



**AGENDA ITEM EXECUTIVE SUMMARY**

Agenda Item number: 5.i

Title:

Recommendation to Award Proposal for Design Engineering for Dunham Road Force Main Replacement

Presenter:

Tim Wilson

Meeting: Government Services Committee

Date: October 23, 2017

Proposed Cost: \$30,300

Budgeted Amount: \$70,000

Not Budgeted:

**Executive Summary** (if not budgeted please explain):

The Dunham Road Sanitary Sewer Force Main has experienced 3 pipe line breaks due to pipe corrosion over the last three years. The force main starts at Royal Fox Lift Station #2 near Muirfield Ct and runs south crossing Dunham Road to the east. The main then transitions to a gravity line in front of St Charles East High School.

A complete evaluation of the force main was conducted in August of 2016 by Crawford, Murphy and Tilly (CMT). The study listed several options for maintenance and replacement of the force main. Due to the cost and the expected life of each option, it was determine a full line replacement was the most cost efficient solution for the City. The project will abandon approximately 2,800 feet of 8” force main, currently located within the Dunham Road right-of-way. The project will run adjacent to a 12” gas main, and near a residential area. Considering the sensitivity of the location and safety factors, low disturbance construction methods will need to be explored.

In September the City conducted an RFP for the engineering design phase of this project. The City received six responses for the project. The proposals submitted were equal in scope of work and met all the criteria of the project timeline. The proposals received were as follows:

- Trotter and Associates : \$30,300
- Ruekert – Mielke : \$41,300
- Gerald Heinz & Ass. : \$45,500
- Christopher Burke : \$53,020
- CMT : \$67,790
- HR Green – Decline submittal work load issues

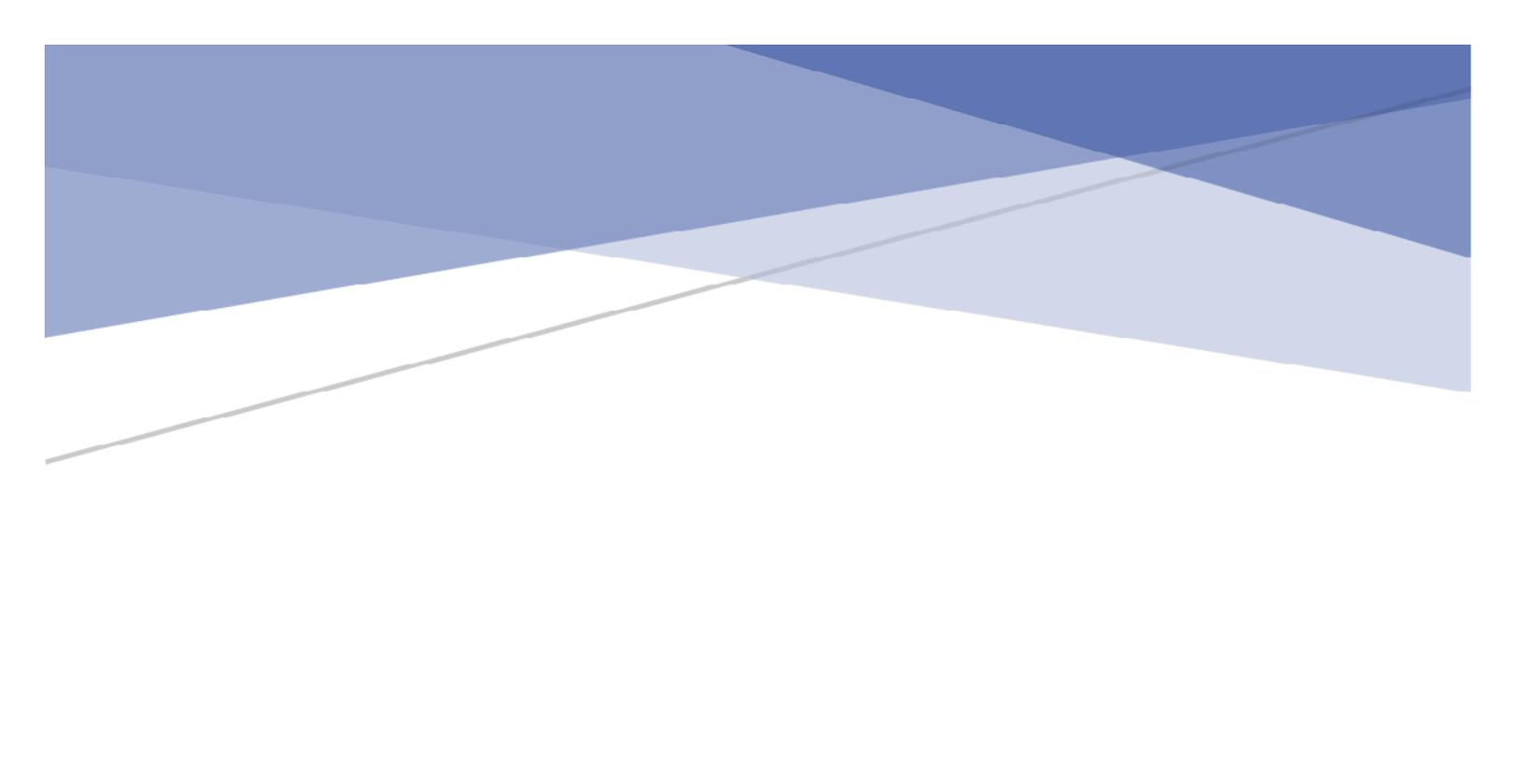
Upon review, Trotter and Associates submitted the lowest proposal for the design project. In addition, they have completed similar projects in comparable communities making them the most qualified for the project.

**Attachments** (please list):

- \* CMT- Dunham Road Force Main Evaluation August 2016
- \* Trotter and Associates Proposal
- \* Trotter and Associates Similar Projects List

**Recommendation/Suggested Action** (briefly explain):

Recommendation is to Award the Proposal for Design Engineering Dunham Road Force Main Replacement to Trotter and Associates for the not to exceed amount of \$30,300.



# CITY OF ST. CHARLES, IL

Dunham Road Force Main Evaluation



By Crawford, Murphy and Tilly, Inc.  
August 2016

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## **INTRODUCTION**

The city of St. Charles is located along the Fox River in central Kane County approximately 35 miles west of downtown Chicago. The city is bordered by the village of South Elgin to the north, the city of West Chicago to the east, the city of Geneva to the south and the village of Campton Hills to the west.

The city owns and operates a sanitary sewer collection system and two wastewater treatment facilities. The collection system tributary to the Main Wastewater Treatment Facility consists of 152 miles of sanitary sewers, 5 miles of force main and 13 lift stations. The Royal Fox II Lift Station is located on Dunham Road, north of St. Charles East High School. The discharge force main from Royal Fox II has had a recent history of breaks, which is the focus of the evaluation.

## **DUNHAM ROAD FORCE MAIN**

### **DESCRIPTION**

The Dunham Road Force Main is an eight-inch ductile iron main, discharging from the Royal Fox Lift Station II wet well to a point approximately 2,760 feet downstream, just north of Dunham Place where it transitions to a gravity sewer. The force main is approximately thirty years old. Its alignment travels through a dense suburban area located near St. Charles middle and high schools. Generally, it is located west of the sidewalk on the west side of Dunham Road with many sections located directly under the sidewalk. The top of force main is approximately six feet below grade and surrounded by a myriad of utilities like gas, electric, communication, water and storm.

### **HISTORY OF FAILURES**

The Dunham Road Force Main experienced 3 breaks in the past 5 years, with 2 of them occurring at the same location. The first break occurred in August 2011, approximately 300 feet south of the Royal Fox II Lift Station. The second break in June 2015 reoccurred at the same location as the first, followed by a third break in July 2015, closer to the point of transition to gravity.



[Figure 1 - Force Main Repair Clamp](#)

On excavating the locations of the failed pipe, heavy pitting and large holes were observed at the points of failure. A hole as large as 2-inches in diameter was observed at the bottom of the pipe during the July 2015 failure following which a steel clamp was put in place to stop the leak, as shown in Figure 1. Figure 2 shows the location of previous force main failures.



Figure 1 - Location of Past Repairs

## FORCE MAIN FAILURE ANALYSIS

CMT understands that force mains typically do not deteriorate or fail systematically along their full length. Rather, pipe condition is related to localized problems due to design, manufacturing, installation, environmental, operational or maintenance factors. Often, it is a combination of several of these factors that lead to force main failures. Common causes of force main failure include:

- Blockage/restriction
- Pressure surge
- Interior hydrogen sulfide (H<sub>2</sub>S) corrosion
- Exterior corrosion due to corrosive soils or stray currents
- Structural failure/collapse
- Third party damage
- Service life expiration

Internal corrosion on ductile iron sanitary sewer pipe can occur if the sewage goes septic and that septic sewage comes in contact with air. This may result in generating sulfuric acid which can deteriorate standard cement mortar lining and/or the ductile iron. In force mains, where pipe is full, this is not a concern since there is no air present. If this problem does occur, it may occur at high points where air is trapped or where the main acts as gravity pipe.

The presence of heavy pitting on the outside pointed towards external factors contributing towards the pipe failures, rather than any internal corrosion. Also, a well maintained ductile iron force main like this one can survive up to 100 years, whereas it was only 30 years old when it first failed.

Given this, it was proposed to evaluate the force main externally, prior to conducting any internal condition assessment, which is very expensive. External evaluation would include non-destructive testing like soil corrosion and/or checking for pipe thickness.

## PROJECT APPROACH

Following a kick-off meeting with the city, CMT received the following data from the city:

- Record drawings of 8" force main (plan and profile)
- GIS data on location of nearby utilities (water, storm, electric, communication)
- Location of past failures

Historical pump operation data was not reviewed. It was learned that there is also a 6" PVC pipe that runs parallel to the lower half of the existing 8" force main. A televising video of the 6" PVC was shared as well.

CMT's first step was to understand the profile of the force main and look for any areas along the main that could potentially impact the interior of the pipe, such as downhill gradient. A downhill gradient would mean that the force main acts like a gravity pipe and could potentially lead to emptying out of pipe and trapping of air. This in turn could lead to corrosion at the crown. Based on a close study of the force main profile, nothing unusual was observed. Also, since the failure was observed at the bottom of the pipe, this form of failure was ruled out.

## SOIL SAMPLING

CMT then proceeded with conducting soil analysis. This was part of the external evaluation to check for the presence of any corrosive soils along the force main. Samples were collected at 6 locations and sent for testing to DIPRA (Ductile Iron Pipe Research Association). The soil was tested using the 10-point soil evaluation procedure, for 5 different parameters, with each parameter having a maximum score as shown:

- Resistivity (Max Score 10)
- Redox potential (Max Score 5)
- pH (Max Score 5)
- Sulfides/Chlorides (Max Score 3.5)
- Moisture Content (Max Score 2)

Each of these parameters can be described as follows:

- Resistivity: Soil resistivity is a measure of how much the soil resists the flow of electricity. Resistivity is highly dependent on the moisture content. Higher the moisture content, lower the soil resistivity and higher the potential for corrosion.
- Redox Potential: Commonly known as oxygen-reducing potential, a high redox potential indicates high oxygen concentration, low electron activity and oxidizing conditions and vice versa.
- Level of Acidity: pH indicates the levels of acidity. pH levels lower than 5 or below indicate faster corrosion rates as well as early pitting.
- Sulfides/Chlorides: Presence of chlorides contributes to more electrolyte in the soil, thus reducing soil resistivity. Similarly, sulfates when reduced to sulfides by the anaerobic bacteria, contribute to corrosion.
- Moisture Content: As explained above, more the moisture content, more the electrolyte, thus more the corrosion.

When scores for each parameter are added, a sum of 10 or more indicates the soil to be corrosive. Figure 3 that follows shows the location of the soil samples that were tested.

Table 1 shows the results from the soil sampling analysis with the associated total score in ().

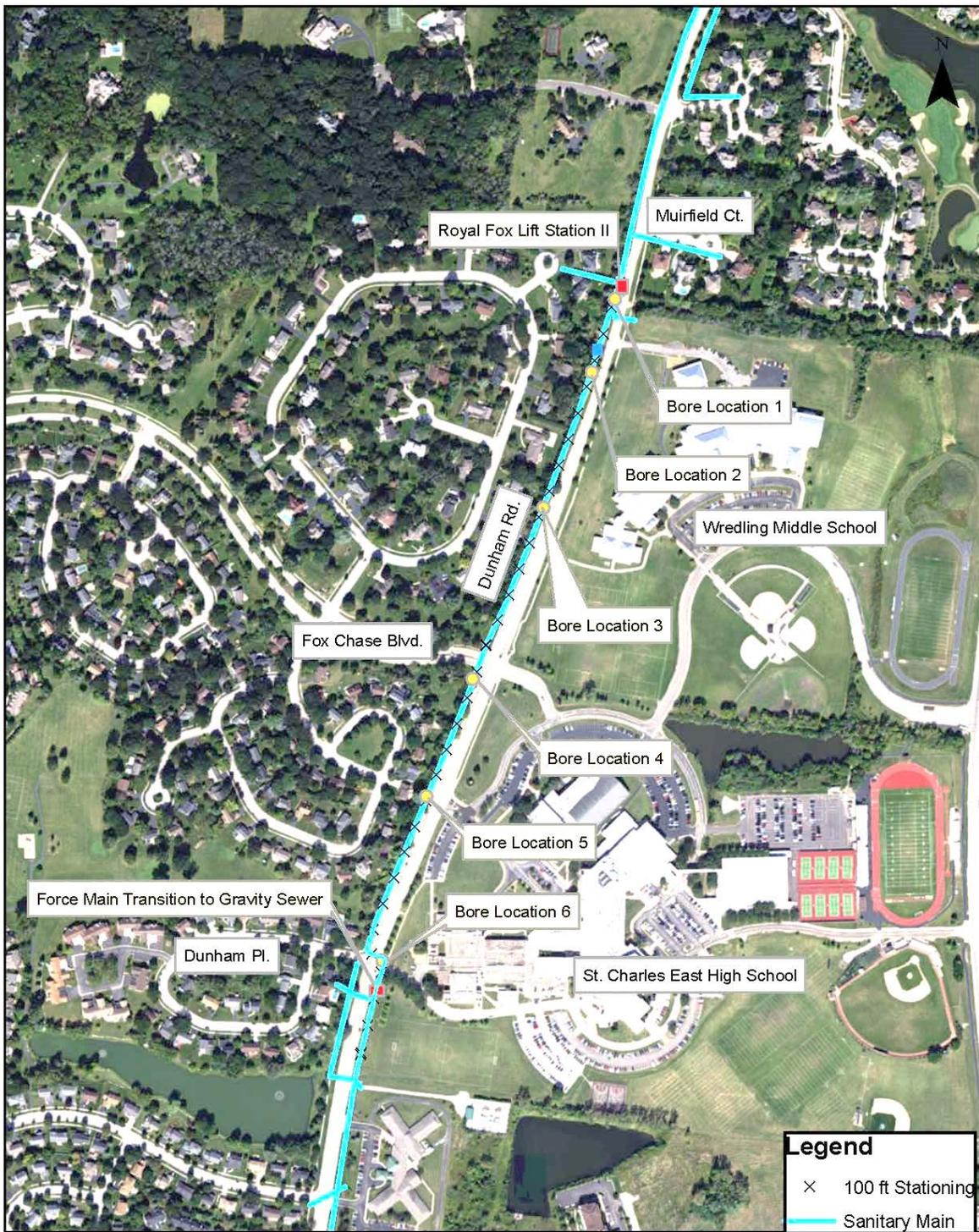


Figure 3- Location of Soil Borings

## TEST RESULTS

Table 1- Soil Analysis Results

Bore Location	Resistivity ohm-cm	Redox Mv	pH	Sulfides	Chlorides	Soil Description	Total Score
1	1,120 (10)	+185 (0)	6.8 (0)	Neg	Neg	Brown silty moist clay (1)	11
*2	960 (10)	+245 (0)	6.7 (0)	Neg	Neg	Dark Brown silty, saturated clay (2)	12
3	1,120 (10)	+200 (0)	7.2 (0)	Neg	Neg	Brown silty saturated clay (2)	12
4	1,920 (8)	-50 (5)	7.3 (0)	Neg	Trace (2)	Black silty saturated clay (2)	17
*5	600 (10)	+210 (0)	7.0 (0)	Neg	Trace (2)	Brown and grey silty saturated clay (2)	14
6	1,440 (10)	+270 (0)	7.1 (0)	Neg	Neg	Dark brown silty saturated clay (2)	12

Notes:

- \* Indicates Location of past repairs.
- DIPRA considers soils to be corrosive if the Total Score is 10 or more.

The soil sampling results pointed towards highly corrosive soils in the areas of the past force main failures. Resistivity values less than 1,500 ohm-cm are considered corrosive, with values less than 1,000 being severely corrosive.

Other factors like impressed currents in the surroundings, that could potentially corrode the ductile iron force main were also considered. Following a meeting between CMT and the representative from Nicor gas, it was concluded that the only gas mains in the immediate vicinity of the force main were small distribution lines that had cathodic protection (not using impressed currents for corrosion control). There is a 12-inch gas main on the east side of Dunham Road that is well isolated from the distribution system and the Dunham Road force main. None of these appeared to contribute towards the corrosion of the force main.

### **PRELIMINARY RECOMMENDATIONS**

Based on the test results, it can be concluded that the force main failed in the past primarily due to external corrosion. Given this, the city can consider the following options to rectify the problem and avoid failures in future.

1. Cathodic Protection of Force Main – Cathodic protection is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell. A simple method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode. The sacrificial metal then corrodes instead of the protected metal. Before applying this technique, one would have to excavate at all joints in order to bond them, without which this technique will not be effective. It is also recommended to assess the pipe wall condition to gauge the thickness loss, before applying this rehabilitation technique. Although this option is very effective, it requires regular maintenance and replacement of anodes every 20 years.
2. Pipe lining – A resin based "cured-in-place-pipe" or a slip-liner is a trenchless rehabilitation method used to repair pipe lines. It is a jointless, seamless, pipe within a pipe technique, however, given the length and alignment of the 8" force main, a few excavation pits will be needed at approximately every 800 feet, especially at the bends and air release valves. It would require flow through the 8" force main to be by-passed while the liner is put in place. This option is very popular and effective but can be considered only after evaluating the hydraulic capacity of the force main with reduced flow area, due to the increase in pipe wall thickness due to the liner.
3. Force Main Replacement – Replace the 8" ductile iron pipe completely with a new pipe. A more economic option would be to replace only part of the pipe around the area of past failures, in lieu of the entire length of the force main.

A conceptual level construction cost estimate for the three alternatives was developed for 2016 and is presented in Table 2.

Table 2- Probable Construction Costs

Repair Method	Budget Cost	Extends Life by*
Cathodic Protection	\$ 250,000	20 yrs
Pipe Lining	\$ 500,000	50 yrs
Force Main Replacement	\$700,000	50 – 100 yrs

\* Typically recommended by manufacturer

### PIPE WALL THICKNESS

CMT measured pipe wall thickness at a location between borings 2/3 and just north of Fox Chase Boulevard. Generally, a pipe wall loss of more than 30% would directly indicate the unsuitability of cathodic protection due to excessive thinning of the pipe wall and loss of durability. Though the pipe loss didn't appear to be greater than 30% at this time, thickness measurements were only feasible at two locations. Since these are limited data points, CMT does not recommend considering Option 1 – Cathodic Protection.

### CONCLUSION

Based on the soil sampling results, the soils are considered corrosive along the entire length of the force main. Specifically, the two soil samples in the vicinity of past repairs have a much lower resistivity (higher rate of corrosion) compared to the other four locations, therefore exterior pipe corrosion appears to be the likely reason for premature failure of the pipe. In addition, based on the general corrosivity of the soils along the pipe alignment, the entire length of pipe is at a risk and corrosion may deteriorate the pipe to a point where it needs to be replaced.

Additional information on pipe wall thickness can be obtained utilizing electronic sensing technologies such "Smartball". Wall thicknesses obtained by such technologies are for a given point in time, and are not an indication of future conditions. Keeping in mind that the soils are corrosive in nature, CMT does not recommend any additional testing and all funds be utilized to replace the force main pipe in its entirety.

Partial pipe replacement was also evaluated by CMT; only replace segments of pipe in the vicinity of previous break locations. However, due to the corrosive nature of the soils, partial replacement does not mitigate the possibility of future breaks. Based on all of the above, CMT recommends replacing the entire length of pipe.

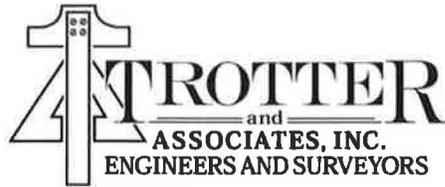
Evaluating materials for pipe replacement will occur during the design phase. Options include PVC, HDPE and ductile iron pipe. St. Charles traditionally uses ductile iron pipe. If ductile iron pipe is used, at minimum polyethylene wrap would be needed to protect against corrosion. As polyethylene wrap has in our experience a high reliance (and failure) based on proper installation, we would suggest considering other coatings, thicker pipe or bonding pipe for protection as options to counteract corrosion.

**COST ESTIMATE – PIPE REPLACEMENT**

<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>COST</b>	<b>TOTAL</b>
Force Main - 8"	LF	2,800	\$150	\$420,000
Trench Backfill	CU YD	1,400	\$27	\$37,800
Sidewalk Rem and Replace	SQ YD	1,600	\$7	\$11,200
Roadway Pavement	SQ YD	350	\$60	\$21,000
Traffic Control	LS	1	\$25,000	\$25,000
Combination Air /Vacuum Valves	EACH	2	\$15,000	\$30,000
Bypass Pumping	LS	1	\$15,000	\$15,000
<b>Subtotal</b>				<b>\$560,000</b>
25% Budget Level Contingency				\$140,000
<b>TOTAL</b>				<b>\$700,000</b>

Note:

1. Assume trench backfill and sidewalk replacement for entire length for planning level costs.



September 29, 2017

Honorable Raymond Rogina  
Mayor of St. Charles  
City of St. Charles  
2 E. Main Street  
St. Charles, Illinois 60174

Re: Dunham Road Sanitary Force Main Replacement Project  
Professional Services Agreement

Dear Mayor Rogina:

We sincerely appreciate this opportunity to offer our services. Enclosed for your review is the engineering services agreement for the referenced project. Please contact us if there are any questions or changes to the listed scope of services. If you would like to proceed with the contract, please sign and return one copy of the agreement.

Sincerely,

TROTTER & ASSOCIATES, INC.

Jerry Ruth, P.E.  
Project Engineer

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September 29, 2017

Honorable Raymond Rogina  
Mayor of St. Charles  
City of St. Charles  
2 E. Main Street  
St. Charles, Illinois 60174

**Re: Dunham Road Sanitary Force Main Replacement Project**  
Professional Services Letter Agreement and Exhibits

Dear Mayor Rogina,

Trotter and Associates, Inc. (ENGINEER) is pleased to provide professional services to the City of St. Charles, IL (CLIENT) for the Dunham Road Sanitary Force Main Replacement Project (hereinafter referred to as the "PROJECT").

### **Project Background**

In 2011, Trotter and Associates, Inc. completed a Facility Plan Update which included a summary of the City's wastewater infrastructure, including the sixteen lift stations. In the 2011 Facility Plan Update, Royal Fox Lift Stations I and II were recommended for future rehabilitation or replacement due to their declining condition. In May of 2012, the City requested further evaluation of the existing infrastructure, more specifically Royal Fox Lift Stations I and II. These lift stations were rehabilitated in 2013 and 2014, respectively.

The service area for Royal Fox Lift Station II contains approximately 1,884 PE and also receives the discharge from Royal Fox Lift Station I. The original lift station was located where the cul-de-sac for Muirfield Court now resides – directly west of the Royal Fox II Lift Station.

Within the last four years, the 8" ductile iron pipe force main from this lift station that runs on the west side of Dunham Road has had several main breaks. Two of these breaks occurred directly west of the back entrance to Wredling Middle School within twenty feet of each other. A third break occurred last July 4th at the entrance to the Norris Cultural Arts Center. Investigation of the pipe completed by the City in 2016 after the main breaks showed deterioration primarily due to external corrosion.

### **Project Understanding**

The proposed improvements include replacement of the existing force main. The City requested several items to be considered in the design. This list has been included and expanded upon below. Special attention will be given to determining which if any of the alternatives below will be implemented in design:

1. Replace all or portions of the force main using directional drilling or jack and bore. This would involve use of a low disturbance means of replacing the force main. TAI has utilized this technology for small-diameter services, gas lines, water mains and force mains using this approach. This method would be desirable for the road crossings on Dunham Road, Fox Chase and Dunham Place / Fighting Saint Lane, as well as in areas of the right-of-way where existing utilities or trees would make an open-cut installation difficult. TAI will pre-qualify contractors for this work if it is determined to be the best method of construction.

2. Extend the length of the force main to a different receiving manhole. In discussions with City staff, the current receiving manhole conveys flow to a 12" sewer that is flat or possibly back-pitched. This causes the gravity lines that flow into the manhole to surcharge, namely the sewer from the St. Charles East High School to the east. TAI will extend the topographic survey and sanitary sewer inspection south to determine if a longer force main to sanitary manhole 3.4-096 or 3.4-095 would alleviate this issue.
3. Modify the route of the force main. This alternative would consider a different location for crossing Dunham Road, as well as keeping the force main completely on the west side of the roadway. The existing force main crosses Dunham Road immediately north of the entrance to a residential area to the west and the entrance to the St. Charles East High School to the east. TAI will evaluate discharging to sanitary manhole 3.4-099 on the west side of Dunham Road, which flows to a 12" gravity sewer for the Dunham Road crossing.
4. Add clean-out structures along the force main. The City has issues with not being able to clean this force main, and ideally would have a clean-out location every three hundred feet. The addition of clean-outs to the force main will increase capital costs but provide the City the ability to maintain this asset.
5. Avoid bypass pumping entirely. The design team recognizes that the City is requesting a bypass pumping plan in this proposal. Bypass pumping is expensive, especially if it must be in place and monitored for an extended period of time. In our experience with this lift station, the system may be bypassed using vacuum trucks in rotation between the lift station wet well and the downstream manhole. This method could be used during the transition to the new force main.
6. Running adjacent to the active DIP force main is an abandoned 8" PVC force main that has been partially investigated by the City. 1,800 linear feet has been televised from just north of Dunham Place to the north side of Fox Chase. The investigation determined that this segment of the abandoned force main is in excellent shape, and may be considered for incorporation into this design.

### **Project Schedule**

The design will adhere to the following implementation schedule based on an effective date of November 1<sup>st</sup>, 2017:

<b>TASK</b>	<b>DATE</b>
Notice to Proceed	November 1, 2017
Complete Topographic Survey	November 15, 2017
Complete 50% Plans and EOPC	December 8, 2017
Receive City Comments on 50% Plans and EOPC	December 22, 2018
Complete 90% PS&E and Submit to IEPA	January 5, 2018
Complete 100% PS&E	January 26, 2018

The City and TAI will work closely to make sure that the permitting of this project will be in to the IEPA with ample time for review prior to entering the bidding phase in April of 2018.

**Scope of Services**

Our services will consist of customary civil engineering and surveying services and related engineering services incidental thereto, described as follows;

1. Preliminary Engineering Report – Completed
2. Preparation of IEPA Low Interest Loan Application – N/A
3. Preliminary Design Phase
  - a. Attend kick-off meeting with City Staff.
  - b. Topographic survey and base sheet development.
    - i. Make necessary field surveys and topographic for design purposes.
    - ii. Make measured drawings of and investigate existing conditions or facilities, or to verify the accuracy of as-built drawings or other information furnished by the City.
    - iii. Advise City if additional reports, data, information, or testing services are necessary and assist City in obtaining such reports, data, information, or services.
  - c. Prepare Preliminary Engineering Plans to show the scope, extent and character of the work to be furnished and performed by the Contractor for the proposed force main. Include the following but is not limited to these drawings:
    - i. Cover Sheet
    - ii. General Construction Details and Notes
    - iii. 50% Site Civil Drawings showing existing conditions, process piping plan and profiles, site grading and landscaping, erosion control plan, and traffic control details, if applicable.
    - iv. 50% Demolition drawings showing existing structures and utilities to be removed or abandoned in place.
    - v. 50% Process drawings including bypass pumping plan and details if applicable.
  - d. Based on the information contained in the Preliminary Design Phase documents, submit a revised opinion of probable Construction Cost and any adjustments to Total Project Costs known to Engineer
  - e. Meet with City Staff to discuss preliminary design and opinion of probable cost.

**PRELIMINARY DESIGN  
 MANPOWER ESTIMATE AND FEE SUMMARY**

TASK	PM	QC	CAD	PLS	SC	TOTAL MANHOURS
Kick-Off meeting with City staff	2	1				3
Topographic survey and base sheet development	2		24	8	56	90
Preliminary design drawings	10	1	24			35
Opinion of probable construction cost	4	1				5
Meet with City staff to review and discuss the preliminary design	2	1				3
<b>TOTAL - PRELIMINARY DESIGN</b>	<b>20</b>	<b>4</b>	<b>48</b>	<b>8</b>	<b>56</b>	<b>136</b>

\*PM = Jerry Ruth; QC = Scott Trotter; CAD = Gary Cooper; PLS = James McKenzie, SC = John Pfortmiller

4. Final Design Phase

- a. Coordinate geotechnical investigations.
- b. Permit design documents. Prepare Engineering Plans to show the scope, extent and character of the work to be furnished and performed by the Contractor for the proposed force main. Include the following but is not limited to these drawings:
  - i. Cover Sheet
  - ii. General Construction Details and Notes
  - iii. 90% Site Civil Drawings showing existing conditions, process piping plan and profiles, site grading and landscaping, erosion control plan, and traffic control details, if applicable.
  - iv. 90% Demolition drawings showing existing structures and utilities to be removed or abandoned in place.
  - v. 90% Process drawings including bypass pumping plan and details if applicable.
  - vi. 90% Project specifications with all process equipment selected in accordance with the 32 / 64 Division CSI Format.
  - vii. Submit engineering plans and specifications to Illinois EPA for construct and operate permit.
  - viii. Submit Kane County Stormwater Permit if applicable.
- c. Prepare an updated opinion of probable cost, based on the Final Engineering Plans.
- d. Meet with City Staff to discuss 90% design and opinion of probable cost.
- e. Final design documents. Prepare Engineering Plans for bidding that show the scope, extent and character of the work to be furnished and performed by the Contractor for the proposed force main.

**FINAL DESIGN  
 MANPOWER ESTIMATE AND FEE SUMMARY**

TASK	PM	QC	CAD	PLS	SC	TOTAL MANHOURS
Coordinate Geotechnical Investigations	2					2
Permit Drawings and Specifications	28	1	18			47
Engineer's Opinion of Probable Construction Costs	4	1				5
Meet with City staff to review the final design documents	3	1				4
Final Drawings and Specifications	6		12			18
<b>TOTAL - FINAL DESIGN</b>	<b>43</b>	<b>3</b>	<b>30</b>			<b>76</b>

\*PM = Jerry Ruth; QC = Scott Trotter; CAD = Gary Cooper; PLS = James McKenzie, SC = John Pfortmiller

5. Bidding and Negotiating Phase – Not Included
6. Construction Phase – Not Included
7. Contractor's Completion Documents – Not Included

Changes to the scope of services outlined in this agreement shall be authorized through execution of an Exhibit D - Contract Addendum.

### **Compensation**

An amount equal to the cumulative hours charged to the Project by each class of ENGINEER's employees times Standard Hourly Rates for each applicable billing class for all services performed on the Project, plus Reimbursable Expenses and ENGINEER's Consultant's charges, if any. ENGINEER's Reimbursable Expenses Schedule and Standard Hourly Rates are attached to this Exhibit B. The total compensation for services is estimated to be \$30,300.00 based on the following assumed distribution of compensation:

Preliminary Design Phase	\$19,600
<u>Final Design Phase</u>	<u>\$10,700</u>
	Not to Exceed: \$30,300

ENGINEER may alter the distribution of compensation between individual phases of the work noted herein to be consistent with services actually rendered, but shall not exceed the total estimated compensation amount unless approved in writing by CLIENT. The total estimated compensation for ENGINEER's services included in the breakdown by phases incorporates all labor, overhead, profit, and ENGINEER's Consultant's charges.

The amounts billed for ENGINEER's services will be based on the cumulative hours charged to the PROJECT during the billing period by each class of ENGINEER's employees times Standard Hourly Rates for each applicable billing class, plus Reimbursable Expenses and ENGINEER's Consultant's charges. The Standard Hourly Rates and Reimbursable Expenses Schedule will be adjusted annually as of January 1<sup>st</sup> to reflect equitable changes in the compensation payable to ENGINEER.

***Soils Analysis for CCDD Forms.*** OWNER will contract directly with a geotechnical engineering company to obtain the appropriate CCDD form. ENGINEER will coordinate with the geotechnical engineering company as necessary to obtain this form.

***Soils Borings for Directional Drilling, if selected.*** Directional drilling is dependent upon the selected method of installation. If necessary, OWNER will contract directly with a geotechnical engineering company to obtain soil borings to facilitate directional drilling. ENGINEER will coordinate with the geotechnical engineering company as necessary to facilitate the borings.

***Reimbursable Expenses.*** OWNER should budget \$200 for Reimbursable Expenses, including printing, plotting and shipping required for the completion of the work. Actual expenses will be compensated for based on actual cost as a pass-through without mark-up.

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**Miscellaneous**

This Agreement constitutes the entire agreement between the parties and supersedes any prior oral or written representations. This agreement may not be changed, modified, or amended except in writing signed by both parties. In the event of any conflict among the exhibits, the exhibit of the latest date shall control.

ENGINEER may have portions of the Services performed by its affiliated entities or their employees, in which event ENGINEER shall be responsible for such services and CLIENT shall look solely to ENGINEER as if ENGINEER performed the Services. In no case shall CLIENT'S approval of any subcontract relieve ENGINEER of any of its obligations under this Agreement. However, ENGINEER is not responsible whatsoever for any obligations its subcontractors might have to its [subcontractors'] employees, including but not limited to proper compensation of its employees.

In the event CLIENT uses a purchase order form or other CLIENT developed document to administer this Agreement, the use of such documents shall be for the CLIENT's convenience only, and any provisions, terms or conditions within the CLIENT developed document shall be deemed stricken, null and void. Any provisions, terms or conditions which the CLIENT would like to reserve shall be added to Exhibit C – Supplemental Conditions and agreed to by both parties.

ENGINEER acknowledges that this project and the scope of work performed thereto will require ENGINEER and all lower tiered subcontractors of ENGINEER to comply with all obligations under and pursuant to the any applicable local, state and/or federal prevailing wage laws (e.g. Davis-Bacon Act, Illinois Prevailing Wage Act, etc.), including but not limited to all wage, notice and/or record keeping requirements to the extent applicable, necessitated and required by law.

If during negotiations or discussion with a Client it becomes clear that Client has determined prevailing wages are not applicable to the work performed by Trotter & Associates, it is best to confirm that understanding in writing with appropriate indemnification language. The following is draft language to consider:

Trotter & Associates' services performed is based on its understanding through the actions, statements and/or omissions of CLIENT that this project [identify] and the work performed relating thereto is professional in nature and not subject to prevailing wage requirements (federal, state or local). If Trotter & Associates' understanding is incorrect, CLIENT agrees and acknowledges that it shall immediately notify Trotter & Associates in writing within forty-eight (48) hours from receiving this notice so that Trotter & Associates may submit a revised proposal and/or invoice reflecting the additional costs associated with applicable prevailing wage laws. If at any time it is determined that this project is or was subject to prevailing wage requirements under federal, state or local law, then CLIENT agrees and acknowledges that it shall reimburse and make whole Trotter & Associates for any back wages, penalties and/or interest owed to its employees or any other third party, including any appropriate governmental agency. CLIENT also agrees that prices, costs and/or applicable fees will also be increased prospectively as required by the increase in wage payments to Trotter & Associates' employees. CLIENT understands and acknowledges that it shall notify Trotter & Associates of any prevailing wage requirements or obligations under applicable laws relating to the work or services performed by Trotter & Associates. CLIENT also agrees to indemnify and hold Trotter & Associates harmless from any error, act or omission on its part with regard to prevailing wage notification that causes any claim, cause of action, harm or loss upon Trotter & Associates, including but not limited to prompt reimbursement to Trotter & Associates of any and all back wages, penalties and/or interest owed to its employees or any other third party, including reasonable attorneys' fees and costs associated with such claim, cause of action, harm or loss.

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**Contents of Agreement**

This Letter Agreement and the Exhibits attached hereto and incorporated herein, represent the entire understanding with respect to the Project and may only be modified in writing signed by both parties.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement.

CLIENT:

Trotter and Associates, Inc.:

\_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Effective Date: \_\_\_\_\_

Date Signed: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

Designated Representative

Designated Representative

Title:

Title:

Phone Number:

Phone Number:

Facsimile Number:

Facsimile Number:

E-Mail Address:

E-Mail Address:

**ATTACHMENTS:**

EXHIBIT A – STANDARD TERMS AND CONDITIONS

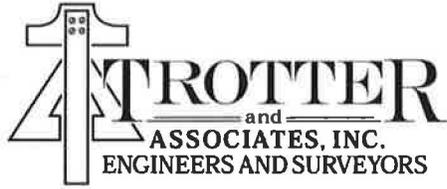
EXHIBIT B – SCHEDULE OF HOURLY RATES AND REIMBURSIBLE EXPENSES

EXHIBIT C – SUPPLEMENTAL GENERAL CONDITIONS

EXHIBIT D – CONTRACT ADDENDUM

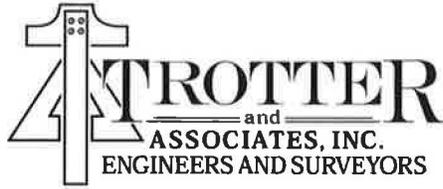
CLIENT Initial \_\_\_\_\_

TAI Initial \_\_\_\_\_



CLIENT Initial \_\_\_\_\_

TAI Initial \_\_\_\_\_



## EXHIBIT A - STANDARD TERMS AND CONDITIONS

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### ARTICLE 1 - SERVICES OF ENGINEER

#### 1.01 Scope

A. ENGINEER shall provide the Professional Services set forth herein and in the Letter Agreement.

B. Upon this Agreement becoming effective, ENGINEER is authorized to begin Services.

### ARTICLE 2 - CLIENT'S RESPONSIBILITIES

#### 2.01 General

A. Provide ENGINEER with all criteria and full information as to CLIENT's requirements for the Project, including design objectives and constraints, space, capacity and performance requirements, flexibility, and expandability, and any budgetary limitations; and furnish copies of all design and construction standards which CLIENT will require to be included in the Drawings and Specifications; and furnish copies of CLIENT's standard forms, conditions, and related documents for ENGINEER to include in the Bidding Documents, when applicable.

B. Furnish to ENGINEER any other available information pertinent to the Project including reports and data relative to previous designs, or investigation at or adjacent to the Site.

C. Following ENGINEER's assessment of initially-available Project information and data and upon ENGINEER's request, furnish or otherwise make available such additional Project related information and data as is reasonably required to enable ENGINEER to complete its Basic and Additional Services. Such additional information or data would generally include the following:

1. Property descriptions.
2. Zoning, deed, and other land use restrictions.
3. Property, boundary, easement, right-of-way, and other special surveys or data, including establishing relevant reference points.
4. Explorations and tests of subsurface conditions at or contiguous to the Site, drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site, or hydrographic surveys, with appropriate professional interpretation thereof.
5. Environmental assessments, audits, investigations and impact statements, and other relevant environmental or cultural studies as to the Project, the Site, and adjacent areas.
6. Data or consultations as required for the Project but not otherwise identified in the Agreement or the Exhibits thereto.

D. Give prompt written notice to ENGINEER whenever CLIENT observes or otherwise becomes aware of a Hazardous Environmental Condition or of any other development that affects the scope or time of performance of ENGINEER's services, or any defect or nonconformance in ENGINEER's services or in the work of any Contractor.

E. Authorize ENGINEER to provide Additional Services as set forth in Exhibit D - Addendum of the Agreement as required.

- F. Arrange for safe access to and make all provisions for ENGINEER to enter upon public and private property as required for ENGINEER to perform services under the Agreement.
- G. Examine all alternate solutions, studies, reports, sketches, Drawings, Specifications, proposals, and other documents presented by ENGINEER (including obtaining advice of an attorney, insurance counselor, and other advisors or consultants as CLIENT deems appropriate with respect to such examination) and render in writing timely decisions pertaining thereto.
- H. Provide reviews, approvals, and permits from all governmental authorities having jurisdiction to approve all phases of the Project designed or specified by ENGINEER and such reviews, approvals, and consents from others as may be necessary for completion of each phase of the Project.
- I. Provide, as required for the Project:
1. Accounting, bond and financial advisory, independent cost estimating, and insurance counseling services.
  2. Legal services with regard to issues pertaining to the Project as CLIENT requires, Contractor raises, or ENGINEER reasonably requests.
  3. Such auditing services as CLIENT requires to ascertain how or for what purpose Contractor has used the moneys paid.
  4. Placement and payment for advertisement for Bids in appropriate publications.
- J. Advise ENGINEER of the identity and scope of services of any independent consultants employed by CLIENT to perform or furnish services in regard to the Project, including, but not limited to, cost estimating, project peer review, value engineering, and constructability review.
- K. Furnish to ENGINEER data as to CLIENT's anticipated costs for services to be provided by others for CLIENT so that ENGINEER may make the necessary calculations to develop and periodically adjust ENGINEER's opinion of Total Project Costs.
- L. If CLIENT designates a manager or an individual or entity other than, or in addition to, ENGINEER to represent CLIENT at the Site, the duties, responsibilities, and limitations of authority of such other party shall be disclosed to the ENGINEER and coordinated in relation to the duties, responsibilities, and authority of ENGINEER.
- M. If more than one prime contract is to be awarded for the Work designed or specified by ENGINEER, designate a person or entity to have authority and responsibility for coordinating the activities among the various prime Contractors, and define and set forth the duties, responsibilities, and limitations of authority of such individual or entity and the relation thereof to the duties, responsibilities, and authority of ENGINEER is to be mutually agreed upon and made a part of this Agreement before such services begin.
- N. Attend the pre-bid conference, bid opening, pre-construction conferences, construction progress and other job related meetings, and Substantial Completion and final payment inspections.
- O. Provide the services of an independent testing laboratory to perform all inspections, tests, and approvals of Samples, materials, and equipment required by the Contract Documents, or to evaluate the performance of materials, equipment, and facilities of CLIENT, prior to their incorporation into the Work with appropriate professional interpretation thereof.
- P. Provide inspection or monitoring services by an individual or entity other than ENGINEER (and disclose the identity of such individual or entity to ENGINEER) as CLIENT determines necessary to verify:
1. That Contractor is complying with any Laws and Regulations applicable to Contractor's performing and furnishing the Work.
  2. That Contractor is taking all necessary precautions for safety of persons or property and complying with any special provisions of the Contract Documents applicable to safety.
- Q. Provide ENGINEER with the findings and reports generated by the entities providing services pursuant to paragraphs 2.01.O and P.

### ARTICLE 3 - TIMES FOR RENDERING SERVICES

#### 3.01 General

- A. ENGINEER's services and compensation under this Agreement have been agreed to in anticipation of the orderly and continuous progress of the Project through completion. Unless specific periods of time or specific dates for providing services are specified in this Agreement, ENGINEER's obligation to render services hereunder will be for a period which may reasonably be required for the completion of said services.
- B. If in this Agreement specific periods of time for rendering services are set forth or specific dates by which services are to be completed are provided, and if such periods of time or dates are changed through no fault of ENGINEER, the rates and amounts of compensation provided for herein shall be subject to equitable adjustment. If CLIENT has requested changes in the scope, extent, or character of the Project, the time of performance of ENGINEER's services shall be adjusted equitably.
- C. For purposes of this Agreement the term "day" means a calendar day of 24 hours.

#### 3.02 Suspension

- A. If CLIENT fails to give prompt written authorization to proceed with any phase of services after completion of the immediately preceding phase, or if ENGINEER's services are delayed through no fault of ENGINEER, ENGINEER may, after giving seven days written notice to CLIENT, suspend services under this Agreement.
- B. If ENGINEER's services are delayed or suspended in whole or in part by CLIENT, or if ENGINEER's services are extended by Contractor's actions or inactions for more than 90 days through no fault of ENGINEER, ENGINEER shall be entitled to equitable adjustment of rates and amounts of compensation provided for elsewhere in this Agreement to reflect, reasonable costs incurred by ENGINEER in connection with, among other things, such delay or suspension and reactivation and the fact that the time for performance under this Agreement has been revised.

#### ARTICLE 4 - PAYMENTS TO ENGINEER

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##### 4.01 Methods of Payment for Services and Reimbursable Expenses of ENGINEER

- A. *For Basic Services.* CLIENT shall pay ENGINEER for Basic Services performed or furnished under as outlined in the Letter Agreement
- B. *For Additional Services.* CLIENT shall pay ENGINEER for Additional Services performed or furnished as outlined in Exhibit D.
- C. *For Reimbursable Expenses.* CLIENT shall pay ENGINEER for Reimbursable Expenses incurred by ENGINEER and ENGINEER's Consultants as set forth in Exhibit B.

##### 4.02 Other Provisions Concerning Payments

- A. *Preparation of Invoices.* Invoices will be prepared in accordance with ENGINEER's standard invoicing practices and will be submitted to CLIENT by ENGINEER, unless otherwise agreed.
- B. *Payment of Invoices.* Invoices are due and payable within 30 days of receipt. If CLIENT fails to make any payment due ENGINEER for services and expenses within 30 days after receipt of ENGINEER's invoice therefor, the amounts due ENGINEER will be increased at the rate of 1.0% per month (or the maximum rate of interest permitted by law, if less) from said thirtieth day. In addition, ENGINEER may, after giving seven days written notice to CLIENT, suspend services under this Agreement until ENGINEER has been paid in full all amounts due for services, expenses, and other related charges. Payments will be credited first to interest and then to principal.
- C. *Disputed Invoices.* In the event of a disputed or contested invoice, only that portion so contested may be withheld from payment, and the undisputed portion will be paid.
- D. *Payments Upon Termination.*
  - 1. In the event of any termination under paragraph 6.06, ENGINEER will be entitled to invoice CLIENT and will be paid in accordance with Exhibit B for all services performed or furnished and all Reimbursable Expenses incurred through the effective date of termination.
  - 2. In the event of termination by CLIENT for convenience or by ENGINEER for cause, ENGINEER, in addition to invoicing for those items identified in subparagraph 4.02.D.1, shall be entitled to invoice CLIENT and shall be paid a reasonable amount for services and expenses directly attributable to termination, both before and after the effective date of termination, such as reassignment of personnel, costs of terminating contracts with ENGINEER's Consultants, and other related close-out costs, using methods and rates for Additional Services as set forth in Exhibit B.
- E. *Records of ENGINEER's Costs.* Records of ENGINEER's costs pertinent to ENGINEER's compensation under this Agreement shall be kept in accordance with generally accepted accounting practices. To the extent necessary to verify ENGINEER's charges and upon CLIENT's timely request, copies of such records will be made available to CLIENT at cost.

- F. *Legislative Actions.* In the event of legislative actions after the Effective Date of the Agreement by any level of government that impose taxes, fees, or costs on ENGINEER's services or other costs in connection with this Project or compensation therefore, such new taxes, fees, or costs shall be invoiced to and paid by CLIENT as a Reimbursable Expense to which a Factor of 1.0 shall be applied. Should such taxes, fees, or costs be imposed, they shall be in addition to ENGINEER's estimated total compensation.

#### ARTICLE 5 - OPINIONS OF COST

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##### 5.01 Opinions of Probable Construction Cost

- A. ENGINEER's opinions of probable Construction Cost provided for herein are to be made on the basis of ENGINEER's experience and qualifications and represent ENGINEER's best judgment as an experienced and qualified professional generally familiar with the industry. However, since ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, ENGINEER cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by ENGINEER. If CLIENT wishes greater assurance as to probable Construction Cost, CLIENT shall employ an independent cost estimator.

##### 5.02 Designing to Construction Cost Limit

- A. If a Construction Cost limit is established between CLIENT and ENGINEER, such Construction Cost limit and a statement of ENGINEER's rights and responsibilities with respect thereto will be specifically set forth in Exhibit C - Supplemental General Conditions.

##### 5.03 Opinions of Total Project Costs

- A. ENGINEER assumes no responsibility for the accuracy of opinions of Total Project Costs.

#### ARTICLE 6 - GENERAL CONSIDERATIONS

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##### 6.01 Standards of Performance

- A. The standard of care for all professional engineering and related services performed or furnished by ENGINEER under this Agreement will be the care and skill ordinarily used by members of ENGINEER's profession practicing under similar circumstances at the same time and in the same locality. ENGINEER makes no warranties, express or implied, under this Agreement or otherwise, in connection with ENGINEER's services.
- B. ENGINEER shall be responsible for the technical accuracy of its services and documents resulting therefrom, and CLIENT shall not be responsible for discovering deficiencies therein. ENGINEER shall correct such deficiencies without additional compensation except to the extent such action is directly attributable to deficiencies in CLIENT-furnished information.
- C. ENGINEER shall perform or furnish professional engineering and related services in all phases of the Project to which this Agreement applies. ENGINEER shall serve as CLIENT's prime professional for the Project. ENGINEER may employ such ENGINEER's Consultants as ENGINEER deems necessary to assist in the performance or furnishing of the services.

ENGINEER shall not be required to employ any ENGINEER's Consultant unacceptable to ENGINEER.

- D. ENGINEER and CLIENT shall comply with applicable Laws or Regulations and CLIENT-mandated standards. This Agreement is based on these requirements as of its Effective Date. Changes to these requirements after the Effective Date of this Agreement may be the basis for modifications to CLIENT's responsibilities or to ENGINEER's scope of services, times of performance, or compensation.
- E. CLIENT shall be responsible for, and ENGINEER may rely upon, the accuracy and completeness of all requirements, programs, instructions, reports, data, and other information furnished by CLIENT to ENGINEER pursuant to this Agreement. ENGINEER may use such requirements, reports, data, and information in performing or furnishing services under this Agreement.
- F. CLIENT shall make decisions and carry out its other responsibilities in a timely manner and shall bear all costs incident thereto so as not to delay the services of ENGINEER.
- G. Prior to the commencement of the Construction Phase, CLIENT shall notify ENGINEER of any other notice or certification that ENGINEER will be requested to provide to CLIENT or third parties in connection with the Project. CLIENT and ENGINEER shall reach agreement on the terms of any such requested notice or certification, and CLIENT shall authorize such Additional Services as are necessary to enable ENGINEER to provide the notices or certifications requested.
- H. ENGINEER shall not be required to sign any documents, no matter by whom requested, that would result in the ENGINEER's having to certify, guarantee or warrant the existence of conditions whose existence the ENGINEER cannot ascertain. CLIENT agrees not to make resolution of any dispute with the ENGINEER or payment of any amount due to the ENGINEER in any way contingent upon the ENGINEER's signing any such certification.
- I. During the Construction Phase, ENGINEER shall not supervise, direct, or have control over Contractor's work, nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by Contractor, for safety precautions and programs incident to the Contractor's work in progress, nor for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's furnishing and performing the Work.
- J. ENGINEER neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform the Work in accordance with the Contract Documents.
- K. ENGINEER shall not be responsible for the acts or omissions of any Contractor(s), subcontractor or supplier, or of any of the Contractor's agents or employees or any other persons (except ENGINEER's own employees) at the Site or otherwise furnishing or performing any of the Contractor's work; or for any decision made on interpretations or clarifications of the Contract Documents given by CLIENT without consultation and advice of ENGINEER.
- L. The General Conditions for any construction contract documents prepared hereunder are to be the "Standard General Conditions of the Construction Contract" as prepared by the Engineers Joint Contract Documents Committee (Document No. 1910-8, 1996 Edition) unless both parties mutually agree to use other General Conditions.

#### 6.02 Authorized Project Representatives

- A. Contemporaneous with the execution of this Agreement, ENGINEER and CLIENT shall designate specific individuals to act as ENGINEER's and CLIENT's representatives with respect to the services to be performed or furnished by ENGINEER and responsibilities of CLIENT under this Agreement. Such individuals shall have authority to transmit instructions, receive information, and render decisions relative to the Project on behalf of each respective party.

#### 6.03 Design without Construction Phase Services

- A. Should CLIENT provide Construction Phase services with either CLIENT's representatives or a third party, ENGINEER's Basic Services under this Agreement will be considered to be completed upon completion of the Final Design Phase or Bidding or Negotiating Phase as outlined in the Letter Agreement.
- B. It is understood and agreed that if ENGINEER's Basic Services under this Agreement do not include Project observation, or review of the Contractor's performance, or any other Construction Phase services, and that such services will be provided by CLIENT, then CLIENT assumes all responsibility for interpretation of the Contract Documents and for construction observation or review and waives any claims against the ENGINEER that may be in any way connected thereto.

#### 6.04 Use of Documents

- A. All Documents are instruments of service in respect to this Project, and ENGINEER shall retain an ownership and property interest therein (including the right of reuse at the discretion of the ENGINEER) whether or not the Project is completed.
- B. Copies of CLIENT-furnished data that may be relied upon by ENGINEER are limited to the printed copies (also known as hard copies) that are delivered to the ENGINEER. Files in electronic media format of text, data, graphics, or of other types that are furnished by CLIENT to ENGINEER are only for convenience of ENGINEER. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk.
- C. Copies of Documents that may be relied upon by CLIENT are limited to the printed copies (also known as hard copies) that are signed or sealed by the ENGINEER. Files in electronic media format of text, data, graphics, or of other types that are furnished by ENGINEER to CLIENT are only for convenience of CLIENT. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk.
- D. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the party delivering the electronic files. ENGINEER shall not be responsible to maintain documents stored in electronic media format after acceptance by CLIENT.
- E. When transferring documents in electronic media format, ENGINEER makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating

systems, or computer hardware differing from those used by ENGINEER at the beginning of this Project.

- F. CLIENT may make and retain copies of Documents for information and reference in connection with use on the Project by CLIENT. Such Documents are not intended or represented to be suitable for reuse by CLIENT or others on extensions of the Project or on any other project. Any such reuse or modification without written verification or adaptation by ENGINEER, as appropriate for the specific purpose intended, will be at CLIENT's sole risk and without liability or legal exposure to ENGINEER or to ENGINEER's Consultants. CLIENT shall indemnify and hold harmless ENGINEER and ENGINEER's Consultants from all claims, damages, losses, and expenses, including attorneys' fees arising out of or resulting therefrom.
- G. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- H. Any verification or adaptation of the Documents for extensions of the Project or for any other project will entitle ENGINEER to further compensation at rates as defined in Exhibit B.

#### 6.05 Insurance

- A. ENGINEER shall procure and maintain insurance as set forth below:
1. Workers Compensation & Employer's Liability
    - a. Each Occurrence: \$1,000,000
  2. General Liability
    - a. Each Occurrence: \$1,000,000
    - b. General Aggregate: \$2,000,000
  3. Excess or Umbrella Liability
    - a. Each Occurrence: \$5,000,000
    - b. General Aggregate: \$5,000,000
  4. Automobile Liability
    - a. Combined Single Limit (Bodily Injury and Property Damage):  
Each Accident \$1,000,000
  5. Professional Liability
    - a. Each Occurrence: \$2,000,000
    - b. General Aggregate: \$2,000,000
- B. CLIENT shall cause ENGINEER and ENGINEER's Consultants to be listed as additional insureds on any general liability or property insurance policies carried by CLIENT which are applicable to the Project.
- C. CLIENT shall require Contractor to purchase and maintain general liability and other insurance as specified in the Contract Documents and to cause ENGINEER and ENGINEER's Consultants to be listed as additional insureds with respect to such liability and other insurance purchased and maintained by Contractor for the Project.
- D. CLIENT and ENGINEER shall each deliver to the other certificates of insurance evidencing the coverage.
- E. All policies of property insurance shall contain provisions to the effect that ENGINEER's and ENGINEER's Consultants' interests are covered and that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder.

- F. At any time, CLIENT may request that ENGINEER, at CLIENT's sole expense, provide additional insurance coverage, increased limits, or revised deductibles that are more protective. If so requested by CLIENT, with the concurrence of ENGINEER, and if commercially available, ENGINEER shall obtain and shall require ENGINEER's Consultants to obtain such additional insurance coverage, different limits, or revised deductibles for such periods of time as requested by CLIENT.

#### 6.06 Termination

A. The obligation to provide further services under this Agreement may be terminated:

1. *For cause,*

a. By either party upon 30 days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party.

b. By ENGINEER:

1) upon seven days written notice if ENGINEER believes that ENGINEER is being requested by CLIENT to furnish or perform services contrary to ENGINEER's responsibilities as a licensed professional; or

2) upon seven days written notice if the ENGINEER's services for the Project are delayed or suspended for more than 90 days for reasons beyond ENGINEER's control.

3) ENGINEER shall have no liability to CLIENT on account of such termination.

c. Notwithstanding the foregoing, this Agreement will not terminate as a result of such substantial failure if the party receiving such notice begins, within seven days of receipt of such notice, to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt thereof; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such 30 day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period provided for herein shall extend up to, but in no case more than, 60 days after the date of receipt of the notice.

2. *For convenience,*

a. By CLIENT effective upon the receipt of notice by ENGINEER.

B. The terminating party under paragraphs 6.06.A.1 or 6.06.A.2 may set the effective date of termination at a time up to 30 days later than otherwise provided to allow ENGINEER to demobilize personnel and equipment from the Site, to complete tasks whose value would otherwise be lost, to prepare notes as to the status of completed and uncompleted tasks, and to assemble Project materials in orderly files.

#### 6.07 Controlling Law

A. This Agreement is to be governed by the law of the state in which the Project is located.

#### 6.08 Successors, Assigns, and Beneficiaries

A. CLIENT and ENGINEER each is hereby bound and the partners, successors, executors, administrators and legal representatives of CLIENT and ENGINEER (and to the extent permitted by paragraph 6.08.B the assigns of CLIENT and ENGINEER) are hereby bound to the other party to this Agreement and to the partners, successors, executors, administrators and legal representatives (and said assigns) of

such other party, in respect of all covenants, agreements and obligations of this Agreement.

B. Neither CLIENT nor ENGINEER may assign, sublet, or transfer any rights under or interest (including, but without limitation, moneys that are due or may become due) in this Agreement without the written consent of the other, except to the extent that any assignment, subletting, or transfer is mandated or restricted by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement.

C. Unless expressly provided otherwise in this Agreement:

1. Nothing in this Agreement shall be construed to create, impose, or give rise to any duty owed by CLIENT or ENGINEER to any Contractor, Contractor's subcontractor, supplier, other individual or entity, or to any surety for or employee of any of them.

2. All duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of CLIENT and ENGINEER and not for the benefit of any other party. The CLIENT agrees that the substance of the provisions of this paragraph 6.08.C shall appear in the Contract Documents.

#### 6.09 Dispute Resolution

A. CLIENT and ENGINEER agree to negotiate all disputes between them in good faith for a period of 30 days from the date of notice prior to exercising their rights under provisions of this Agreement, or under law. In the absence of such an agreement, the parties may exercise their rights under law.

B. If and to the extent that CLIENT and ENGINEER have agreed on a method and procedure for resolving disputes between them arising out of or relating to this Agreement, such dispute resolution method and procedure is set forth in Exhibit C, "Supplemental Conditions."

#### 6.10 Hazardous Environmental Condition

A. CLIENT represents to Engineer that to the best of its knowledge a Hazardous Environmental Condition does not exist.

B. CLIENT has disclosed to the best of its knowledge to ENGINEER the existence of all Asbestos, PCB's, Petroleum, Hazardous Waste, or Radioactive Material located at or near the Site, including type, quantity and location.

C. If a Hazardous Environmental Condition is encountered or alleged, ENGINEER shall have the obligation to notify CLIENT and, to the extent of applicable Laws and Regulations, appropriate governmental officials.

D. It is acknowledged by both parties that ENGINEER's scope of services does not include any services related to a Hazardous Environmental Condition. In the event ENGINEER or any other party encounters a Hazardous Environmental Condition, ENGINEER may, at its option and without liability for consequential or any other damages, suspend performance of services on the portion of the Project affected thereby until CLIENT: (i) retains appropriate specialist consultant(s) or contractor(s) to identify and, as appropriate, abate, remediate, or remove the Hazardous Environmental Condition; and (ii) warrants that the Site is in full compliance with applicable Laws and Regulations.

- E. CLIENT acknowledges that ENGINEER is performing professional services for CLIENT and that ENGINEER is not and shall not be required to become an "arranger," "operator," "generator," or "transporter" of hazardous substances, as defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA), which are or may be encountered at or near the Site in connection with ENGINEER's activities under this Agreement.
- F. If ENGINEER's services under this Agreement cannot be performed because of a Hazardous Environmental Condition, the existence of the condition shall justify ENGINEER's terminating this Agreement for cause on 30 days notice.

#### 6.11 Allocation of Risks

##### A. Indemnification

1. To the fullest extent permitted by law, ENGINEER shall indemnify and hold harmless CLIENT, CLIENT's officers, directors, partners, and employees from and against any and all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) caused solely by the negligent acts or omissions of ENGINEER or ENGINEER's officers, directors, partners, employees, and ENGINEER's Consultants in the performance and furnishing of ENGINEER's services under this Agreement.
2. To the fullest extent permitted by law, CLIENT shall indemnify and hold harmless ENGINEER, ENGINEER's officers, directors, partners, employees, and ENGINEER's Consultants from and against any and all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) caused solely by the negligent acts or omissions of CLIENT or CLIENT's officers, directors, partners, employees, and CLIENT's consultants with respect to this Agreement or the Project.
3. To the fullest extent permitted by law, ENGINEER's total liability to CLIENT and anyone claiming by, through, or under CLIENT for any cost, loss, or damages caused in part by the negligence of ENGINEER and in part by the negligence of CLIENT or any other negligent entity or individual, shall not exceed the percentage share that ENGINEER's negligence bears to the total negligence of CLIENT, ENGINEER, and all other negligent entities and individuals.
4. In addition to the indemnity provided under paragraph 6.11.A.2 of this Agreement, and to the fullest extent permitted by law, CLIENT shall indemnify and hold harmless ENGINEER and its officers, directors, partners, employees, and ENGINEER's Consultants from and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from a Hazardous Environmental Condition, provided that (i) any such cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than completed Work), including the loss of use resulting therefrom, and (ii) nothing in this paragraph 6.11.A.4. shall obligate CLIENT to indemnify any individual or entity

from and against the consequences of that individual's or entity's own negligence or willful misconduct.

5. The indemnification provision of paragraph 6.11.A.1 is subject to and limited by the provisions agreed to by CLIENT and ENGINEER in Exhibit C, "Supplemental Conditions," if any.

#### 6.12 Notices

- A. Any notice required under this Agreement will be in writing, addressed to the appropriate party at its address on the signature page and given personally, or by registered or certified mail postage prepaid, or by a commercial courier service. All notices shall be effective upon the date of receipt.

#### 6.13 Survival

- A. All express representations, indemnifications, or limitations of liability included in this Agreement will survive its completion or termination for any reason.

#### 6.14 Severability

- A. Any provision or part of the Agreement held to be void or unenforceable under any Laws or Regulations shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon CLIENT and ENGINEER, who agree that the Agreement shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

#### 6.15 Waiver

- A. Non-enforcement of any provision by either party shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Agreement.

#### 6.16 Headings

- A. The headings used in this Agreement are for general reference only and do not have special significance.

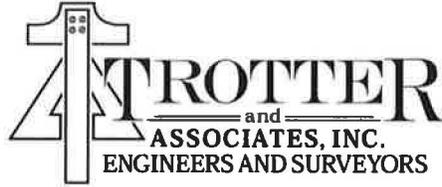
#### 6.16 Definitions

- A. Defined terms will be in accordance with EJCDC No. 1910-1 (1996 Edition)

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**EXHIBIT B  
SCHEDULE OF HOURLY RATES AND REIMBURSABLE EXPENSES**

2017 Schedule of Hourly Rates		2017 Reimbursable Expenses		
Classification	Billing Rate	Item	Unit	Unit Price
Principal	\$224.00	Engineering Copies 1- 249 Sq. Ft.	Sq. Ft.	\$0.29
Senior Project Manager	\$214.00	Engineering Copies 250-999 Sq. Ft.	Sq. Ft.	\$0.27
Project Manager	\$189.00	Engineering Copies 1000-3999 Sq. Ft.	Sq. Ft.	\$0.25
Professional Land Surveyor	\$179.00	Engineering Copies 3999 Sq. Ft. & Up	Sq. Ft.	\$0.23
Project Coordinator	\$179.00	Mylar Engineering Copies up to 24" by 36"	Each	\$8.00
Senior Project Engineer	\$179.00	Color Presentation Grade Large Format Print	Sq. Ft.	\$5.15
Engineer Level IV	\$166.00	Comb Binding > 120 Sheets	Each	\$4.75
Engineer Level III	\$149.00	Comb Binding < 120 Sheets	Each	\$3.50
Engineer Level II	\$130.00	Binding Strips ( Engineering Plans)	Each	\$1.00
Engineer Level I	\$110.00	5 Mil Laminating	Each	\$1.25
Engineering Intern	\$51.00	Copy 11" x 17" - Color	Each	\$0.50
Senior Technician	\$155.00	Copy 11" x 17" - Black and White	Each	\$0.25
Technician Level IV	\$134.00	Copy 8.5" x 11" - Color	Each	\$0.25
Technician Level III	\$122.00	Copy 8.5" x 11" - Black and White	Each	\$0.12
Technician Level II	\$109.00	Recorded Documents	Each	\$25.00
Technician Level I	\$96.00	Plat Research	Time and Material	
Clerical Level II	\$75.00	Per Diem	Each Day	\$30.00
Clerical Level I	\$63.00	Field / Survey Truck	Each Day	\$45.00
Survey Crew Chief	\$151.00	Postage and Freight		Cost
Survey Technician Level II	\$80.00	Mileage	Per Mile	Federal Rate
Survey Technician Level I	\$65.00			
Prevailing Wage Survey Foreman**	\$181.00			
Prevailing Wage Survey Worker**	\$176.00			
Sub Consultants	Cost Plus 5%			

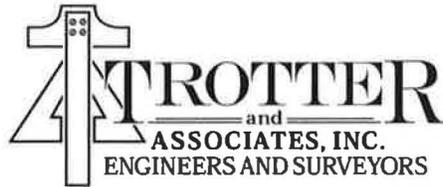
*\*\*Rates will be escalated for Overtime & Holiday Pay to adjust for Premium Time based on the current Illinois Department of Labor Rules*

*Note: On January 1<sup>st</sup> of each year, the fees and hourly rates may be escalated by an amount not to exceed five (5) percent.*

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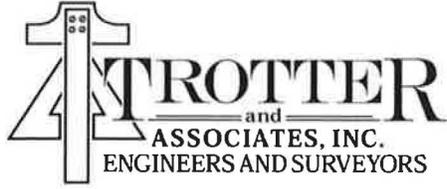
**EXHIBIT C  
SUPPLEMENTAL CONDITIONS**

Engineer hereby agrees to incorporate and accept the following provisions to be included in the aforementioned Agreement at no additional compensation:

- A. The Engineer agrees to take affirmative steps to assure that disadvantaged business enterprises are utilized when possible as sources of supplies, equipment, construction and services in accordance with the Clean Water Loan Program rules as required by the award conditions of USEPA's Assistance Agreement with the IEPA. The Engineer acknowledges that the fair share percentages are 5% for MBE's and 12% for WBE's.
- B. The Engineer shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Engineer shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.
- C. Audit and access to records clause:
1. Books, records, documents and other evidence directly pertinent to performance of PWSLP loan work under this agreement shall be maintained consistent with generally accepted accounting standards in accordance with the American Institute of Certified Public Accountants Professional Standards. The Agency or any of its authorized representatives shall have access to the books, records, documents and other evidence for the purpose of inspection, audit and copying. Facilities shall be provided for access and inspection.
  2. Audits conducted pursuant to this provision shall be in accordance with generally accepted auditing standards.
  3. All information and reports resulting from access to records pursuant to the above section C.1 shall be disclosed to the Agency. The auditing agency shall afford the engineer an opportunity for an audit exit conference and an opportunity to comment on the pertinent portions of the draft audit report. The final audit report shall include the written comments, if any, or the audited parties.
  4. Records under the above section C.1 shall be maintained and made available during performance of project services under this agreement and for 3 years after the final loan closing. In addition, those records that relate to any dispute pursuant to Section 365.650 (Disputes) of Illinois Administrative Code, Title 35, litigation, the settlement of claims arising out of project performance, costs or items to which an audit exception has been taken shall be maintained and made available for 3 years after the resolution of the appeal, litigation, claim or exception.
- D. Covenant Against Contingent Fees:
- The Engineer warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bonafide employees. For breach or violation of this warranty, the Owner shall have the right to annul this agreement without liability or in its discretion to deduct from the contract price or consideration or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

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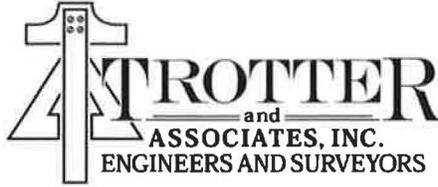
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**EXHIBIT D  
CONTRACT ADDENDUM**

Project Name: Dunham Road Sanitary Force Main Replacement

Project No. STC-109

Addendum No. \_\_\_\_\_

This is an addendum attached to, made part of and incorporated by reference into the Agreement between CLIENT and ENGINEER for modification of scope and compensation for the PROJECT. All other terms and conditions of the original Agreement between CLIENT and ENGINEER are unchanged by this Contract Addendum and shall remain in full force and effect and shall govern the obligations of both CLIENT and ENGINEER, including obligations created by this Contract Addendum.

The contract modifications are described below:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

CONTRACT SUMMARY

Original Contract Amount	\$ _____
Changes Prior to This Change	\$ _____
Amount of This Change	\$ _____
Revised Contract Amount:	\$ _____

For purposes of expediency, ENGINEER and CLIENT agree that an executed electronic version of this Contract Addendum shall suffice. The original of this Contract Addendum shall be returned to ENGINEER after execution.

CLIENT:

ENGINEER:

CITY OF ST. CHARLES

TROTTER AND ASSOCIATES, INC.

SIGNED:

\_\_\_\_\_  
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\_\_\_\_\_  
 \_\_\_\_\_

TITLE

TITLE

Exhibit D  
Contract Addendum  
Page 2

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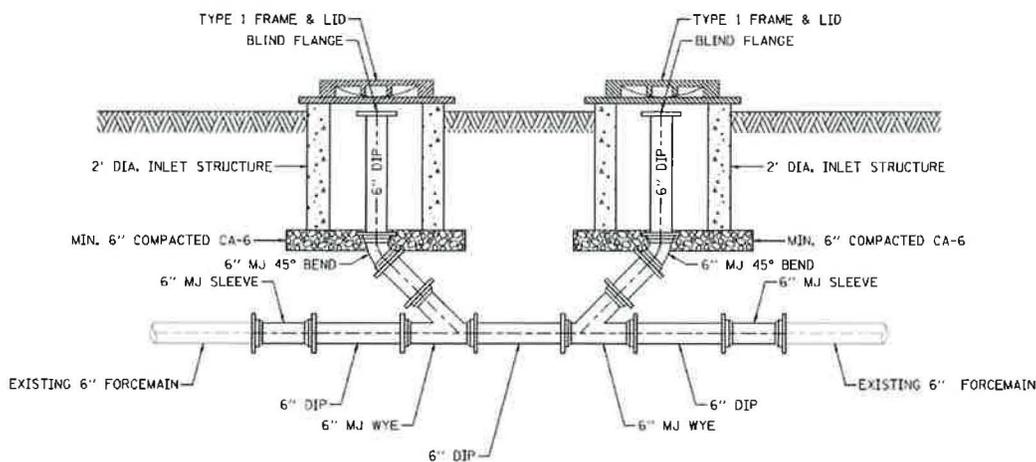
## SIMILAR PROJECTS

### Royal Fox Lift Stations I and II

Trotter and Associates, Inc. completed a Facility Plan Update in 2011 which included a summary of the City of St. Charles' wastewater infrastructure including the fifteen lift stations. Within the Facility Plan, Royal Fox Lift Stations I and II were recommended for future rehabilitation or replacement. This project began with a conditions assessment of both lift stations to prioritize the rehabilitation work. The assessment recommended that the lift stations be lined with a fast curing structural material instead of replacing the structures. It was recommended that Royal Fox No. II be rehabilitated first due to the severity of corrosion within the structure.

The **Royal Fox Lift Station No. II Rehabilitation** included the replacement of the pumps, pipe, appurtenances, and electrical control panel, as well as the structural lining of the wet well and valve vault. The lining work required the isolation of the lift station, and a bypass pumping system was utilized for several weeks. In order to provide the lining material with proper adherence, the surface must be dry and clean. This required the installation of a dewatering well to lower the groundwater near the wet well. The project was completed in 2013.

The **Royal Fox Lift Station No. I Rehabilitation** included replacement of the pumps, pipe, appurtenances, and electrical control panel, as well as the structural lining of the wet well and valve vault and *installation of cleanout structures on the discharge force main (see below)*. *The cleanouts were located at regular intervals and at 90-degree bends in the small-diameter forcemain, which will facilitate cleaning by traditional methods.* During the lift station lining, a bypass pumping system was utilized. During installation of the clean out structures, vacuum trucks were used to transport wastewater from upstream of the lift station to downstream of the force main. The project was completed in 2014.





### Fox River Water Reclamation District – Taly Park Pump Station Rehabilitation

James Kerrigan, P.E., Senior Project Engineer  
1957 N. LaFox (Route 31)  
(847) 742-2068

Taly Park Pump Station is a triplex submersible pump station originally constructed in 2003. An inspection performed in 2016 revealed failure of the coatings on piping, valves, and other metallic components in the wet well and valve vault. The District retained Trotter and Associates, Inc. to provide design engineering services and prepare design documents for the rehabilitation of the pump station.



The rehabilitation includes: replacement of all pump discharge piping, including the wall pipes, if necessary; surface preparation and recoating of all piping; retrofit of the existing access hatches with fall-through protection grates; incorporation of bypass capabilities in the existing surge relief valve vault; and reconfiguration of the existing odor control system. Rehabilitation of the pump station is anticipated to be completed in January 2018.

### Fox River Water Reclamation District – Pump Station 40 Replacement and Force Main Repair

James Kerrigan, P.E., Senior Project Engineer  
1957 N. LaFox (Route 31)  
(847) 742-2068

Pump Station 40 was constructed in the 1960's and is a prefabricated wet pit-dry pit buried steel can station. Pumps, valves and controls are contained within a dry-well vault approximately 16 feet below ground. The existing dry-well vault is experiencing corrosion of the underground steel structure and requires replacement. **The existing 6-inch diameter cast iron force main (1,150 feet in length) serving Pump Station No. 40 and was also constructed in the 1960's. The District televised the force main in July 2016 and found that the downstream end has experienced significant corrosion.**



The District retained Trotter and Associates, Inc. to provide design engineering services for the replacement of the pump station and repair of the existing force main.

The existing pump station will be replaced with precast concrete structures, including a new wet well, valve vault, and meter vault. Construction of the new structures will be adjacent to the existing pump station in order to connect the existing wet well to the proposed wet well during start up and decommission the existing steel lift station. The existing wet well will remain and become a junction manhole. The pumping system will include two submersible pumps, isolation valves, and a by-pass connection for a portable pump. A magnetic flow meter will be located in a separate vault for flow measurement. Level control will be monitored by a submersible pressure transducer with back-up floats for operation as well as alarms. The electrical system will be housed in suitable NEMA 4X enclosures and include a pump control panel and starters. The design also incorporates the District provided PLC to provide SCADA communications in a similar way to the current system. The design also includes provisions to allow for the connection of a portable generator for emergency use.

**A 20-foot section of corroded cast iron force main will be removed at the discharge manhole and replaced with PVC.** Construction is anticipated to be completed in March 2018.





### DeKalb Sanitary District - Lions Park Lift Station Improvements

Mike Holland, P.E., District Engineer  
(815) 758-3513

TAI provided planning, design, and construction phase engineering services related to the replacement of a regional lift station located in Lions Park (DeKalb Park District) for the DeKalb Sanitary District. The project included the construction of a new cast-in-place wet well and valve room structure with a brick and block building which houses the electrical/control room and generator room. The 10 MGD lift station included four VFD controlled submersible pumps, magnetic flow meter, SCADA communication, and back-up generator.



### DeKalb Sanitary District - Country Club Lift Station Improvements

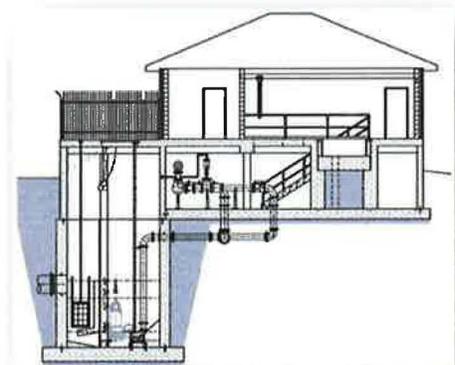
Mike Holland, P.E., District Engineer  
(815) 758-3513

TAI provided planning, design, and construction phase engineering services related to the replacement of a regional lift station on Buena Vista Golf Course (DeKalb Park District) for the DeKalb Sanitary District. The project included the construction of a new cast-in-place wet well and valve room structure with a brick and block building which houses the electrical/control room and generator room. The lift station was design for phased expansion to meet the community's long-term needs and includes room for four VFD controlled submersible pumps. The first phase included two submersible pumps, magnetic flow meter, SCADA communication, and back-up generator.



The project was funded through the **ARRA program**. The improvements were substantially completed in December 2010 and final restoration was completed in April 2011.

**2011 APWA Environmental Project of the Year  
(Under \$5 Million)**





## City of St. Charles - East Side Pump Station

Tim Wilson, Environmental Services Manager  
(630) 377-4918

East Side Lift Station was originally constructed in 1973. Prior to construction of this lift station the service area was tributary to the Riverside Pump Station via an interceptor along Seventh Avenue Creek. The interceptor is currently maintained as an emergency overflow in the event that the East Side Lift Station is unable to handle the peak flow during storm events.

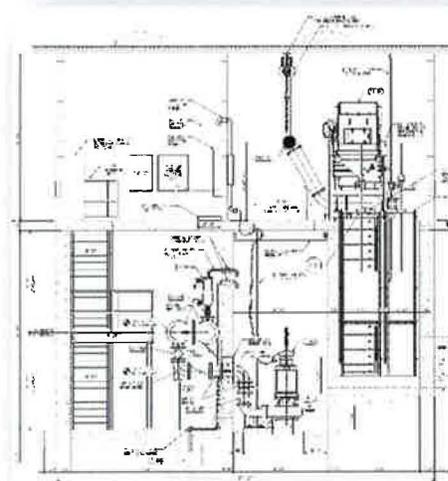
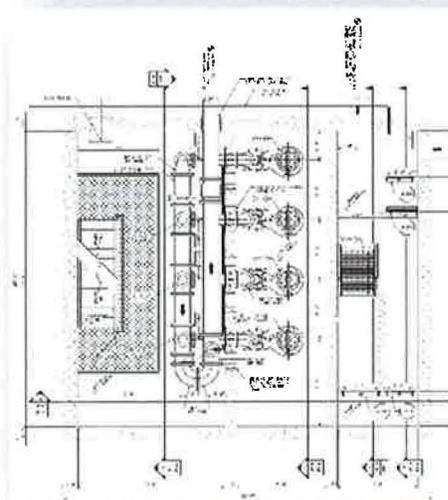
The original lift station included a wet well and dry pit design with influent screening and a by-pass channel. The existing pumps, controls, and mechanical screen were nearing the end of their service life. Rehabilitation of this lift station had been identified during the 2002 Facility Plan and was part of the City's Capital Improvements Plan.

Trotter and Associates provided planning, design and construction engineering for the rehabilitation. The City and TAI developed several alternative designs and selected to rehabilitate the lift station with submersible pumps. Furthermore, the original design average flow to East Side Lift Station was 4.0 MGD and the design maximum flow was 8.0 MGD. However, the estimated flow to this lift station during a 10-year rainfall event is 13.3 MGD. Therefore, the new submersible pumps were designed to meet 14.0 MGD with three of the four proposed pumps running.

The project included:

- new fine screen & washer compactor
- new gates and operators
- four 100 Hp submersible pumps
- flow meters, piping and valves
- new auto-transfer switch & MCC
- installation of VFD's, PLC, and back-up controls
- rehabilitation of the structure interior and exterior

The project was combined with the Riverside Pump Station Rehabilitation Project and funded through the Illinois EPA Low Interest Loan and ARRA Stimulus Program. The \$2,042,000 contract was awarded in October of 2009 and completed in August of 2010.





### City of St. Charles - Riverside Pump Station

*Tim Wilson, Environmental Services Manager  
(630) 377-4405*

Riverside Pump Station was originally constructed in the 1930's and has been expanded and rehabilitated on several occasions. The existing mechanical fine screens were reaching the end of their service life and slated for replacement as part of the City's Capital Improvements Plan. When the USEPA announced the creation of the 2009 Stimulus Program, the City elected to move this project forward.

Trotter and Associates provided planning, design and construction engineering for the improvements. The project scope originally included installation of two mechanical fine screens, a washer/compactor, and a breakwater system. During the bidding phase the lift station experienced a major electrical strike which resulted in failure of variable frequency drives, broken piping, and failure of a 75 horsepower pump motor. The scope of the project and loan amount were increased to address these issues.

The project was combined with the East Side Pump Station Rehabilitation Project and funded through the Illinois EPA Low Interest Loan and ARRA Stimulus Program. The \$2,042,000.00 contract was awarded in October of 2009 and completed in August of 2010.





## Village of Algonquin – Intermediate Pumping Station

*Ed Brown, Executive Director*  
(847) 658-2754

Constructed as part of a larger wastewater treatment plant expansion project, the Algonquin WWTP Intermediate Pumping Station lifts primary clarifier effluent and return activated sludge to the head of the 5-stage phosphorous and nitrogen removal process. The station is configured with three screw centrifugal horizontal dry pit pumps, each capable of pumping 10 MGD. The station is designed to ultimately house 6 pumps, bringing the ultimate pumping capacity to 50 MGD with one pump out of service.

Each pump is equipped with a dedicated force main and flow meter, properly sized for the full range of flow for the individual pump, resulting in more accurate flow information at low flows than would be possible from a single large meter. In addition, the dedicated force main for each pump solves lower flow velocity issues while allowing higher flow rates at lower horsepower than combined force main systems. An additional advantage is that meters can be isolated and serviced one at a time while the other pumps remain in service.

The pumps, 75 hp Wemco Hidrostral screw centrifugals, were chosen for their overall efficiency and reliable operation. The pumps are equipped with VFD's for flow paced operation.

The project was completed and placed into service in February 2008.





### Northern Moraine WRD - Rehabilitation of Lakemoor Lift Stations 1,2,3,4 & 5 and Plant Lift Station

Eric Lecuyer, District Manager  
(847) 526-3300

The Northern Moraine Wastewater Reclamation District completed a Facility Plan Amendment in 2004 which outlined a Capital Improvements Program for rehabilitation of the older lift stations. In 2006, the District assumed ownership of the collection system and lift stations in the Village of Lakemoor. The lift stations were in poor physical condition, which included failed structural components, code violations, and inoperable pumps and valves. The District reprioritized its Capital Improvements Plan to address the needs of the infrastructure and elected to move forward with the rehabilitation of five Lakemoor Lift Stations immediately.

Trotter and Associates, Inc. provided planning, design and construction engineering for the project. The project included complete rehabilitation of five lift stations: the replacement of pumps, piping, valves, controls, structural components, hatches, and back-up power. The stations had various flow rates, head conditions, and pump sizes. Trotter and Associates developed a standard design for rehabilitation of these stations based on a flexible configuration that could be applied to each station. A single pump size was selected that could be adjusted by variable frequency drive setting to pump at the appropriate rate for the individual application. Once the appropriate pump speed was determined, the pumps were then set to start and run at that speed. This system enabled the District to maintain a single pump type and stock spares that are universally interchangeable across the system.

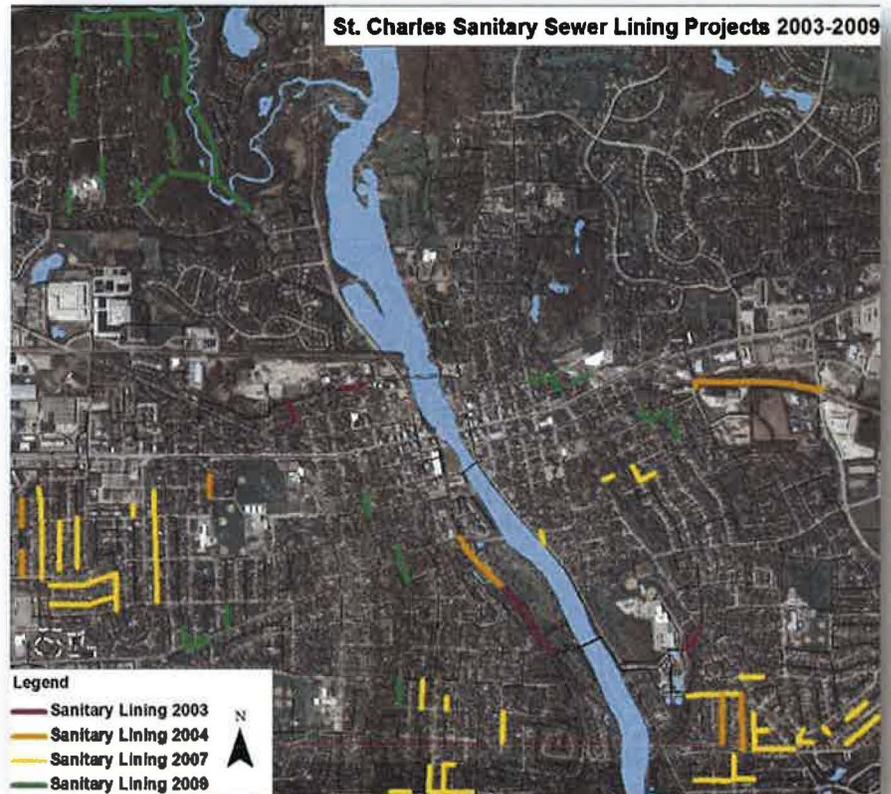
The project was awarded at a cost of \$527,000 and completed in June of 2007.





### Collection System Rehabilitation and Improvements (2003 – 2009)

Trotter and Associates, Inc. have provided sanitary sewer collection system engineering services for the City of St. Charles since 1999. TAI has written the City of St. Charles' Facility Plans and Facility Plan Updates for both the Main Wastewater Treatment Facility's Service Area and the West Side Water Reclamation Facility's Service Area. Both included an in-depth analysis of the existing sanitary sewer collection systems for the respective treatment facilities. The reports identified and evaluated the existing and future capacity requirements, provided an analysis existing conditions of the sewers, and provided recommendations for maintenance, rehabilitation and future improvements.



In 2003, TAI assisted the City with the implementation of the City's first sewer lining program and has provided engineering services on an annual to bi-annual basis. Since 2009 Sewer Lining Project, the City had completed sewer lining for nearly 50,800 feet of sanitary sewer with a total construction cost of \$1,730,000. At the conclusion of this project, TAI provided engineering documentation developed specifically for the City to assist them with implementation of their routine sewer lining program in-house.

- 2003 Sewer Lining Project – \$182,348 – 2,406 feet of 8" – 24"
- 2004 Sewer Lining Project – \$239,528 – 6,258 feet of 8" – 15"
- 2005 Sewer Lining Project – \$314,706 – 10,261 feet of 8" – 18"
- 2007 Sewer Lining Project – \$512,654 – 17,030 feet of 8" – 10"
- 2009 Sewer Lining Project – \$480,727 – 14,790 feet of 6" – 15"





### Siphon Evaluations and Rehabilitations

The City wished to evaluate the condition and capacity of the three inverted siphons that convey flow across the Fox River. Sanitary sewer modeling indicated that the siphons had a reduced capacity from their original design. It was assumed that one or more of the three crossings were partially blocked with sediment. While the existing structures were in good condition, it was determined that most of the mechanical components (gates, valves, etc.) had become corroded and were inoperable. Therefore, routine cleaning and maintenance was very difficult.

The **Park Shore Siphon Evaluation** included replacement of the concrete lid, access hatch, and isolation shear gates and placement of flowable fill in the overflow section of the influent chamber. The flap gates in the upper effluent chamber were also replaced, and valves and cleanout quick-connection fittings were installed in the lower effluent chamber. Finally, the 10", 14" and 20" siphon lines were cleaned and televised. The project was completed in 2011.



The **North Siphon Rehabilitation** required a similar evaluation that was performed on the Park Shore Siphon. The project included replacement of the concrete lid, access hatches, and isolation shear gates in the influent chamber. The flap gates were replaced in the effluent chamber, and the 14" and 18" siphon lines were cleaned, televised and scanned. The project was completed in 2012.





The **Illinois Street Siphon Rehabilitation** required a similar evaluation, but unlike the Park Shore and North siphons, the work would take place within a busy street. TAI worked with the contractor and the City to phase in the work to minimize the effect on traffic, the collection system, and events downtown such as the annual Scarecrow Festival. The project included the replacement of clean-out valves on both ends of the 10" and 12" siphon lines, replacement of the manhole frames and covers above the effluent chamber, replacement of the concrete roadway above the effluent chamber, and the cleaning and televising of both siphon lines.

During televising, several sources of I/I were identified at joints in the siphon lines. TAI administered a change order to provide chemical grouting at the joints and to install cured-in-place pipe (CIPP) within each siphon line. The lines were televised again to provide the City assurance that the leaks were eliminated. The project was completed in 2014.



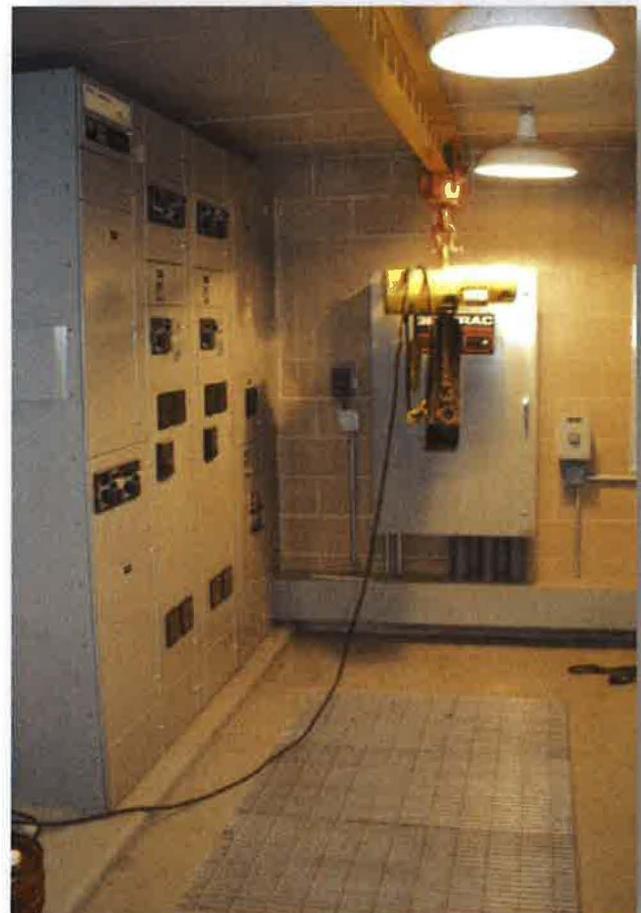


### **DeKalb Sanitary District – Annie Glidden Pumping Station**

*Mike Holland, P.E., District Engineer*  
*(815) 758-3513*

Annie Glidden Pumping Station serves portions of Northern Illinois University and western DeKalb. The station equipment had exceeded its service life and required replacement.

The existing pump systems were driven by a liquid rheostat DC drive (“FloMatcher”) and had a capacity of 1.43 MGD. The liquid rheostat system was replaced with variable frequency drives. The pump station capacity was increased to 4.31 MGD with the ability to add a third pump bringing the ultimate capacity to 6.11 MGD. Wemco Hidrostal with screw centrifugal pumps were chosen due to the characteristics of the waste received from NIU. The project also included new control systems, motor control and power distribution equipment, and general refurbishment.





### Other Lift Station Projects

Trotter and Associates, Inc. has provided planning, design, permitting and construction engineering for over 150 water and wastewater projects in the last nineteen years including over forty lift station projects and forcemain repairs/replacements. In addition to those listed on the proceeding pages, TAI also provided design and construction services for the following projects.

- City of Batavia – First Street Lift Station
- City of Batavia – Colonial Village Lift Station
- City of Batavia – South River Street Lift Station
- City of Batavia – Holy Cross Lift Station
- City of Des Plaines – Oakton Street Pump Station
- City of Geneva – East Side Interceptor Sewer
- City of St. Charles – West Side WRF Raw Sewage Lift Station
- City of St. Charles – West Side WRF – RAS/WAS Lift Station
- DeKalb Sanitary District – West Lincoln Highway Sanitary Sewer Improvements
- DeKalb Sanitary District – Moraine Terrace Sewer Improvements
- DeKalb Sanitary District – Locust Street Sanitary Sewer Improvements
- DeKalb Sanitary District – Sewer Lining and Spot Repairs (2002-2010)
- Illinois American Water – Route 7 (159<sup>th</sup> Street) Water main and Sanitary Sewer Relocates
- Illinois American Water – IL Routes 53 and 56 Water Main and Sanitary Sewer Relocations
- Illinois American Water – Bell Road Water and Sewer Main Relocation
- Northern Moraine WRD – Deer Grove North Lift Station
- Northern Moraine WRD – Darrell Road Lift Station
- Northern Moraine WRD – Port Barrington LPSS
- Northern Moraine WRD – Route 120 Interceptor and Low Pressure Sanitary Sewer
- Northern Moraine WRD – Port Barrington Low Pressure Sanitary Sewer Improvements Phases I and II
- Village of Addison – Route 53 Pump Station
- Village of Addison – Belmont Sanitary Water Improvements
- Village of Addison – Jo Ann Lane Sewer Replacement
- Village of Algonquin – Raw Sewage Lift Station
- Village of Algonquin – RAS/WAS Lift Station
- Village of Algonquin – Northern Basin Capacity Analysis & CIP Development
- Village of Algonquin – GIS Basemap
- Village of Bartlett – U46 Sanitary Sewer Extension Improvements
- Village of Carpentersville – Lift Station #10
- Village of Carpentersville – Lift Station #12
- Village of Carpentersville – Lift Station #13
- Village of Carpentersville – Miller Road Lift Station
- Village of Carpentersville – Rivers End Lift Station
- Village of East Dundee – RAS/ WAS Lift Station
- Village of Fox Lake – GIS Implementation
- Village of Mundelein – Lift Station #3
- Village of Mundelein – IL Route 45 Sanitary Sewer Improvements
- Village of Roselle – Chesapeake Lift Station
- Village of Roselle – Excess Flow Lift Station
- Village of Union – GIS Conversion of the Village Zoning and Land Use Plan Maps

