. 6800 Corporate Drive Kansas City, Missouri 64120-1372 1-800-TNEMEC1 Fax: 1-816-483-3969 www.tnemec.com



# ELASTO-SHIELD® SERIES 262

## PRODUCT PROFILE

**GENERIC DESCRIPTION** Modified Polyurethane

**COMMON USAGE** Chemical- and abrasion-resistant elastomeric membrane with exceptional strength and flexibility. Ideally suited for environmental requirements of waste containment for primary or secondary containment. Spray applied, it forms the monolithic, impermeable liner required for earth collection and catch basins, decorative ponds and fountains, reservoirs, cooling towers, dams and spillways.

**COLORS** Black

**FINISH** Gloss. **Note:** Prolonged exterior exposure will cause flattening of the finish.

**PERFORMANCE CRITERIA** Extensive test data available. Contact your Tnemec representative for specific test results.

## COATING SYSTEM

**SURFACER/FILLER/PATCHER** Series 215, 217, 218, 265

**ADHESION PROMOTER AND PRIMER** **Steel:** Self-priming or Series 66, N69, 161, V260  
**Galvanized Steel and Non-Ferrous Metals:** Series 66, N69, 161, V260  
**Concrete:** Series 66, N69, 161  
**CMU:** Series 66, N69, 161  
**Note:** The use of the recommended epoxy primer will greatly reduce the natural tendency of concrete and CMU to outgas - a frequent cause of polyurethane topcoat bubbling. Also, Series 66, N69 or 161 exterior exposed more than one week must first be scarified or reprimed with themselves. Brush blasting with fine abrasive is the preferred method of scarification. See also **Caution** statement at APPLICATION.

**TOPCOATS** Series 156 - Optional, when additional UV protection or a color coat is desired for secondary containment. Series 156 is not recommended for immersion service.

## SURFACE PREPARATION

**STEEL** **Immersion Service:** SSPC-SP10 Near-White Blast Cleaning  
**Non-Immersion Service:** SSPC-SP6 Commercial Blast Cleaning

**GALVANIZED STEEL** Surface preparation recommendations will vary depending on substrate and exposure conditions. Contact your Tnemec representative or Tnemec Technical Services.

**CONCRETE** Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). **Note:** The testing listed above cannot guarantee avoidance of future moisture related problems particularly with existing concrete slabs. This is especially true if the use of an under slab moisture vapor barrier cannot be confirmed or concrete contamination from oils, chemical spills, unreacted silicates, chlorides or Alkali Silica Reaction (ASR) is suspected.

Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 3 or greater surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer. **Note:** For horizontal applications, if moisture content exceeds 3 lbs per 1,000 sq ft or relative humidity is in excess of 80%, Series 208 or 241 may be substituted for the primer. Refer to the Series 208 or 241 product data sheet for more information.

**ALL SURFACES** Must be clean, dry and free of oil, grease, form release agents, curing compounds/membranes, sealers, hardeners and other contaminants.

## TECHNICAL DATA

**VOLUME SOLIDS** 88.0 ± 2.0% (mixed)

**RECOMMENDED DFT** 50 to 100 dry mils (1270 to 2540 microns) by spray. Multiple passes at timed intervals are required to achieve recommended dry film thickness on vertical surfaces. Timing is dependent upon material and substrate temperatures. See the Elasto-Shield Application Guide for additional instructions. Up to 125 mils (3175 microns) per coat by squeegee.

| CURING TIME | Temperature               | Initial Cure | Recoat  | Immersion |
|-------------|---------------------------|--------------|---------|-----------|
|             | 75°F (24°C)<br>at 50 mils | 3 to 4 hours | 3 hours | 48 hours  |

Curing time varies with air & substrate temperature, air movement, humidity and film thickness. **Note:** Contact your Tnemec representative for curing times involving severe abrasion and traffic applications. Also, scarify the surface and apply a coat of Series V260 Tnemec-Bond before recoating if the maximum recoat time has been exceeded.

**VOLATILE ORGANIC COMPOUNDS** 0.76 lbs/gallon (92 grams/litre)

**THEORETICAL COVERAGE** 1,396 mil sq ft/gal (34.2 m²/L at 25 microns). See APPLICATION for coverage rates.

**NUMBER OF COMPONENTS** Two: Part A (resin) and Part B (iso)

**PACKAGING** KIT CONSISTS OF:

|           | PART A (Partially filled) | PART B (Partially filled) | When Mixed        |
|-----------|---------------------------|---------------------------|-------------------|
| Large Kit | 5.5 gallon pail           | 1/2 gallon plastic jug    | 5 gallons (18.9L) |

**NET WEIGHT PER GALLON** 8.28 ± .25 lbs (3.71 ± .11 kg) (mixed)

# ELASTO-SHIELD® | SERIES 262

|                               |   |
|-------------------------------|---|
| <b>STORAGE TEMPERATURE</b>    | Part A: Minimum 20°F (-7°C) Maximum 110°F (43°C)<br>Part B: Minimum 70°F (21°C) Maximum 95°F (35°C)   |
| <b>TEMPERATURE RESISTANCE</b> | (Dry) Continuous 200°F (93°C) Intermittent 250°F (121°C)  |
| <b>SHelf LIFE</b>             | Part A: 2 years and Part B: 6 months at recommended storage temperatures.   |
| <b>FLASH POINT - SETA</b>     | Part A: 101°F (38°C) Part B: >250°F (121°C)   |
| <b>HEALTH &amp; SAFETY</b>    | This product contains chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product.<br><b>Keep out of the reach of children.</b> |

## APPLICATION

**COVERAGE RATES** Before commencing, obtain and thoroughly read the Elasto-Shield Surface Preparation and Application Guide.

| Dry Mills †<br>(Microns) | Wet Mills †<br>(Microns) | Sq Ft/Gal (m <sup>2</sup> /Gal) |
|--------------------------|--------------------------|---------------------------------|
| 50-100 (1270-2540)       | 57.5-115 (1460-2920)     | 14.0-27.9 (1.3-2.6)             |

† Spray application on vertical surfaces requires multiple passes to achieve minimum film thickness. **Caution: Do not apply when surface temperature is below 50°F (10°C); material temperature at time of application must be a minimum of 70°F (21°C).** Allow for overspray and surface irregularities. Application of coating below minimum recommended dry film thickness may adversely affect coating performance.

**MIXING** Use a 1/2" (5.5 amp) variable speed drill with a drywall mud or plaster mixing blade. Slowly mix the entire contents of Part A in the pail supplied. While continuing agitation, slowly add the entire contents of the Part B jug and mix for 3 minutes. **Note:** Do not vary these directions. Also, these materials are packaged by weight and the ratio of Part A and Part B should not be altered. Refer to the Elasto-Shield Application Guide for additional information.

**THINNING** Not recommended.

**POT LIFE** 45 minutes at 60°F (16°C) 30 minutes at 70°F (21°C) 20 minutes at 80°F (27°C)  
10 minutes at 90°F (32°C)

**Note:** Values are for pouring and spreading applications. Sprayable times will be somewhat less.

**APPLICATION EQUIPMENT**

**Air Spray**

| Gun                    | Fluid Nozzle | Air Cap            | Air Hose ID           | Mat'l Hose ID          | Atomizing Pressure          | † Pump                              | ‡ Fluid Pressure               |
|------------------------|--------------|--------------------|-----------------------|------------------------|-----------------------------|-------------------------------------|--------------------------------|
| Graco 204-000          | 167-331      | 160-660<br>160-663 | 3/8" min.<br>(9.5 mm) | 3/4" min.<br>(19.0 mm) | 40-100 psi<br>(2.8-6.9 bar) | 954-088 10:1<br>President Pump      | 350-800 psi<br>(24.1-55.2 bar) |
| Binks 7E2 or #125 Pole | 47           | 3/8" 3/8" E 291    | 3/8" min.<br>(9.5 mm) | 3/4" min.<br>(19.0 mm) | 40-100 psi<br>(2.8-6.9 bar) | 41-6670 8:1<br>Comet Pump           | 350-800 psi<br>(24.1-55.2 bar) |
| WIWA 410 or 600        | 1/4"         | N/A                | 3/8" min.<br>(9.5 mm) | 3/4" min<br>(19.0 mm)  | N/A                         | 410 (9:1 Ratio)<br>600 (12:1 Ratio) | 350-800 psi<br>(24.1-55.2 bar) |

† Pump must have a minimum of 2 gpm delivery. ‡ Listed pressure is at gun.

**Vertical Surfaces:** A functional coat of Elasto-Shield may contain some runs, sags and small bubbles.

Backrolling can help alleviate this condition.

**Horizontal Surfaces:** Notched squeegee. Refer to the Elasto-Shield Application Guide.

**SURFACE TEMPERATURE**

Minimum 50°F (10°C) Maximum 120°F (49°C)

The surface should be dry and at least 5°F (3°C) above the dew point. To avoid outgassing, concrete temperature should be stabilized or in a descending temperature mode. Material should not be applied in direct sunlight.

**CLEANUP**

Flush and clean all equipment immediately after use with MEK.

**CAUTION**

All material, equipment, air supply and surfaces to be coated must be kept dry. Do not apply when wet weather or wet conditions may occur within 4 hours of application. Refer to the Elasto-Shield Application Guide for further instructions.

WARRANTY & LIMITATION OF SELLER'S LIABILITY: Tnemec Company, Inc. warrants only that its coatings represented herein meet the formulation standards of Tnemec Company, Inc. THE WARRANTY DESCRIBED IN THE ABOVE PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The buyer's sole and exclusive remedy against Tnemec Company, Inc. shall be for replacement of the product in the event a defective condition of the product should be found to exist and the exclusive remedy shall not have failed its essential purpose as long as Tnemec is willing to provide comparable replacement product to the buyer. NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, ENVIRONMENTAL INJURIES OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO THE BUYER. Technical and application information herein is provided for the purpose of establishing a general profile of the coating and proper coating application procedures. Test performance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests or any other tests, accurately represent all environments. As application, environmental and design factors can vary significantly, due care should be exercised in the selection and use of the coating.

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**DEMPSEY, DILLING & ASSOCIATES**

*an affiliate of*

**THOMAS & HUTTON**

ENGINEERING | SURVEYING | LANDSCAPE ARCHITECTURE | GIS | CONSULTING



Mr. Victor Lay, City Administrator  
City of Spring Hill  
199 Town Center Parkway  
Spring Hill, Tennessee 37174

August 27, 2020

**RE: WASTEWATER TREATMENT PLANT IMPROVEMENTS  
EXISTING HEADWORKS UPGRADES AND PROPOSED EQUALIZATION BASIN  
ENGINEERING SERVICES PROPOSAL**

Dear Mr. Lay:

As requested, Dempsey, Dilling & Associates (DDA), an affiliate of Thomas and Hutton, is pleased to submit a proposal to provide engineering services for the Wastewater Treatment Plant (WWTP) Improvements. Our proposal is based on providing engineering services for design and development of construction bid documents (plans and specifications), consisting of existing headworks upgrades and proposed equalization (EQ) basin. The following tasks and engineering disciplines will be provided as part of the contract proposal.

**TASKS**

1. Surveying (Subconsultant-Sawyer Land Surveying-Mark Sawyer)
2. Civil Engineering Design
3. Structural Engineering Design
4. Electrical Engineering Design (Subconsultant-WWR Engineers-Ron Carter)
5. Design Development Report with Hydraulic Analysis
6. Plans and Specifications Development
7. Submittal to TDEC
8. Opinion of Probable Construction Cost
9. Bidding Assistance

**SCOPE OF WORK**

1. A field topographic survey of the portion of the existing WWTP site, which will contain the proposed expanded headworks structure and EQ basin, will be performed. The survey shall obtain contour elevations, existing structures and components location, within the general area of the proposed structures, existing piping invert elevations, and underground utilities based on as-built drawings and field located valving.
2. Services provided within the civil engineering task shall consist of developing the preliminary site layout, site and grading plans, hydraulic calculations, headworks equipment review and recommendations, headworks structure design, and EQ basin design.
3. Structural engineering shall perform sizing of footers, floor slab, walls, partitions, walkways, handrailing and pipe penetrations. Construction joints, expansion joints, reinforcement steel sizing, and reinforcement steel layouts shall also be included within this project task. A concrete design mix, testing parameters, and concrete placement specifications shall also be developed.

4. Electrical engineering shall consist of designing and specifying all electrical components/power supply requirements for the headworks screens and grit removal systems as well as any required electric actuated valves for the ERQ basin. The electrical work will evaluate existing electrical components and integrate the proposed required components accordingly.

5. The Design Development Report (DDR) shall be written and submitted to the Tennessee Department of Environment and Conservation (TDEC). The DDR shall compile all design assumptions, basis, parameters and calculations for the headworks upgrade and EQ basin design. The DDR will contain the hydraulic analysis for the existing average daily flows (ADF) and peak daily flows (PDF) to determine the required sizing of both the headworks upgrades, EQ basin, pump size and line sizes.

6. Plans and Specifications shall be developed as to allow the City to publish an advertisement for bidding solicitations purposes. Plans and specifications will be a complete set of construction drawings as well as front end bid documents and technical specifications.

7. Plans and Specifications with hydraulic calculations will be submitted to TDEC for review and approval for construction.

8. Opinion of Probable Construction Cost will be developed to allow the City to review and perform budgetary planning. Based on project quantities, we will hire a consulting contractor with experience in this type project and who has provided these services on past projects for our structural engineering division.

9. Bidding Assistance will be provided to answer all contractor questions and develop addendums as necessary. DDA will attend the bid opening to record bids and will conduct a thorough review of submitted bids and front-end documents. DDA will provide an award recommendation letter to the City upon completion of the reviews and reference confirmations.

#### OPINION OF PROBABLE CONSTRUCTION COST

The Facilities Plan estimated cost of construction, for both the headworks upgrade (\$1,853,000) and proposed equalization basin (\$4,525,801) totals \$6,378,801. In addition, there will be required pumping and piping as to allow the equalization basin to be drained and sent to either the front of the existing process or back to the main lift station. It is estimated this piping and possible pumping work will cost approximately \$750,000. Therefore, the total cost basis of this project is estimated to be approximately \$7,128,801. Due to recent shortage of building materials and COVID-19, it is recommended a contingency of at least 15% be added for budgetary purposes. These costs referenced in the Facilities Plan will be verified by an outside consulting contractor upon completion of design.

#### FEES

Engineering Design Fee: DDA, an affiliate of T&H, proposes to perform the above described engineering services, as part of our current contract with the City of Spring Hill, for a lump sum cost of \$540,000 which represents a fee rate of 7.6%. Please note the attached DDA-Spring Hill Contract Terms and Conditions are an integral part of this contract proposal. DDA's monthly billing will be based on the percent completion of the above referenced services. The headworks design is estimated to take 3 months and the equalization basin is estimated to take 6 months. These components can be designed concurrently.

TDEC submittal fees will be the responsibility of the City of Spring Hill and are estimated to be \$2,500. The required Geotechnical Study shall be considered additional services and will be invoiced in accordance with the attached Terms and Conditions. It is estimated the Geotechnical Study will cost approximately \$15,000 to perform for this project.

Construction Engineering and Inspection Fee: CEI Services is estimated to be \$285,000 (4% of the estimated construction) for a period of 12 months. CEI Services shall include onsite inspection during construction activities, shop drawing reviews, monthly progress meetings, pay request reviews and recommendations, contractor and City staff correspondence concerning project questions and issues, change order development if required, record drawings development, final project inspection and deficiencies list, follow-up final inspection, project closeout documents and recommendation of acceptance project.

**PROPOSED SCHEDULE**

1. September 2020: Approval of DDA Contract and Authorization-To-Proceed
2. September 2020: Preliminary Site Layout
3. October 2020: Topographic Survey and Geotechnical Study
4. November 2020: Design Development Report and Hydraulic Analysis
5. December 2020: Headworks Expansion Design
6. January 2021: Equalization Basin Design
7. February 2021: Final Plans and Specifications
8. March 2021: TDEC Submittal
9. May 2021: Advertise for Bid
10. June 2021: Accept Bids
11. July 2021: Award Project to Contractor and Issue Notice-To-Proceed
12. June 2022: Project Completion (12 months)

If the City of Spring Hill agrees with this proposal, we ask that both original copies be signed by an authorized representative. Please retain one copy and return one copy to DDA as authorization to proceed. Please note the attached Terms and Conditions are an integral part of this proposal.

Again, DDA appreciates the opportunity to work with the City of Spring Hill on this project. Should you have any questions or comments please give me a call.

Sincerely,  
**DEMPSEY, DILLING & ASSOCIATES**  
an affiliate of, Thomas and Hutton

Jerome D. Dempsey, P.E.  
Principal/Regional Director

Accepted By: Rick Graham, City of Spring Hill, TN

(Print Name)

(Signature)

Date: 8/9/20

## **PROJECT DESCRIPTION**

The project scope will consist of providing professional engineering services for upgrades to the existing WWTP headworks and for a proposed equalization basin. The scope of work for the WWTP Improvements expansion design will include equipment review and recommendations, hydraulic calculations, hydraulic profile, and site design work at the proposed equalization basin. The design of both the headworks upgrade and equalization basin will include surveying, process design, civil engineering, structural engineering, and electrical engineering services.

The design of each component (headworks upgrade and equalization basin) will be based on Phase I flows as summarized in the *Wastewater Treatment Plant Facilities Plan (WWTPFP)* dated March 2019. As part of the WWTPFP development, the following flows were determined:

### **2013 Plant Expansion Design Flows:**

Average Daily Flow (ADF): 5.0 MGD

Peak Daily Flow (PDF): 11.5 MGD

Peak Hourly Flow (PHF): 14.0 MGD

### **2018 Average Flows (WWTPFP):**

ADF: 3.56 MGD (71% of Design Capacity)

PDF: 8.57 MGD (75% of Design Capacity)

PHF: 12.0 MGD (86% of Design Capacity)

### **Phase I Expansion Design Flows:**

ADF: 7.5 MGD

PDF: 17.25 MGD

PHF: 21.0 MGD

### **Phase II Expansion Design Flows:**

ADF: 10.0 MGD

PDF: 23.0 MGD

PHF: 28.0 MGD

## **HEADWORKS**

The existing influent headworks structure contains two parallel 2.5 MGD ADF channels which were constructed in the last expansion during 2013. Flow enters the headworks from the influent pump station through a 24-inch DI pipe which contains a magnetic flow meter, for measuring and recording the influent flow. The parallel concrete channels feed flow to each of the two fine screen and grit removal equipment setups. A separate center bypass channel, with a manual bar screen, is provided to allow each screen and grit chamber to be taken out of service for maintenance and repairs.

The screening equipment consists of two fine bar-type cylindrical roto type screens. The first screen is manufactured by Lakeside which was initially installed at the WWTP during the year 2000 expansion. The second screen is manufactured by Huber and was installed during the year 2013 expansion, both of which are mechanically cleaned and utilize 0.25-inch openings. The Lakeside screen is model no. 47FS-0.250-93 and the Huber screen is the Rotamat model no. Ro1/1200/6 with Ro8t screw conveyor. Screenings from the mechanically cleaned screens are conveyed and dewatered via an integral mechanical device. Dewatered screenings are captured in an auger-type conveyor and transported to an adjacent dumpster. Influent flow then passes through the screens to enter the grit removal tank.

The grit removal equipment consists of two Smith & Loveless Model No. 7.0 Pista-Grit vortex type removal devices, serial no. 03-1577-G and 03-2439-R. Each Pista-Grit removal equipment installation contains a dewatering conveyor and a 250-gpm concentrator pump (top mounted Model 4B2H). Grit is periodically removed from each grit hopper via the referenced pump and discharged to a solids separation or classification device. Each grit classification device consists of one, common, vortex grit separator mounted over a screw-type separator. Excess water from the classifier flows via gravity back to the influent channel. The dewatered grit is transported via a conveyor to the adjacent dumpster.

The proposed engineering services for this project will include replacement of the two (2) existing cylindrical bar screens with new perforated filter screens and adding a third new perforated filter screen in an expanded headworks structure. Therefore, a total of three new screens are proposed for this project and a space for a future screen. One additional grit removal system is also proposed for this project. A single Pista-Grit removal tank, pump and removal system will be required for the initial expansion and should be sized the same as the two existing systems (2.5 MGD, ADF and 7.0 MGD, PHF).

### EQUALIZATION BASIN

The proposed equalization basin will be designed as to allow future conversion to an oxidation basin capable of processing an additional 2.5 MGD of flow. The equalization basin volume will be approximately 3.4 MG and will be designed as to allow it to be converted to a future five-stage bardenpho oxidation basin process matching the existing biological process. To better understand the existing oxidation basins and the future basin's internal sub-basins needed, the five-stage biological process is described as follows:

First stage of this type treatment process consists of influent flow being mixed with the Returned Activated Sludge (RAS), returned from secondary clarification and is referred to as the anaerobic stage. This first stage is sometimes called the fermentation stage of the treatment process which provides stress conditions, due to the absence of dissolved oxygen (DO) and nitrates (NO<sub>3</sub>), which allows large quantities of phosphorous to be released and ultimately removed in the subsequent aerobic stages.

Second stage is the first anoxic stage where the flow is mixed with NO<sub>3</sub> from the nitrification zone and denitrification takes place where NO<sub>3</sub> levels are usually 3-5 MG/L.

Third stage is the aeration-nitrification stage, where oxygen is added and BOD is converted to carbon dioxide, and ammonia to NO<sub>3</sub>, generally BOD levels are less than 10.0 MG/L, ammonia is at 1 MG/L, and NO<sub>3</sub> are 3-5 MG/L.

Fourth stage is the second anoxic stage where NO<sub>3</sub> is reduced to nitrogen gas, NO<sub>3</sub> are typically in the range of 1.0 MG/L.

Fifth stage is the re-aeration stage where the DO is increased in the mixed liquor to prevent phosphorous from being released in the secondary clarification process.

### DRAIN PIPING/PUMP

The design will include drain piping and/or pumping as to allow draining of the equalization basin. The drain components will allow the stored peak flow volume to be conveyed back to the head of the treatment process or to the effluent lift station. The exact configuration will be determined during the engineering design.

**PROFESSIONAL ENGINEERING SERVICES CONTRACT TERMS AND CONDITIONS  
DEMPSEY, DILLING & ASSOCIATE, an affiliate of Thomas and Hutton  
CITY OF SPRING HILL, TENNESSEE**

**Access to the Site/Job Site Safety**

Unless otherwise stated, Dempsey, Dilling & Associates, an affiliate of Thomas and Hutton (DDA) will have access to the site for activities necessary for the performance of the services. The Client/Owner (City of Spring Hill, TN) understands that DDA is not responsible, in any way, for the means, methods, sequence, procedures, techniques, scheduling of construction, or job site safety. DDA will not be responsible for any losses or injuries that occur at the project site.

**The Owner's Responsibilities:**

Provide DDA with all available information, which is pertinent to the project.

Guarantee access to the work and make all provisions for DDA to enter upon public lands as required to perform work essential to the development of the project.

Give thorough consideration to all reports and other documents presented by DDA and inform DDA of all decisions within a reasonable time so as not to delay the work of DDA.

Furnish DDA with any standards to be required to follow.

Furnish approvals from all government authorities having jurisdiction over the project and such approvals and consents from others as may be necessary for the completion of the project.

Provide all legal, accounting, independent cost estimating and insurance counseling services as may be required for the project.

Give prompt written notice to DDA whenever it is observed or otherwise becomes apparent that any substantial changes in the scope of work or physical conditions, of the existing geographical features, have occurred which would significantly impact the project.

**Fees**

Hourly rate charges will be as follows:

| <u>Classification</u>       | <u>Standard Hourly Charge</u> |
|-----------------------------|-------------------------------|
| Principal Engineer          | 125.00                        |
| Engineer                    | 100.00                        |
| Engineering Intern          | 90.00                         |
| Sr. CADD Designer           | 65.00                         |
| CADD Technician             | 50.00                         |
| Construction Representative | 50.00                         |
| Administrative Assistant    | 50.00                         |
| Clerical                    | 40.00                         |

Outside services contracted for a specific project, such as professional or technical consultants, laboratory testing, reproduction, photography, etc., will be invoiced at the amount of the sub-consultant's statement plus 15% for overhead and profit (if applicable).

Other expenses which are properly chargeable to the work will be invoiced as follows:

- a) Travel by private vehicle: standard IRS mileage rate
- b) In-house printing, reproduction and photography.

Lump sum fees, when applicable for certain projects, shall be understood to be an estimate and shall not be exceeded without written approval of the Client/Owner. DDA's hourly fee rates may be adjusted during the extent of this contract according to annual review by DDA.

#### **Termination of Services**

This Agreement may be terminated by the Client/Owner or DDA should the other fail to perform its obligations hereunder. The Client/Owner and DDA may also, at any time, terminate the Contract for the Client/Owner's or DDA's convenience, with or without cause. Upon receipt of written notice from the Client/Owner or DDA of such termination for the Client/Owner's or DDA's convenience, DDA shall cease work. In the event of termination by either party, the Owner/Client shall pay for all services rendered to the date of termination and all-reimbursable expenses. The Client/Owner or DDA shall have the right to terminate this Agreement by giving written notice of such termination and specifying the effective date thereof, at least sixty (60) days before the effective date of such termination.

#### **Payment**

DDA will invoice the City of Spring Hill on a monthly basis. Payment is expected within 30 days of the date of invoice. Any invoices which exceed 30-days in payment shall be assessed a 5% fee per 30 days it remains unpaid. Should an invoice be paid in a time less than 30 days then a prorated fee will be paid to DDA.

#### **Insurance**

DDA shall secure and maintain professional liability insurance in the amount of \$1,000,000.00 as will protect it from claims of bodily injury, death or property damage, which may arise from the performance of service under this Agreement. DDA will provide the City of Spring Hill a certificate of insurance for their professional liability coverage.

#### **Ownership of Documents**

All documents, including, but not limited to, drawings, specifications, reports, calculations and computer software documents, programs and spreadsheets prepared by DDA pursuant to this Agreement are instruments of service in respect to any project. They are not intended or represented to be suitable for reuse by Client/Owner or others on modifications or extensions of this project in the future or on any other project. Any reuse without prior written approval by DDA for the specific purpose intended will be at the Client/Owner's sole risk and without liability or legal exposure to DDA. Client/Owner shall defend, indemnify and hold harmless DDA and its sub-consultants against all judgments, losses, damages, injuries, and expenses, including reasonable attorney's fees, arising out of or as a result from such reuse, to the extent permitted by law. Any verification for another purpose or adaptation of documents will entitle DDA to additional compensation at rates to be agreed upon by Client/Owner and DDA. Except as otherwise provided herein, documents, drawings, and specifications prepared by DDA and furnished to Client/Owner as part of the services under this Agreement shall become the property of the Client/Owner, provided, however, that DDA shall have the unrestricted right to their use. DDA shall retain any copyright and ownership rights in its design, drawing details, specifications, databases, computer software, and other proprietary property. Intellectual property developed, utilized, or modified in the performance of the services under this Agreement shall remain the property of DDA.

**Changes**

The Client/Owner may request changes in the Scope of Services of any project to be performed hereunder. Such changes, including any increase or decrease in the amount of lump sum compensation, which are mutually agreed upon by and between the Client/Owner and DDA shall be incorporated into the agreement for each particular project. Any changes made to the construction documents by the Client/Owner or the Client's/Owner's representatives are strictly prohibited without the knowledge and written consent of DDA. DDA shall be released from any liability resulting from damages, injuries, and or death resulting from the unauthorized alteration of construction documents.

**Applicable Laws**

This Agreement shall be governed by the laws of the State of Tennessee.

**Opinion of Construction Cost**

Any opinion of probable construction cost or estimates prepared by DDA represents DDA's judgment as engineering design professionals and is supplied for general guidance to the Client/Owner. Since DDA has no control over the construction marketplace, economic factors, elapsed time between opinion of probable construction cost and actual bidding, DDA does not guarantee the accuracy of such opinions as compared to contractor bids or actual cost to Client/Owner.