



# **REQUEST FOR PROPOSAL**

***DUNDALK***

***WASTEWATER TREATMENT FACILITY EXPANSION***

**August 31, 2021**



**PROPOSALS TO BE RECEIVED BY**

**October 19, 2021**



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## 1.0 Project Advertisement

On behalf of the Township of Southgate (Township), Triton Engineering Services Limited (Triton) has issued this Request for Proposal (RFP) to receive proposals to increase the treatment capacity of the existing wastewater treatment facility through the supply and implementation of additional/upgraded technology, processes and equipment or facilities.

## 2.0 Scope of Work/Opportunity

The Township is currently completing a Schedule C Municipal Class Environmental Assessment (Class EA) to evaluate potential solutions to address the treatment capacity concerns of the Dundalk WWTF. A number of alternatives are being considered to address the Problem Statement as described within the Class EA, which reads as follows:

*“The Township of Southgate is committed to delivering responsive and cost-effective municipal services that provide for the economic, social and environmental well-being of its ratepayers now and in the future. Proposed growth in the Dundalk urban centre will result in the allocation of the remaining reserve capacity of the Dundalk wastewater treatment facility to residential development. As a result, further commitment toward growth and infilling cannot be realized until additional wastewater capacity is made available. The objective of this Class EA is to consider cost effective sewage collection and treatment alternatives for the Dundalk urban centre that will minimize environmental impacts and provide additional wastewater treatment capacity.”*

The intent of this RFP is to receive Proposals to increase Dundalk’s wastewater treatment capacity through optimization and/or expansion of the existing treatment facility by implementing industry accepted technology and processes. The Proposals must meet or exceed the expected treatment effluent criteria at the indicated design flow rates as described in the following sections.

A non-mandatory information session and tour of the WWTF may be coordinated based on applicant interest or request. Proposals received will be evaluated as part of the Class EA, with the intention of selection and implementation, should it be identified as a component of the preferred solution.

## 3.0 Instruction to Respondents

Electronic submissions clearly marked “Proposal for The Dundalk Wastewater Treatment Facility Expansion” must be sent via email to: [tenders@southgate.ca](mailto:tenders@southgate.ca)

Electronic submissions are required in pdf format, under 10 MB in size. The submission closing date is October 19, 2021 at 2:00 pm.

## 4.0 Contacts

Any questions or concerns arising from this RFP are to be addressed to both of the following contacts:

**Dustin C. Lyttle, P. Eng.**

Triton Engineering Services Limited

105 Queen Street West, Unit 14

Fergus, ON N1M 1S6

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**Jim Ellis, CRS S**

Public Works Manager

Township of Southgate

185667 Grey Road 9 RR #1

Dundalk, ON N0C 1B0

Tel: 1-888-560-6607 x 250 Fax: 519-923-9262

[jellis@southgate.ca](mailto:jellis@southgate.ca)

## 5.0 Background

### 5.1 General Description of the Site

The Dundalk WWTF is located at 752051 Ida Street South, on the south side of the community of Dundalk, within the Township of Southgate and County of Grey. It is a facultative lagoon system, generally consisting of a raw sewage pumping station (SPS) and four facultative lagoons (Cells) with a total surface area of 15 hectares, a post aeration cell, and tertiary filtration. It discharges treated effluent to the Foley Drain which then drains to the Grand River.

### 5.2 Existing Conditions

#### 5.2.1 WWTF Components

The existing Dundalk WWTF was commissioned in the early 1970s and consists of the following treatment components:

- Influent Parshall flume to measure raw sewage flows
- Raw sewage pumping station (SPS) that discharges to Cell 1.
- Optional Alum addition at the raw SPS
- Stand-by power at the raw SPS
- 4 facultative lagoons that are operated in series

- 1 post-lagoon aeration cell
- Post-aeration cell pumping station (within the Filter Building)
- Tertiary filter with the optional addition of Alum and Polymer for phosphorus removal
- Re-aeration of effluent following filtration
- V-notch weir to measure effluent flow.

The treatment process flow schematic is presented on Figure 1. An aerial photo of the Dundalk WWTF is presented on Figure 2.

Details regarding the four main cells of the lagoons are provided in Table 1 below.

*Table 1 – Existing Lagoon Cell Data*

<b>Classification</b>	<b>Cell No.</b>	<b>Operating Volume (m<sup>3</sup>)</b>	<b>Area (ha)</b>
Facultative	1	57,600	4.4
Facultative	2	57,600	4.4
Facultative	3	46,660	2.9
Facultative	4	46,660	2.9
<b>Total</b>		<b>208,520</b>	<b>15</b>



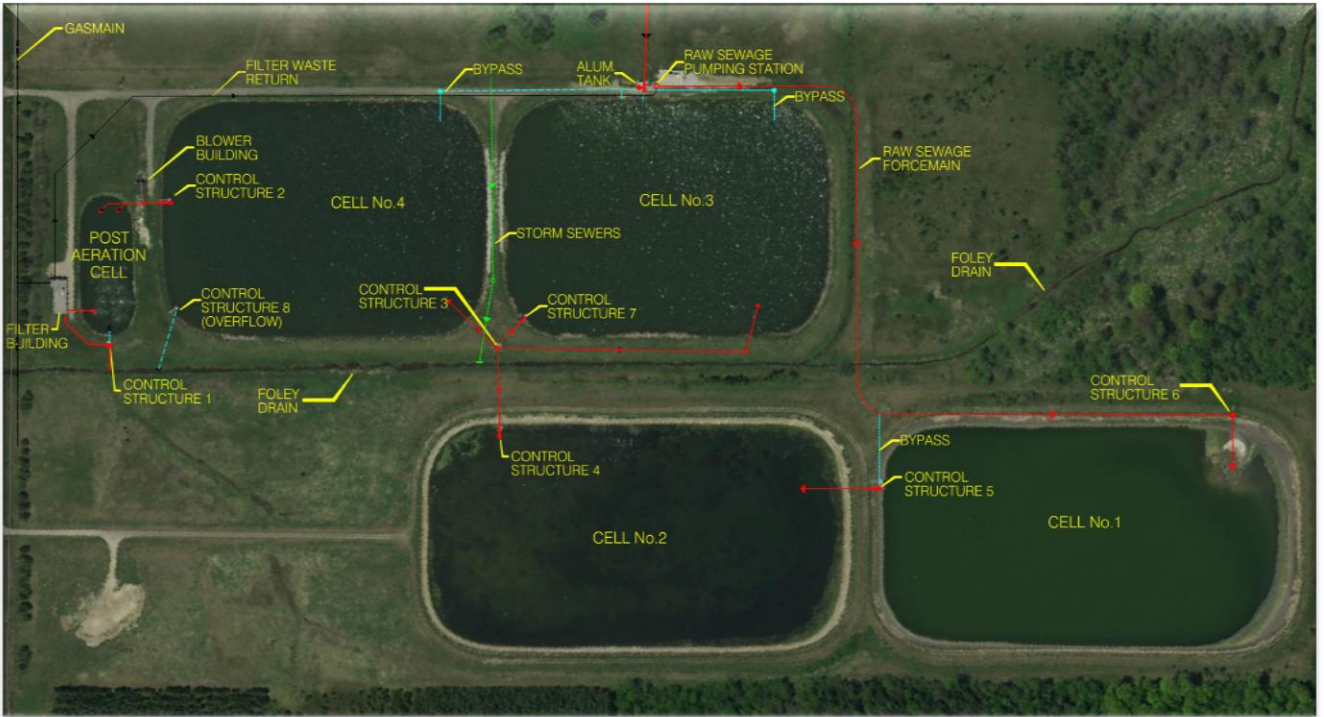


Figure 2 – Dundalk WWTF Aerial & Process Layout

### 5.2.2 Environmental Compliance Approval

As per the Environmental Compliance Approval (ECA) for the existing WWTF, the average day flow (ADF) rated capacity is 1,832 m<sup>3</sup>/day. The effluent criteria as per the ECA is summarized in Table 2 below.

Table 2 – Existing Effluent Criteria

Effluent Parameter	Concentration Objective (mg/L)	Effluent Limits	
		Monthly Average Concentration (mg/L)	Monthly Average Loading (kg/d)
CBOD <sub>5</sub>	5.0	10.0	18.32
Total Suspended Solids	5.0	10.0	18.32
Total Phosphorus <i>Temperature &gt; 5°C</i>	0.3	0.4	0.73
Total Phosphorus <i>Temperature ≤ 5°C</i>	0.6	0.8	1.47
Dissolved Oxygen	5.0	4.0	NA
Un-Ionized Ammonia	0.05	0.1 (Single sample result)	NA

### 5.2.3 Influent Flow Rates & Quality

The Township monitors the daily influent flow rate and quality. A complete summary of the recent (2016-2020) influent flows are summarized in Table 3 below.

*Table 3 – Historical Dundalk WWTF Influent Flows*

Year	2016	2017	2018	2019	2020
Biological Oxygen Demand (mg/L)	164.7	113.5	142.3	113.0	88.5
Total Suspended Solids (mg/L)	204.4	160.6	177.9	239	270.9
Total Phosphorus (mg/L)	3.66	2.98	3.55	3.50	3.10
Total Kjeldahl Nitrogen (mg/L)	35.5	28.1	31.7	34.2	33.0
Average Daily Flow ADF (m <sup>3</sup> /day)	986	1,168	1,105	1,114	1,161
Annual Influent (m <sup>3</sup> )	334,685	424,727	401,279	405,664	425,922
Influent Maximum Daily (m <sup>3</sup> /day)	4,820	6,362	9,022	3,989	4,510
Peak Factor	4.9	5.4	8.2	3.6	3.9
ADF Plant Utilization (%)	50%	64%	60%	61%	63%
Population (person)	1,681	1,703	1,703	2,431	2,774
Annual Per Person ADF (m <sup>3</sup> /day)	0.587	0.686	0.649	0.458	0.419

### 5.2.4 Effluent Flows

The 75th percentile and average effluent parameter concentrations for the Dundalk WWTF for the years 2016 to 2020 inclusive are summarized in Table 4. The 25th percentile for Dissolved Oxygen (DO) is included in the table as low values are potentially more impactful for this parameter.

A summary of the ECA effluent objectives and limits exceedances are summarized in Table 5.

Table 4 – Summary of Recent (2016-2020) Monthly WWTF Effluent Quality

Parameter	TSS		Un-ionized Ammonia		TAN		DO		cBOD <sub>5</sub>		TP		E. coli	
	(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(CFU/100 mL)	
Month														
Statistic	75 <sup>th</sup>	Avg	75 <sup>th</sup>	Avg	75 <sup>th</sup>	Avg.	25 <sup>th</sup>	Avg	75 <sup>th</sup>	Avg	75 <sup>th</sup>	Avg.	75 <sup>th</sup>	Geo Mean
Jan	7.0	5.2	0.020	0.017	8.7	5.3	11.6	12.8	3.8	3.4	0.083	0.103	165	106
Feb	10.0	7.6	0.045	0.033	11.6	8.9	10.6	11.6	8.0	6.5	0.100	0.199	1720	1114
Mar	12.8	10.4	0.075	0.049	7.7	7.5	10.4	11.7	11.3	8.6	0.298	0.313	1833	687
Apr	16.0	12.6	0.070	0.050	8.3	6.1	9.2	10.9	9.0	7.4	0.355	0.264	14	15
May	6.0	5.6	0.030	0.017	2.4	1.2	7.7	8.7	5.0	4.2	0.090	0.060	4	5
Jun	10.0	6.3	0.017	0.014	0.1	0.1	6.1	6.6	5.5	4.4	0.115	0.101	2	4
Jul	5.8	4.3	0.015	0.016	0.2	0.3	5.9	6.9	4.8	3.8	0.225	0.173	2	2
Aug	5.0	4.4	0.002	0.002	0.1	0.1	7.0	7.6	3.0	3.2	0.120	0.083	70	30
Sep	4.0	3.2	0.002	0.001	0.3	0.2	7.3	8.1	3.0	2.4	0.060	0.072	30	18
Oct	3.0	2.7	0.001	0.002	0.4	0.3	9.2	10.4	3.0	2.5	0.085	0.065	59	51
Nov	5.0	3.6	0.022	0.015	2.7	1.9	12.8	13.8	3.0	2.4	0.060	0.048	3	4
Dec	7.3	5.3	0.046	0.027	6.8	3.8	13.9	14.3	3.0	2.7	0.070	0.050	2	7
Objective	5		0.05		NV		5		5		0.3 – 0.6		NV	
Limit	10		0.10		NV		4		10		0.4 – 0.8		NV	

Note: Values exceeding the Objective and Limit are highlighted in yellow and red respectively.

Table 5 – Summary of Recent (2016-2020) WWTF Effluent Exceedances

		cBOD <sub>5</sub>	TSS	TP	Un-ionized Ammonia	DO	pH	Total Days Discharging	Months of Discharge	Discharge Volume (m <sup>3</sup> )
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)				
Objective		5	5	0.3 - 0.4	* 0.05	>5	* 6.5 - 8.5			
Limit		10	10	0.6 - 0.8	* 0.1	> 4	* 6.0 - 9.0			
2020	Months >Obj.	0	2	0	4	0	* 4/90	215.5	9	396,688
	Months >Limit	0	0	0	* 5/85	0	* 4/90			
2019	Months >Obj.	2	4	3	1	0	* 11/104	310	12	407,659
	Months >Limit	2	2	1	* 1/105	0	* 4/104			
2018	Months >Obj.	6	6	0	2	1	* 0/102	298.7	12	404,858
	Months >Limit	1	3	0	* 1/100	1	* 0/102			
2017	Months >Obj.	1	2	0	2	0	* 6/98	342	12	420,598
	Months >Limit	0	0	0	* 4/108	0	* 6/98			
2016	Months >Obj.	0	2	0	1	0	* 4/82	307	11	334,685
	Months >Limit	0	0	0	* 1/91	0	* 2/82			

Note: \* individual sample criteria

Values exceeding the Objective and Limit are highlighted in yellow and red respectively.

### **5.2.5 Ongoing Studies**

Through the Grand River Conservation Authority (GRCA) Wastewater Optimization program, the Township is taking part in ongoing research and demonstration programs at the Dundalk WWTF as an effort to continuously comply with the existing ECA criteria. These programs include the following:

- Filter Bed Expansion Special Study
- Filter Visual Backwash Observation Special Study
- The Influence of Seasonal Changes in Temperature on Lagoon Performance
- Dundalk Lagoons – Proactive Operational Monitoring
- Dundalk Lagoons Filters Capacity and Performance Evaluation
- Filter Optimization Special Study

A copy of these studies can be made available upon request.

## **6.0 Projected Conditions**

### **6.1 Population Growth**

The current population serviced by the municipal wastewater system in Dundalk is estimated at 2,774 people or 1,067 equivalent residential units (ERUs). The December 2015 Grey County growth study indicates that approximately 370 more new residential homes will be constructed to the year 2036. However, it is anticipated that this is below the actual growth that will be realized. Given the current interest in development for the community, it is expected that the serviced ERUs will continue to grow at approximately 150 ERUs for the next 5 years (2020-2025) and 120 ERUs for the following 20 years (2026 – 2045), resulting in a total growth of 3,150 ERU by the end of year 2046. Growth beyond the year 2045 is expected to continue at an average rate of 2% until the 50-year planning horizon (2073) is achieved. The growth projections are summarized in Table 6 below.

*Table 6 – Summary of Projected Growth within Dundalk*

<b>Year</b>	<b>Growth Assumed</b>	<b>New Equivalent Residential Units (ERUs)</b>	<b>Total ERUs</b>	<b>Population (Capita)</b>
2020	Existing	Existing	1,067	2,774
2025	150 ERUs/year	750	1,817	4,769
2030	120 ERUs/year	600	2,417	6,365
2035	120 ERUs/year	600	3,017	7,961
2040	120 ERUs/year	600	3,617	9,557
2045	120 ERUs/year	600	4,217	11,153
2050	2% Annualized growth	439	4,656	12,320
2055	2% Annualized growth	485	5,140	13,610
2060	2% Annualized growth	535	5,676	15,033
2065	2% Annualized growth	591	6,266	16,604
2070	2% Annualized growth	652	6,918	18,339
2073	2% Annualized growth	423	7,342	19,465

## **6.2 Expected Influent Flow**

### **6.2.1 Average Daily Flow**

The most recent existing ADF of 419 L/person/day is above expected and typical rates for communities of similar size (i.e., population) to Dundalk. In conjunction with a recently completed I/I monitoring and remediation program, changes to servicing standards and construction techniques, it is expected that new developments will not be inundated with the same extraneous flows as existing infrastructure within Dundalk. To confirm this, the sanitary flow produced by a new development was monitored to establish a typical per person flow rate. The results of this limited flow monitoring determined that the per person flow rate within a new development is significantly lower than the existing flow, approximately 70L/capita/day for the development monitored.

However, as indicated in the MOE Guidelines, the minimum flow rate allowance per person should be not less than 250L/capita/day. As these values will be utilized for future calculations, a factor of safety was applied, resulting in a recommended new development per person average flow rate of 350L/capita/day.

### **6.2.2 Peak Flow Factor**

Similar to how the per person flow rate is expected to reduce in the future, this peak flow factor is also anticipated to reduce as an improved collection system comes into service. As such, the Harman Formula will be used to determine the expected peak flow at the WWTF moving forward, as summarized in Table 7.

### 6.2.3 Influent ADF and Peak Flow

As summarized in Table 7, the Dundalk WWTF will require a substantial increase in the average day flow rating within the 5 years.

*Table 7 – Projected Sanitary Peak Factor and Loading*

Year	Population	Peaking Factor	ADF (m <sup>3</sup> /day)	Peak Flow (L/s)
2020	2,774	3.5	1,161	46.64
2025	4,769	3.3	1,859	70.24
2030	6,365	3.1	2,418	88.05
2035	7,961	3.1	2,976	105.15
2040	9,557	3.0	3,535	121.69
2045	11,153	2.9	4,094	137.76
2050	12,320	2.9	4,502	149.25
2055	13,610	2.8	4,954	161.72
2060	15,033	2.8	5,452	175.24
2065	16,604	2.7	6,002	189.89
2070	18,339	2.7	6,609	205.78
2073	19,465	2.7	7,003	215.95

Based on the above, the Township plans to increase the treatment capacity in a phased approach. The first phase will increase the treatment capacity to an ADF of 3,025 m<sup>3</sup>/day and be implemented within the next year, which is expected to provide treatment sufficient capacity to service the projected population up to the 10-to-15year planning horizon. The second phase will increase the treatment capacity to 4,200 m<sup>3</sup>/day, which is expected to provide sufficient treatment capacity to service the projected population to at least the 25-year planning horizon. Implementation of the second phase will be contingent on additional receiver monitoring and assessment, as discussed within the following section.

### 6.2.4 Proposed Effluent Quality

An Assimilative Capacity Study (ACS) has been completed to support this Schedule C Class EA. This ACS has been reviewed and generally accepted by the MECP. A copy of the ACS can be made available upon request.

In accordance with the findings of the ACS, the proposed effluent objectives and effluent limits under the 10-to-15-year and 25+ year planning horizons are summarized in Tables 8 and 9, respectively.

Further, the ACS has confirmed that prior to WWTF rated capacity being increased to an ADF rate of 4,200m<sup>3</sup>/day, additional monitoring and assessment of the Foley Drain will be required. As such, it is imperative that the proposed treatment technology/processes have the ability to be implemented/expanded in a phased approach and allow for flexibility in effluent requirements.

*Table 8 – Phase 1 Effluent Quality for Rated Capacity of 3,025 m<sup>3</sup>/day*

Parameter	Effluent Objective (mg/L)	Effluent Limit (mg/L)	Loading Objective (kg/d)
Carbonaceous Biochemical Oxygen Demand (cBOD <sub>5</sub> )	5	10.00	15.13
Total Suspended Solids (TSS)	5	10.00	15.13
Total Phosphorus (TP)			
Temperature > 5°C	0.21	0.40	0.73
Temperature < 5°C	0.43	0.80	1.47
Dissolved Oxygen (DO)	> 5	> 4	N.A.
Un-Ionized Ammonia (NH <sub>3</sub> -N)	0.05	0.10	
pH	6.5 - 8.5	6.0 - 9.0	
E.coli (#/100mL) <sup>1</sup>	100	200	

Note: <sup>1</sup> Contingent on type of treatment process selected for increased treatment capacity

*Table 9 –Phase 2 Effluent Quality for Rated Capacity of 4,200 m<sup>3</sup>/day.*

Parameter	Effluent Objective (mg/L)	Effluent Limit (mg/L)	Loading Objective (kg/d)
Carbonaceous Biochemical Oxygen Demand (cBOD <sub>5</sub> )	5	10.00	21.00
Total Suspended Solids (TSS)	5	10.00	21.00
Total Phosphorus (TP)			
Temperature > 5°C	0.17	0.40	0.73 <sup>2</sup>
Temperature < 5°C	0.35	0.80	1.47 <sup>2</sup>
Dissolved Oxygen (DO)	> 5	> 4	N.A.
Un-Ionized Ammonia (NH <sub>3</sub> -N)	0.05	0.10	
pH	6.5 - 8.5	6.0 - 9.0	
E. coli (#/100mL) <sup>1</sup>	100	200	

Notes:

<sup>1</sup> Contingent on type of treatment process selected

<sup>2</sup> To be confirmed by additional sampling and assessment at the proposed 3,025m<sup>3</sup>/day flow rate.

## 7.0 Form of Response and Evaluation

Proposals will be assessed through the Class EA process (i.e., all alternative design concepts are evaluated) with respect to the extent to which the problem statement is addressed; advantages and disadvantages, and potential effects on the environmental, cultural, social, natural, technical and economical environments of the associated study area for the project. Mandatory consultation with the public will be completed as part of the review of the alternative design concepts and selection of the preferred design concept. The confirmed preferred design concept will then be outlined in detail as part of the Class EA Implementation (i.e., contract documents, construction, operation and monitoring) will follow completion of the Class EA.

The Township reserves the right to shortlist firms for further evaluation and interviews, if required.

All materials submitted to the Township in response to the RFP will become the property of the Township and may be used by the Township in any aspect of the project, and, unless specifically exempted, should be considered to be public records.

Submission of a Proposal shall be taken as a declaration that the Respondent understands all of the requirements and conditions described in the RFP. Proponents should assume the Township has no prior knowledge of their experience and the Proposals will be based on the information presented in the Proposals.

### 7.1 Deliverables

Proposals are to include but limited to the following elements:

#### **A. Transmittal Letter**

- a. Letter that briefly describes the Proposal contents and identifies the lead contact person and contact information.

#### **B. Project Understanding and Approach, Including Work Plan and Schedule:**

- a. Expected overall WWTF effluent changes if the technology/processes are implemented, corresponding to the project sewage flows in two phases (i.e., to projected ADF of 3,025 m<sup>3</sup>/day and 4,200 m<sup>3</sup>/day, respectively).
- b. Expected impacts on treatment capacity, corresponding to the projected sewage flows in a phased approach.
- c. Organizational structure and engagement approach proposed for the project.
- d. Any visual representations of the proposed technology or links to websites that would provide additional information.

- e. Proposed schedule to implement the preferred design concept, assuming that implementation starts in the spring of 2022 and includes finalization of the details of the preferred design through to construction, operation and monitoring.
- f. Proposed treatment technology will be required to provide a guarantee on performance.

**C. Qualifications and Expertise of Project Team**

- a. Examples of past project experience of similar nature, including description, costs including financing strategy, location, year, public/private partnership (if any), and reference contact information and/or website.  
A minimum of 3 project examples should be included in the submission.
- b. Resumes for the proposed Project Team members and description of their roles and responsibilities for the Project.
- c. Any crucial differences between the subject site and the example project in either general arrangement, influent/effluent parameters or climate conditions is to be explored and commented on.

**D. Expected Implementation Costs and Potential Grants/Funding**

- a. Provide a break down of estimated capital cost for full-scale installation for the first and second phase of the implementation.
- b. Describe any potential grant/funding opportunities.

**E. Expected Operational Cost (monthly and/or annual)**

- a. Provide a break down of expected monthly and/or annual operational and maintenance costs for the first and second stage of implementation.

**F. Expected General Arrangement (concept) on Site**

- a. Conceptual physical layout of the WWTF after implementation of improvements/upgrades.
- b. Include all modifications (addition, removal) required on the existing WWTF flow schematic to accommodate the proposed treatment system.

*Note: AutoCAD DWG of the flow schematic and site layout is available upon request.*

## **8.0 General Terms & Conditions**

The Township reserves the right to amend or modify the RFP at any time during the procurement process, prior to the date and time which Proposals are due. All amendments and modifications will be posted on the Township's website in the form of an Addendum. It is the responsibility of the Plan Takers to check the website.

The Township reserves the right, at its sole discretion, to reject any or all proposals or parts of any and all proposals; re-issue this RFP; postpone or cancel, at any time, this RFP process; or waive any irregularities in this RFP or in the proposals received as a result of this RFP.

The Township reserves the right, in its sole discretion, to determine the appropriate next steps. The Township may also issue a new RFP with project modifications based on information learned from the initial round or other changing circumstances, or may terminate or suspend the solicitation process at any time. The Township reserves the right to reject all submissions, or to cancel this procurement at any time.