



Report to: Development Services Committee

Meeting Date: April 1, 2019

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**SUBJECT:** Bill Crothers Artificial Turf Field Replacement  
**PREPARED BY:** David Plant, Manager Parks Operations X4893

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**RECOMMENDATION:**

- 1) That the report entitled “Bill Crothers Artificial Turf Field Replacement” be received;
- 2) And that Staff be authorized to issue a purchase order to York Region District School Board (YRDSB) in the amount of \$1,339,365.00, inclusive of HST for the City’s portion (50%) of the Bill Crothers Secondary School artificial turf replacements;
- 3) And that the purchase order in the amount of \$1,339,365.00, inclusive of HST be funded from project 18220 Replacement of Artificial Turf Fields with available budget of \$814,100.00;
- 4) And that shortfall in the amount of (\$525,265.00) (\$814,100.00 - \$1,339,365.00) be funded from the Life Cycle Replacement and Capital Reserve Fund;
- 5) And that staff be directed to execute the Shared Use and Maintenance Agreement prior to proceeding with the project.
- 6) And further that staff be authorized and directed to do all things necessary to give effect to this resolution.

**PURPOSE:**

The purpose of this report is to seek Council approval to issue a purchase order to YRDSB and for additional funding in the amount of \$525,265.00 for 50% of the artificial turf fields replacement costs, which will be recovered through reduced lifecycle costs as a result of changes to the turf system. There are financial risks to the City on this project, as the assumption of the increased life expectancy of the turf system were provided by the YRDSB consultant and the system has not been used in the Canadian market long enough for the 15 year cycle to be validated.

**BACKGROUND:**

The artificial sports fields and related outdoor facilities at Bill Crothers Secondary School resulted from a recommendation by City staff in a General Committee report on March 19, 2007 (Attachment A). In that report, Council approved funding of \$2 million for the following: to upgrade two natural turf sports fields to artificial turf; to provide lights for all three fields; to increase the size of the maintenance and washroom building and equipment purchases. This work would be conducted in partnership with YRDSB at Bill Crothers Secondary School. This was proposed to address recommendations within the existing Parks, Recreation, Culture and Library Master Plan that identified the need for additional outdoor soccer fields. In exchange for the City’s contribution to the upgrade to

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the fields, the City would have the right to permit out these fields to community user groups evening and weekends during the school year and full access during non-school times. The major user of this outdoor sport campus is Unionville Milliken Soccer Club. During the discussion with Council in 2007, it was mentioned that the turf fields at Bill Crothers Secondary School would be built on a flood plain, which is a potential risk. At that time, there had not been any significant flooding in the area, so Council decided to move forward with the proposal. The City entered into a 10 year Shared Use and Maintenance Agreement with the York Region District School Board (YRDSB) on September 2, 2008 following the construction of the two artificial fields at Bill Crothers Secondary School located at 44 Main Street Unionville. On April 3, 2018, Council authorized the renewal of the 10 year Shared Use and Maintenance Agreement for a further 10 year term pursuant to the report attached as Attachment B and the Council resolution attached as Attachment C.

On September 4, 2012 and again on June 28, 2013, the Unionville area experienced severe storm occurrences which left the fields flooded and the artificial turf fabric saturated with fine silt. The City and the YRDSB equally shared the costs of repairs in order to realign the artificial turf fabric and make reasonable efforts to remove the excess silt. The end result of the silt contamination of the crumb rubber infill materials (the fine rubber particles which holds the fabric upright and provides the shock absorption) was a playing surface which did not perform as designed with respect to injury prevention.

The City and YRDSB both agreed that the artificial turf fields needed to be replaced. The decision to replace the artificial fields was based on the results of independent testing and a condition assessment identifying risk to both parties as a result of unfavorable drop testing results (safety measurement which calculates acceptable risk or head injuries) on existing artificial fields. Based on this condition assessment, the fields had reached the end of their useful life.

In preparation for budget cycle in 2017, it was agreed that both parties, based on the terms of the Shared Use Agreement would seek approval from their respective Councils to move forward with the design of the replacement of the artificial turf fields, and ensure that the drainage issues were addressed.

Council supported the project and that drainage strategies were included as part of the scope of the project to be developed by an external consultant in an effort to mitigate future flooding concerns. The result of this direction was the Operations – Parks capital project #17145 (Bill Crothers Turf Replacement – Design) to be undertaken first to explore the feasibility of replacing the fields.

In order to explore all options available, staff were also asked to report on options to relocate the fields because of flood plain issues. Staff met with YRDSB to review options which included: 1) relocation of the 2 artificial turf fields to an alternative

secondary school site; and 2) relocation of the 2 artificial turf fields to an alternative City park site.

YRDSB indicated that because Bill Crothers Secondary School is the designated regional sports school and that they need to have fields located at this facility to ensure that they meet their mandate.

Staff reviewed City park sites to identify if within our existing inventory we had capacity to build artificial turf fields with lights. The challenge is that to recognize the benefits of artificial turf you must install lights, which allow you to play two games an evening on the turf. All of our existing parks are within built-out neighborhoods, and the installation of lights would not be acceptable to residents.

### **OPTION/DISCUSSION:**

#### Field Replacement

It was agreed by both parties that the YRDSB would be the lead on the replacement of the artificial turf fields as they are the subject matter experts having recently constructed artificial turf fields at Denison High School in Newmarket in 2018. YRDSB confirmed that construction and safety standards for artificial turf fields have changed significantly since 2008 when the Bill Crothers fields were constructed and as such the reconstruction of the 2 fields at Bill Crothers would reflect the new standards.

Following meetings with staff from the City, YRDSB and consultants, specifications for construction were completed and reviewed by both parties. YRDSB then prepared tender documents which were released to qualified bidders for pricing.

The tender result came in at \$2,678,730.00 (inclusive of HST) as compared to original budgeted cost of \$1,628,200 for the 2 artificial turf replacements, resulting in a total shortfall of (\$1,050,530.00). The City's portion of this shortfall is \$525,265.00 (50% x \$1,050,530.00), which represents 50% share of costs for the replacement of the 2 artificial fields.

	a	b = a x 50%
	Total Cost	City's Share
Total Artificial Turf Replacement Costs (A)	2,678,730.00	1,339,365.00
Budget Available (B)	1,628,200.00	814,100.00
Budget Shortfall (C=B-A)	(1,050,530.00)	(525,265.00)

The total project shortfall of (\$1,050,530.00) is attributed primarily to the revised Federation of International Football Association (FIFA) specifications for artificial field

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construction relating to drop test thresholds required to address reduction of head injuries (\$543,000) and costs of additional drainage works (\$329,000).

Specifications for construction of artificial fields have changed since the two artificial fields were first constructed in 2008 specifically with respect to the method in which shock is absorbed for the purposes of injury prevention.

FIFA changed their standards in 2015 based on years of research and testing. In order for artificial turf to be FIFA certified, the following criteria are evaluated:

- Interaction between the players and the surface
- Interaction between the ball and the surface
- Product composition
- Weather resistance
- Seam strength
- Service life

As fields get replaced across Canada the new standards are being upgraded. The YRDSB has installed this new standard at Denison High School in Newmarket. As well, Hershey Sports Complex and the City of Burlington have installed artificial turf fields to the new standards.

Current construction method require the use of compacted aggregate as the base material on which the artificial turf fabric is laid.

Replacement of the existing artificial turf involves removing and disposing of all of the turf fabric along with large quantities of crumb rubber material and replacing most of these elements with a new shock pad system. The existing artificial turf fabric strands are approximately 70mm in length and held upright with granular or crumb rubber infill for shock absorption placed in between the grass strands. As previously noted, this crumb rubber infill from the existing turf fields has been contaminated with silt and is not performing as required resulting in unfavorable drop testing results (safety measurement).

In the 2019 specifications for construction, a shock pad artificial field system is being used which forms an integral part of the shock absorption of the fields, in addition to the infill materials. Unlike the crumb rubber infill, this shock pad is not at risk of external contamination. It is similar to the under pad used with carpet to add additional absorption.

With the shock pad system proposed for the new fields, only the 25mm turf fabric and a greatly reduced amount of crumb rubber infill is replaced based on condition assessment. This top layer of turf fabric can now last 15 years as compared to the previous design, which lasts 10 years. In addition, the shock pad component itself will remain in place and is covered by a manufacturer's warranty for 30 years which should last for at least 1 additional cycle of turf replacement. Although the cost of the drainage work is higher than anticipated, it has been designed to last for several replacements of the turf fabric.

Despite the additional costs of \$525,625 for the new standards, the lifecycle savings of \$718,333 as a result of a longer life will provide \$193,068 in reduced cash flow.

Included in this tender process, YRDSB is undertaking further replacement of the running track and additional works at the football field, which are clearly separated in the tender and are not shared costs with the City resulting in additional costs to the YRDSB of \$1,664,177.58.

#### Shared Use Agreement

The artificial fields at Bill Crothers Secondary School is an integral part of Recreation Service's sport field allocation to community sports groups, particularly Unionville Milliken Soccer Club. If the City decided not to replace the artificial fields, the City does not have the inventory to meet this need and community groups would not have access to the fields, which they heavily rely on.

At this time, the new Shared Use and Maintenance Agreement between the City and YRDSB has not been signed and the previous Shared Use and Maintenance Agreement has expired. However, staff at the City and YRDSB have been working cooperatively on the replacement of the artificial fields based on the shared understanding that the new Shared Use and Maintenance Agreement will be signed and that the City will be responsible for 50% of the cost of replacing the artificial fields. If the City decided not to share in the cost of replacing the artificial fields, community sports groups would lose access to the artificial fields at Bill Crothers Secondary School. To fill the service void for these community groups, the City may potentially need to construct and operate its own fields at 100% of the cost. In addition, the cooperative relationship that the City has built with YRDSB over many years may suffer, which may negatively impact other shared arrangements between the City and YRDSB. There are shared use arrangements between the City and YRDSB relating to the Thornlea Pool, the Outdoor Sport Field Agreement and Markham Theatre and Unionville High School. For these reasons, staff recommends that the increased costs for the artificial fields be approved by Council.

YRDSB has indicated in writing that they have their funding in place and are prepared to proceed as soon as they obtain City approval of its share. With respect to the tender process, delays in the award of this project will likely result in the delay to the start of the project as well as potential price increases. The project has been planned to be completed by the end of Q4 with any delays potentially impacting planned revenue opportunities.

Since the Shared Use and Maintenance Agreement between the City and YRDSB is the agreement that provides the City with use of the turf fields at Bill Crothers Secondary School, staff recommend that the Shared Use and Maintenance Agreement with YRDSB be executed before the purchase order to YRDSB the amount of \$1,339,365.00, inclusive of HST for the City's portion (50%) of the Bill Crothers Secondary School artificial turf replacements is issued.

## FINANCIAL CONSIDERATIONS

Staff recommend the budget for project 18220 Replacement of Artificial Turf Field be increased by \$525,265 from \$814,100 to \$1,339,365.00, to be funded from the Life Cycle Replacement and Capital Reserve Fund.

### Operating and Life Cycle Impact

As discussed previously, the existing artificial turf system has a different replacement cycle as compared to the proposed artificial turf system:

1. Current turf fabric and crumb rubber infill material has a life of 10 years as compared to a life of 15 years with the new turf fabric and rubber/sand infill material. Furthermore, the new turf fabric is more advanced in construction and shorter strand length requiring less infill materials when combined with the shock pad system installation.
2. The shock pad is a relatively new component in artificial turf field construction and is more widely used now as the price has become more affordable. The shock pad has a 30 year warranty and will require replacement at the end of 30 year cycle.
3. Drainage life cycle of 30 years remains the same in both scenarios.

The City has not had any experience with this type of artificial turf. Hence, the validity of the cost analysis is contingent on the life expectancies and future replacement costs as provided by the YRDSB consultant, based on certification by FIFA.

The table below provides a comparison of the cash outlay for the current artificial turf system as compared to the upgraded system over a 25 year period:

	a	b	c	d = b / c	e = d x 25	f = a + e
	Year 0	Future Replacement Cost	Life Cycle	Annualized Replacement Cost	Yr 1 - 25 Total	Yr 0 to 25 Total
<b>Current Artificial Turf System</b>						
Turf Fabric and Infill	654,100	654,100	10	65,400	1,635,000	2,289,100
Drainage Replacement	160,000	80,000	30	2,667	66,667	226,667
<b>Total Current Artificial Turf System Cost (A)</b>	<b>814,100</b>	<b>734,100</b>		<b>68,067</b>	<b>1,701,667</b>	<b>2,515,767</b>
<b>Proposed Artificial Turf System</b>						
i) Turf Fabric and Infill		495,000	15	33,000	825,000	825,000
ii) Drainage Replacement		80,000	30	2,667	66,667	66,667
iii) Shockpad Replacement		110,000	30	3,667	91,667	91,667
Total Turf Upgrade Cost (incl. i, ii, iii above)	1,339,365					1,339,365
<b>Total Proposed Turf System Cost (B)</b>	<b>1,339,365</b>	<b>685,000</b>		<b>39,333</b>	<b>983,333</b>	<b>2,322,698</b>
<b>Fav/(Unfav) Variance (C=A-B)</b>	<b>(525,265)</b>			<b>28,733</b>	<b>718,333</b>	<b>193,068</b>

Costs in the above table are in today's dollars and have not been adjusted for inflation.

Explanation of each column in the above table:

a: Year 0 or current year cash outlay – City will need to spend \$525,265 more with the proposed artificial turf system as compared to the current turf system

b: Future Replacement Cost – Future cost of replacement in current dollars

c: Life Cycle – Life of asset or year when asset will require replacement

d: Annualized Replacement Cost (b / c) – Annual cash required to be set aside in order to have sufficient funds in year of replacement

e: Year 1 to 25 Total (d x 25) – Total cash required over 25 years for replacement cost

f: Year 0 to 25 Total (a + d) – Total cash required over 25 years, including initial cost outlay to upgrade/repair the artificial turf fields

The table shows that despite an initial higher cash outlay of \$525,625 to upgrade the artificial turf fields to the new FIFA specifications, the City will have reduced cash outlay of \$28,733 per year or \$718,333 over 25 years when comparing the proposed artificial turf system to the existing system, netting to an overall reduced cash outflow of \$193,068 (\$718,333 - \$525,625).

The favourable net cash flow in this analysis is based on:

- a) The new turf fabric and infill lasting 50% longer (from 10 years to 15 years)
- b) The turf fabric and infill costing less to replace after 15 years (from \$654,100 to \$495,000). The installation of the shock pad in the new system allows for a thinner turf fabric with less infill, resulting in potentially lower future replacement costs.
- c) The shock pad has a life expectancy for 30 years.

The life expectancies and replacement costs were provided by the YRDSB consultant. The first generation of turf product had a projected service life of 10 years but had an actual service life of 12 years based on YRDSB experience. The manufacturer estimates this new fourth generation turf product will last 15 years. The product has not been used in the Canadian market long enough for the 15 year life cycle to be validated.

In addition, staff are aware that the change in FIFA specifications for artificial turf fields will have an impact on the other 2 City owned artificial turf fields (located in Mount Joy and St. Robert's Catholic High School). Staff will complete full assessments of the changes in standards and update the Life Cycle Reserve Study accordingly. There are no incremental operating budget impact.

#### **HUMAN RESOURCES CONSIDERATIONS**

Not applicable.

#### **ALIGNMENT WITH STRATEGIC PRIORITIES:**

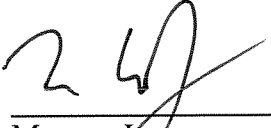
Not applicable.

#### **BUSINESS UNITS CONSULTED AND AFFECTED:**

Finance and Recreation departments have reviewed this report and their comments have been incorporate.


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**RECOMMENDED BY:**



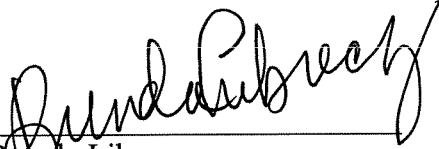
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Morgan Jones  
Director, Operations



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Mary Creighton  
Director, Recreation Services



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Brenda Librecz,  
Commissioner, Community &  
Fire Services

**ATTACHMENTS:**

**Attachment A** - March 19, 2007 General Committee report: York Region District School Board – Markham Centre Secondary School for Athletics & Healthy Active Living – Outdoor Sports Field

**Attachment B** - January 25, 2018 General Committee report: Bill Crothers Secondary School Outdoor Sports Field Joint Use and Maintenance Agreement

**Attachment C** – April 3, 2018 Council resolution: Bill Crothers Secondary School Outdoor Sports Field Joint Use and Maintenance Agreement