To: Warden and Members of Council

From: Chris Bradley, Director of Public Works
Kendra Reid, Senior Engineering Technologist, Engineering & Design

Date: October 18, 2017

Subject: County Road (CR) 24/Woodland Drive Intersection
Results of Visibility Study Re: Controller Boxes

Recommendation:

Be it resolved that County Council receive this report and forward it to the Township of Selwyn Council Members for information purposes.

Financial Impact:

No financial impact.

Background and Overview:

The intersection of CR24/Woodland Drive in the Township of Selwyn was selected as the first location to be the subject of a Roadside Safety Audit (RSA).

At the August 3, 2016, meeting, County Council endorsed the recommendation by staff to proceed with the installation of the following countermeasures identified as a result of the RSA conducted for intersection of CR24/Woodland Drive:

- Enhanced pavement markings;
- Double up special oversized Stop signs (eastbound and westbound);
- Oversized speed zone signs;
- Brushing;
- Overhead Intersection Red/Yellow beacon;
- Review Woodland corridor as part of 2018 Transportation Master Plan update;
- Annual monitoring of traffic growth;
- Police Services Board education / “Roadwatch” signage;
- Continued enforcement.

At its meeting held on September 6, 2017, Peterborough County Council passed the following resolution:
“Be it resolved that County Council:

1. Receives the email and picture (see Appendix A) from Councillor Gerry Herron, Township of Selwyn dated August 24, 2017 regarding the intersection concerns at Woodland and Centreline.

2. Refers this matter to the Director of Public Works.”

Analysis:

The following five (5) criteria was reviewed by County staff at the intersection to evaluate whether the location of the existing controller boxes impeded the visibility of southbound vehicles at the westbound stop condition:

1. Review of sight distance requirements as per MTO Geometric Design Standards for Ontario Highways at an At-Grade Intersection;

2. Review of clear zone requirements as per MTO Roadside Safety Manual;

3. Review of signage and line painting requirements as per Ontario Traffic Manuals (OTMs);

4. Review of the Highway Traffic Act (HTA) relating to stopping at an intersection; and


County staff evaluated the intersection based on the above criteria with the results summarized below:

**Review of Sight Distance Requirements as per MTO Geometric Design Standards for Ontario Highways at an At-Grade Intersection**

CR24 at Woodland Drive has a design speed of 70 km/hr with a regulatory posted speed of 60 km/hr (see Appendix B). As per MTO Geometric Design Standards for Ontario Highways At-Grade Intersections sight distances for departures (see Figure E3-2 in Appendix C) were checked in the field by County staff as follows:

Sight distance requirements for crossing movements for a posted speed of 60 km/hr with a design speed of 70 km/hr (see Figure E3-5 in Appendix D) for passenger cars (P) is 115 m (see picture below), single unit trucks (SU) is 180 m (see picture below) and WB-15 (tractor-semi-tractor combination) is 260 m are met at the intersection.
Passenger Car (P) at Westbound Stop Condition CR24/Woodland Drive at Stop Block
Single Unit Truck (SU) at Westbound Stop Condition CR24/Woodland Drive at Stop Block
Sight distance requirements for stopping, crossing and turning movements for a posted speed of 60 km/hr with a design speed of 70 km/hr for passenger vehicles (P) on two-lane highways (see Figure E3-6 in Appendix E) are as follows:

A. minimum stopping sight distance (see Table E3-1 in Appendix F) is 110 m;
B. safe distance for P vehicle, crossing two-lane highway from stop is 140 m;
C. safe distance for P vehicles, turning left into two-lane highway across P vehicle approaching from left is 180 m; and
D. safe sight distance for P to turn left into two-lane highway and attain assumed operating speed before being overtaken by P vehicle approaching in same direction at design speed is 275 m

All of the above sight distances are met at CR24/Woodland Drive.

**Review of Clear Zone Requirements as per MTO Roadside Safety Manual**

As per MTO Roadside Safety Manual (see Table 2.2.1 in Appendix G) for a design speed of 70 km/hr with an average annual daily traffic (AADT) \( \geq 1500 \), the required clear zone offset is 3 m on tangent with a curve correction factor of 1.00 m (see Table 2.2.2 in Appendix G). CR24/Woodland Drive is on a horizontal curve having a radius of 1,746 m (see Appendix B) and this curve correction factor has no impact on the clear zone offset (i.e. it remains 3 m). The clear zone offset in the field for the existing hydro pole and controller boxes is 7.0 m from CR24 and is 7.5 m from Woodland Drive.

**Review of Signage and Line Painting Requirements as per OTMs**

All existing signage meets or exceeds the requirements of OTM Book 5 - Regulatory Signs including double up special oversized stop signs (see picture below). All existing line painting meets the requirements of OTM Book 11 – Marking and Delineations (see pictures below and Figure 26 – Approaches to Rural Intersections and Figure 2 – Typical Locations of STOP Sign in Appendix H).
Double Up Special Oversized Stop Signs at CR24/Woodland Drive
New Stop Block at CR24/Woodland Drive
Location of Countermeasures at Cr24/Woodland Drive
Review of the Highway Traffic Act (HTA) relating to approaching a stop sign at an intersection

As per the HTA, R.S.O. 1990, Chapter H.8 Part X Rules of the Road Stop at through highway Section 136 (1):

“Every driver or street car operator approaching a stop sign at an intersection, (a) shall stop his or her vehicle or street car at a marked stop line or, if none, then immediately before entering the nearest crosswalk or, if none, then immediately before entering the intersection; and (b) shall yield the right of way to traffic in the intersection or approaching the intersection on another highway so closely that to proceed would constitute an immediate hazard and, having so yielded the right of way, may proceed. R.S.O. 1990, c. H.8, s. 136 (1).”

Review of the Official MTO Driver’s Handbook for Safe Stopping

As per the Official MTO Driver’s Handbook for safe stopping, the following excerpt applies:

“You must come to a complete stop for all stop signs and red traffic lights. Stop at the stop line if it is marked on the pavement.”

Summary and Recommendation:

Based on the evaluation of the five (5) criteria, there is no technical justification for relocating the existing controller boxes at the intersection of CR24/Woodland Drive.

Upon stopping at the stop block on Woodland Drive (travelling westbound), there is sufficient sight distance to the approaching southbound travelling vehicles along County Road 24 for a safe departure from the intersection at a stopped position.

Staff recommend County Council receive this report and forward it to the Township of Selwyn Council Members for information purposes.

Respectfully submitted,

Original signed by

Chris Bradley         Kendra Reid, C.E.T.
Director of Public Works  Senior Engineering Technologist, Engineering & Design
Appendix A

Reid, Kendra

From: Bradley, Chris
Sent: Thursday, August 24, 2017 9:19 AM
To: Nielsen, Peter; Saccocia, Doug; Reid, Kendra
Subject: FW: Woodland & Centerline

fyi

Chris Bradley,
Director of Public Works,
County of Peterborough,
310 Armour Road,
Peterborough, Ontario,
K9H 1Y6
705-775-2757, ext. 3102
chadley@ptbcounty.ca

"* County phone extensions, e-mails & web address have CHANGED.
Please UPDATE contact info."*

From: Saunders, Sally
Sent: Thursday, August 24, 2017 8:53 AM
To: King, Gary <GKing@ptbcounty.ca>
Cc: Bradley, Chris <cbradley@ptbcounty.ca>
Subject: FW: Woodland & Centerline

Gary – Will add to the September 6th Action Correspondence to receive and refer to Director of Public Works?

Sally
705-713-0380, Extension 2101

From: Gerry Heron <gerry.herond@sympatico.ca>
Sent: August 24-17 8:45 AM
To: Saunders, Sally <SSaunders@ptbcounty.ca>
Subject: Woodland & Centerline

Hi Sally,

Can you please forward to the members of council and Kendra, as they improved this intersection not long ago, but may have made it dangerous again.

I received this from a concerned citizen.

Thank you in advance,

Gerry Heron
Selwyn Council
705-741-6595

From: [Redacted]
Date: August 22, 2017 at 7:22:20 PM EDT
To: "gerrybcrnn@outlook.com" <gerrybcrnn@outlook.com>
Subject: Intersection sight line

When the battery boxes were installed for the solar panels at the intersection of Centre Line and Woodlands, they were placed east-west on the pole. Had they been installed north-south, they would not block a driver's sightline. As you see, a driver has to move forward of the stop sign to check traffic. In this photo you cannot see the motorcycle until you have cleared past the stop sign AND the battery boxes.

It's clear the boxes need to be moved to a north-south position ... or way up the pole!

Hope the solution is as easy as it appears!
Best regards,
Linda A.

Sent from my iPhone
Appendix B
Appendix D

AT-GRADE INTERSECTIONS

Figure D.5

Sight Distance Requirements for Crossing Movements from Stop Condition
Appendix E

AT-GRADE INTERSECTIONS

A - Minimum Stopping Sight Distance, Table E3-1.
A1 - Distance travelled in 3a, Table E3-2.
B - Safe Sight Distance for P vehicle, crossing 2-lane highway from stop.
C - Safe Sight Distance for P vehicle, turning left into 2-lane highway across P vehicle approaching from left.
D - Safe Sight Distance for P vehicle to turn left into 2-lane highway and attain assumed operating speed before being overtaken by P vehicle approaching in same direction at design speed.
E - Safe Sight Distance for P vehicle to turn right into 2-lane highway and attain assumed operating speed before being overtaken by P vehicle approaching in same direction at design speed.

Figure E3-5

Sight Distance Requirements for Stopping
Crossing and Turning Movements
Appendix F

AT-GRADE INTERSECTIONS

<table>
<thead>
<tr>
<th>Design Speed, km/h</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
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<tbody>
<tr>
<td>Minimum Stopping Sight Distance, m</td>
<td>20</td>
<td>30</td>
<td>45</td>
<td>65</td>
<td>85</td>
<td>110</td>
<td>135</td>
<td>160</td>
<td>185</td>
<td>215</td>
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Table E3-1
Minimum Stopping Sight Distance

The no control condition may be adequate at the intersection of a local road with a local road where the following conditions exist:

- the total AADT for the intersection is 1000-1500 vehicles or less;
- the safe approach speed (stopping sight distance) is approximately equal to or greater than the 85 percentile speed of the speed limit whenever it is less;
- accident history indicates two or less right angle collisions per year.

As an absolute minimum requirement, drivers approaching an uncontrolled intersection must have at least sufficient sight distance to adjust their speeds to avoid collision while continuing through the intersection. For this situation, these seconds are needed along each approach roadway to allow drivers to perceive, react, and break. Distances required to allow three seconds are listed in Table E3-2 for various approach speeds.

It is assumed that vehicles will seldom be required to stop at uncontrolled intersections. In the event that a vehicle has to stop, the sight distance requirements for departure would be the same as those shown for stop control.

E.3.2.2 Yield Control

Where an intersection is controlled by a yield sign, on the side road it is assumed that a driver on that approach will reduce speed sufficiently to enable him to stop and accelerate and pass through the intersection. The sight line for this condition is established by applying:

- the minimum stopping sight distance along the uncontrolled highway.

For design values see Table E3-1.

Suggested speeds on the yield controlled approach are:

- urban conditions - 50 km/h;
- rural conditions - 60 or 70 km/h

See Table E3-1 for the minimum stopping sight distances relating to these speeds.

The yield control condition is most applicable to the intersection of a local road with a local road or a local road with a collector under the following conditions:

- total AADT entering the intersection is 1500-3000 vehicles;
- a safe approach speed (stopping sight distance) is equal to or greater than 20 km/h;
- a history of three or more right angle accidents per year.

The sight line for the safe departure and crossing of a standing vehicle on the yield-controlled side road is established in the same manner as for stop control, as discussed below.

E.3.2.3 Stop Control

POLICY

THE SIGHT DISTANCE ALONG THE MAJOR HIGHWAY SHOULD BE MEASURED FROM THE HEIGHT OF THE TURNING VEHICLE DRIVER'S EYE OF 1.05 M TO THE TOP OF THE APPROACHING VEHICLE 1.3 M ABOVE THE PAVEMENT. FOR THE EFFECT OF GRADE, TABLE E3-2 SHOULD BE APPLIED.
Appendix G

Table 2.2.1

<table>
<thead>
<tr>
<th>Design Speed (km/h)</th>
<th><strong>Clear Zone Width (m)</strong></th>
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<tr>
<td></td>
<td>A</td>
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<tr>
<td></td>
<td>AADT ≥ 6000</td>
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<tr>
<td>120</td>
<td>10</td>
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<td>80</td>
<td>5</td>
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<tr>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>60 or less</td>
<td>3</td>
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<tr>
<td>60 or less with barrier curb</td>
<td>0.5</td>
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** For point of measurement see "definition"
* For explanation of Design Speed refer to the Geometric Design Manual

Refer to Section 2.2.3 for application of the Clear Zone in urban areas.

On any project where these offsets cannot be cost-effectively accommodated and protection is not provided, a statement in the design criteria will indicate this fact. Approval of the Design Criteria Committee will be required. Justification for reduced offsets will be retained in the project file.
PROCEDURE

Total clear zone widths on the outside and inside of curves are obtained by multiplying the clear zone widths for tangents, (Table 2.2.1) by the appropriate curve correlation factor (provided in Table 2.2.2) and rounding to the nearest 0.5 metre. Exceptions to the clear zone width are to be treated as shown in Section 2.2.1.

Table 2.2.2
Curve Correlation Factors

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<th>Radius (m)</th>
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Date 1993 03
Appendix H

Figure 26 – Approaches to Rural Intersections
Figure 2 – Typical Locations of STOP Sign

7. a) 3.