

Windsor, Ontario March 29, 2016

REPORT NO. 356 of the
ENVIRONMENT, TRANSPORTATION & PUBLIC SAFETY
STANDING COMMITTEE
of its meeting held February 17, 2016

Present: Councillor Chris Holt
Councillor Bill Marra (Chair)
Councillor Hilary Payne
Councillor Paul Borrelli

Absent: Councillor Fred Francis

That the following recommendations of the Environment, Transportation and Public Safety Standing Committee **BE APPROVED**:

Moved by Councillor Payne, seconded by Councillor Holt,
That report M461-2015 Improvements to Cycling and Pedestrian Pavement Markings **BE RECEIVED** for information; and,

THAT the 2016 Education and Awareness Campaign specifically target information supporting the correct direction of travel in bike lanes.

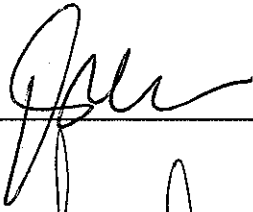
Carried.

Councillor Borrelli was absent at the time the vote was taken on this matter.


S 5/2016 MB2016

Clerk's Note: The report of the City Engineer dated January 5, 2016 entitled "M461-2015 Improvements to Cycling and Pedestrian Markings" is **attached** as background information.

Also attached is a memo from the City Engineer dated February 11, 2016 entitled "S 5/2016 – M461-2015 Improvements to Cycling and Pedestrian Pavement Markings – Correction to Appendix 'A'"

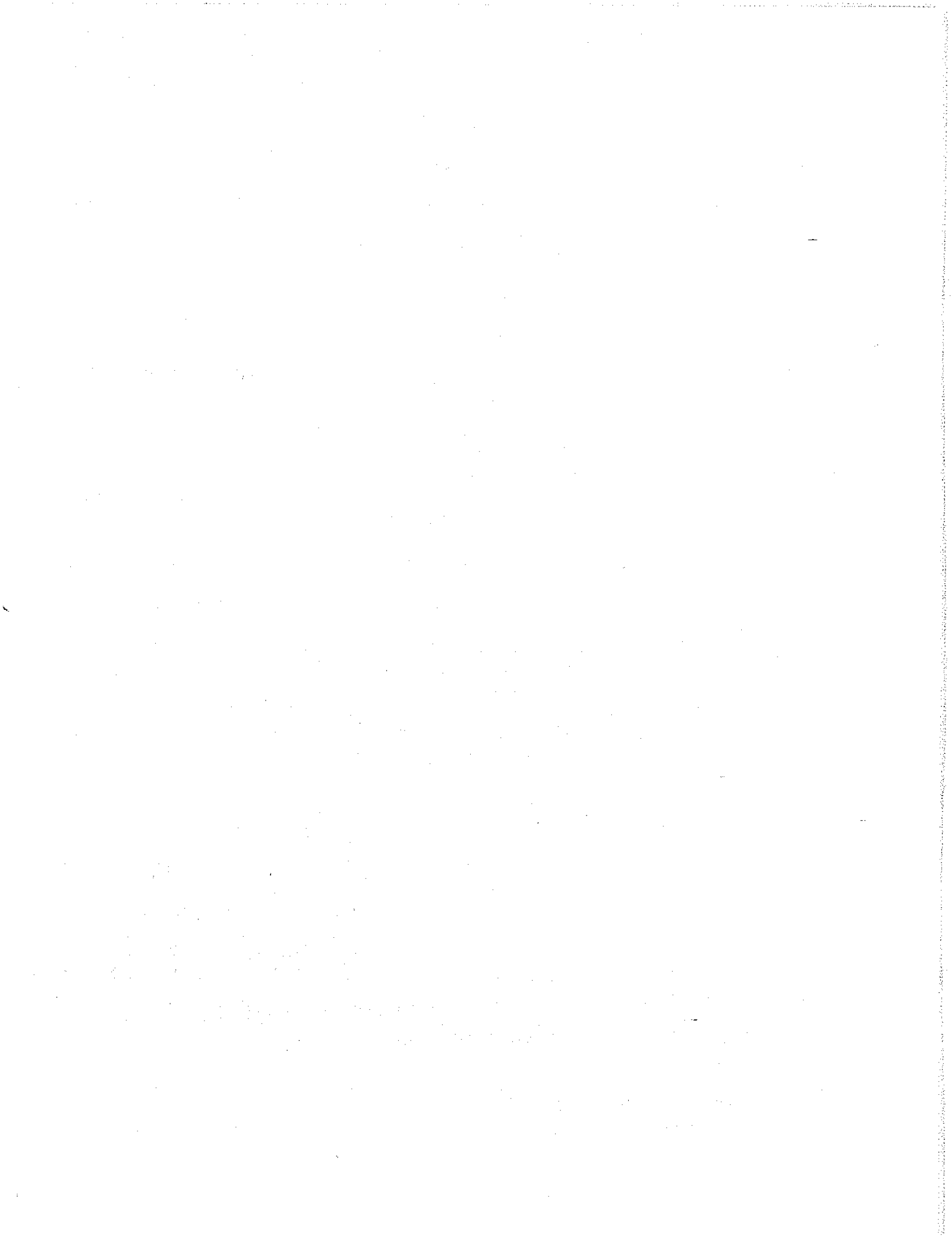


CHAIRPERSON



SUPERVISOR OF COUNCIL SERVICES

| NOTIFICATION: | |
|--|--|
| NAME | CONTACT INFORMATION |
| Lori Newton, Bike Friendly Windsor Essex | Lori.Newton@me.com |
| Amy Farkas, Windsor Bicycling Committee | afarkas@me.com |





Public Works - Operations

MISSION STATEMENT

"Our City is built on relationships – between citizens and their government, businesses and public institutions, city and region – all interconnected, mutually supportive, and focused on the brightest future we can create together"

| | |
|--|----------------------------|
| REPORT #: S 5/2016 | Report Date: 1/5/2016 |
| Author's Contact: Jennifer Leitzinger Transportation Planning Engineer 519-255-6247 ext. 6002 jleitzinger@citywindsor.ca | Date to Council: 2/17/2016 |
| | Clerk's File #: MB2016 |
| | |

To: Mayor and Members of City Council

Subject: M461-2015 Improvements to Cycling and Pedestrian Pavement Markings

RECOMMENDATION:

That report *M461-2015 Improvements to Cycling and Pedestrian Pavement Markings* BE RECEIVED for information and

THAT the 2016 Education and Awareness Campaign specifically target information supporting the correct direction of travel in bike lanes

EXECUTIVE SUMMARY:

N/A

BACKGROUND:

Windsor City Council adopted the following resolution at its meeting held November 16, 2015

M461-2015 That Report No. 303 of the Environment, Transportation & Public Safety Standing Committee of its meeting held October 21, 2015 regarding "Report No. 61 of the Windsor Bicycling Committee (Improvements to Cycling and Pedestrian Pavement Markings)" BE APPROVED as follows:

WHEREAS there have been developments in best practices, techniques and materials in terms of cycling pavement markings (samples of which are attached), the Windsor Bicycling Committee recommends that Administration **BE REQUESTED** to provide a report regarding how the City of Windsor might

improve its cycling and pedestrian pavement markings in terms of durability and clarity; and further,

*THAT particular consideration **BE GIVEN** to use directional arrows on bicycle lanes to encourage riding in the direction of traffic.*

DISCUSSION:

Pavement Markings - Durability and Clarity

As per Ontario Traffic Manual (OTM) Book 18 Cycling Facilities, pavement markings are painted or durable lines or symbols applied on any paved bikeway or roadway surface for guiding vehicular, cyclist and pedestrian traffic.

There are two types of pavement markings:

1. Overlay
 - a. Paint
 - b. Durable Liquid Pavement Markings (DLPM)
 - i. Epoxy
 - ii. Methyl Methacrylate (MMA)
 - iii. Thermoplastic
2. Embedded
 - a. Colored Asphalt

Further details regarding these different pavement markings can be seen in **Appendix A**.

Line Painting Maintenance

Traffic Operations is using the most durable paint product currently available that meets legislative requirements. The current Signs and Markings operating budget of \$750,000/year allows for pavement markings, which includes bike lanes, symbols and sharrows to be painted annually as mandated by the OTM Book 11 Pavement, Hazard and Delineation Markings. This is a seasonal program beginning in early spring to late fall and is weather and temperature dependent.

In order to provide markings of consistent reflectivity so as not to divert the attention of the driver, all pavement markings would need to be maintained in the same manner Citywide. If there is a variation of differing levels of reflectivity on a roadway, this could create confusion among drivers and increase potential liability. Therefore it is not recommended to only repaint the cycling related pavement markings. If this operation was to be completed twice a year, additional staffing and budget would be required.

Cost of Paint

The cost of longitudinal lines for bike lanes (including paint, labour and equipment) is approximately \$0.45 per linear metre.

The typical cost for bicycle symbol and diamond using paint is approximately \$75.00 for both symbols.

Cost of Durable Liquid Pavement Markings (Methyl Methacrylate (MMA))

The installed cost is approximately \$60.00 - \$70.00 per square metre. Cost is slightly higher on older asphalt because more material is required to cover the aggregate properly. In addition, certain colours are also more expensive. The longitudinal lines should be done in an agglomerate product, which is about \$6.00 per linear metre. It needs to be refreshed every 4 to 5 years with a spray MMA product and the cost is approximately \$3.00 per metre. All costs are excluding HST.

The typical cost for bicycle symbol and diamond using MMA pavement markings is approximately \$220.00 and \$110.00 respectively.

The MMA product is currently being used in Windsor for stop bars, arrows, longitudinal lines and bike lanes on concrete roads and at intersections which are difficult to paint.

The following locations include the MMA product (also known as durables):

- Ouellette Ave. and Tecumseh Rd. intersection
- Giles Blvd. and McDougall St. intersection
- Shepherd and McDougall St. intersection
- Howard Ave. and Cabana Rd. intersection
- Dougall Ave. and Cabana Rd. intersection
- Provincial Rd. and Cabana intersection continuing on Provincial Rd. to Marentette Ave.
- Walker Rd. and Wyandotte St. E. intersection continuing on Wyandotte St. E. to Monmouth Rd.
- Lincoln Rd. – Riverside Dr. E to Shepherd St.
- Gladstone Ave. - Riverside Dr. E to Shepherd St.

There have been no complaints to date respecting the clarity of durables.

Arrow Types

- MMA pavement markings would be approximately \$185 per arrow.

- The left turn and right arrows, bike symbols and diamonds are applied using MMA pavement markings on concrete roads and at intersections which are hard to paint.
 - Applying MMA pavement markings is contracted out to contractors
-
- A tape product is also available but costly at approximately \$400 - \$500 per arrow.

Directional Arrows and Enhanced Pavement Markings

OTM Book 18 Cycling Facilities was developed by the Ministry of Transportation (MTO) with the assistance of a Consultant Team and Technical Advisors. MMM Group was included in the Consultant Team, who also performed Administration's Peer Review for the Cabana Road interim cycling facilities.

"The purpose of the Ontario Traffic Manual (OTM) is to provide information and guidance for transportation practitioners, and to promote uniformity of treatment in the design, application and operation of traffic control devices and systems across Ontario. The objective is safe driving behaviour, achieved by a predictable roadway environment through the consistent, appropriate application of traffic control devices. (OTM Book 18, pg. i)"

Directional arrows are discussed in section 4.2.1.3 Pavement Markings in OTM Book 18. Bicycle lanes typically include a solid white lane line, and are marked by two white symbols:

- a diamond (reserved lane pavement marking that specifies bike lane is for cyclists) and,
- a bicycle

Reserved lane pavement markings must be used to identify restricted lanes and regulate their operation. Therefore the diamond symbol is used and centered in the bicycle lane, as seen in **Appendix B**. These pavement markings must be used in conjunction with a Reserved Bicycle Lane sign.

Cyclists should travel in the same direction as motorists, therefore when cyclists travel in the appropriate direction in a bike lane the bicycle symbol will be painted right side up, as seen in **Figure 1 and Image 1**.

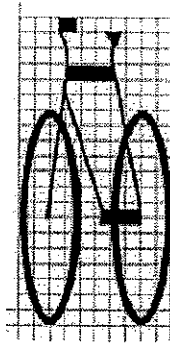


Figure 1: Bicycle Symbol #1 (Source: OTM Book 18)

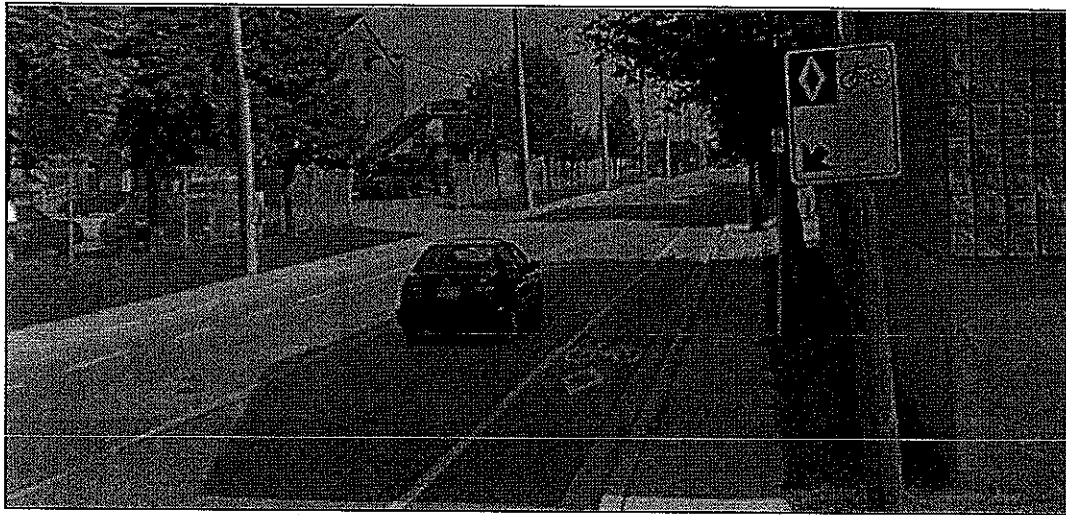


Image 1: Southbound on McDougall St., Cyclists Travelling Southbound (Proper direction in the bike lane) (Source: Google Maps)

The orientation of the bicycle image communicates the appropriate direction of travel. When travelling in the wrong direction in a bike lane, the bicycle symbol is upside down and only the backside of the Reserved Bicycle Lane sign is visible, as seen in **Figure 2** and **Image 2**, limiting the ability to communicate when a bike lane ends or transitions into sharrows.

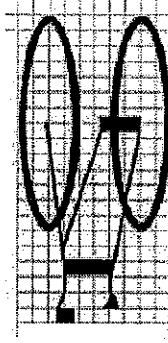


Figure 2: Inverted Bicycle Symbol (Source: OTM Book 18)

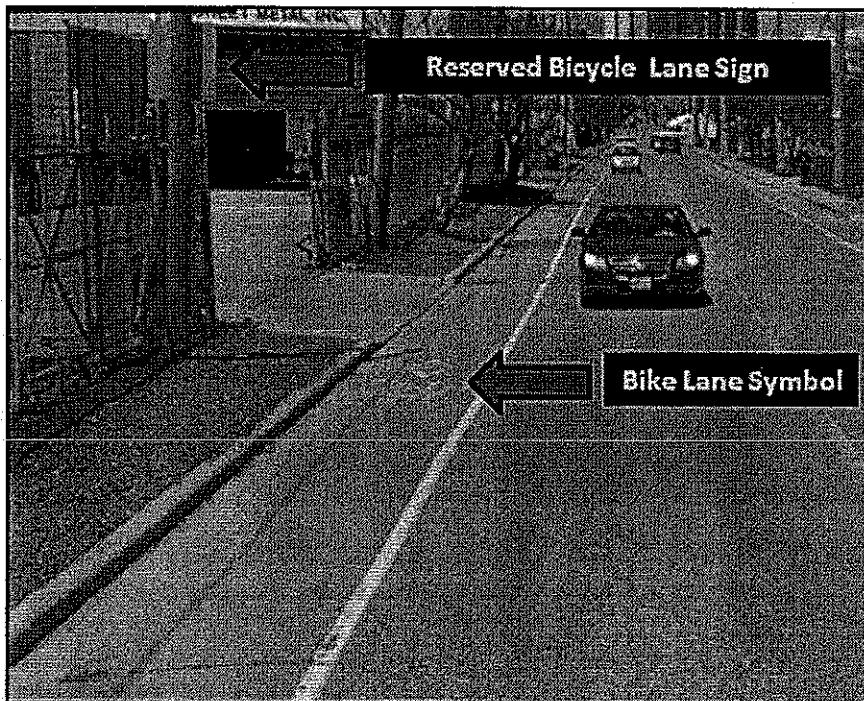


Image 2: Southbound Bike Lane on McDougall St., Facing Northbound (wrong direction) in the Bike Lane (Source: Google Maps)

In accordance with OTM Book 18, an optional directional arrow may also be used where the direction of travel is not clear, confusion exists or additional guidance is required. The cyclist directional arrow is shown with the bicycle and diamond symbol in **Appendix B**.

Enhanced Pavement Markings

As projects are designed to include cycling facilities steps are being taken to incorporate enhanced markings from OTM Book 18. This was demonstrated in Report #17663

CR209/2014 – Cabana Road Cycling Facilities, which included the MMM Group Peer Review for the Cabana Road interim active transportation facilities. Examples of these enhanced markings are the green sharrows recommended at the Cabana Rd. W. and Dougall Ave. intersection, as seen in **Figure 3**.

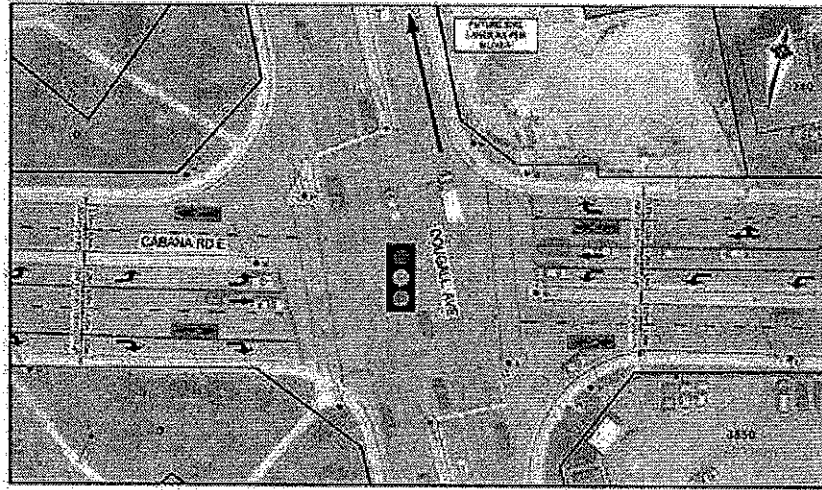


Figure 3: Cabana Rd. W. and Dougall Avenue Intersection

Administration is recommending that OTM Book 18 be utilized to guide the selection of cycling facility type and inform their detailed design to achieve its objective of safe driving behaviour, achieved by a predictable roadway environment through the consistent, appropriate application of traffic control devices.

Pavement markings and signage communicate to both the motorist and cyclist alike. Typical bike lanes will be marked with the standard recommended in the guide and the introduction of a directional arrow will be reserved for locations where additional guidance is required.

Education and awareness campaigns will communicate the safe operation of bicycles on Ontario-wide roadway infrastructure to local cyclists and motorists so that no matter where in the Province they are traveling, they will comprehend their responsibilities for predictable and safe driving behaviour.

RISK ANALYSIS:

Pavement markings are applied as per OTM Book 11 and directional arrows are not mandatory as per OTM Book 18, therefore minimal risks are associated when placing pavement markings in accordance with the OTM standards, which includes not painting arrows.

FINANCIAL MATTERS:

The annual paint budget of \$750,000 would be anticipated to double if the pavement markings in the City were painted twice annually. Four to six additional staff would be required as painting would be continuous throughout the year and work currently performed during the non paint season would need to be done by other staff. Administration is unable to quantify the number of bicycle related pavement markings; therefore a total cost for these markings or directional arrows is not available. Directional arrows would have a similar unit cost as the other bike symbols.

The recommended 2016 Education and Awareness Campaign specifically targeting information supporting the correct direction of travel in bike lanes will be funding through the Bikeways Development capital budget.

CONSULTATIONS:

Traffic Operations

CONCLUSION:

Administration is recommending the 2016 Education & Awareness campaign be designed to specifically target information supporting the correct direction of travel in bike lanes.

PLANNING ACT MATTERS:

N/A

| Name | Title |
|----------------|------------------------------------|
| Josette Eugeni | Manager of Transportation Planning |
| Dwayne Dawson | Executive Director of Operations |
| Mark Winterton | City Engineer |
| Helga Reidel | Chief Administrative Officer |

NOTIFICATIONS:

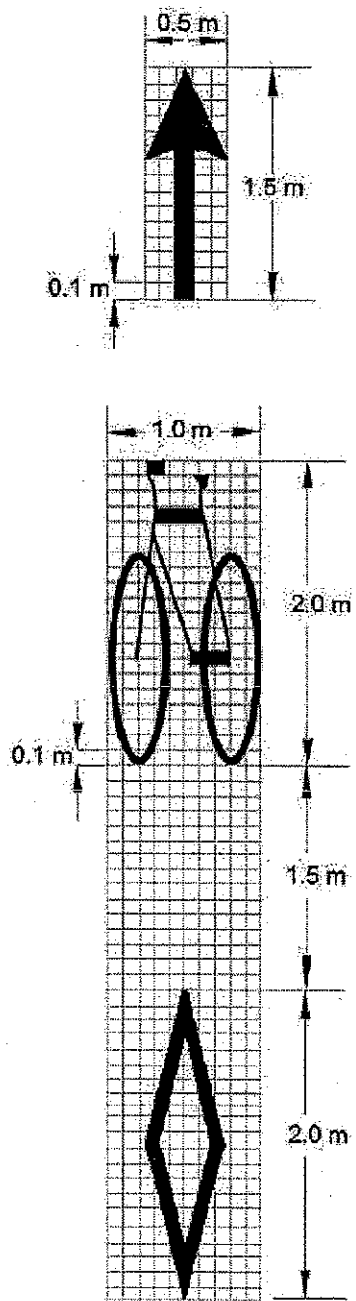
| Name | Address | Email |
|-------------|----------------|--------------|
| n/a | | |

APPENDICES:

1. Pavement Marking Types
2. Bicycle Lane Symbols

Appendix 'A'

| Product | Maintenance Considerations | Longevity | Material Cost (in U.S. Dollars) | Recommended by Administration (Yes/No) |
|---|---|--|--|---|
| Overlay | | | | |
| 1. Paint | Reapplication of paint, as needed. | 6 months to 2 years based on weather, motor vehicle traffic & snow removal operations. | \$0.6 ft ² for raw materials \$1.20-\$1.60 ft ² installed | No |
| 2. Durable Liquid Pavement Markings (DLPM) <u>Two types available:</u> Epoxies (epoxy/resin) Methyl Methacrylate (MMA) (acrylic-based resin) | DLPM: Some cities have reported that colour intensity fades over time due to colour instability under ultraviolet lighting (sunlight) exposure. Pooling water can reduce material longevity. | Similar to thermoplastic. Poor pavement quality impacts treatment longevity. Epoxy paint has proven skid resistance and longevity of 3-5 years. MMA may last as long as 3-6 years. | <u>Epoxy</u> : \$1-\$3 ft ² for raw materials \$8-\$11 ft ² installed <u>MMA</u> : \$3-\$4 ft ² for raw materials \$8-\$11 ft ² installed | Epoxies – No MMA – Yes |
| 3. Thermoplastic | A small piece of plastic is torched in place for spot fixes. Thermoplastic can be recessed to make flush with pavement or tamped down to form a seal with the roadway top reduce the likelihood of snow plow impact. | 6 months to 2 years based on weather, motor vehicle traffic & snow removal operations | \$3-\$6 ft ² for raw materials \$10-\$14 ft ² installed | No (Torch is required for installation, and this poses a safety concern and requires specialized training) |
| Embedded | | | | |
| 1. Coloured Asphalt | It is expected that coloured asphalt at least 1 cm thick will last for the life time of the pavement. | Based on motor vehicle traffic, but typically similar to conventional asphalt. | When applied as a thin layer within new construction, pigmented asphalt costs between 30 and 50 percent than a non-colored structural asphalt section. For thin overlay applications, the difference in costs will be greater. | No |



Bicycle Lane Pavement Markings

Source: Based on the TAC Bikeway Traffic Control Guidelines for Canada, 2012 (Table 7-1)



THE CORPORATION OF THE CITY OF WINDSOR

Memo

To: Members of the Environment, Transportation & Public Safety Standing Committee
From: Jennifer Leitzinger
Date: February 11, 2016
Subject: S5/2016 - M461-2015 Improvements to Cycling and Pedestrian Pavement Markings -
Correction to Appendix 'A'

Environment, Transportation & Public Safety Standing Committee Report S5/2016 dated January 5, 2016 and entitled "M461-2015 Improvements to Cycling and Pedestrian Pavement Markings" is scheduled for the Standing Committee's consideration at its February 17, 2016 meeting.

The attached correction in Appendix 'A' is to be made in the "Recommended by Administration" column as shown on the proceeding page.



Josette Eugeni
Manager of Transportation Planning



Dwayne Dawson
Executive Director of Operations



Mark Winterton
City Engineer and Corporate Leader
Environmental Protection and Transportation



Helga Reidel
Chief Administrative Officer

**CITY OF WINDSOR
COUNCIL SERVICES**

FEB 12 2016

RECEIVED

Appendix 'A'

| Product | Maintenance Considerations | Longevity | Material Cost (in U.S. Dollars) | Recommended by Administration (Yes/No) |
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| Overlay | | | | |
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