SUBJECT: Cosmetic Pesticide Ban - Impact on Sports Field Marking Activities (PW08143b) - (City Wide)  
*Public Works Committee - Outstanding Business List*

**RECOMMENDATION:**

(a) That latex paint be approved as the standard for sports field line marking;

(b) That City of Hamilton staff purchase the required number of spray paint applicator machines and annually purchase bulk quantities of latex paint for distribution to all applicable user groups city-wide and ;

(c) That staff be directed to develop a standard service level agreement for sports field user groups relating to the application of their own field marking;

(d) That this program enhancement be submitted as part of the 2010 Budget process. This includes an annualized operating budget increase of $150,000 to fund the purchase of latex spray paint;

(e) That the item related to “Cosmetic Pesticide Ban - Impact on Sports Field Marking Activities” be removed from the Public Works Committee Outstanding Business List.

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**EXECUTIVE SUMMARY:**

The ban on cosmetic pesticides took effect in Ontario on April 22, 2009, with the approval of the Cosmetic Pesticides Ban Act, 2008. Requirements are set out in
amendments to the Pesticides Act and Ontario Regulation 63/09 preventing the use of cosmetic pesticides and herbicides on sports fields. Staff took a proactive role and researched alternatives to the previous sport field line marking method known as “line burning”. This method utilized the non selective herbicide glyphosate, commonly marketed under the brand name of Round-Up, which is now banned for use under the Cosmetic Pesticides Ban Act.

The increasing demand for the elimination of herbicides/pesticides and user expectations for high quality sports fields has resulted in staff recommending latex paint line painting (Method 8 as described in the Analysis / Rationale section and Appendix “A” of Report PW08143b) as the most cost effective alternative to the use of herbicides for the lining of the sports fields. This method will not impact Class A and B soccer pitches or major sports complexes such as Bernie Arbour Stadium, which are exempt from the Cosmetic Pesticides Ban Act.

One of the greatest challenges in implementing any alternative to the use of Round-Up is the time and labour associated with the application of the alternative methods. A total of 217 sports fields (134 soccer pitches, 68 ball diamonds, 11 football fields, 3 cricket pitches, and 1 Aussie Rule football field) are affected.

The recommended alternative method (Method 8) for sports field lining is estimated to take 1.5 hours per application, and requires a minimum of 17 applications per season, across 217 sports fields compared to the “line-burning” method, which required one application per season. As a result labour requirements will increase from the current 325 hours to 5,530 person hours for the recommended method. To mitigate the additional labour expense, staff are recommending that user groups line their own sports fields with latex paint and equipment supplied by the City. Volunteer labour will save the City an estimated $202,000 annually for a net cost of $150,000.

**BACKGROUND:**

The information/recommendations contained within this report have City wide implications.

Staff's previous standard for field marking of sports fields is referred to as “line burning.” This process involves staff going to each field and applying a small amount of a non-selective herbicide (glyphosate which is marketed as Round-Up) diluted with water and applied via a spray applicator and used to “burn” the lines of a field. This process of field lining typically lasts the entire season. It was extremely cost effective at approximately $1.60 for materials per field annually.

This one time spring application took approximately 1.5 hours to complete, and generally lasts the entire playing season. This methodology although very cost effective was not the preferred method of most user groups as it can create deep troughs over time around the playing surface from repeated applications. The troughs can become a tripping hazard and is also not as aesthetically pleasing as the use of white latex spray paint.

Changing the standard material to white latex spray painted lines will require multiple applications as much of the applied spray paint will be removed during the process of mowing the turf.
The requirement of multiple applications (estimated at 17) will result in the need for additional resources (person hours) to meet the increase in the line application cycles.

**ANALYSIS/RATIONALE:**

There are approximately 217 sports fields that are affected (134 soccer pitches, 68 ball diamonds, 11 football fields, 3 cricket pitches, and 1 Aussie Rule football field). Each of these fields requires a new line marking process and material standard as the use of herbicides are banned for cosmetic use and parks are not granted an exemption under the Cosmetic Pesticides Ban Act.

During the 2009 summer operating season staff conducted a number of trials in consultation with sport field user groups at Macassa Park. The purpose of the trials was to collect information with regards to cost, visibility, and practicality of 8 different line marking alternatives.

A summary of the methods, costs and results of the line marking trial are provided in Table 1. Detailed descriptions, costs and performance results are provided in Appendix “A” of Report PW08143b.

**Table 1 - Summary of Line Marking Trial Methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>Capital Cost</th>
<th>Annual Maintenance Cost</th>
<th>User Group Comments</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Permaline Embedded Artificial Lines</td>
<td>$2.42 million</td>
<td>$80,290</td>
<td>Favourable Reviews</td>
<td>Effective but Unaffordable</td>
</tr>
<tr>
<td>#2 Steam Burning</td>
<td>N/A</td>
<td>$390,600 (Performed by Contractor)</td>
<td>Unfavourable Reviews</td>
<td>Ineffective and Unaffordable</td>
</tr>
<tr>
<td>#3 Liquid Nitrogen Fertilizer</td>
<td>Minimal</td>
<td>Minimal</td>
<td>Unfavourable Reviews</td>
<td>Ineffective but Affordable</td>
</tr>
<tr>
<td>#4 Conventional Chalk</td>
<td>$11,200</td>
<td>$592,410</td>
<td>Unfavourable Reviews</td>
<td>Ineffective and Unaffordable</td>
</tr>
<tr>
<td>#5 Compressed Paint</td>
<td>N/A</td>
<td>$1,291,150 (Performed by contractor)</td>
<td>Very Favourable Reviews</td>
<td>Effective but Unaffordable</td>
</tr>
<tr>
<td>#6 Bannerman “Line Licker” Belt Applicator</td>
<td>$19,963</td>
<td>$564,417</td>
<td>Favourable Reviews</td>
<td>Effective but Unaffordable</td>
</tr>
<tr>
<td>#7 Vinegar and Molasses Mixture</td>
<td>Minimal</td>
<td>Minimal</td>
<td>Unfavourable Reviews</td>
<td>Ineffective but Affordable</td>
</tr>
<tr>
<td>#8 Conventional Latex Spray Paint</td>
<td>$3,650</td>
<td>$352,000</td>
<td>Favourable Reviews</td>
<td>Effective but Unaffordable*</td>
</tr>
</tbody>
</table>

The previous method of “line burning” with glyphosate (Round-Up) was very cost effective with one application per field per year for an annual cost of approximately $350 in materials and $12,000 in labour.

The recommended alternative method (Method 8 - Conventional Latex Spray Paint) for sports field lining is estimated to take 1.5 hours per application, at a minimum of 17
applications per season, across 217 sports fields. As a result labour costs will increase from the current $12,000 to $202,000 annually. To mitigate this increase in labour costs, staff recommend that volunteer community sports groups line the sports fields with materials supplied by the City (paint and applicators). Therefore the increase in costs will decrease from $352,000 to $150,000 which represents the cost of paint only.

City Staff will work with the community sports groups to distribute the materials and paint applicators either by delivering them to sport group representatives or by arranging a pick-up location.

If approved, Method 8 - Conventional Latex Spray Paint will be the only method made available to community sports groups for sports field lining. Groups that have a pre-existing approved alternate method can continue to implement their user group funded alternate method.

**ALTERNATIVES FOR CONSIDERATION:**

As an alternative to the recommendation, Council may choose:

- Method 1, the installation of Embedded Artificial Lines
- Method 2, Contracted Steam Burning
- Method 4, Chalk Lining
- Method 5, Contracted Compressed Paint
- Method 6, Bannerman “Line Licker” Belt Application
- Direct Staff to cease all field marking activities leaving the onus with sports field users to use a method requiring written approval from parks operations staff.
- The material and equipment cost of the recommended Spray Paint Method could be evenly shared by all user groups in the form of an increase to user fees for permits in 2010.
- City Staff perform the labour component of Method 8 which would require a total annualized increase to the Parks and Cemeteries Operating budget of $352,000 and 2.66 FTE to include both the material and labour components needed to deliver this program.

**FINANCIAL/STAFFING/LEGAL IMPLICATIONS:**

Financial implications of the recommendation are associated with the increased material costs for the use of latex spray paint as the standard material used for the lining of 217 sports fields at an annualized cost of $150,000. There will also be a one-time equipment expenditure in the recommendation of $3,640 to purchase the needed applicator equipment.

If user groups do not take on the task of applying the material, the associated Labour costs of $202,000 are required due to the increased frequencies (17 cycles) of lining the fields resulting in an increase in 2.66 Full Time Employees.

There are no legal implications associated with this report.
POLICIES AFFECTING PROPOSAL:

This recommendation is in line with the Public Works Business Plan by being “a leader in ‘greening’ and stewardship in the City”. This will be achieved by reducing the amount of herbicides used in the City of Hamilton Parks.

This recommendation is in line with the City of Hamilton’s Strategic Plan by being “Financially Sustainable” which is one of the focus areas of the plan.

RELEVANT CONSULTATION:

Staff consulted with the Community Services Department, Finance and Administration, in the drafting of this report.

All Users groups were informed that the trials on alternative methods were going on and that a new standard would be recommended. Further consultation with user groups will be done once the alternative method is approved.

CITY STRATEGIC COMMITMENT:

By evaluating the “Triple Bottom Line”, (community, environment, economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

Community Well-Being is enhanced. ☑ Yes ☐ No
This is achieved by providing safe and well-maintained places for sports and recreation.

Environmental Well-Being is enhanced. ☑ Yes ☐ No
This is achieved through the reduction of herbicides used within City Parks.

Economic Well-Being is enhanced. ☐ Yes ☑ No

Does the option you are recommending create value across all three bottom lines?
☑ Yes ☐ No

Do the options you are recommending make Hamilton a City of choice for high performance public servants?
☐ Yes ☑ No
Sports Field Line Marking - Method Trial Analysis

Alternative methods to “Line Burning” for sports field marking were tested in 2009 in response to the Cosmetic Pesticides Ban Act that went into effect in April 2009. Eight (8) methods were tested at Macassa Park during the 2009 playing season on Fields 1, 2,3,4,5,6,9 and 11.


This method is no longer available to staff as the Cosmetic Pesticides Ban Act Names Round-Up (active ingredient glyphosate) as a banned substance for cosmetic use. This was the previous standard material prior to the pesticide ban and preferred method for line marking on sports fields.

“Line Burning” Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours Required per application: 1.5</td>
<td></td>
</tr>
<tr>
<td>Labour Cost per application</td>
<td>$55</td>
</tr>
<tr>
<td>Cost of Material per application</td>
<td>$1.60</td>
</tr>
<tr>
<td>Number of applications per year: 1</td>
<td></td>
</tr>
<tr>
<td>Total Cost in Materials per field</td>
<td>$1.60</td>
</tr>
<tr>
<td>Annual Material Cost for 217 fields</td>
<td>$350</td>
</tr>
<tr>
<td>Annual Labour Cost</td>
<td>$11,935</td>
</tr>
<tr>
<td><strong>Total Annual Cost for 217 fields</strong></td>
<td><strong>$12,285</strong></td>
</tr>
</tbody>
</table>

Alternative Methods:

**Method 1 - Permaline Embedded Artificial Lines**

This method was applied to Field 1 at Macassa Park.

The embedding of artificial turf lines was completed by City of Hamilton staff with the supplier on hand for direction. The lines are made up of strips of painted artificial playing surface that are placed into the field after a unique sod cutting machine removes the existing turf grass. The strips are then put into place with large staples then sand and rubber mixture is poured over the lines.

Comments from the user group included:

Positives:
- looked “great” throughout the season
- lines very straight and uniform
- very visible
- sand and rubber mixture stayed in place

Concerns:
- weeds grew into the fabric
- looked dirty at points during the season
- strands separate from the artificial line when pushed against by a cleated shoe
- permanent embedded line was below the “cut-line” making it uneven
- How will winter ground heaving effect the product?

Cost:
The Material Cost for the Mini-Pitch was $7,740 this included:
- the lines for embedding
- the sand and rubber mixture
- the staples for securing the lines into the ground

This figure does not include:
- the 30+ hours required for installation
- annual inspection and maintenance costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours per installation: 32</td>
<td></td>
</tr>
<tr>
<td>Labour Cost per installation</td>
<td>$1,170</td>
</tr>
<tr>
<td>Estimated number of hours for Inspections and Routine Maintenance per field: 10</td>
<td></td>
</tr>
<tr>
<td>Total Maintenance Cost Per Field</td>
<td>$370</td>
</tr>
<tr>
<td>Cost of Material per Full Field Installation</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

Total Annual Cost for 217 fields $80,290

It is important to note that there would be a one time Capital cost of $2,420,000 to install the Permaline product at 217 fields.

Conclusion: Method effective but unaffordable.

**Method 2 - Steam Burning**

This method was applied to Field 2 at Macassa Park.

A contractor was hired to complete this trial. The steam burning essentially cooks the turf grass plants. The lines turn brown and die, making a natural line. There was a great deal of precipitation in 2009 so a mid-summer drying out of the turf did not occur, so it is inconclusive as to how the lines would look in the middle of summer during a dry period. The lines were visible for approximately 1-6 weeks after an application.

Comments from the user group included:

Positives:
- playing surface was always level
- environmentally friendly

Negatives:
- lines were not all that apparent
- poor visibility
- after a couple of days, there was virtually no field marking
Steam Burning Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost per Contracted Application per field</td>
<td>$150</td>
</tr>
<tr>
<td>Number of Applications required per field: 12</td>
<td></td>
</tr>
<tr>
<td>Annual Cost per Field</td>
<td>$1,800</td>
</tr>
<tr>
<td>Total Annual Cost for 217 fields</td>
<td>$390,600</td>
</tr>
</tbody>
</table>

Conclusion: Method both ineffective and unaffordable.

**Method 3 - Liquid Nitrogen Fertilizer**

This method was applied to Field 3 at Macassa Park.

The principle behind this trial was to “burn” the turf with a high concentration of nitrogen fertilizer. This process involved staff diluting the product and applying it with a spray wand.

This method was unsuccessful. Staff tried increasingly stronger concentrations which had little to no effect.

Comments from the user group included:

Positives:
- environmentally friendly

Negatives:
- lines were not uniform
- the line markings faded quickly
- lines widths were inconsistent
- concern that divots/troughs might occur

Costs: Not Applicable - with higher and higher concentrations of the material, no results were achieved. Therefore, a cost for this method cannot be determined.

Conclusion: Method ineffective.

**Method 4 - Conventional Field Chalk**

This method was applied to Field 4 at Macassa Park.

This method was delivered by staff. It consisted of staff loading a walk-behind chalk spreader and walking the lines of the field thus distributing chalk in the desired areas.

Staff found this method very time consuming and the results were poor. Various factors made this a less desirable option, including weather and degree of usage; the lines would quickly fade with rain events and/or heavy usage after one or two days. Weekly applications would be required to maintain a suitable playing line.

Comments from the user group included:

Positives:
- none

Negatives:
- did not hold up to weather and usage
- hard to establish lines
### Chalk Lining Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours required per application: 1.5</td>
<td></td>
</tr>
<tr>
<td>Labour Cost per application</td>
<td>$55</td>
</tr>
<tr>
<td>Cost of Material per application</td>
<td>$50</td>
</tr>
<tr>
<td>Number of Applications per year: 26</td>
<td></td>
</tr>
<tr>
<td>Annual Labour Cost per field</td>
<td>$1,430</td>
</tr>
<tr>
<td>Annual Material Cost per field</td>
<td>$1,300</td>
</tr>
</tbody>
</table>

Annual Labour Cost for 217 fields: $310,310
Annual Material Cost for 217 fields: $282,100
Total Annual Cost for 217 fields: $592,410

It is important to note that there will be a one time capital cost of $11,200 to purchase applicator machines for this method.

**Conclusion:** Method both ineffective and unaffordable.

### Method 5 - Compressed Paint Application

This method was applied to Field 5 at Macassa Park.

This process was accomplished by a contractor that would bring specialized equipment that produces a pressurized spray of latex paint that is applied directly onto the grass. The contractor used a compressor-power-sprayer machine to achieve superior results. This process produced superior professional looking lines on the sports fields.

Comments from the user group included:

**Positives:**
- looked great
- professional looking
- favourite option of some users
- lines extremely uniform and consistent

**Negatives:**
- none

### Compressed Paint Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per Contracted Application per field</td>
<td>$350</td>
</tr>
<tr>
<td>Number of Applications per field: 17</td>
<td></td>
</tr>
<tr>
<td>Annual Cost per field</td>
<td>$5,950</td>
</tr>
</tbody>
</table>

Total Annual Cost for 217 Sports Fields: $1,291,150

Conclusion: Method effective but unaffordable.

### Method 6 - Bannerman “Line Licker” Belt Applicator

This method was applied to Field 6 at Macassa Park.

This method was completed by city staff with a “Line Licker” paint applicator, which is a machine that uses a belt to transfer the paint to the playing surface. As the machine operator walks along the line they push the machine over the areas that require paint.
This method produced bold highly visible lines. The problem with this method is that the process is time consuming. The applicator works slowly and it takes time to mix the paint to the proper ratio.

Comments from the user group included:

Positives:
- looked good
- generally well liked by user group
- lines were uniform and true
- lines were very durable, remaining visible longer than other methods

Negatives:
- none

### Bannerman “Line Licker” Belt Applicator Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours required per application: 2</td>
<td></td>
</tr>
<tr>
<td>Labour Cost per application</td>
<td>$73</td>
</tr>
<tr>
<td>Cost of Material per application</td>
<td>$80</td>
</tr>
<tr>
<td>Number of Applications per year: 17</td>
<td></td>
</tr>
<tr>
<td>Annual Labour cost per field</td>
<td>$1,240</td>
</tr>
<tr>
<td>Annual Material cost per field</td>
<td>$1360</td>
</tr>
<tr>
<td>Annual Labour cost for 217 fields</td>
<td>$269,300</td>
</tr>
<tr>
<td>Annual Material cost for 217 fields</td>
<td>$295,120</td>
</tr>
<tr>
<td><strong>Total Annual Cost for 217 fields</strong></td>
<td><strong>$564,420</strong></td>
</tr>
</tbody>
</table>

It is important to note that there will be a one time capital cost of $19,963 to purchase 28 applicator machines for this method.

Conclusion: Method effective but unaffordable.

**Method 7 - Vinegar and Molasses Mixture**

This method was applied to Field 9 at Macassa Park.

This method was unsuccessful. A citizen forwarded a “recipe” for a homemade product. A mixture of vinegar, salt, and molasses was combined and manually applied by staff. Staff tried increasingly stronger concentrations which had little to no effect.

Comments from the user group included:

Positives:
- environmentally friendly

Negatives:
- no effect in terms of line marking even with higher concentrations
- no effect other than very faint yellowing effect
- no definition or consistency of lines

Costs: Not Applicable – although low in cost, the method did not work.

Conclusion: Method ineffective affordable.
Method 8 - Conventional Latex Spray Paint (Recommended Method)

This method was applied to Field 11 at Macassa Park.

This method consisted of staff using a rolling spray paint applicator cart to mark the perimeter lines with latex-marking spray paint.

Comments from the user group included:
Positives:
- lines very functional
- lines always visible
- relatively consistent

Negatives:
- none

### Conventional Spray Paint Method Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Hours required per application: 1.5</td>
<td></td>
</tr>
<tr>
<td>Labour Cost per application</td>
<td>$55</td>
</tr>
<tr>
<td>Cost of Material per application</td>
<td>$40</td>
</tr>
<tr>
<td>Number of Applications per year: 17</td>
<td></td>
</tr>
<tr>
<td>Annual Labour cost per field</td>
<td>$935</td>
</tr>
<tr>
<td>Annual Material cost per field</td>
<td>$680</td>
</tr>
<tr>
<td>Annual Labour cost for 217 fields</td>
<td>$202,000</td>
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<tr>
<td>Annual Material cost for 217 fields</td>
<td>$150,000</td>
</tr>
<tr>
<td><strong>Total Annual Cost for 217 fields</strong></td>
<td><strong>$352,000</strong></td>
</tr>
</tbody>
</table>

Conclusion: This method is the most cost effective considering the performance of the product.

It is important to note that there will be a one time capital cost of $3,640 to purchase applicator machines for this method.

Staff recommends that the materials and supplies for Method 8 be provided to user groups and that the user groups provide the necessary labour to mark the fields appropriately, thereby saving the City $202,000 annually in labour costs.