Appendix C: Railway Crossing Assessment
Technical Memorandum: Railway Assessment

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1 Introduction

This technical memorandum summarizes the findings and recommendations of the railway grade crossing detailed safety assessment conducted for the railway crossings at Bayview Drive and Welham Road in support of the Bayview Drive and Big Bay Point Road Class Environmental Assessment. The crossing locations are illustrated in Figure 1. The field assessment was conducted in July 2015 by C.C. Tatham & Associates.

1.1 Objectives

The fundamental objectives of the railway grade crossing detailed safety assessment are to:

- reduce crash risk within the grade crossing environment;
- minimize the frequency and severity of preventable crashes;
- consider the safety of all grade crossing users;
- verify compliance with the technical standards referred to in the Grade Crossing Regulations\(^1\) and contained in the Grade Crossing Standards\(^2\) document; and
- ensure that all crash mitigation measures aimed to eliminate or reduce the identified safety problems are fully considered, evaluated and documented for review by the appropriate authorities.

1.2 Methodology

The collection of field data and subsequent crossing assessments have been completed in accordance with guidelines set forth in the Grade Crossing Standards and the Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide\(^3\). These documents have been produced by Transport Canada and thus reflect federal guidelines, including incorporation of the Manual of Uniform Traffic Control Devices for Canada\(^4\) (MUTCD) with respect to road signs and pavement markings. It is noted that the Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide and related field data forms reference the standards published in the RTD 10 Road/Railway Grade Crossing Technical Standards and Inspection, Testing and Maintenance Requirements, which has been superseded by the Grade Crossing Standards publication. While the field data forms utilized in the assessments consider the standards published in the RTD 10 document, the assessment has considered the updated standards (where such differ) provided in the Grade Crossing Standards publication.

\(^2\) Grade Crossing Standards. Transport Canada, July 2014.
\(^3\) Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide. Transport Canada, April 2005.
2 Existing Conditions

This chapter summarizes the existing conditions at the subject railway crossings.

2.1 Road Network

2.1.1 Bayview Drive

As per the City of Barrie Official Plan, Bayview Drive is classified as a major collector road. The posted speed limit through the railway crossing area is 50 km/h. Based on a turning movement count conducted in 2014 at the intersection of Bayview Drive with Big Bay Point Road, the daily volume on Bayview Drive is estimated at 7,300 vehicles; however, historical data (2011) indicates an average daily volume of 9,000 vehicles. The road has a 4-lane cross-section (2 travel lanes per direction) at the grade crossing.

2.1.2 Welham Road

Welham Road is a local road within the City of Barrie with a posted speed limit of 50 km/h in the area of the crossing. Based on available traffic count data, the daily volume on Welham Road at the crossing is estimated at 2,750 vehicles. The road has a 2-lane cross-section (1 travel lane per direction) at the grade crossing. The City’s bus transit depot is located on Welham Road, north of Big Bay Point Road.

2.2 Barrie Collingwood Railway (BCRY)

The Barrie Collingwood Railway (BCRY) is an active short-line rail operation providing freight service to customers in the City of Barrie, Town of Innisfil and Township of Essa. The railway tracks crossing both Bayview Drive and Welham Road are a spur of the BCRY, providing rail service to industrial customers in the area. It is noted that the portion of the spur which enters the former Molson lands has been decommissioned and is scheduled to be removed.

With respect to train operations, the spur line maintains an active status. Based on discussions with the City of Barrie, the spur line has historically serviced 2 trains per week which translates to 4 crossings per week (0.57 crossings per day on average) at each respective crossing. It is noted that train volumes on the spur are dictated by industry needs in the area. As an active spur, additional train movements could readily be introduced to the line should the need arise. Trains currently operating on the spur are limited to a speed of 10 mph (approximately 17 km/h) and must stop in advance of each crossing before proceeding. The railway grade crossings do not currently have active warning systems in place (i.e. the crossings are demarcated by warning signs only; there are no gates, lights or bells).
The subdivision and mile of each crossing is as follows:

- Welham crossing: Bayview Industrial Spur Mile 1.10, off Beeton Subdivision Mile 82.50; and
- Bayview Crossing: Bayview Industrial Spur Mile 1.27, off Beeton Subdivision Mile 82.50.

Additional details with respect to the road and railway approaches are provided in the field data forms attached in Appendix A (Bayview Drive) and Appendix B (Welham Road). The field data forms for passive crossings were utilized in the assessment (recognizing the absence of active warning systems). The Grade Crossing Regulations and Grade Crossing Standards are provided in Appendix C and Appendix D, respectively.

Photographs of the railway crossings are provided in Figure 2 (Bayview Drive) and Figure 3 (Welham Road).
3 Detailed Assessment

3.1 General Information & Design Considerations

3.1.1 Design Vehicle

For the purpose of this assessment, and in consideration of the industrial lands served by area road network, a B-Train Double (BTD) combination vehicle, which is 25 metres in length, was selected as the appropriate design vehicle (as per the Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide).

3.1.2 Regulatory Requirements

The assessment has considered the requirements under the Grade Crossing Regulations as they pertain to existing grade crossings. For the purpose of this assessment, the regulatory requirements have been categorized as follows:

- Category A: Basic Requirements under the Grade Crossing Regulations requiring immediate action;
- Category B: Requirements under the Grade Crossing Regulations that must be implemented on the day that is seven years after the Grade Crossing Regulation comes into force (November 2021);
- Category C: Requirements under the Grade Crossing Regulations that must be implemented when changes are made at the subject grade crossing (no implementation schedule or deadline is specified); and
- Category D: Recommendations not required under the Grade Crossing Regulations but nonetheless recommended based on best practices or non-regulatory guidelines.

With respect to Category A requirements which require immediate action, it is noted that such improvements may be delayed given that the railway spur, while active, has seen infrequent use over the past several years and has recently only been used to store rail cars. However, any Category A requirements must be addressed prior to the resumption of rail operations along the spur.

3.1.3 Rail/Road Authorities — Responsibilities

The Grade Crossing Regulations identify which authority (i.e. road or rail) is responsible for ensuring compliance with the requirements of the Regulations as they pertain to specific aspects of a public grade crossing. These responsibilities for each respective authority are summarized below.
Railway Company

A railway company must ensure compliance of the following:

- a “Railway Crossing” sign, a “Number of Tracks” sign and an “Emergency Notification” sign;
- the maintenance of a stop sign, where such is installed on the same post as the “Railway Crossing” sign;
- a warning system;
- a crossing surface (not including its design); and
- sightlines within the railway right-of-way and over land adjoining the railway right-of-way.

Road Authority

A road authority must ensure compliance of the following:

- the design, construction and maintenance of a road approach;
- traffic control devices (not including a stop sign installed on the same post as a “Railway Crossing” sign);
- the design of a crossing surface; and
- sightlines within the road right-of-way and over land in the vicinity of the grade crossing.

3.2 Bayview Drive Crossing

The key findings of the field audit and detailed safety assessment of the Bayview Drive crossing, including recommended remediation measures, are provided in Table 1. The field data assessment forms are provided in Appendix A, whereas site photos are provided in Figure 2.

3.2.1 Grade Crossing Warning System Warrants

As per the Grade Crossing Standards, the specifications for a public grade crossing at which a warning system (ie. lights and bells) without gates is required are as follows:

- the cross-product of the daily road and train volumes is 2,000 or more;
- the grade crossing does not include a sidewalk, path or trail and the maximum railway operating speed exceeds 129 km/h (80 mph);
- the grade crossing includes a sidewalk, path or trail and the maximum railway operating speed exceeds 81 km/h (50 mph); or
where the railway design speed is more than 25 km/h (15 mph) but less than the railway design speed referred to above, and

- where there are 2 or more lines of railway where rail equipment may pass each other; or

- the distance between a stop sign at an intersection and the nearest rail in the crossing surface is less than 30 metres; or

- in the case of an intersection with a traffic signal, the distance between the stop line of the intersection and the nearest rail in the crossing surface is less than 60 metres, or where there is no stop line, the distance between the edge of travelled way and the nearest rail in the crossing surface is less than 60 metres.

The specifications for a public grade crossing at which a warning system with gates is required are as follows:

- a warning system without gates is required based on the above noted criteria; and

- the cross-product is 50,000 or more;

- where there are 2 or more lines of railway where rail equipment may pass each other;

- the railway design speed is more than 81 km/h (50 mph);

- the distance between a stop sign at an intersection and the nearest rail in the crossing surface is less than 30 metres; or

- in the case of an intersection with a traffic signal, the distance between the stop line of the intersection and the nearest rail in the crossing surface is less than 60 metres, or where there is no stop line, the distance between the edge of travelled way and the nearest rail in the crossing surface is less than 60 metres.

Assuming daily train traffic of 0.57 trains per day (i.e. 4 crossings per week, as previously noted), the cross-product would exceed 2,000 (existing AADT of 7,275 vehicles per day x 0.57 train crossings per day = 4,147). Thus a warning system (i.e. bells and lights) without gates is warranted at the Bayview Drive crossing based on the assumed train operations (i.e. 0.57 trains per day). The traffic volumes are such that the warning system would be required to accommodate the existing conditions.

It is noted that the warrants for gates are not satisfied, recognizing the following:

- the cross-product is less than 50,000;

- there are less than 2 railway lines,

- the railway design speed is less than 81 km/h (50 mph); and

- the stop bar at the signalized intersection is located in advance of the rail line.
Due to the close proximity of the rail line to the intersection with Big Bay Point Road, it is recommended that the warning system (bells and lights) be coordinated with the existing traffic signals in order to provide an added level of control. “No Right Turn on Red” signage (i.e. Rb-79R) would also be required for the westbound right turn movement from Big Bay Point Road to Bayview Drive. For the eastbound left turn movement from Big Bay Point Road to northbound Bayview Drive, consideration should be given to providing a protected left turn phase in order to prohibit this movement while the crossing is active. Furthermore, the warning lights would need to be placed so as to be visible by all approaches. Additional signage (i.e. “Do not block tracks” and/or “Stop here on red”) would also be recommended.

It is noted that the above recommendation considers rail traffic of 0.57 trains per day. If rail traffic projections increase, the cross product and need for gates should be re-evaluated. It is noted that the AADT on Bayview Drive is projected to reach 12,000 vehicles in 2031. In consideration of these traffic volumes, rail traffic of 4.2 trains per day would trigger the warrant for a gate system.
<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location of Grade Crossing</strong></td>
<td>No action required to address the existing conditions. The stop bar for the intersection is located in advance of the rail line. The railway operating speed along the spur is less than 15 mph. Thus location of grade crossing in relation to adjacent intersection is acceptable.</td>
</tr>
</tbody>
</table>
| The grade crossing is 13.5 m from the intersection of Bayview Drive with Big Bay Point on the south approach. *Grade Control Standards* (GCS) notes a minimum separation of 30 m where train speeds exceed 15 mph. | *Implementation*: N/A  
*Responsibility*: N/A                                                                                                                                                                                                                                                                                     |
| **2. Grade Crossing Surface**                                              |                                                                                                                                                                                                                                                                                        |
| Flangeways are filled with debris.                                         | Clear flangeways of debris.                                                                                                                                                                                                                                                                                                                       |
| *Implementation*: Category A  
*Responsibility*: Railway Company                                                                 |                                                                                                                                                                                                                                                                                        |
| Asphalt does not extend the minimum 0.5 m beyond edge of east shoulder.     | Place additional asphalt to extend crossing surface to the east to satisfy 0.5 m requirement.                                                                                                                                                                                                                                                       |
| GCS requires that the crossing surface be equal to the width of the travelled way and shoulders of the road, plus 0.5 m on each side, or, where shoulders don’t exist, 0.5 m beyond edge of travelled way. | *Implementation*: Category A  
*Responsibility*: Railway Company                                                                                                                                                                                                                                                                                                           |
| **3. Road Geometry**                                                       | No deficiencies noted.                                                                                                                                                                                                                                                                |
| *Implementation*: N/A  
*Responsibility*: N/A                                                                 |                                                                                                                                                                                                                                                                                        |
<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
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</thead>
<tbody>
<tr>
<td><strong>4. Sightlines</strong></td>
<td></td>
</tr>
<tr>
<td>D<em>SSD</em> is limited on north approach (left &amp; right of driver) and south approach (right of driver) by vegetation, trees and existing buildings. D<em>STOPPED</em> is limited on north approach in both directions by vegetation and trees along and adjacent to the railway right-of-way.</td>
<td>Trim/remove vegetation to improve sightlines to the extent possible. Implementation of a warning system (i.e. bells and lights – no gates) coordinated with the existing traffic signals would help mitigate sight line concerns by giving motorists advanced warning.</td>
</tr>
<tr>
<td>Implementation: Category B</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td><strong>5. Signs &amp; Pavement Markings</strong></td>
<td></td>
</tr>
<tr>
<td>Railway crossing sign on south approach is faded and post is covered with climbing vegetation during summer months.</td>
<td>Replace sign and remove vegetation from pole. Test signs on both approaches for reflectivity.</td>
</tr>
<tr>
<td>Implementation: Category A</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Reflective strips missing from railway crossing sign posts on both approaches. GCS requires reflective material on both sides of posts. It is noted that the reflective material on the signs was not tested for reflectivity.</td>
<td>Apply reflective strips to posts.</td>
</tr>
<tr>
<td>Implementation: Category B</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Observations</td>
<td>Recommended Actions</td>
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<td>----------------------------------------------------------------------------</td>
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</tbody>
</table>
| Railway signs are located less than 2.0 m from the nearest rail (both approaches). GCS require that railway crossing signs are located no closer than 3.0 m from the nearest rail. | Re-locate posts so that they are no closer than 3.0 m from the closest rail and between 0.3 m and 2.0 m from the outer edge of the road approach shoulder.  
*Implementation:* Category A  
*Responsibility:* Railway Company |
| No emergency notification signs were observed. GCS requires Emergency Notification signs at all grade crossings | Install Emergency Notification signs on each approach. Signs must include railway company's emergency telephone number and provide the location of the grade crossing.  
*Implementation:* Category B  
*Responsibility:* Railway Company |
| Queueing of traffic on the railway tracks in the southbound direction was observed. There are no signs indicating “Do Not Stop on Tracks”. | Install “Do Not Stop on Tracks” signs on the north approach, in advance of the crossing, to advise motorists not to stop/queue on the railway tracks.  
*Implementation:* Category D  
*Responsibility:* Road Authority |
| Railway Crossing Ahead sign (WA18-20) is located 150 m in advance of ‘X’ pavement marking on north approach. As per MUTCD, sign should be located 10 m in advance of ‘X’ pavement marking. | Relocate Railway Crossing Ahead sign as per MUTCD recommendations (Section A3.4.2 & A3.2.5).  
*Implementation:* Category D  
*Responsibility:* Road Authority |
<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
</tr>
</thead>
</table>
| There is no ‘X’ pavement marking or Railway Crossing Ahead sign on the south approach. | Install Railway Crossing Ahead Sign and paint ‘X’ pavement marking on south approach to provide advance warning to motorists.  
*Implementation:* Category D  
*Responsibility:* Road Authority                                                      |
| Railway Crossing Ahead on Cross Road (Wc-4B) located on Big Bay Point Road, approximately 125 m west of Bayview Drive is badly faded. | Install new Wc-4B on Big Bay Point Road.  
*Implementation:* Category D  
*Responsibility:* Road Authority                                                      |
| Double stop bars in on north approach are becoming worn.                      | Repaint double stop bars to MUTCD guidelines.  
*Implementation:* Category D  
*Responsibility:* Road Authority                                                      |

**6. Miscellaneous**

Given the infrequent use of the railway spur, there has been a lack of general maintenance with respect to clearing the track and right-of-way of vegetation and debris. | Ensure routine maintenance of the spur line is completed at regular intervals.  
*Implementation:* Category D  
*Responsibility:* Railway Company                                                      |
3.3 Welham Road Crossing

The key findings of the field audit and detailed safety assessment of the Welham Road crossing, including recommended remediation measures, are provided in Table 2. The field data assessment forms are provided in Appendix B, whereas site photos are provided in Figure 3.

3.3.1 Grade Crossing Warning System Warrants

The Welham Road crossing was reviewed with respect to the grade crossing warning system warrants provided in the Grade Crossing Standards and previously noted in Section 3.2.1.

Assuming that the daily train traffic is 0.57 trains per day (i.e. 4 crossings per week, as previously noted), the cross product at the Welham Road crossing would not exceed the threshold of 2,000 (existing AADT of 2,750 vehicles x 0.57 trains per day = 1,568). Thus a warning system is not required under existing conditions.

In consideration of the future need for a grade crossing warning system, the traffic projections for the year 2031 were also considered, with volumes projected to be 3,500 vehicles per day\(^5\). In considering future conditions, the cross-product of daily road and train volumes in 2031 will approach the 2,000 threshold for implementation of a warning system (projected AADT of 3,500 vehicles per day x 0.57 train crossings per day = 1,995). Thus consideration for a warning system without gates should be considered under future conditions.

Similar to the conditions at the Bayview Drive crossing, the Welham Road crossing is in close proximity to Big Bay Point Road. This causes sight line issues for vehicles turning from Big Bay Point Road, north onto Welham Road (i.e. motorists will have restricted views of trains approaching from behind). As such, a warning system without gates (bells and lights) is recommended for the Welham Road crossing in order to mitigate sight line constraints. The warning system should be coordinated with the existing traffic lights in order to provide an additional level of control, particularly where turning movements from Big Bay Point Road onto Welham Road are concerned. “No Right Turn on Red” signage (i.e. Rb-79R) would also be required for the westbound right turn movement from Big Bay Point Road to Welham Road. For the eastbound left turn movement from Big Bay Point Road to northbound Welham Road, consideration should be given to providing a protected left turn phase in order to prohibit this movement while the crossing is active.

### Table 2: Welham Road Crossing – Observations & Recommendations

<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location of Grade Crossing</strong></td>
<td>No action required to address the existing conditions. The stop bar for the intersection is located in advance of the rail line. The railway operating speed along the spur is less than 15 mph. Thus location of grade crossing in relation to adjacent intersection is acceptable.</td>
</tr>
</tbody>
</table>
| The grade crossing is approximately 13.5 m from the intersection of Welham Road with Big Bay Point on the south approach. The *Grade Crossings Standards* (GCS) note a minimum separation of 30 m where adjacent intersection is stop controlled and 60 m where adjacent intersection is signalized, and train speeds exceed 15 mph. | Implementation: N/A  
Responsibility: N/A                                                                                      |
| **2. Grade Crossing Surface**                                               | Clear flangeways of debris.                                                                                      |
| Flangeways are filled with debris, difficult to ascertain depth.             | Implementation: Category A  
Responsibility: Railway Company                                                                                         |
| Asphalt does not extend the minimum 0.5 m beyond edge of shoulder. GCS requires that the crossing surface be equal to the width of the travelled way and shoulders of the road, plus 0.5 m on each side, or, where shoulders do not exist, 0.5 m beyond edge of travelled way. | Place additional asphalt to extend crossing surface to ensure 0.5 m extension beyond edge of shoulder.  
Implementation: Category A  
Responsibility: Railway Company                                                                                         |
<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. Road Geometry</strong></td>
<td></td>
</tr>
</tbody>
</table>
| No deficiencies noted. | Implementation: N/A
Responsibility: N/A |
| **4. Sightlines** | |
| Stopping Sight Distance (SSD) is limited to 98 m on the north approach due to curvature of Welham Road and trees/bushes growing within the road right-of-way. Minimum SSD of 110 m is required. | Clear existing trees/bushes to maximize SSD and satisfy 110 m minimum SSD requirement as per GCS.

*Implementation: Category B
Responsibility: Road Authority* |
| $D_{SSD}$ is limited on north approach (left & right of driver) and south approach (right of driver) by vegetation, trees, existing buildings and parked vehicles in adjacent parking lots. $D_{STOPPED}$ is limited on north approach to the driver’s right, obstruction caused by vegetation and trees along and adjacent to the railway right-of-way. | Trim/remove vegetation to improve sightlines to the extent possible.

While not warranted based on the noted criteria for Grade Crossing Warning Systems, implementation of a warning system (i.e. bells and lights – no gates) coordinated with the existing traffic signals would help mitigate sight line concerns.

*Implementation: Category B
Responsibility: Railway Company* |
<table>
<thead>
<tr>
<th>Observations</th>
<th>Recommended Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Signs &amp; Pavement Markings</td>
<td></td>
</tr>
<tr>
<td>Railway crossing sign on north approach is askew (i.e. cross blades are not perpendicular with each other). The railway crossing sign is also slightly tilted.</td>
<td>Replace or repair railway crossing signs to ensure compliance with GCS. Test for reflectivity.</td>
</tr>
<tr>
<td>Reflection: Category A</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Reflective strips missing from railway crossing sign posts on both approaches. GCS requires reflective material on both sides of posts. It is noted that the reflective material on the signs was not tested for reflectivity.</td>
<td>Apply reflective strips to posts.</td>
</tr>
<tr>
<td>Implementation: Category B</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Railway crossing sign on north approach is leaning and abuts edge of pavement. GCS require that railway crossing signs are located between 0.3 m and 2.0 m from outer edge of road approach shoulder.</td>
<td>Re-locate post on north approach so as to satisfy GCS placement requirements.</td>
</tr>
<tr>
<td>Implementation: Category A</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Stop sign which indicates “stop and proceed” for train travelling eastbound is located on post of railway crossing sign on north approach.</td>
<td>Consider placing stop sign for rail traffic on separate sign post.</td>
</tr>
<tr>
<td>Implementation: Category D</td>
<td>Responsibility: Railway Company</td>
</tr>
<tr>
<td>Observations</td>
<td>Recommended Actions</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>No emergency notification signs were observed. GCS requires Emergency</td>
<td>Install Emergency Notification signs on each approach. Signs must include railway company’s emergency telephone number and provide the location of the grade crossing.</td>
</tr>
<tr>
<td>Notification signs at all grade crossings</td>
<td><em>Implementation</em>: Category B</td>
</tr>
<tr>
<td></td>
<td><em>Responsibility</em>: Railway Company</td>
</tr>
<tr>
<td>Railway Crossing Ahead sign (WA18-20) is located adjacent to ‘X’ pavement</td>
<td>Relocate Railway Crossing Ahead signs as per MUTCD recommendations (Section A3.4.2 &amp; A3.2.5).</td>
</tr>
<tr>
<td>marking on both north and south approaches. As per MUTCD, sign should be</td>
<td><em>Implementation</em>: Category D</td>
</tr>
<tr>
<td>located 10 m in advance of ‘X’ pavement marking.</td>
<td><em>Responsibility</em>: Road Authority</td>
</tr>
<tr>
<td>The ‘X’ pavement marking on the north approach is becoming worn.</td>
<td>Repaint ‘X’ pavement marking to MUTCD guidelines.</td>
</tr>
<tr>
<td></td>
<td><em>Implementation</em>: Category D</td>
</tr>
<tr>
<td></td>
<td><em>Responsibility</em>: Road Authority</td>
</tr>
<tr>
<td>Double stop bars on north approach are too close (4.0m) to nearest rail.</td>
<td>Remove and repaint double stop bars to MUTCD guidelines.</td>
</tr>
<tr>
<td>As per MUTCD, stop bars should be 5.0m from nearest rail.</td>
<td><em>Implementation</em>: Category D</td>
</tr>
<tr>
<td></td>
<td><em>Responsibility</em>: Road Authority</td>
</tr>
</tbody>
</table>
4 Summary

4.1 General Recommendations

The detailed grade crossing field safety assessments conducted for the Bayview Drive and Welham Road grade crossings identified several deficiencies with respect to the grade crossing surface, available sightlines, signage and pavement markings. Recommendations have been made to address each of the identified deficiencies. Many of the required improvements can be attributed to the reduced use of the railway spur in recent years and a lack of ongoing maintenance that would otherwise be present if the line had been servicing greater rail traffic (i.e. clear sight lines, clean flangeways, sign maintenance, etc.). As an active line, a comprehensive assessment of the full length of the spur is recommended along with on-going general maintenance. It is noted that the Grade Crossing Regulations are unclear with respect to the required maintenance of grade crossings that experience low use. It is noted that all deficiencies identified as Category A must be rectified, recognizing that the spur line is considered an active line. Furthermore, all deficiencies identified as Category B must also be resolved prior to November 2021, as noted in the Grade Crossing Regulations.

It is noted that the safety assessment of the Bayview Drive and Welham Road grade crossings covers physical features which may affect road and rail user safety and it has sought to identify potential safety hazards and deficiencies with respect to the Grade Crossing Standards. However, no guarantee is made that every deficiency has been identified. Furthermore, if all the recommendations in this assessment were to be addressed, this would not confirm that the crossing is ‘safe’; rather, adoption of the recommendations should improve the level of safety at the facility. It is noted that train whistling was not otherwise addressed at this crossing.

4.2 Grade Crossing Warning Systems

A warning system without gates (i.e. bells & lights) is recommended at both the Bayview Drive and Welham Road crossings. Gates are not warranted at this time. Given the proximity of the railway crossings to the signalized intersections with Big Bay Point Road, the warning systems implemented at the subject crossings would be required to coordinate with the traffic signals of the adjacent intersection to ensure that vehicle movements at the intersection that would otherwise conflict with the rail crossing would receive a red (i.e. stop) signal.

It is noted that the assessment and application of grade crossing warrants assumes train activity of 0.57 trains per day (i.e. 4 trains per week). While the Welham Road crossing would not warrant a warning system until 2031 based on the projected traffic volumes and assumed train activity; such would be recommended under existing conditions in order to mitigate sight line constraints.

All improvements noted within this report are to be confirmed during the detailed design stage.
Grade Crossing Locations

Bayview Drive Crossing

Welham Road Crossing
Bayview Drive Crossing – north road approach (looking south)
Bayview Drive Crossing – south road approach (looking north)
Bayview Drive Crossing – west rail approach (looking east)
Bayview Drive Crossing – west rail approach (looking west)
Bayview Drive Crossing – east rail approach (looking west)
Bayview Drive Crossing – east rail approach (looking east)
Bayview Drive Crossing – northeast quadrant
Bayview Drive Crossing – southwest quadrant
Bayview Drive Crossing – southeast quadrant
Bayview Drive Crossing – double stop bar (north approach)
Bayview Drive Crossing – railway crossing sign (north approach)
Bayview Drive Crossing – crossing surface extension (west)
Bayview Drive Crossing – crossing surface extension (east)
Bayview Drive Crossing – railway crossing pavement marking (north approach)
Bayview Drive Crossing – railway crossing ahead on crossroad signage on Big Bay Point Road (west of Bayview Drive)
Bayview Drive Crossing – vehicles stopping beyond stop bars and queuing over tracks
APPENDIX A:
FIELD DATA FORMS — BAYVIEW DRIVE
Appendix C1: FIELD DATA FORMS

Passive Crossings
**Grade Crossing Safety Assessment**

**Passive Crossings**

**Date of Assessment:** July 15, 2015

**Assessment Team Members & Affiliations:** David Perks

Reason for Assessment:
- periodic assessment
- cessation of whistling
- change in vehicle types
- significant change in infrastructure
- significant change in train operations
- 2+ fatal collisions in 5yr. period
- significant change in road or rail volumes
- significant change in road or rail speeds
- other collision experience (see below)

**Railway Authority:** City of Barrie (BCRY)

**Crossing Location:**

**Location Number:**

**Municipality:** City of Barrie

**Railway:**

**Mile:**

**Sub-division:**

**Spur:**

**Type of Grade Crossing:** [SRC] FLB, FLBG

**Track Type:** [mainline, etc.] SHORTLINE SPUR

**Road Authority:** City of Barrie

**Road Name / Number:** Bayview Drive

**Province:** ON

**Location Reference (control section, etc.):** North of Big Bay Point Road

**Road Classification**
- freeway/expressway arterial, collector, local, etc.:
  - Major Collector

**Collision History (5-year period):**

- Property Damage collisions: ______
- + Personal Injury collisions: ______
- + Fatal Injury Collisions: ______
- Total Collisions in last 5 year period: ______

Number of Persons Injured: ______

Number of Persons Killed: ______

**Provide Details of the collisions and any remedial measures taken if available:**

*Not Addressed*

- identify main contributing factors
- attach collision diagrams if available
- as a minimum, take pictures all road/rail approaches and each quadrant

- key the orientation of pictures to the scene sketch (Sheet 2a)
NOTE: All references to direction in this safety review are keyed to this diagram.

Include:
- directions to nearby municipalities for both road & rail approaches (use arrows)
- adjacent intersections
- landmarks
- geographical features
- relevant road signs/signals
- crosswalks/paths
- bus stops, etc.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Daily Train Volume: $\frac{\text{675}}{0.57} = \frac{7275}{0} \text{ (freight trains/day)}$</td>
<td>Sect. 2.1</td>
</tr>
<tr>
<td>Rail</td>
<td>Switching during daytime? Y/N nighttime? Y/N</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Avg. Annual Daily Traffic, AADT $= \frac{\text{5700}}{0} \text{ (vpd)}$</td>
<td>Year of count: 2014</td>
</tr>
<tr>
<td>Road</td>
<td>High seasonal fluctuation in volumes? No</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Pedestrian Volumes = (ped./day)</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Is crossing on a School Bus route? Yes</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Do Dangerous Goods trucks use this roadway? ROAD SERIES SOME INDUSTRY, SO DG IS LIKELY.</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Cyclist Volumes = (cyclists/day)</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Regular use of crossing by persons with Assistive Devices? No</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Other special road users? type daily volume</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Forecasted AADT² $= \frac{5700}{10} \text{ (vpd)}$ Forecast Year: 2021-2031</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Design Speed: $70 \text{ km/h}$</td>
<td>Posted Speed: $50 \text{ km/h}$</td>
</tr>
<tr>
<td>Road</td>
<td>Maximum Operating Speed: $50 \text{ km/h}$</td>
<td>note: provide details if all approaches are not the same</td>
</tr>
<tr>
<td>Road</td>
<td>Road Surface Type (asphalt, concrete, gravel, etc.): ASPHALT</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Surrounding Land Use: COMMERCIAL, INDUSTRIAL Urban / rural? RURAL</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Any schools, retirement homes, etc. nearby? HIGH SCHOOL</td>
<td>Recreation Centre Located Approx. 1.2 km North of crossing.</td>
</tr>
<tr>
<td>Notes:</td>
<td>✓ indicates information should be confirmed by field observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Road Authority should provide plans if available.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Forecast AADT until next assessment if significant developments are expected or if a planned bypass may reduce volumes.</td>
<td></td>
</tr>
</tbody>
</table>

*SPUR IS CURRENTLY INACTIVE THROUGH THE AREA.*

*W*HEN *ACTIVE*: 2 TRAINS PER WEEK (4 CROSSINGS) 4/7 = 0.57

INFO PROVIDED BY CITY.
Table 4-6: Ratios of Acceleration Times on Grades

<table>
<thead>
<tr>
<th>Design Vehicle</th>
<th>Road Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-4</td>
</tr>
<tr>
<td>Passenger Car</td>
<td>0.7</td>
</tr>
<tr>
<td>Single Unit Truck and Buses</td>
<td>0.8</td>
</tr>
<tr>
<td>Tractor- Semitrailer</td>
<td>0.8</td>
</tr>
</tbody>
</table>
### DESIGN CONSIDERATIONS

#### Source

**Design Vehicle**

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Road</strong></td>
<td>T 4-1</td>
</tr>
<tr>
<td>Type: <strong>B-TRAIN DUTIES (COMBINATION TRUCK)</strong></td>
<td>T 4-1</td>
</tr>
<tr>
<td><strong>look-up</strong> Length, ( L = 25 ) m</td>
<td>T 4-1</td>
</tr>
</tbody>
</table>

#### look-up

**Stopping Sight Distance, SSD**

\[ S = 110 \text{ m} \]

**measure** Clearance Distance, \( cd \)

\[ cd = 13.4 \text{ m} \]

**calculate** Vehicle Travel Distance:

\[ S = L + cd = 38.4 \text{ m} \]

**Road Grade Effect:**

**Road ✓**

maximum approach grade within 'S':

\[ = \pm 0 \% \]

**calculate** Design Vehicle Departure Time, \( Td = J + T + K \)

\[ Td = 1 + 2 = 14.50 \text{ sec} \]

where \( J = 2 \text{ sec perception & reaction} \)

where \( K = \text{additional time due to crossing conditions} \)

**observe** Do field acceleration times exceed \( Td \)?

**No**

**look-up** Pedestrian, cyclist & Assistive Devices Departure Time

\[ Tp = 1.0 \text{ sec} \]

\( ✓ \) indicates information should be confirmed by field observation

---

<table>
<thead>
<tr>
<th>Class</th>
<th>General Vehicle Descriptions</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Car</td>
<td>1. Passenger Cars, Vans, and Pickups (P)</td>
<td>5.6</td>
</tr>
<tr>
<td>Trucks</td>
<td>2. Light Single-Unit Trucks</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>3. Medium Single-Unit Trucks</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>4. Heavy Single-Unit Trucks</td>
<td>11.5</td>
</tr>
<tr>
<td>Tractor Trailers</td>
<td>5. WB-19 Tractor-Semitrailers</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>6. WB-20 Tractor-Semitrailers</td>
<td>22.7</td>
</tr>
<tr>
<td>Combination Vehicles</td>
<td>7. A-Train Doubles (ATDD)</td>
<td>24.5</td>
</tr>
<tr>
<td></td>
<td>8. B-Train Doubles (BTDD)</td>
<td>25.0</td>
</tr>
<tr>
<td>Buses</td>
<td>9. Standard Single-Unit Buses (B-12)</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>10. Articulated Buses (A-BUS)</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>11. Intercity Buses (I-BUS)</td>
<td>14.0</td>
</tr>
</tbody>
</table>

#### Table 4-5: Stopping Sight Distances (SSD)

<table>
<thead>
<tr>
<th>Maximum Road Operating Speed (km/h)</th>
<th>Passenger Car Class (m)</th>
<th>Truck Class (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>50</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>60</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>70</td>
<td>110</td>
<td>160</td>
</tr>
<tr>
<td>80</td>
<td>140</td>
<td>190</td>
</tr>
<tr>
<td>90</td>
<td>170</td>
<td>220</td>
</tr>
<tr>
<td>100</td>
<td>210</td>
<td>260</td>
</tr>
<tr>
<td>110</td>
<td>250</td>
<td>300</td>
</tr>
</tbody>
</table>

#### Table 4-7: Departure Time - Pedestrians, Cyclists, Persons Using Assistive Devices

<table>
<thead>
<tr>
<th>Clearance Distance (m)</th>
<th>Departure Time (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>7.6</td>
</tr>
<tr>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>30</td>
<td>25</td>
</tr>
</tbody>
</table>

---

Passive Crossings C1.9
Figure 5-1: Restrictions on the Proximity of Intersections and Entranceways to Unrestricted Grade Crossing

NOTE:
D not less than 30 m where the maximum railway operating speed exceeds 15 mph.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>observe</td>
<td>“D” should not be less than 30m for either approach if the train speed exceeds 15 mph.</td>
<td>Fig 5-1</td>
</tr>
<tr>
<td>observe</td>
<td>Are there pedestrian crossings on either road approach that could cause vehicles to queue back to the tracks?</td>
<td>YES (No painted crossings but red signals on all crossings)</td>
</tr>
<tr>
<td>observe</td>
<td>Is “D” insufficient such that road vehicles might queue onto the rail tracks?</td>
<td>See Notes Below</td>
</tr>
<tr>
<td>observe</td>
<td>Is “D” insufficient such that road vehicles turning from a side street might not see warning devices for the crossing?</td>
<td>-comment below</td>
</tr>
</tbody>
</table>

Comments Following Site Visit:

D = 13.5 m: Insufficient for train speed exceeding 15 mph. However, train operating speeds on spur are limited to 10 mph. Furthermore, trains operate under stop and proceed. On the north approach, a double stop bar is painted on the road in advance of the tracks. There are no “DO NOT BLOCK TRACKS” signs present.

On a red signal, southbound vehicles on Bayview Drive are to stop at the double stop bar in advance of the tracks, thus queueing should theoretically not occur. Observations in the field indicate that some motorists stop beyond the tracks, occasionally blocking the tracks. Instances of vehicles blocking the track were fener than observed at Welham Crossing.

Pedestrian volumes are currently low at this intersection (no pedestrians were observed during assessment).

Queueing over tracks most likely to occur when SB left turning vehicles are pre-empted by NB through traffic. SB advance green limits queueing.
Figure 6-1: Grade Crossing Surface - Plan View

a) ROAD, INCLUDING A PATH OR TRAIL

b) SIDEWALK, PATH, OR TRAIL ALONGSIDE A ROAD

Figure 6-2: Grade Crossing Surface - Cross Section

<table>
<thead>
<tr>
<th>Flangeway:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width:</td>
<td>65-75 mm</td>
</tr>
<tr>
<td>Maximum wear limit:</td>
<td>76 mm</td>
</tr>
<tr>
<td>Grade crossings regularly used by a person using an assistive device:</td>
<td>100 mm</td>
</tr>
<tr>
<td>All other grade crossings:</td>
<td>130 mm</td>
</tr>
<tr>
<td>Depth:</td>
<td>50 mm</td>
</tr>
<tr>
<td>Minimum:</td>
<td></td>
</tr>
<tr>
<td>Maximum: Urban areas and any other grade crossing regularly used by a person using an assistive device:</td>
<td>75 mm</td>
</tr>
<tr>
<td>All other grade crossings:</td>
<td></td>
</tr>
</tbody>
</table>

b) Space for Field Side Rail Grinding:
A space is permitted on the outer side of the rail at locations where there is frequent rail grinding, except for grade crossings regularly used by a person using an assistive device.

Maximum width: 50 mm
Minimum depth: 38 mm

Elevation of Top of Rail with respect to the Crossing Surface:
The top of rail shall be installed as close as possible to the crossing surface, with the exception of a grade crossing regularly used by a person using an assistive device, where the top of rail may be installed above the crossing surface within the wear limit.

Wear Limits:
Any route identified for regular use by a person using an assistive device:

Maximum distance above crossing surface: +13 mm
Minimum distance below crossing surface: -7 mm
Unweighted grade crossings for vehicle use, and other grade crossings used regularly by passenger cars, trucks other than off-road trucks, and recreational vehicles:

All other grade crossings: +50 mm
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is the crossing smooth enough to allow road vehicles, pedestrians, cyclists, and other road users to cross at their normal speed without consequence?</td>
<td>-comments below</td>
</tr>
<tr>
<td></td>
<td>Grade Crossing Surface Material: (e.g., asphalt, wood, concrete, rubber, etc.)</td>
<td>ASPHALT</td>
</tr>
<tr>
<td>observe</td>
<td>Approach Road Surface Type:</td>
<td>ASPHALT</td>
</tr>
<tr>
<td></td>
<td>Approach Road Surface Condition:</td>
<td>STREET LIGHTING</td>
</tr>
<tr>
<td></td>
<td>Roadway Illumination?:</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>note: measured at right angle to roadway centre line</td>
<td>Fig 6-1</td>
</tr>
<tr>
<td>measure</td>
<td>Road Surface crossing width =</td>
<td>19.8 m (note: min. = 8m)</td>
</tr>
<tr>
<td>measure</td>
<td>Road Surface extension beyond travel lanes</td>
<td>0.5 m N/E approach = 2.0 m S/W approach (note: min. = 0.5m)</td>
</tr>
<tr>
<td>measure</td>
<td>Sidewalk/Path/Trail crossing width =</td>
<td>N/A m (note: min. = 1.5m)</td>
</tr>
<tr>
<td>measure</td>
<td>Sidewalk/Path/Trail extension beyond sidewalk</td>
<td>N/A m N/E approach = N/A m S/W approach (note: min. = 0.5m)</td>
</tr>
<tr>
<td>measure</td>
<td>Distance Between Travel Lane and Sidewalk =</td>
<td>N/A m</td>
</tr>
<tr>
<td></td>
<td>Cross-Section:</td>
<td></td>
</tr>
<tr>
<td>measure</td>
<td>Flangeway width =</td>
<td>N/A mm (note: max. = 76 or 100mm)</td>
</tr>
<tr>
<td>measure</td>
<td>Flangeway depth =</td>
<td>N/A mm (note: min. = 50mm/ max. =76mm or none)</td>
</tr>
<tr>
<td>measure</td>
<td>Side Grinding width =</td>
<td>N/A mm (note: max. = 50mm or 0')</td>
</tr>
<tr>
<td>measure</td>
<td>Side Grinding depth =</td>
<td>N/A mm (note: min. = 38mm)</td>
</tr>
<tr>
<td>measure</td>
<td>Elevation of Top Rail above road surface =</td>
<td>SEE NOTES mm (note: max. = 13mm, 25mm, or 50mm)</td>
</tr>
<tr>
<td>measure</td>
<td>Elevation of Top Rail below road surface =</td>
<td>SEE NOTES mm (note: min. = -7mm, -25mm, or -50mm)</td>
</tr>
</tbody>
</table>

1. if frequent use by persons using assistive devices

**Comments Following Site Visit:**

Top of rail is slightly higher than elevation of asphalt crossing surface.

Asphalt surface on approach is in good condition.

Road surface extension beyond travel lanes (West)

- rough crossing surface, loose timbers, etc.
- surface distress of roadway approaches
- photos
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>observe</td>
<td>Are horizontal and vertical alignments smooth and continuous throughout SSD?</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: □</td>
<td>S / W Approach: □</td>
</tr>
<tr>
<td>observe</td>
<td>Is horizontal alignment straight beyond rails for a distance ≥ design vehicle length, L (see form 4)?</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: □</td>
<td>S / W Approach: □</td>
</tr>
<tr>
<td>observe</td>
<td>Are the road lanes at least the same width on the crossing as on the road approaches?</td>
<td>Sect. 7-5</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: □</td>
<td>S / W Approach: □</td>
</tr>
<tr>
<td>Grades</td>
<td>Slope within 8m of nearest rail = ( &lt; 2 \cdot 0 % ) (on N / E approach) (max. = 2%)</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td>measure</td>
<td>Slope within 8m of nearest rail = ( &lt; 2 \cdot 0 % ) (on S / W approach) (max. = 2%)</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td>measure</td>
<td>Slope between 8m &amp; 18m of nearest rail = ( &lt; 2 \cdot 0 % ) (on N / E approach) (max. = 5 or 10%)</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td>measure</td>
<td>Slope between 8m &amp; 18m of nearest rail = ( &lt; 2 \cdot 0 % ) (on S / W approach) (max. = 5 or 10%)</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td>measure</td>
<td>If crossing is only for pedestrians, cyclists, or persons using assistive devices: slope within 5m of nearest rail = ( N / A % ) (max. = 1 or 2%)</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td></td>
<td>General approach grade = ( &lt; 2 \cdot 0 % )</td>
<td>N / E</td>
</tr>
<tr>
<td></td>
<td>( = &lt; 2 \cdot 0 % )</td>
<td>S / W</td>
</tr>
<tr>
<td>observe</td>
<td>Are rail tracks super-elevated? Y / N</td>
<td>Rate of s-o: ______ m/m</td>
</tr>
<tr>
<td>Road ( \checkmark )</td>
<td>If train speeds exceed 15mph: what is the angle between the crossing and the roadway? = ( N / A ) degrees</td>
<td>Sect. 7.6</td>
</tr>
<tr>
<td>observe</td>
<td>Condition of Road Approaches: (e.g., anything that might affect stopping or acceleration)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( \checkmark )</td>
<td></td>
</tr>
<tr>
<td>observe</td>
<td>Is there any evidence that &quot;low bed&quot; trucks have difficulty negotiating the crossing (i.e., might they bottom-out or get stuck)? Y / N</td>
<td></td>
</tr>
</tbody>
</table>

\( \checkmark \) indicates information should be confirmed by field observation

Comments Following Site Visit:

---

Passive Crossings C1.15
**Figure 8-1: Minimum Sightlines - Grade Crossings Without A Grade Crossing Warning System**

(A) Minimum Sightlines for Drivers Approaching a Grade Crossing

(B) Minimum Sightlines for Drivers Stopped at the Grade Crossing

(C) Minimum Sightlines for Pedestrians and Cyclists Stopped at the Grade Crossing
Driver Eye Height = 1.05m passenger vehicles, pedestrians, cyclists & assistive devices  
= 1.80m buses & straight trucks  
= 2.10m large trucks & tractor-trailers  
Target Height = 1.20m above rails

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
</table>
| observe | Are sightlines within the rail R.O.W. clear of bushes/vegetation; 15 m on each side of the track and, 30 m along the track, on each side of the crossing?  
-if no detail the location | Sect. 8-1 |
| look up | SSD minimum = 110 m (from sheet #4) | Sect. 8.1 |
| measure | SSD actual: N / E approach = 7300 m  
S / W approach = 7300 m | Sect. 8.5 |

**Warning:** some formulae are based on Imperial units while others are Metric

| calculate | D_{SSD} minimum (ft) = 1.47V_t x T_{SSD}  
T_{SSD} is the greater of:  
[(SSD+cd+L)/0.28V_t]  
or 10 seconds  
\[V_{t}=\text{max. road operating speed in km/h}\]  
\[T_{SSD} = \frac{110+15\cdot\frac{t}{25}}{6.28\cdot50} = 10.6\]  
D_{SSD} minimum = 156 ft  
48 m (calculate or use Table 8-1) | T 8-1 |
| D_{SSD} actual:  
N / E approach = 10 m (to driver's left);  
S / W approach = 125 m (to driver's left);  
= 10 m (to driver's right) | Fig 8-1 |
| calculate | D_{STOPPED} minimum (ft) = 1.47V_t x T_d  
with T_d from sheet #4 | Sect. 8.5 |
| D_{STOPPED} minimum = 213 ft  
65 m (calculate or use Table 8-1) | T 8-1 |
| D_{STOPPED} actual:  
N / E approach = 135 m (to driver's left);  
S / W approach = 140 m (to driver's left);  
= 10 m (to driver's right) | Fig 8-1 |
| look up | Ped./Cyclist D_{STOPPED} (m) \[= 50 \text{ using Table 8-1 and Tp (from sheet #4)} \] | T 4-7 |
| measure | Ped./Cyclist D_{STOPPED} Actual:  
N / E approach = 35 m (to cyclist's left);  
S / W approach = 40 m (to cyclist's left);  
= 50 m (to cyclist's right) | Fig 8-1 |
| observe | Are there any obstacles within the sight triangles (Figure 8-1) other than traffic signs/utility poles that might affect visibility?  
VEGETATION, BUILDINGS | Fig 8-1 |
| Consideration should be given to also utilizing the newer methodologies for determining sight distances and clearance times developed by M. Gou, 2003  
http://www.tc.gc.ca/tdc/summary/14100/14172e.htm | [TP14172E] |

Comments Following Site Visit:

D_{SSD} ON NORTH APPROACH (LEFT FRONT OF DRIVER) IS LIMITED BY VEGETATION/TREES  
AND ULTIMATELY BY BUILDINGS.  
D_{SSD} ON SOUTH APPROACH (RIGHT OF DRIVER) LIMITED BY BUILDING.  
D_{STOPPED} DISTANCES LIMITED SOLELY BY TREES/VEGETATION ALONG/ADJACENT TO RAILWAY BOX. REMOVAL WOULD IMPROVE D_{STOPPED} SO THAT MINIMUM IS SATISFIED.

- visibility along the track impaired due to the angle of crossing?  
- special considerations for large trucks?  
- can sightlines be maintained on an ongoing basis? (snow)

**NOTE:** TRAINS ARE REQUIRED TO COME TO A FULL STOP PRIOR TO CROSSING AS PER OPERATING PROCEDURES.
## Source: Railway Crossing Sign

### Item

- **Comment on the following in the field:**
  - Location: [See Diagram Below](#)
  - Height: **North Approach = 2.6m**  **South Approach = 2.5m**

### Observations

- **Retroreflective material on back of crossing signs?** Yes
- **Front & back of posts?** No

### Measurements

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure</strong></td>
<td><strong>N / E Approach: sign = cd/lux/m²</strong> <strong>Post = cd/lux/m²</strong></td>
<td>Fig 9-2</td>
</tr>
<tr>
<td><strong>S / W Approach: sign = cd/lux/m²</strong> <strong>Post = cd/lux/m²</strong></td>
<td>Fig 9-2</td>
<td></td>
</tr>
</tbody>
</table>

### Observations

**Number of Tracks sign?**

### Comments Following Site Visit:

- General condition
- Clear sightlines to the sign
- Posts
- Photos

---

## Source: DO NOT STOP ON TRACK

### Item

- **Road ✓** Does queued traffic routinely encroach closer than 5m from the crossing surface? Yes
- **Observe** Are these signs present on either approach? No

✓ Indicates information should be confirmed by field observation

### Comments Following Site Visit:

- No reflective tape on posts
- Crossing post + sign on south approach is covered with climbing vines during summer months.

---

Passive Crossings C1.19
RAILWAY CROSSING

Stroke Width of "X" to be 300 mm to 500 mm

FIGURE C1-5

JUNE 2001
### Railway Crossing Ahead Sign (WA18-20)

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>look-up</td>
<td>Is AADT &gt; 100? (see sheet #3)</td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>observe</td>
<td>Is area urban such that WA18-20 is not required?</td>
<td><strong>No</strong></td>
</tr>
<tr>
<td>measure</td>
<td>Distance from nearest rail to sign</td>
<td>245 m <strong>N / E approach</strong></td>
</tr>
<tr>
<td></td>
<td>= No symbol</td>
<td><strong>S / W approach</strong></td>
</tr>
<tr>
<td></td>
<td>Location: From edge of traveled way</td>
<td>6.0m (approx)</td>
</tr>
<tr>
<td>observe</td>
<td>Height:</td>
<td><strong>North Approach</strong></td>
</tr>
<tr>
<td>observe</td>
<td>Appropriate orientation of symbol</td>
<td><strong>Yes</strong></td>
</tr>
</tbody>
</table>

**Comment Following Site Visit:**
- Located approximately 125m west of Bayview Drive, on Biabak Point Road
- 110m East
- Located approximately 150m in advance of pavement marking
- General condition: Faded and difficult to read
- Clear sightlines to the sign
- Posts
- Aligned to the driver
- Photos

### Advisory Speed Sign

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADVISORY SPEED SIGN</td>
<td>30 km/h</td>
</tr>
<tr>
<td></td>
<td>Normally used in conjunction with WA18-20 signs if reduced speeds are necessary to provide adequate sight distance.</td>
<td>Sect. A3.2.5 MUTCD</td>
</tr>
<tr>
<td>observe</td>
<td>Are they present on both approaches?</td>
<td><strong>No</strong></td>
</tr>
<tr>
<td></td>
<td>Posted speed limit?</td>
<td></td>
</tr>
<tr>
<td>look-up</td>
<td>Are they required on either approach?</td>
<td><strong>No</strong></td>
</tr>
</tbody>
</table>

**Comment Following Site Visit:**
- N/A
RAILWAY CROSSING

Stroke Width of "X" to be 300 mm to 500 mm

FIGURE C1-5
### Source: STOP SIGN AHEAD

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Sect. A3.6.1 MUTCD</td>
</tr>
</tbody>
</table>

- **Is sign present on either approach?**
- **Is sign required on either approach?**
- **Is there an advisory tab with a track symbol present?**
- **What is the distance from the nearest rail to the sign?**
  - m N/E approach
  - m S/W approach

#### Comments Following Site Visit:

- N/A
- General condition
- Clear sightlines to the sign
- Posts
- Aligned to the driver
- Photos

---

### Source: STOP SIGN

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Sect. A2.2.1 MUTCD</td>
</tr>
</tbody>
</table>

- **Is sign present on either approach?**
- **Is sign required on either approach?**
- **Are signs mounted on same post as Railway Crossing Signs?**
- **What is the distance from the nearest rail to the sign?**
  - m N/E approach
  - m S/W approach

#### Comments Following Site Visit:

- N/A
- General condition
- Clear sightlines to the sign
- Position
- Posts
- Aligned to the driver
- Photos
RAILWAY CROSSING

Stroke Width of "X" to be 300 mm to 500 mm

FIGURE C1-5
### PAVEMENT MARKINGS

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Are pavement markings consistent with those from the MUTCD Manual?</td>
<td>No (see Diagram)</td>
</tr>
<tr>
<td></td>
<td>observe</td>
<td>MUTCD</td>
</tr>
<tr>
<td></td>
<td>Are there lines to delineate sidewalks/paths?</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sect. 9.7</td>
</tr>
</tbody>
</table>

**Comments Following Site Visit:**

1. Too far in advance of 'X' marking.
2. 'X' marking has minor dimension variances from Fig C1-5.
3. No 'X' marking on south approach.
4. No stop bars on south approach due to proximity of Big Bay Point Road.

- general condition of markings
- are centerlines or stop lines present?
- width of markings?
- provincial practice not to use X?

**General Comments Regarding Signs & Pavement Markings:**

- special sign required?
- missing signs
- visual clutter
- obscured view / sightlines
- retroreflectivity levels at night

---

Passive Crossings C1.25
Figure 10-1: Train Illumination: Grade Crossings without Grade Crossing Warning Systems

Plan View

Height to be covered by luminaire
### Sheet 10

**TRAIN ILLUMINATION**

(only for crossings without warning systems)

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flood lighting is required if <strong>all</strong> of the following exist:</td>
<td>sec 10.1</td>
</tr>
<tr>
<td></td>
<td>- unrestricted grade crossing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- road speed limit is ≥ 50 km/h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- routinely equipment on rails after dark is either stopped or traveling # 15 mph</td>
<td></td>
</tr>
<tr>
<td>observe</td>
<td>Are luminaires required?</td>
<td><strong>No</strong> - SPUR IS INACTIVE, OPERATING SPEED LIMIT (when active)</td>
</tr>
<tr>
<td></td>
<td>Are luminaires present on both approaches?</td>
<td><strong>No</strong></td>
</tr>
</tbody>
</table>

**Comments Following Site Visit:**

- general condition of luminaires
- visibility at night
- adjacent commercial lighting?
- appropriate orientation of lights?
Figure 11-1: Proximity of Grade Crossing Warning Systems to Stop Signs and Traffic Signals

a) NEAR STOP SIGNS

NOTES:
Where the maximum railway operating speed exceeds 15 mph:
- if $D$ is less than 30 m, a grade crossing warning system including gates is required;
- if $D$ is 30 m or greater, a grade crossing warning system including gates is required unless a traffic study indicates that traffic will not normally queue to within 2.4 m of the rail nearest the road intersection. For grade crossings or road intersections nearby an existing grade crossing, where the maximum railway operating speed exceeds 15 mph:

b) NEAR TRAFFIC SIGNALS

NOTES:
For grade crossings or road intersections nearby an existing grade crossing, where the maximum railway operating speed exceeds 15 mph:
- if $D$ is less than 60 m, a grade crossing warning system including gates is required;
- if $D$ is 60 m or greater, a grade crossing warning system including gates is required unless a traffic study shows that traffic will not queue to within 2.4 m of the rail nearest the road intersection.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Warning System Warrants</strong></td>
<td>Sect. 11.1 &amp; 11.2</td>
</tr>
<tr>
<td></td>
<td>-if any of A through E below are met, then a warning system is warranted</td>
<td></td>
</tr>
<tr>
<td>look-up</td>
<td>Existing AADT = 7275 Forecast AADT = 10,100 (if available)</td>
<td>sheet 3</td>
</tr>
<tr>
<td>look-up</td>
<td>Daily Train Volume = 0.57 (2 trains per week or 4 crossings per week when active)</td>
<td>sheet 3</td>
</tr>
<tr>
<td>calculate</td>
<td><strong>A. Cross-Product = ( \frac{4147 \times 6350 (\text{active})}{1,000 \text{ min.}} )</strong></td>
<td>Sect. 11.1</td>
</tr>
<tr>
<td>look-up</td>
<td><strong>B. Maximum Rail Operating Speed = 10 mph</strong></td>
<td>sheet 3</td>
</tr>
<tr>
<td></td>
<td>(max = 80 mph or 60 mph with crosswalk)</td>
<td></td>
</tr>
<tr>
<td>Rail ✓</td>
<td><strong>C. Number of Tracks = 1</strong></td>
<td>Sect. 11.1</td>
</tr>
<tr>
<td></td>
<td>...........if ( \geq 2 ), can trains pass one another?</td>
<td></td>
</tr>
<tr>
<td>look up</td>
<td><strong>D. Are Sightlines obscured? (see form 8)</strong></td>
<td>Sect. 8.3</td>
</tr>
<tr>
<td></td>
<td><strong>YES</strong></td>
<td></td>
</tr>
<tr>
<td>observe</td>
<td><strong>E. Is at least one of the proximity conditions met to warrant a warning system?</strong></td>
<td>Fig. 11-1</td>
</tr>
</tbody>
</table>

✓ indicates information should be confirmed by field observation

**Comments Following Site Visit:**

```
RAIL SPUR OPERATES AS 'STOP! PROCEED' WHEN ACTIVE.
```

extraordinary conditions why warning system should be installed ——on a school bus route?
Table 16-1: Requirements for Public Grade Crossings Within an Area Without Train Whistling

<table>
<thead>
<tr>
<th>Maximum Railway Operating Speed</th>
<th>Grade Crossings for Vehicle Use</th>
<th>Grade Crossings Exclusively for Pedestrians, Cyclists or Assistive Devices; and Sidewalks, Paths, or Trails with the centreline no closer than 3.6 m (12 ft) to a warning signal for vehicles (Refer to Figure 13-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Tracks</td>
<td>No. of Tracks</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2 or more</td>
</tr>
<tr>
<td>Stop &amp; proceed</td>
<td>Manual protection or FLB</td>
<td>Manual protection or FLB</td>
</tr>
<tr>
<td>Up to 15 mph</td>
<td>FLB</td>
<td>FLB or FLB &amp; G (Note 1)</td>
</tr>
<tr>
<td>16 - 49 mph</td>
<td>FLB or FLB &amp; G (Note 2)</td>
<td>FLB &amp; G</td>
</tr>
<tr>
<td>50 mph or more</td>
<td>FLB &amp; G</td>
<td>FLB &amp; G</td>
</tr>
<tr>
<td>Where:</td>
<td>Manual protection is by a member of the train crew in accordance with the Canadian Rail Operating Rules. FLB is a grade crossing warning system consisting of flashing lights and a bell. FLB &amp; G is a grade crossing warning system consisting of flashing lights, gates, and a bell.</td>
<td></td>
</tr>
</tbody>
</table>

Passive Crossings C1.30
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Is train whistling prohibited at this crossing? 24 hours?</td>
<td>sec 16.1</td>
</tr>
<tr>
<td>Observe</td>
<td>Is there evidence of routine unauthorized access (trespassing) on the rail line in the area of the crossing?</td>
<td>sec 16.7</td>
</tr>
<tr>
<td>Observe</td>
<td>Are the requirements of Table 16-1 met?</td>
<td>sec 16.2</td>
</tr>
</tbody>
</table>

Comments Following Site Visit:

*Not Addressed*
Additional Prompt Lists

Human Factors:

- Control device visibility / background visual clutter.
- Driver workload through this area (i.e., are there numerous factors that simultaneously require the driver's attention such as traffic lights, pedestrian activity, merging/entering traffic, commercial signing, etc.).
- Driver expectancy of the environment (i.e., are the control measures in keeping with the design levels of the road system and adjacent environment).
- Need for positive guidance.
- Conflicts between road and railway signs and signals.

Environmental Factors:

- Extreme weather conditions.
- Lighting issues (night, dawn/dusk, tunnels, adjacent facilities, headlight or sunlight glare, etc.).
- Landscaping or vegetation.
- Integration w/ surrounding land use (e.g., parked vehicles blocking sightlines, merging traffic lanes, etc.)

All Road Users:

- Have needs of the following been met:
  - pedestrians (including strollers, baby carriages, and blind persons)
  - children / elderly
  - assistive devices (wheelchairs, scooters, walkers, etc)
  - bicyclists
  - motorcyclists
  - over-sized trucks
  - buses
  - recreational vehicles
  - golfcarts
  - hazardous materials

- Significant volume of pedestrians requiring special safety measures:
  (maze barriers/guide fencing, sign indicating potential presence of 2nd train at a multi track crossing, etc)

Other:

- Should closure of the crossing be considered due to inactivity, presence of nearby adjacent crossings, etc.

Comments Following Site Visit:
APPENDIX B:
FIELD DATA FORMS — WELHAM CROSSING
Appendix C1: **FIELD DATA FORMS**

Passive Crossings
Sheet 1

Grade Crossing Safety Assessment

Passive Crossings

Date of Assessment: July 15th, 2015
Assessment Team Members & Affiliations: David Peeks

Reason for Assessment: ✔ periodic assessment
- cessation of whistling
- change in vehicle types
- significant change in infrastructure
- significant change in train operations
- 2+ fatal collisions in 5yr. period
- significant change in road or rail volumes
- significant change in road or rail speeds
- other collision experience (see below)

Railway Authority: City of Barrie (BCRY)
Crossing Location:
Location Number:
Municipality: City of Barrie
Railway:
Mile:
Sub-division:
Spur:
Type of Grade Crossing: SRC2, FL, FLB, FLBG
Track Type: [mainline, etc.] Shortline spur

Road Authority: City of Barrie
Road Name / Number: Welham Road
Province: ON
Location Reference (control section, etc.):
North of Bly Bay Point Road
Road Classification
(freeway/expressway arterial, collector, local, etc.):
Local

Collision History (5-year period):

Property Damage collisions: ____
+ Personal Injury collisions: ____
+ Fatal Injury Collisions: ____
= Total Collisions in last 5 year period: ____

Number of Persons Injured: ____
Number of Persons Killed: ____

Provide Details of the collisions and any remedial measures taken if available:

NOT ADDRESSED

- identify main contributing factors
- attach collision diagrams if available

Passive Crossings C1.3
- as a minimum, take pictures all road/rail approaches and each quadrant
- key the orientation of pictures to the scene sketch (Sheet 2a)
NOTE: All references to direction in this safety review are keyed to this diagram.

Include:
- directions to nearby municipalities for both road & rail approaches (use arrows)
- adjacent intersections - landmarks - geographical features
- relevant road signs/signals - crosswalks/paths - bus stops, etc.
### General Information

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Maximum Railway Operating Speed, $V_T = 10$ (mph)</td>
<td>Sect. 2.1</td>
</tr>
<tr>
<td>Rail</td>
<td>Daily Train Volume: $= 0.57 *$ (freight trains/day) $= 0$ (passenger trains/day)</td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td>Switching during daytime? Y/N nighttime? Y/N</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Avg. Annual Daily Traffic, AADT = 2750 (vpd) Year of count: 2013</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>High seasonal fluctuation in volumes? NO</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Pedestrian Volumes = (ped./day)</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Is crossing on a School Bus route? NO</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Do Dangerous Goods trucks use this roadway? ROAD SEEMS INDUSTRIAL AREA SO SOME DANGEROUS GOODS LIKELY</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Cyclist Volumes = (cyclists/day)</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Regular use of crossing by persons with Assistive Devices? NO</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Other special road users? type daily volume</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Forecasted AADT$^2$ = 3000 to 2500 (vpd) Forecast Year: 2021 &amp; 2031</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Design Speed: Max Operating Speed: 70 km/h Posted Speed: 50 km/h note: provide details if all approaches are not the same</td>
<td>Sect. 2.1</td>
</tr>
<tr>
<td>Road</td>
<td>Road Surface Type (asphalt, concrete, gravel, etc.): ASPHALT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surrounding Land Use: COMMERCIAL, INDUSTRIAL Urban / rural? RURAL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any schools, retirement homes, etc. nearby?</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- ✓ indicates information should be confirmed by field observation

1. Road Authority should provide plans if available.
2. Forecast AADT until next assessment if significant developments are expected or if a planned bypass may reduce volumes.

*Spur is currently inactive, through area.
2 trains per week (4 crossings) as per city $4/7 = 0.57$
Table 4-6: Ratios of Acceleration Times on Grades

<table>
<thead>
<tr>
<th>Design Vehicle</th>
<th>Road Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-4</td>
</tr>
<tr>
<td>Passenger Car</td>
<td>0.7</td>
</tr>
<tr>
<td>Single Unit Truck and Buses</td>
<td>0.8</td>
</tr>
<tr>
<td>Tractor-Semitrailer</td>
<td>0.8</td>
</tr>
</tbody>
</table>
### Design Considerations

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td><strong>B-Train Distance (Combination Truck)</strong></td>
<td>T 4-1</td>
</tr>
<tr>
<td>look-up</td>
<td>Length, L = 25 m</td>
<td>T 4-1</td>
</tr>
<tr>
<td>look-up</td>
<td>Stopping Sight Distance, SSD = 110 m</td>
<td>T 4-5</td>
</tr>
<tr>
<td>measure</td>
<td>Clearance Distance, cd = 9.6 m</td>
<td>Fig 4-1</td>
</tr>
<tr>
<td>calculate</td>
<td>Vehicle Travel Distance: S = L + cd = 34.6 m</td>
<td>Sect. 4.6</td>
</tr>
<tr>
<td>look-up</td>
<td>Vehicle Departure Time, t = 11.75 sec</td>
<td>Fig 4-2</td>
</tr>
<tr>
<td></td>
<td><strong>Road Grade Effect:</strong></td>
<td></td>
</tr>
<tr>
<td>look-up</td>
<td>maximum approach grade within 'S': = ± 0%</td>
<td></td>
</tr>
<tr>
<td>calculate</td>
<td>grade adjustment factor = 1.0</td>
<td>T 4-6</td>
</tr>
<tr>
<td>calculate</td>
<td>Td = t x adjustment factor = 11.75 sec</td>
<td></td>
</tr>
<tr>
<td>calculate</td>
<td>Design Vehicle Departure Time, Td = J + T + K where J = 2 sec perception &amp; reaction</td>
<td>Sect. 4.7</td>
</tr>
<tr>
<td>calculate</td>
<td>Td =</td>
<td>13.75 sec</td>
</tr>
<tr>
<td>observe</td>
<td>Do field acceleration times exceed Td? No</td>
<td></td>
</tr>
<tr>
<td>look-up</td>
<td>Pedestrian, cyclist &amp; Assistive Devices Departure Time Tp = 7.9 sec</td>
<td>T 4-7</td>
</tr>
</tbody>
</table>

✓ indicates information should be confirmed by field observation

### Table 4-1: General Vehicles

<table>
<thead>
<tr>
<th>Class</th>
<th>General Vehicle Descriptions</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Car</td>
<td>1. Passenger Cars, Vans, and Pickups (P)</td>
<td>5.6</td>
</tr>
<tr>
<td>Trucks</td>
<td>2. Light Single-Unit Trucks</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>3. Medium Single-Unit Trucks</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>4. Heavy Single-Unit Trucks</td>
<td>11.5</td>
</tr>
<tr>
<td>Tractor Trailers</td>
<td>5. WB-19 Tractor-Semitrailers</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>6. WB-20 Tractor-Semitrailers</td>
<td>22.7</td>
</tr>
<tr>
<td>Combination Vehicles</td>
<td>7. A-Train Doubles (ATD)</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>8. B-Train Doubles (BTD)</td>
<td>25.0</td>
</tr>
<tr>
<td>Buses</td>
<td>9. Standard Single-Unit Buses (B-12)</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>10. Articulated Buses (A-BUS)</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>11. Intensity Buses (I BUS)</td>
<td>14.9</td>
</tr>
</tbody>
</table>

### Table 4-5: Stopping Sight Distances (level grade, on wet pavement and gravel surfaces)

<table>
<thead>
<tr>
<th>Maximum Road Operating Speed (km/h)</th>
<th>Passenger Car Class (m)</th>
<th>Truck Class (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>50</td>
<td>65</td>
<td>110</td>
</tr>
<tr>
<td>70</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>80</td>
<td>110</td>
<td>180</td>
</tr>
<tr>
<td>90</td>
<td>140</td>
<td>210</td>
</tr>
<tr>
<td>100</td>
<td>170</td>
<td>265</td>
</tr>
<tr>
<td>110</td>
<td>210</td>
<td>330</td>
</tr>
<tr>
<td>250</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4-7: Departure Time - Pedestrians, Cyclists, Persons Using Assistive Devices

<table>
<thead>
<tr>
<th>Clearance Distance (m)</th>
<th>Departure Time (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>7.4</td>
</tr>
<tr>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>30</td>
<td>25</td>
</tr>
</tbody>
</table>

Passive Crossings C1.9
Figure 5-1: Restrictions on the Proximity of Intersections and Entranceways to Unrestricted Grade Crossing

NOTE:
D not less than 30 m where the maximum railway operating speed exceeds 15 mph.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>observe</td>
<td>&quot;D&quot; should not be less than 30m for either approach if the train speed exceeds 15 mph.</td>
<td>Fig 5-1</td>
</tr>
<tr>
<td>observe</td>
<td>Are there pedestrian crossings on either road approach that could cause vehicles to queue back to the tracks?</td>
<td>Yes</td>
</tr>
<tr>
<td>observe</td>
<td>Is &quot;D&quot; insufficient such that road vehicles might queue onto the rail tracks?</td>
<td>See Notes Below</td>
</tr>
<tr>
<td>observe</td>
<td>Is &quot;D&quot; insufficient such that road vehicles turning from a side street might not see warning devices for the crossing? -comment below</td>
<td></td>
</tr>
</tbody>
</table>

Comments Following Site Visit:

D = 13.7m 6° INSUFFICIENT FOR TRAIN SPEED EXCEEDING 15 mph.

However, train operating speeds on spur are limited to 10 mph.

On North Approach, a double stop bar is painted on the road in advance of the tracks. A "Do Not Block Tracks" is also present.

On a red signal, southbound vehicles on Welham Rd. are to stop at the stop bar in advance of tracks, thus queuing should theoretically not occur. However, several instances were observed where vehicles stopped beyond the bar and blocked the tracks.

There are pedestrian signal heads on all corners of Welham Big Bay Point intersection. On a green signal, SB vehicles could be caused to queue over tracks as they wait for pedestrians to cross both east/west approaches. Similarly, SB vehicles completing a left turn onto Big Bay Point Rd. could be preempted by NB through volumes, causing potential queue spill back.

Passive Crossings C1.11
RTD Section 6

**Figure 6-1: Grade Crossing Surface - Plan View**

a) **ROAD, INCLUDING A PATH OR TRAIL**

![Diagram of a road including a path or trail]

b) **SIDEWALK, PATH, OR TRAIL ALONGSIDE A ROAD**

![Diagram of a sidewalk alongside a road]

**Figure 6-2: Grade Crossing Surface - Cross Section**

![Diagram of a grade crossing surface cross section]

---

### a) Flangeway:

- **Width:** Installation all grade crossings: 65-78 mm, Maximum wear limit: 75 mm, Grade crossings regularly used by a person using an assistive device: 100 mm, All other grade crossings: 50 mm.
- **Depth:** Minimum: Urban areas and any other grade crossing regularly used by a person using an assistive device: 70 mm, All other grade crossings: none.

### b) Space for Field Side Rail Grinding:

A space is permitted on the outer side of the rail at locations where there is frequent rail grinding, except for grade crossings regularly used by a person using an assistive device.

- **Maximum width:** 50 mm, **Minimum:** 38 mm.

### c) Elevation of Top of Rail with respect to the Crossing Surface:

The top of rail shall be installed as close as possible to the crossing surface, with the exception of a grade crossing regularly used by a person using an assistive device, where the top of rail may be installed above the crossing surface within the wear limit.

- **Wear limits:** Any route identified for regular use by a person using an assistive device: +13 mm, Maximum distance above crossing surface: -7 mm, Minimum distance below crossing surface: +25 mm, Unrestricted grade crossings for vehicle use, and other grade crossings if used regularly by passenger cars, trucks other than off-road trucks, and recreational vehicles: +50 mm.
**Grade Crossing Surface Material:**
(e.g., asphalt, wood, concrete, rubber, etc.)

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the crossing smooth enough to allow road vehicles, pedestrians, cyclists, and other road users to cross at their normal speed without consequence?</td>
<td>ASPHALT</td>
<td>comments below</td>
</tr>
</tbody>
</table>

**Observe**

<table>
<thead>
<tr>
<th>Grade Crossing Surface Type:</th>
<th>ASPHALT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach Road Surface Condition:</td>
<td>GOOD</td>
</tr>
<tr>
<td>Roadway Illumination?:</td>
<td>YES (STREET LIGHTING)</td>
</tr>
</tbody>
</table>

**Measure**

<table>
<thead>
<tr>
<th>Road Surface crossing width =</th>
<th>14.3 m (note: min. = 8m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>note: measured at right angle to roadway centre line</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Road Surface extension beyond travel lanes =</th>
<th>0.7 m N/E approach = 0.7 m S/W approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>(note: min. = 0.5m)</td>
<td>Fig 6-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sidewalk/Path/Trail crossing width =</th>
<th>N/A m (note: min. = 1.5m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig 6-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sidewalk/Path/Trail extension beyond sidewalk =</th>
<th>N/A m N/E approach = N/A m S/W approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>(note: min. = 0.5m)</td>
<td>Fig 6-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance Between Travel Lane and Sidewalk =</th>
<th>N/A m</th>
</tr>
</thead>
</table>

**Cross-Section:**

<table>
<thead>
<tr>
<th>Flangeway width =</th>
<th>N/A mm (note: max. = 76 or 100mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flangeway depth =</td>
<td>N/A mm (note: min. = 50mm/ max.=76mm or none)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Side Grinding width =</th>
<th>N/A mm (note: max. = 50mm or 0&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Grinding depth =</td>
<td>N/A mm (note: min. = 38mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elevation of Top Rail above road surface =</th>
<th>SEE NOTES mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>(note: max. = 13mm¹, 25mm, or 50mm)</td>
<td>Fig 6-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elevation of Top Rail below road surface =</th>
<th>SEE NOTES mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>(note: min. = -7mm¹, -25mm, or -50mm)</td>
<td>Fig 6-2</td>
</tr>
</tbody>
</table>

1. If frequent use by persons using assistive devices

**Comments Following Site Visit:**

- Difficult to determine extent of road surface extension as edge of pavement flag.

- Some minor cracking in asphalt abutting outer edge of north rail (SS line).

- Top of rail is slightly higher than elevation of asphalt crossing surface.

- Rough crossing surface, loose timbers, etc.

- Surface distress of roadway approaches - photos

---

Passive Crossings C1.13
### ROAD GEOMETRY

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>observe</td>
<td>Are horizontal and vertical alignments smooth and continuous throughout SSD?</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: 46%</td>
<td>S / W Approach: 46%</td>
</tr>
<tr>
<td>observe</td>
<td>Is horizontal alignment straight beyond rails for a distance ≥ design vehicle length, L (see form 4)?</td>
<td>Sect. 7-1</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: 46%</td>
<td>S / W Approach: 46%</td>
</tr>
<tr>
<td>observe</td>
<td>Are the road lanes at least the same width on the crossing as on the road approaches?</td>
<td>Sect. 7-5</td>
</tr>
<tr>
<td></td>
<td>N / E Approach: 46%</td>
<td>S / W Approach: 46%</td>
</tr>
</tbody>
</table>

#### Grades

| measure | Slope within 8m of nearest rail = \( \leq 2\% \) (on \( \text{N} / \text{E} \) approach) (max. = 2%) | Sect. 7-1 |
| measure | Slope within 8m of nearest rail = \( \leq 2\% \) (on \( \text{S} / \text{W} \) approach) (max. = 2%) | Sect. 7-1 |
| measure | Slope between 8m & 18m of nearest rail = \( \leq 2\% \) (on \( \text{N} / \text{E} \) approach) (max. = 5 or 10%) | Sect. 7-1 |
| measure | Slope between 8m & 18m of nearest rail = \( \leq 2\% \) (on \( \text{S} / \text{W} \) approach) (max. = 5 or 10%) | Sect. 7-1 |
| measure | If crossing is only for pedestrians, cyclists, or persons using assistive devices: slope within 5m of nearest rail = \( \leq 2\% \) (max. = 1 or 2%) | Sect. 7-1 |
| measure | General approach grade = \( \leq 2\% \) | N / E | max. = 2% | Sect. 7-1 |
| measure | General approach grade = \( \leq 2\% \) | S / W | max. = 2% | Sect. 7-1 |

| Are rail tracks super-elevated? | Y / N | Rate of s-e: _____ m/m | Sect. 7.4 |

**Road**

- If train speeds exceed 15mph:
  - what is the angle between the crossing and the roadway? = N/A degrees
  - (70° minimum w/o warning system; 45° minimum with warning system)

| observe | Condition of Road Approaches: (e.g., anything that might affect stopping or acceleration) | Sect. 7.6 |
|         | N/A |

| observe | Is there any evidence that "low bed" trucks have difficulty negotiating the crossing (i.e., might they bottom-out or get stuck)? | Sect. 7.6 |
|         | N/A |

✓ indicates information should be confirmed by field observation

### Comments Following Site Visit:

---

Passive Crossings  C1.15
Figure 8-1: Minimum Sightlines - Grade Crossings Without A Grade Crossing Warning System

(A) Minimum Sightlines for Drivers Approaching a Grade Crossing

(B) Minimum Sightlines for Drivers Stopped at the Grade Crossing

(C) Minimum Sightlines for Pedestrians and Cyclists Stopped at the Grade Crossing
Driver Eye Height = 1.05m passenger vehicles, pedestrians, cyclists & assistive devices
= 1.80m buses & straight trucks
= 2.10m large trucks & tractor-trailers

Target Height = 1.20m above rails

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are sightlines within the rail R.O.W. clear of bushes/vegetation; 15 m on each side of the track and, 30 m along the track, on each side of the crossing?</td>
<td>Sect. 8-1</td>
<td></td>
</tr>
<tr>
<td>Are sightlines on the road R.O.W. within 15m of the rail crossing clear of bushes/vegetation?</td>
<td>Sect. 8-1</td>
<td></td>
</tr>
<tr>
<td>SSD minimum = 110 m</td>
<td>(from sheet #4)</td>
<td></td>
</tr>
<tr>
<td>SSD actual: N/E approach = 98 m</td>
<td>S/W approach = 165 m</td>
<td>Sect. 8.5</td>
</tr>
</tbody>
</table>

**Warning:** some formulae are based on imperial units while others are Metric

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSD minimum (ft) = 1.47Vr x Tsd</td>
<td>where Vr is from Sheet #4</td>
<td>Sect. 8.5</td>
</tr>
<tr>
<td>Tsd is the greater of: [(SSD+cd+L)/0.28V] or 10 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSSD maximum</td>
<td>151 ft</td>
<td>46 m</td>
</tr>
<tr>
<td>DSSD actual:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/E approach = 10 m (to driver’s left); = 0 m (to driver’s right)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S/W approach = 45-50 m (to driver’s left); = 45-50 m (to driver’s right)</td>
<td>Fig 8-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSTOPPED minimum (ft) = 1.47Vt x Ts</td>
<td>with Ts from Sheet #4</td>
<td>Sect. 8.5</td>
</tr>
<tr>
<td>DSTOPPED minimum</td>
<td>203 ft</td>
<td>62 m</td>
</tr>
<tr>
<td>DSTOPPED actual:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/E approach = 10 m (to driver’s left); = 25 m (to driver’s right)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S/W approach = 80 m (to driver’s left); = 90 m (to driver’s right)</td>
<td>Fig 8-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ped/Cyclist DSTOPPED (m)</td>
<td>45</td>
<td>using Table 8-1 and Tp (from Sheet #4)</td>
</tr>
<tr>
<td>Ped/Cyclist Actual:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/E approach = 70 m (to cyclist’s left); = 25 m (to cyclist’s right)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S/W approach = 80 m (to cyclist’s left); = 90 m (to cyclist’s right)</td>
<td>Fig 8-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSD on north approach limited by trees/bush growing into ROW. Clearing of bush would result in SSD of 4m or better (satisfying minimum SSD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSD - north approach: To driver’s left - limited by parked vehicles, trees, landscaping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To driver’s right - completely obstructed by trees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South approach: To driver’s left - OK. Can be limited by vehicles in parking lot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees along rail ROW can cause obstruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To driver’s right - obstructed/limited by building.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Consideration should be given to also utilizing the newer methodologies for determining sight distances and clearance times developed by M. Gou, 2003
http://www.tc.gc.ca/tdc/summary/14100/14172e.htm

**Comments Following Site Visit:**

- SSD on north approach limited by trees/bush growing into row. Clearing of bush would result in SSD of 4m or better (satisfying minimum SSD)
- SSD - north approach: To driver’s left - limited by parked vehicles, trees, landscaping
- To driver’s right - completely obstructed by trees.
- South approach: To driver’s left - OK. Can be limited by vehicles in parking lot
- Trees along rail ROW can cause obstruction
- To driver’s right - obstructed/limited by building.

Visibility along the track impaired due to the angle of crossing?
- special considerations for large trucks?
- can sightlines be maintained on an ongoing basis? (snow)
- check visibility at all pedestrian crossing points
- special design vehicle?
- photos

**Special Note**: Trains are required to complete stop prior to crossing, road AS per operating procedures.
NOTES:

1. Where a road crosses adjacent tracks and the minimum distance between track centre lines, measured along the travelled surface parallel to the axis of the road, is more than 30 m, each track or set of tracks so separated shall have separate Railway Crossing Signs.

2. A sidewalk, pedestrian or bicycle path, or trail with its centreline more than 3.6 m (12 ft.) from a Railway Crossing Sign supporting post beside a road for vehicle traffic shall have separate Railway Crossing Signs.

3. Signs shall be located between 0.75 m and 1.25 m from the face of curb, or outer edge of road shoulder, or, where there is no curb or shoulder, 2.0 m to 2.5 m from the edge of traveled way.

4. Railway Crossing Signs shall be located as close as possible to the traveled way of the road, within the limits shown, to be clearly visible to all persons approaching the grade crossing on the grade crossing road or intersecting roads. Location outside the limits specified is permissible to the extent necessary to make the sign visible to approaching drivers, pedestrians, cyclists and persons using assistive devices.
Figure 9-2: Retroreflective Material on the Back of the Railway Crossing Sign and on the Post (unrestricted grade crossing without grade crossing warning system)

Figure 9-3: Location of Railway Crossing Signs and Number of Tracks Signs (unrestricted grade crossings without grade crossing warning systems)

Figure 9-4: Stop Signs and Stop Ahead Signs

NOTES:
1. Where a road crosses adjacent tracks and the minimum distance between track centre lines, measured along the travelled surface parallel to the axis of the road, is more than 30 m, each track or set of tracks so separated shall have separate Railway Crossing Signs.
2. A sidewalk, pedestrian or bicycle path, or trail with its centreline more than 3.6 m (12 ft.) from a Railway Crossing Sign supporting post beside a road for vehicle traffic shall have separate Railway Crossing Signs.
3. Signs shall be located between 0.75 m and 1.25 m from the face of curb, or outer edge of road shoulder; or, where there is no curb or shoulder, 2.0 m to 2.5 m from the edge of travelled way.
4. Railway Crossing Signs shall be located as close as possible to the travelled way of the road, within the limits shown, to be clearly visible to all persons approaching the grade crossing on the grade crossing road or intersecting roads. Location outside the limits specified is permissible to the extent necessary to make the sign visible to approaching drivers, pedestrians, cyclists and persons using assistive devices.
## Sheet 9a  SIGNS AND PAVEMENT MARKINGS  RTD Section 9

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Railway Crossing Sign</td>
<td>Sect. A2.2.4 MUTCD</td>
</tr>
</tbody>
</table>

---

**--comment on the following in the field:**

- **observe**
  - location: See diagram below
  - height: **North and South Approaches = 2.5m**

- **observe**
  - retroreflective material on back of crossing signs?: front & back of posts?

- **measure**
  - N / E approach: sign = cd/lux/m² post = cd/lux/m²
  - S / W approach: sign = cd/lux/m² post = cd/lux/m²

- **observe**
  - Number of Tracks sign?

### Comments Following Site Visit:

- located 2.0m from edge of pavement
- located at edge of pavement

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DO NOT STOP ON TRACK</td>
<td>U.S. MUTCD</td>
</tr>
</tbody>
</table>

- **Road ✓** Does queued traffic routinely encroach closer than 5m from the crossing surface? Yes

- **observe**
  - Are these signs present on either approach? **Yes, on North Approach. Located 3.3m in advance of stop bar.**

  ✓ indicates information should be confirmed by field observation

### Comments Following Site Visit:

- No reflective tape on post
- Reflective tape on back of sign appears worn
- Crossing sign on North Approach is leaning!

  ✓ is askew (X)
RAILWAY CROSSING

FIGURE C1-5

JUNE 2001

Stroke Width of "X" to be 300 mm to 500 mm
### Railway Crossing Ahead Sign (WA18-20)

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look-up</td>
<td>Is AADT &gt; 100? (see sheet #3)</td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>Observe</td>
<td>Is area urban such that WA18-20 is not required?</td>
<td><strong>No</strong></td>
</tr>
<tr>
<td>Measure</td>
<td>Distance from nearest rail to sign <strong>135 m</strong> N/E approach</td>
<td><strong>130 m</strong> S/W approach</td>
</tr>
<tr>
<td>Observe</td>
<td>Location: From edge of traveled way. North Approach: 70m, South Approach: 25m</td>
<td></td>
</tr>
<tr>
<td>Observe</td>
<td>Height: North Approach:</td>
<td></td>
</tr>
<tr>
<td>Observe</td>
<td>Appropriate orientation of symbol</td>
<td><strong>Yes</strong></td>
</tr>
</tbody>
</table>

**Comments Following Site Visit:**

Railway crossing sign located adjacent to 'X' road marking on both approaches. As per Fig C1-5, should be located 10m in advance of road marking.

- Located 230m west of Welham Road.
- Located 150m east of Welham Road.

- General condition
- Clear sightlines to the sign
- Posts
- Aligned to the driver
- Photos

### Advisory Speed Sign

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory Speed Sign</td>
<td><img src="image" alt="30 km/h" /></td>
<td>Sect. A3.2.5 MUTCD</td>
</tr>
<tr>
<td>Normally used in conjunction with WA18-20 signs if reduced speeds are necessary to provide adequate sight distance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observe</td>
<td>Are they present on both approaches?</td>
<td><strong>No</strong></td>
</tr>
<tr>
<td>Observe</td>
<td>Posted speed limit?</td>
<td></td>
</tr>
<tr>
<td>Look-up</td>
<td>Are they required on either approach?</td>
<td>No (clearing of brush within ROW would improve sightlines to satisfy SSD)</td>
</tr>
</tbody>
</table>

**Comments Following Site Visit:**

N/A

- General condition
- Clear sightlines to the sign
- Posts
- Photos
### STOP SIGN AHEAD

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STOP SIGN AHEAD</td>
<td>Sect. A3.6.1 MUTCD</td>
</tr>
</tbody>
</table>

- Is sign present on either approach?
- Is sign required on either approach? check SSD
- Is there an advisory tab with a track symbol present? check SSD
- What is the distance from the nearest rail to the sign?
  - m N/E approach
  - m S/W approach

### Comments Following Site Visit:

![N/A](image)

- General condition, clear sightlines to the sign, posts, aligned to the driver, photos

---

### STOP SIGN

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STOP SIGN</td>
<td>Sect. A2.2.1 MUTCD</td>
</tr>
</tbody>
</table>

- Is sign present on either approach?
- Is sign required on either approach? check D_STOPPED
- Are signs mounted on same post as Railway Crossing Signs? Fig 9-4
- What is the distance from the nearest rail to the sign?
  - m N/E approach
  - m S/W approach

### Comments Following Site Visit:

![N/A](image)

- General condition, clear sightlines to the sign, position, posts, aligned to the driver, photos

---

*Passive Crossings C1.23*
RAILWAY CROSSING

Stroke Width of "X" to be 300 mm to 500 mm

FIGURE C1-5

JUNE 2001
PAVEMENT MARKINGS

<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Are pavement markings consistent with those from the MUTCD Manual?</td>
<td>No (see diagram) MUTCD</td>
</tr>
<tr>
<td>observe</td>
<td>Are there lines to delineate sidewalks/paths?</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sect. 9.7</td>
</tr>
</tbody>
</table>

Comments Following Site Visit:

1. **X** MARKINGS HAVE MINOR VARIANCES COMPARED TO FIG C1-5. (SEE DIAGRAM BELOW)
2. STOP BARS too close to nearest rail.
3. NO STOP BARS ON SOUTH APPROACH DUE TO PROXIMITY OF BIG BAY POINT ROAD.

General Comments Regarding Signs & Pavement Markings:

- Special sign required?
- Missing signs
- Visual clutter
- Obscured view / sightlines
- Retroreflectivity levels at night

Passive Crossings C1.25
Figure 10-1: Train Illumination: Grade Crossings without Grade Crossing Warning Systems

Plan View

Height to be covered by luminaire

4.5 m to top of rail
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flood lighting is required if all of the following exist:</td>
<td>sec 10.1</td>
</tr>
<tr>
<td></td>
<td>- unrestricted grade crossing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- road speed limit is ≥ 50 km/h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- routinely equipment on rails after dark is either stopped or traveling ≥ 15mph</td>
<td></td>
</tr>
<tr>
<td>observe</td>
<td>Are luminaires required? <em>NO - SPAR IS INACTIVE, OPERATING SPEED 10mph (when active)</em></td>
<td>Fig 10-1</td>
</tr>
<tr>
<td></td>
<td>Are luminaires present on both approaches? <em>NO</em></td>
<td></td>
</tr>
</tbody>
</table>

**Comments Following Site Visit:**

- general condition of luminaires
- visibility at night
- adjacent commercial lighting?
- appropriate orientation of lights?
Figure 11-1: Proximity of Grade Crossing Warning Systems to Stop Signs and Traffic Signals

a) NEAR STOP SIGNS

NOTES:
Where the maximum railway operating speed exceeds 15 mph:
- if D is less than 30 m, a grade crossing warning system including gates is required;
- if D is 30 m or greater, a grade crossing warning system including gates is required unless a traffic study indicates that traffic will not normally queue to within 2.4 m of the rail nearest the road intersection. For grade crossings or road intersections nearby an existing grade crossing, where the maximum railway operating speed exceeds 15 mph:

b) NEAR TRAFFIC SIGNALS

NOTES:
For grade crossings or road intersections nearby an existing grade crossing, where the maximum railway operating speed exceeds 15 mph:
- if D is less than 60 m, a grade crossing warning system including gates is required;
- if D is 60 m or greater, a grade crossing warning system including gates is required unless a traffic study shows that traffic will not queue to within 2.4 m of the rail nearest the road intersection.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Warning System Warrants</td>
<td>Sect. 11.1 &amp; 11.2</td>
</tr>
<tr>
<td></td>
<td>-if any of A through E below are met, then a warning system is warranted</td>
<td></td>
</tr>
<tr>
<td>look-up</td>
<td>Existing AADT = 2750 Forecast AADT = 3,000 (if available)</td>
<td>sheet 3</td>
</tr>
<tr>
<td>look-up</td>
<td>Daily Train Volume = 0.57 (2 trains per week or 4 crossings per week when)</td>
<td>sheet 3</td>
</tr>
</tbody>
</table>
| calculate | A. Cross-Product = \[
\frac{\text{1,568}}{\text{2,000}} = \text{0.784} (1,000 \text{ min.})
\]
|         | B. Maximum Rail Operating Speed = \[\frac{\text{10}}{\text{mph}}\] (max = 80mph or 60 mph with crosswalk)         | Sect. 11.1         |
| look-up | C. Number of Tracks = _ - if ≥ 2, can trains pass one another?                                                    | Sect. 11.1         |
| Rail    | D. Are Sightlines obscured? (see form 8) YES                                                                     | Sect. 8.3          |
| observe | E. Is at least one of the proximity conditions met to warrant a warning system? YES                                | Fig. 11-1          |

✓ indicates information should be confirmed by field observation

Comments Following Site Visit:

RAIL SPUR OPERATES AS 'STOP! PROCEED WHEN ACTIVE.'

- extraordinary conditions why warning system should be installed - on a school bus route?
Table 16-1: Requirements for Public Grade Crossings Within an Area Without Train Whistling

<table>
<thead>
<tr>
<th>Maximum Railway Operating Speed</th>
<th>Grade Crossings for Vehicle Use</th>
<th>Grade Crossings Exclusively for Pedestrians, Cyclists or Assistive Devices; and Sidewalks, Paths, or Trails with the centreline no closer than 3.6 m (12 ft) to a warning signal for vehicles (Refer to Figure 13-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Tracks</td>
<td>No. of Tracks</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2 or more</td>
</tr>
<tr>
<td>Stop &amp; proceed</td>
<td>Manual protection or FLB</td>
<td>Manual protection or FLB</td>
</tr>
<tr>
<td></td>
<td>FLB</td>
<td>FLB or FLB &amp; G (Note 1)</td>
</tr>
<tr>
<td>Up to 15 mph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 - 49 mph</td>
<td>FLB or FLB &amp; G (Note 2)</td>
<td>FLB or FLB &amp; G (Note 1)</td>
</tr>
<tr>
<td></td>
<td>FLB &amp; G</td>
<td>FLB &amp; G</td>
</tr>
<tr>
<td>50 mph or more</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where:

Manual protection is by a member of the train crew in accordance with the Canadian Rail Operating Rules.

FLB is a grade crossing warning system consisting of flashing lights and a bell.

FLB & G is a grade crossing warning system consisting of flashing lights, gates, and a bell.
<table>
<thead>
<tr>
<th>Source</th>
<th>Item</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Is train whistling prohibited at this crossing? 24 hours?</td>
<td>sec 16.1</td>
</tr>
<tr>
<td>Observe</td>
<td>Is there evidence of routine unauthorized access (trespassing) on the rail line in the area of the crossing?</td>
<td>sec 16.7</td>
</tr>
<tr>
<td>Observe</td>
<td>Are the requirements of Table 16-1 met?</td>
<td>sec 16.2</td>
</tr>
</tbody>
</table>

Comments Following Site Visit:

Not Addressed
**Additional Prompt Lists**

**Human Factors:**
- Control device visibility / background visual clutter.
- Driver workload through this area (i.e., are there numerous factors that simultaneously require the driver's attention such as traffic lights, pedestrian activity, merging/entering traffic, commercial signing, etc.).
- Driver expectancy of the environment (i.e., are the control measures in keeping with the design levels of the road system and adjacent environment).
- Need for positive guidance.
- Conflicts between road and railway signs and signals.

**Environmental Factors:**
- Extreme weather conditions.
- Lighting issues (night, dawn/dusk, tunnels, adjacent facilities, headlight or sunlight glare, etc.)
- Landscaping or vegetation.
- Integration w/ surrounding land use (e.g., parked vehicles blocking sightlines, merging traffic lanes, etc.)

**All Road Users:**
- Have needs of the following been met:
  - pedestrians (including strollers, baby carriages, and blind persons)
  - children / elderly
  - assistive devices (wheelchairs, scooters, walkers, etc)
  - bicyclists
  - motorcyclists
  - over-sized trucks
  - buses
  - recreational vehicles
  - golfcarts
  - hazardous materials

- Significant volume of pedestrians requiring special safety measures:
  (maze barriers/guide fencing, sign indicating potential presence of 2nd train at a multi track crossing, etc)

**Other:**
- Should closure of the crossing be considered due to inactivity, presence of nearby adjacent crossings, etc.

**Comments Following Site Visit:**

---

*Passive Crossings C1.33*
APPENDIX C:
GRADE CROSSING REGULATIONS
Subsections 31(1) and (3) of the *Legislation Revision and Consolidation Act*, in force on June 1, 2009, provide as follows:

**Published consolidation is evidence**

**31 (1)** Every copy of a consolidated statute or consolidated regulation published by the Minister under this Act in either print or electronic form is evidence of that statute or regulation and of its contents and every copy purporting to be published by the Minister is deemed to be so published, unless the contrary is shown.

...  

**Inconsistencies in regulations**

**3** In the event of an inconsistency between a consolidated regulation published by the Minister under this Act and the original regulation or a subsequent amendment as registered by the Clerk of the Privy Council under the *Statutory Instruments Act*, the original regulation or amendment prevails to the extent of the inconsistency.

**NOTE**

This consolidation is current to February 3, 2016. Any amendments that were not in force as of February 3, 2016 are set out at the end of this document under the heading “Amendments Not in Force”.

**CARACTÈRE OFFICIEL**

**DES CODIFICATIONS**

Les paragraphes 31(1) et (3) de la *Loi sur la révision et la codification des textes législatifs*, en vigueur le 1er juin 2009, prévoient ce qui suit :

**Codifications comme élément de preuve**

**31 (1)** Tout exemplaire d’une loi codifiée ou d’un règlement codifié, publié par le ministre en vertu de la présente loi sur support papier ou sur support électronique, fait foi de cette loi ou de ce règlement et de son contenu. Tout exemplaire donné comme publié par le ministre est réputé avoir été ainsi publié, sauf preuve contraire.

[...]  

**Incompatibilité — règlements**

**3** Les dispositions du règlement d'origine avec ses modifications subséquentes enregistrées par le greffier du Conseil privé en vertu de la *Loi sur les textes réglementaires* l'emportent sur les dispositions incompatibles du règlement codifié publié par le ministre en vertu de la présente loi.

**NOTE**

Cette codification est à jour au 3 février 2016. Toutes modifications qui n’étaient pas en vigueur au 3 février 2016 sont énoncées à la fin de ce document sous le titre « Modifications non en vigueur ». 
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<td><strong>1</strong> Définitions</td>
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<td>Application</td>
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<td><strong>2</strong> Application</td>
<td><strong>2</strong> Application</td>
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<tr>
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<td>Respect des exigences</td>
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<td><strong>3</strong> Public grade crossing</td>
<td><strong>3</strong> Passage à niveau public</td>
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<td>Information Sharing</td>
<td>Partage des renseignements</td>
</tr>
<tr>
<td>Railway Company</td>
<td>Compagnie de chemin de fer</td>
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<td><strong>4</strong> Information</td>
<td><strong>4</strong> Renseignements</td>
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<tr>
<td><strong>5</strong> Change</td>
<td><strong>5</strong> Modification</td>
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<td><strong>6</strong> Railway design speed</td>
<td><strong>6</strong> Vitesse de référence sur la voie ferrée</td>
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<td><strong>7</strong> Exception</td>
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<td><strong>8</strong> Average annual daily railway movements</td>
<td><strong>8</strong> Moyenne annuelle de mouvements ferroviaires quotidiens</td>
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<td><strong>9</strong> Sifflet</td>
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<td><strong>10</strong> Transfer of line of railway</td>
<td><strong>10</strong> Transfert d’une voie ferrée</td>
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<td><strong>11</strong> Date and contact information</td>
<td><strong>11</strong> Date et coordonnées</td>
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<td>Road Authority</td>
<td>Autorité responsable du service de voirie</td>
</tr>
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<td><strong>12</strong> Renseignements</td>
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<td><strong>13</strong> Modification</td>
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<td><strong>14</strong> Vitesse de référence au franchissement routier</td>
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<td><strong>15</strong> Interconnected traffic signal and sign</td>
<td><strong>15</strong> Feu de circulation et panneau interconnectés</td>
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<tr>
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<td><strong>16</strong> Exception</td>
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<tr>
<td><strong>17</strong> Transfer of road</td>
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<td><strong>18</strong> Date et coordonnées</td>
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<td>21 Existing grade crossing without a warning system</td>
<td>21 Passage à niveau existant — non muni d’un système</td>
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**New Grade Crossing**

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<td>Temps de passage</td>
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<td>35 Design vehicle</td>
<td>Véhicule type</td>
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<td>36 Road crossing design speed</td>
<td>Vitesse de référence au franchissement routier</td>
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<td>Passage à niveau public</td>
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<td>Panneau Signal avancé d’un passage à niveau et panonceau Vitesse recommandée</td>
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<td></td>
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<td>Private Grade Crossing</td>
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<td>Railway Crossing sign and Number of Tracks sign</td>
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**Existing Grade Crossing**

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| Stop Ahead sign | 65 | Panneau Signal avancé d’arrêt |
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| Prepare to Stop at Railway Crossing sign | 67 | Panneau Préparez-vous à arrêter à un passage à niveau |</p>
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His Excellency the Governor General in Council, on the recommendation of the Minister of Transport, pursuant to subsection 7(1)a, section 7.1b, subsections 18(1)c and (2)d, paragraph 23.1(1)(a)e, subsection 24(1)f and sections 37g and 47 of the Railway Safety Acth, makes the annexed Grade Crossings Regulations.

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*a* S.C. 2012, c. 7, s. 7(1)

*b* S.C. 1999, c. 9, s. 4

*c* S.C. 2012, c. 7, s. 13

*d* S.C. 1999, c. 9, s. 12

*e* S.C. 1999, c. 9, s. 18

*f* S.C. 2012, c. 7, s. 16(1)

*g* S.C. 2012, c. 7, s. 30

*h* S.C., c. 32 (4th suppl.)
Grade Crossings Regulations

Interpretation

Definitions

1 (1) The following definitions apply in these Regulations.

Advisory Speed Tab sign means the sign referred to in article 8.2.1 of the Grade Crossings Standards. (panonceau Vitesse recommandée)

average annual daily railway movements means the number of movements of engines, or engines coupled with railway equipment, across a grade crossing in a year, divided by the number of days in that year. (moyenne annuelle de mouvements ferroviaires quotidiens)

crossing surface means the part of a road that lies between the ends of a railway tie and that has the width shown in Figure 5-1 of the Grade Crossings Standards. (surface de croisement)

design vehicle means one of the vehicles shown in Figures 1.2.4.1 to 1.2.4.11 of the Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada and dated September 1999. (véhicule type)

Emergency Notification sign means the sign referred to in article 8.5 of the Grade Crossings Standards. (panneau Avis d’urgence)

eexisting grade crossing means a grade crossing for which actual construction is started before the day on which these Regulations come into force. (passage à niveau existant)

grade crossing means a road crossing at grade, or two or more road crossings at grade where the lines of railway are not separated by more than 30 m. (passage à niveau)

Grade Crossings Standards means the Grade Crossings Standards published by the Department of Trans-
new grade crossing means a grade crossing for which actual construction is started on or after the day on which these Regulations come into force. (new passage à niveau)

Number of Tracks sign means the sign referred to in article 8.1.2 of the Grade Crossings Standards and, for the purposes of sections 58 and 73, the sign referred to in article 4 of Part B of those Standards. (panneau Nombre de voies ferrées)

Prepare to Stop at Railway Crossing sign means the sign referred to in article 18.1 of the Grade Crossings Standards. (panneau Préparez-vous à arrêter à un passage à niveau)

private authority means a person, other than a road authority, who has a right with respect to a private grade crossing. (autorité privée)

private grade crossing means a grade crossing that is not a public grade crossing. (passage à niveau privé)

public grade crossing means a grade crossing whose road is opened or maintained by a road authority and is designed for public use. (passage à niveau public)

Railway Crossing Ahead sign means the sign referred to in article 8.2.1 of the Grade Crossings Standards. (panneau Signal avancé d’un passage à niveau)

Railway Crossing sign means the sign and post referred to in article 8.1.1 of the Grade Crossings Standards and, for the purposes of sections 58 and 73, the sign referred to in article 4 of Part B of those Standards. (panneau Passage à niveau)

railway design speed means the railway equipment speed that corresponds to the current design of the grade crossing. (vitesse de référence sur la voie ferrée)

road approach means the part of a road, other than the crossing surface, that lies between the point that marks the start of the stopping sight distance and the point that marks the front of a design vehicle when it is past the clearance point as shown in Figure 10-1 of the Grade Crossings Standards. (abord routier)

road crossing design speed means the motor vehicle speed that corresponds to the current design of the grade crossing. (vitesse de référence au franchissement routier)

locomotives attelées à du matériel ferroviaire, qui franchissent un passage à niveau dans une année, divisé par le nombre de jours dans la même année. (average annul daily railway movements)

Normes sur les passages à niveau Les Normes sur les passages à niveau publiées par le ministère des Transports et datées de juillet 2014. (Grade Crossings Standards)

nouveau passage à niveau Passage à niveau dont la construction sur le terrain a débuté à la date d’entrée en vigueur du présent règlement ou après cette date. (new grade crossing)

panneau Avis d’urgence Le panneau visé à la section 8.5 des Normes sur les passages à niveau. (Emergency Notification sign)

panneau Nombre de voies ferrées Le panneau visé à la section 8.1.2 des Normes sur les passages à niveau et, pour l’application des articles 58 et 73, le panneau visé à la section 4 de la partie B de ces normes. (Number of Tracks sign)

panneau Passage à niveau Le panneau et le poteau visés à la section 8.1.1 des Normes sur les passages à niveau et, pour l’application des articles 58 et 73, le panneau visé à la section 4 de la partie B de ces normes. (Railway Crossing sign)

panneau Préparez-vous à arrêter à un passage à niveau Le panneau visé à la section 18.1 des Normes sur les passages à niveau. (Prepare to Stop at Railway Crossing sign)

panneau Signal avancé d’arrêt Le panneau visé à la section 8.3.1 des Normes sur les passages à niveau. (Stop Ahead sign)

panneau Signal avancé d’un passage à niveau Le panneau visé à la section 8.2.1 des Normes sur les passages à niveau. (Railway Crossing Ahead sign)

panneau Stop Le panneau visé à la section 8.4.1 des Normes sur les passages à niveau. (Stop sign)

panonceau Vitesse recommandée Le panonceau visé à la section 8.2.1 des Normes sur les passages à niveau. (Advisory Speed Tab sign)

passage à niveau Franchissement routier à niveau ou plusieurs franchissements routiers à niveau dont les voies ferrées ne sont pas séparées l’une de l’autre par plus de 30 m. (grade crossing)
**sightlines** means the sightlines referred to in sections 20 and 21, as applicable. (**lignes de visibilité**)

**Stop Ahead sign** means the sign referred to in article 8.3.1 of the Grade Crossings Standards. (**panneau Signal avancé d’arrêt**)

**Stop sign** means the sign referred to in article 8.4.1 of the Grade Crossings Standards. (**panneau Stop**)

**stopping sight distance** means the distance calculated in accordance with article 7.2 of the Grade Crossings Standards. (**distance de visibilité d’arrêt**)

**traffic control device** means

(a) a Stop sign;

(b) a Stop Ahead sign;

(c) a Railway Crossing Ahead sign;

(d) an Advisory Speed Tab sign;

(e) a Prepare to Stop at Railway Crossing sign, including the interconnection with the warning system; or

(f) a traffic signal, including the interconnection with the warning system. (**dispositif de contrôle de la circulation**)

**warning system** means an automated system, other than an interconnected traffic signal, that indicates the approach or presence of railway equipment at a grade crossing and that is composed of any combination of light units, bells, gates, operating mechanisms and circuits. (**système d’avertissement**)

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**Separate grade crossings**

(2) For the purposes of these Regulations, two adjacent and separate roads that are used by motor vehicles and that cross one or more lines of railway are considered to be separate grade crossings.

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**Application**

**Application**

2 (1) These Regulations apply in respect of public grade crossings and private grade crossings.
Railway company

(2) Despite subsection (1), these Regulations do not apply in respect of a private grade crossing if the road is opened or maintained by a railway company that is the sole private authority at the grade crossing.

Compliance

Public grade crossing

3 (1) Unless otherwise specified in an order of the Agency or in an agreement filed with the Agency under subsection 101(1) of the Canada Transportation Act, in the case of a public grade crossing,

(a) a railway company must ensure compliance with the requirements of these Regulations respecting

(i) a Railway Crossing sign, a Number of Tracks sign and an Emergency Notification sign,

(ii) the maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign,

(iii) a warning system,

(iv) a crossing surface, other than its design, and

(v) sightlines within the railway right-of-way and over land adjoining the railway right-of-way, including the removal of trees and brush that obstruct the sightlines; and

(b) a road authority must ensure compliance with the requirements of these Regulations respecting

(i) the design, construction and maintenance of a road approach,

(ii) traffic control devices, except for the maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign,

(iii) the design of a crossing surface, and

(iv) sightlines within the land on which the road is situated and over land in the vicinity of the grade crossing, including the removal of trees and brush that obstruct the sightlines.

Respect des exigences

Passage à niveau public

3 (1) Sauf indication contraire dans un arrêté de l’Office ou dans une entente déposée auprès de l’Office en application du paragraphe 101(1) de la Loi sur les transports au Canada, dans le cas d’un passage à niveau public :

(a) la compagnie de chemin de fer veille à ce que soient respectées les exigences du présent règlement concernant :

(i) le panneau Passage à niveau, le panneau Nombre de voies ferrées et le panneau Avis d’urgence,

(ii) l’entretien d’un panneau Stop fixé au même poteau que celui du panneau Passage à niveau,

(iii) le système d’avertissement,

(iv) la surface de croisement, sauf la conception de celle-ci,

(v) les lignes de visibilité dans les limites de l’emprise du chemin de fer et sur les terrains contigus à celle-ci, y compris l’enlèvement des arbres et broussailles qui obstruent les lignes de visibilité;

(b) l’autorité responsable du service de voirie veille à ce que soient respectées les exigences du présent règlement concernant :

(i) la conception, la construction et l’entretien de l’abord routier,

(ii) les dispositifs de contrôle de la circulation, sauf l’entretien d’un panneau Stop fixé au même poteau que celui du panneau Passage à niveau,

(iii) la conception de la surface de croisement,

(iv) les lignes de visibilité dans les limites du terrain où est située la route et sur les terrains situés à proximité du passage à niveau, y compris l’enlèvement des arbres et broussailles qui obstruent les lignes de visibilité.
Private grade crossing

(2) Unless otherwise specified in an order of the Agency under section 103 of the Canada Transportation Act, in the case of a private grade crossing,

(a) a railway company must ensure compliance with the requirements of these Regulations respecting

(i) a Railway Crossing sign, a Number of Tracks sign and an Emergency Notification sign,

(ii) the maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign,

(iii) a warning system,

(iv) a crossing surface and a road approach within the railway right-of-way, including the selection of the road crossing design speed and design vehicle, and

(v) sightlines within the railway right-of-way and over land adjoining the railway right-of-way — other than sightlines over land owned by a private authority — including the removal of trees and brush that obstruct the sightlines; and

(b) a private authority must ensure compliance with the requirements of these Regulations respecting

(i) a road approach outside the railway right-of-way, other than the road crossing design speed and design vehicle,

(ii) traffic control devices on land owned by the private authority, except for the maintenance of a Stop sign that is installed on the same post as a Railway Crossing sign, and

(iii) sightlines over land owned by the private authority up to the railway right-of-way, including the removal of trees and brush that obstruct the sightlines.

Information Sharing

Railway Company

Information

4 (1) A railway company must provide a road authority, in writing, with the following information in respect of a public grade crossing:

Passage à niveau privé

(2) Sauf indication contraire dans un arrêté de l’Office visé à l’article 103 de la Loi sur les transports au Canada, dans le cas d’un passage à niveau privé :

(a) la compagnie de chemin de fer veille à ce que soient respectées les exigences du présent règlement concernant :

(i) le panneau Passage à niveau, le panneau Nombre de voies ferrées et le panneau Avis d’urgence,

(ii) l’entretien d’un panneau Stop fixé au même poteau que celui du panneau Passage à niveau,

(iii) le système d’avertissement,

(iv) la surface de croisement et l’abord routier dans les limites de l’emprise du chemin de fer, y compris le choix de la vitesse de référence au franchissement routier et du véhicule type,

(v) les lignes de visibilité dans les limites de l’emprise du chemin de fer et sur les terrains contigus à celle-ci — sauf les lignes de visibilité sur le terrain appartenant à une autorité privée —, y compris l’enlèvement des arbres et broussailles qui obstruent les lignes de visibilité;

(b) une autorité privée veille à ce que soient respectées les exigences du présent règlement concernant :

(i) l’abord routier à l’extérieur des limites de l’emprise du chemin de fer, sauf la vitesse de référence au franchissement routier et le véhicule type,

(ii) les dispositifs de contrôle de la circulation situés sur le terrain appartenant à l’autorité privée, sauf l’entretien d’un panneau Stop fixé au même poteau que celui du panneau Passage à niveau,

(iii) les lignes de visibilité sur le terrain appartenant à l’autorité privée jusqu’à l’emprise du chemin de fer, y compris l’enlèvement des arbres et broussailles qui obstruent les lignes de visibilité.

Information Sharing

Compagnie de chemin de fer

Renseignements

4 (1) La compagnie de chemin de fer fournit par écrit à l’autorité responsable du service de voirie les renseignements ci-après à l’égard d’un passage à niveau public :
(a) the precise location of the grade crossing;
(b) the number of tracks that cross the grade crossing;
(c) the average annual daily railway movements;
(d) the railway design speed;
(e) the warning system in place at the grade crossing;
(f) an indication of whether a Stop sign is installed on the same post as the Railway Crossing sign; and
(g) an indication of whether or not whistling is required when railway equipment is approaching the grade crossing.

Timing
(2) The information must be provided on receipt of a notice under section 3 of the Notice of Railway Works Regulations.

Timing — existing grade crossing
(3) In the case of an existing grade crossing, the information must be provided not later than the day that is two years after the day on which these Regulations come into force, if a notice under section 3 of the Notice of Railway Works Regulations has not been received within that two-year period.

Change
5 In the case of a change referred to in paragraph 28(a) or (b) or section 87, a railway company must provide a road authority, in writing, not later than 60 days before the day on which the change begins, with the details of the change and with the information referred to in subsection 4(1) relating to the change.

Railway design speed
6 A railway company must notify a road authority in writing of an increase in the railway design speed at a public grade crossing not later than 60 days before the day on which the increase takes effect and must specify in the notice the precise location of the grade crossing and the new railway design speed.

Exception
7 Despite sections 5 and 6, a railway company may make a change referred to in those sections at any time if the road authority has advised the railway company that the requirements of these Regulations with which the road

(a) l’emplacement exact du passage à niveau;
(b) le nombre de voies ferrées le franchissant;
(c) la moyenne annuelle de mouvements ferroviaires quotidiens;
(d) la vitesse de référence sur la voie ferrée;
(e) le système d’avertissement en place au passage à niveau;
(f) une mention indiquant si un panneau Stop est fixé au même poteau que celui du panneau Passage à niveau;
(g) l’exigence ou non d’utiliser le sifflet lorsque le matériel ferroviaire s’approche du passage à niveau.

Échéancier
(2) Les renseignements doivent être fournis sur réception d’un avis donné en vertu de l’article 3 du Règlement sur l’avis de travaux ferroviaires.

Échéancier — passage à niveau existant
(3) Dans le cas d’un passage à niveau existant, les renseignements doivent être fournis au plus tard à l’expiration d’une période de deux ans suivant l’entrée en vigueur du présent règlement si aucun avis prévu à l’article 3 du Règlement sur l’avis de travaux ferroviaires n’a été reçu au cours de cette période.

Modification
5 Dans le cas d’une modification visée aux alinéas 28a) ou b) ou à l’article 87, la compagnie de chemin de fer fournit par écrit à l’autorité responsable du service de voirie, au moins soixante jours avant le début de la modification, les renseignements visés au paragraphe 4(1) qui sont relatifs à la modification, ainsi que les détails sur celle-ci.

Vitesse de référence sur la voie ferrée
6 La compagnie de chemin de fer avise par écrit l’autorité responsable du service de voirie de l’augmentation de la vitesse de référence sur la voie ferrée d’un passage à niveau public au moins soixante jours avant que l’augmentation prenne effet et indique, dans son avis, l’emplacement exact du passage à niveau et la nouvelle vitesse de référence sur la voie ferrée.

Exception
7 Malgré les articles 5 et 6, la compagnie de chemin de fer peut effectuer l’une ou l’autre des modifications visées à ces articles à tout moment si l’autorité responsable du service de voirie l’a avisée que les exigences du présent
authority must comply with respect to the change are met.

Average annual daily railway movements

8 A railway company must provide a road authority with the average annual daily railway movements when that value is three or more and the value increases by 50% or more relative to the previous value provided to the road authority.

Whistling

9 If a railway company stops requiring the use of a whistle at a grade crossing, it must notify the road authority in writing of that change not later than 30 days after the day on which the change is made.

Transfer of line of railway

10 If a line of railway at a public grade crossing is transferred from one railway company to another, the railway company to which the line of railway is transferred must, within seven days after the day on which the transfer takes effect, provide the road authority with the name, address, telephone number and email address of a contact person.

Date and contact information

11 The information referred to in sections 4 to 6, 8 and 9 must include the date on which it is sent, the name and address of the railway company, and the name, telephone number and email address of the person who provides the information.

Road Authority

Information

12 (1) A road authority must provide a railway company, in writing, with the following information in respect of a public grade crossing:

(a) the precise location of the grade crossing;

(b) the number of traffic lanes that cross the crossing surface;

(c) the average annual daily traffic;

(d) the road crossing design speed;

(e) the specifications set out in columns A, B and C of Table 10-2 of the Grade Crossings Standards to which the road approach corresponds, taking into account régime qu’elle est tenue de respecter relativement à cette modification le sont.

Moyenne annuelle de mouvements ferroviaires quotidiens

8 La compagnie de chemin de fer fournit à l’autorité responsable du service de voirie la moyenne annuelle de mouvements ferroviaires quotidiens lorsque cette valeur est de trois ou plus et qu’elle augmente de 50 % ou plus par rapport à la valeur précédente fournie à l’autorité responsable du service de voirie.

Sifflet

9 Si elle n’exige plus l’utilisation du sifflet à un passage à niveau, la compagnie de chemin de fer avise par écrit l’autorité responsable du service de voirie du changement au plus tard trente jours après la date de celui-ci.

Transfert d’une voie ferrée

10 Si la voie ferrée d’un passage à niveau public est transférée d’une compagnie de chemin de fer à une autre, la compagnie de chemin de fer à laquelle est transférée la voie ferrée fournit à l’autorité responsable du service de voirie, dans les sept jours suivant la date où le transfert prend effet, les nom, adresse, numéro de téléphone et adresse électronique d’une personne-ressource.

Date et coordonnées

11 Les renseignements visés aux articles 4 à 6, 8 et 9 doivent inclure la date de leur transmission, les nom et adresse de la compagnie de chemin de fer et les nom, numéro de téléphone et adresse électronique de la personne qui les fournit.

Autorité responsable du service de voirie

Renseignements

12 (1) L’autorité responsable du service de voirie fournit par écrit à la compagnie de chemin de fer les renseignements ci-après à l’égard d’un passage à niveau public :

a) l’emplacement exact du passage à niveau;

b) le nombre de voies de circulation qui franchissent la surface de croisement;

c) le débit journalier moyen annuel;

d) la vitesse de référence au franchissement routier;

e) les spécifications qui sont prévues aux colonnes A, B et C du tableau 10-2 des Normes sur les passages à
the characteristics set out for rural roads in Table 10-3 of those Standards or the characteristics set out for urban roads in Table 10-4 of those Standards, as applicable;

(f) the width of each traffic lane and shoulder on the road approach;

(g) the design vehicle;

(h) the stopping sight distance;

(i) the average gradient of the road approach;

(j) the crossing angle referred to in article 6.5 of the Grade Crossings Standards;

(k) the applicable departure time referred to in article 10.3 of the Grade Crossings Standards;

(l) the activation time referred to in article 18.2 of the Grade Crossings Standards;

(m) the time referred to in article 19.3(a) of the Grade Crossings Standards; and

(n) an indication of whether the grade crossing includes a sidewalk, path or trail, and if so, whether the sidewalk, path or trail has been designated for persons using assistive devices.

Timing

(2) The information must be provided on receipt of a notice under section 3 of the Notice of Railway Works Regulations.

Timing — existing grade crossing

(3) In the case of an existing grade crossing, the information must be provided not later than the day that is two years after the day on which these Regulations come into force, if a notice under section 3 of the Notice of Railway Works Regulations has not been received within that two-year period.

Change

13 In the case of a change referred to in paragraph 28(c) or (d) or sections 88 to 91, a road authority must provide a railway company, in writing, not later than 60 days before the day on which the change begins, with the details of the change and with the information referred to in subsection 12(1) relating to the change.

Échéancier

(2) Les renseignements doivent être fournis sur réception d'un avis donné en vertu de l'article 3 du Règlement sur l'avis de travaux ferroviaires.

Échéancier — passage à niveau existant

(3) Dans le cas d'un passage à niveau existant, les renseignements doivent être fournis au plus tard à l'expiration d'une période de deux ans suivant l'entrée en vigueur du présent règlement si aucun avis prévu à l'article 3 du Règlement sur l'avis de travaux ferroviaires n'a été reçu au cours de cette période.

Modification

13 Dans le cas d'une modification visée aux alinéas 28c) ou d) ou aux articles 88 à 91, l'autorité responsable du service de voirie fournit par écrit à la compagnie de chemin de fer, au moins soixante jours avant le début de la modification, les renseignements visés au paragraphe 12(1) qui sont relatifs à la modification, ainsi que les détails sur celle-ci.
Road crossing design speed
14 A road authority must notify a railway company in writing of an increase in the road crossing design speed at a public grade crossing not later than 60 days before the day on which the increase takes effect and must include in the notice the information referred to in paragraphs 12(1)(a), (d), (h) and (i).

Interconnected traffic signal and sign
15 A road authority must provide a railway company with the information referred to in paragraphs 12(1)(a), (l) and (m) not later than 60 days before the day on which an interconnected traffic signal referred to in article 19 of the Grade Crossings Standards, or a Prepare to Stop at Railway Crossing sign, is installed or is changed.

Exception
16 Despite sections 13 to 15, a road authority may make a change referred to in those sections at any time if the railway company has advised the road authority that the requirements of these Regulations with which the railway company must comply with respect to the change are met.

Transfer of road
17 If a road at a public grade crossing is transferred from one road authority to another, the road authority to which the road is transferred must, within seven days after the day on which the transfer takes effect, provide the railway company with the name, address, telephone number and email address of a contact person.

Date and contact information
18 The information referred to in sections 12 to 15 must include the date on which it is sent, the name and address of the road authority, and the name, telephone number and email address of the person who provides the information.

Sightlines
Application
Public grade crossing
19 (1) Sections 20 to 28 apply to a public grade crossing.
Private grade crossing

(2) Sections 20 to 28 apply to a private grade crossing other than a private grade crossing with a railway design speed of 25 km/h or less if

(a) access to the road leading to the grade crossing is controlled by a locked barrier; or

(b) the grade crossing is for the exclusive use of the private authority and is not used by the public.

Standards

New grade crossing with a warning system

20 (1) The sightlines at a new grade crossing with a warning system must be as shown in Figure 7-1(a) of the Grade Crossings Standards.

New grade crossing without a warning system

(2) The sightlines at a new grade crossing without a warning system must be as shown in Figures 7-1(a) and (b) of the Grade Crossings Standards.

Establishment of sightlines

(3) The sightlines at a new grade crossing must be established in accordance with the standards set out in article 7 of the Grade Crossings Standards.

Existing grade crossing without a warning system

21 (1) The sightlines at an existing grade crossing without a warning system must be as shown in Figures 7-1(a) and (b) of the Grade Crossings Standards and are not required to take account of any railway equipment that is moving or attended.

Existing grade crossing with a warning system

(2) The sightlines at an existing grade crossing with a warning system without a gate, which are within the railway right-of-way and within the land on which the road is situated, must be as shown in Figure 7-1(a) of the Grade Crossings Standards and are not required to take account of

(a) any railway equipment;

Passage à niveau privé

(2) Les articles 20 à 28 s’appliquent à un passage à niveau privé, sauf un passage à niveau privé dont la vitesse de référence sur la voie ferrée est de 25 km/h ou moins dans les cas suivants :

a) l’accès à la route menant au passage à niveau est contrôlé par une barrière verrouillée;

b) le passage à niveau est destiné à l’usage exclusif de l’autorité privée et n’est pas utilisé par le public.

Normes

Nouveau passage à niveau muni d’un système d’avertissement

20 (1) Les lignes de visibilité d’un nouveau passage à niveau muni d’un système d’avertissement doivent être conformes à celles illustrées à la figure 7-1a) des Normes sur les passages à niveau.

Nouveau passage à niveau non muni d’un système d’avertissement

(2) Les lignes de visibilité d’un nouveau passage à niveau non muni d’un système d’avertissement doivent être conformes à celles illustrées aux figures 7-1a) et b) des Normes sur les passages à niveau.

Établissement des lignes de visibilité

(3) Les lignes de visibilité d’un nouveau passage à niveau doivent être établies conformément aux normes prévues à la section 7 des Normes sur les passages à niveau.

Passage à niveau existant — non muni d’un système d’avertissement

21 (1) Les lignes de visibilité d’un passage à niveau existant non muni d’un système d’avertissement doivent être conformes à celles illustrées aux figures 7-1a) et b) des Normes sur les passages à niveau et n’ont pas à tenir compte du matériel ferroviaire en mouvement ou sous surveillance.

Passage à niveau existant — muni d’un système d’avertissement

(2) Les lignes de visibilité d’un passage à niveau existant muni d’un système d’avertissement sans barrière, dans les limites de l’emprise du chemin de fer et dans les limites du terrain où est située la route, doivent être conformes à celles illustrées à la figure 7-1a) des Normes sur les passages à niveau et n’ont pas à tenir compte :

a) de tout matériel ferroviaire;
(b) any permanent visual obstructions that exist on the day on which these Regulations come into force; or

(c) any areas beyond the visual limits of a curve.

Establishment of sightlines

(3) The sightlines at an existing grade crossing must be established in accordance with the standards set out in article 7 of the Grade Crossings Standards.

Timing

(4) The requirements of subsections (1) to (3) must be met beginning on the day that is seven years after the day on which these Regulations come into force.

Warning system with a gate

22 Despite sections 20 and 21, the requirements respecting sightlines do not apply to a grade crossing with a warning system with a gate.

Maintenance of Sightlines

Maintenance of sightlines

23 Sightlines must be maintained to meet the requirements of section 20 or 21, as applicable, including by the removal of trees and brush that obstruct the sightlines.

Obstruction of Sightlines

Buildings and structures

24 A person must not erect, on land adjoining the land on which a line of railway is situated, a building or other structure, not being a railway work, that will obstruct the sightlines.

Things placed on land

25 A person must not place, on land adjoining the land on which a line of railway is situated, anything that will obstruct the sightlines.

Trees and brush

26 A person who grows trees and brush, or allows them to grow, on land in the vicinity of a grade crossing must remove them if they obstruct the sightlines.

Unattended railway equipment

27 A company must not leave unattended any railway equipment that obstructs the sightlines.
Changes

Changes to grade crossing

28 The sightlines at a grade crossing must meet the requirements of section 20 if

(a) a line of railway is added within the sightlines of the grade crossing;

(b) the class of track referred to in column 1 of the table to article 7.1.2 of the Grade Crossings Standards changes, taking into account the maximum allowable operating speed set out in column 2 or 3 of that table, as applicable;

(c) the design vehicle changes; or

(d) an increase in the road crossing design speed results in a change to the specification set out in column B of Table 10-2 of the Grade Crossings Standards to which the road approach corresponds, taking into account the characteristics set out for rural roads in Table 10-3 of those Standards or the characteristics set out for urban roads in Table 10-4 of those Standards, as applicable.

New Grade Crossing

Prohibition

Construction

29 A person must not construct a grade crossing if

(a) the railway design speed would be more than 177 km/h (110 mph); or

(b) the road approach of the proposed grade crossing would be a freeway, taking into account the characteristics set out for rural roads in Table 10-3 of the Grade Crossings Standards or the characteristics set out for urban roads in Table 10-4 of those Standards, as applicable.

Design and Construction

Application

30 Sections 31 to 36 apply to the design and construction of a new grade crossing.

Modifications

Modification du passage à niveau

28 Les lignes de visibilité d’un passage à niveau doivent respecter les exigences de l’article 20 dans les cas suivants :

(a) une voie ferrée est ajoutée dans les limites des lignes de visibilité du passage à niveau;

(b) la catégorie de voie visée à la colonne 1 du tableau figurant à la section 7.1.2 des Normes sur les passages à niveau change, compte tenu de la vitesse maximale permise prévue aux colonnes 2 ou 3, selon le cas;

(c) le véhicule type change;

(d) une augmentation de la vitesse de référence au franchissement routier a pour effet de changer la spécification qui est prévue à la colonne B du tableau 10-2 des Normes sur les passages à niveau et à laquelle correspond l’abord routier, compte tenu des caractéristiques prévues pour les routes rurales au tableau 10-3 de ces normes ou de celles prévues pour les routes urbaines au tableau 10-4 de ces normes, selon le cas.

Nouveau passage à niveau

Interdiction

Construction

29 Il est interdit de construire un passage à niveau dans les cas suivants :

(a) la vitesse de référence sur la voie ferrée serait supérieure à 177 km/h (110 mi/h);

(b) l’abord routier du passage à niveau proposé serait une autoroute, compte tenu des caractéristiques prévues pour les routes rurales au tableau 10-3 des Normes sur les passages à niveau ou de celles prévues pour les routes urbaines au tableau 10-4 de ces normes, selon le cas.

Conception et construction

Application

30 Les articles 31 à 36 s’appliquent à la conception et à la construction des nouveaux passages à niveau.
Crossing surface
31 A crossing surface must meet the standards set out in article 5 of the Grade Crossings Standards.

Road approach
32 A road approach must meet the standards set out in article 6 of the Grade Crossings Standards.

Location
33 The location of a public grade crossing must meet the standards set out in article 11 of the Grade Crossings Standards.

Departure times
34 Departure times must be calculated in accordance with article 10.3 of the Grade Crossings Standards.

Design vehicle
35 A design vehicle must be selected for the design of a grade crossing.

Road crossing design speed
36 A road crossing design speed must be selected for the design of a private grade crossing.

Signs and Warning System

Public Grade Crossing

Application

Application
37 Sections 38 to 46 apply to a new grade crossing that is a public grade crossing.

Signs

Railway Crossing sign and Number of Tracks sign
38 A Railway Crossing sign — and, if there is more than one track, a Number of Tracks sign — must be installed at a grade crossing and meet the standards set out in article 8.1 of the Grade Crossings Standards.
Emergency Notification sign

39 An Emergency Notification sign must be installed at a grade crossing in accordance with the standards set out in article 8.5 of the Grade Crossings Standards.

Stop sign

40 (1) A Stop sign must be installed at a grade crossing without a warning system if the road crossing design speed is less than 15 km/h.

Standards

(2) The Stop sign and its installation must meet the standards set out in article 8.4 of the Grade Crossings Standards.

Stop Ahead sign

41 A Stop Ahead sign must be installed if the Stop sign is not clearly visible within the stopping sight distance, and must meet the standards set out in article 8.3 of the Grade Crossings Standards.

Railway Crossing Ahead sign and Advisory Speed Tab sign

42 (1) A Railway Crossing Ahead sign with an Advisory Speed Tab sign must be installed if

(a) the Railway Crossing sign is not clearly visible within the stopping sight distance; or

(b) the speed of a motor vehicle on the road approach needs to be reduced in order to correspond to the road crossing design speed.

Standards

(2) The Railway Crossing Ahead sign and the Advisory Speed Tab sign must meet the standards set out in article 8.2 of the Grade Crossings Standards.

Prepare to Stop at Railway Crossing sign

43 (1) A Prepare to Stop at Railway Crossing sign must be installed if

(a) the road approach is an expressway, taking into account the characteristics set out for expressways in Table 10-4 of the Grade Crossings Standards;

(b) at least one set of front light units on the warning system is not clearly visible within the stopping sight

Panneau Avis d’urgence

39 Un panneau Avis d’urgence doit être installé à un passage à niveau conformément aux normes prévues à la section 8.5 des Normes sur les passages à niveau.

Panneau Stop

40 (1) Un panneau Stop doit être installé à un passage à niveau qui n’est pas muni d’un système d’avertissement si la vitesse de référence au franchissement routier est de moins de 15 km/h.

Normes

(2) Le panneau Stop et son installation doivent respecter les normes prévues à la section 8.4 des Normes sur les passages à niveau.

Panneau Signal avancé d’arrêt

41 Un panneau Signal avancé d’arrêt doit être installé si le panneau Stop n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt et il doit respecter les normes prévues à la section 8.3 des Normes sur les passages à niveau.

Panneau Signal avancé d’un passage à niveau et panonceau Vitesse recommandée

42 (1) Un panneau Signal avancé d’un passage à niveau comportant un panonceau Vitesse recommandée doit être installé dans les cas suivants :

a) le panneau Passage à niveau n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt;

b) la vitesse des véhicules automobiles sur l’abord routier doit être réduite pour correspondre à la vitesse de référence au franchissement routier.

Normes

(2) Le panneau Signal avancé d’un passage à niveau et le panonceau Vitesse recommandée doivent respecter les normes prévues à la section 8.2 des Normes sur les passages à niveau.

Panneau Préparez-vous à arrêter à un passage à niveau

43 (1) Un panneau Préparez-vous à arrêter à un passage à niveau doit être installé dans les cas suivants :

a) l’abord routier est une route express, compte tenu des caractéristiques prévues pour une route express au tableau 10-4 des Normes sur les passages à niveau;

b) au moins un ensemble de dispositifs lumineux avant sur le système d’avertissement n’est pas claire-
distance of at least one of the lanes of the road approach; or

(c) the weather conditions at the grade crossing repeatedly obscure the visibility of the warning system.

Standards

(2) The Prepare to Stop at Railway Crossing sign must meet the standards set out in article 18 of the Grade Crossings Standards.

Warning System

Warning system

44 (1) A warning system must be installed at a grade crossing that corresponds to the specifications set out in article 9.1 or 9.5 of the Grade Crossings Standards, as applicable, and must meet the applicable standards set out in articles 12 to 16 of those Standards.

Exception

(2) If railway equipment is required to stop at the grade crossing, a traffic signal that is activated by the presence of the railway equipment may be installed at the grade crossing instead of a warning system, or the railway company may manually protect the grade crossing instead of installing a warning system.

Warning system with a gate

45 (1) A warning system with a gate must be installed at a grade crossing that corresponds to the specifications set out in article 9.2 or 9.6 of the Grade Crossings Standards, as applicable, and must meet the standards set out in articles 12 to 16 of those Standards.

Gate arm clearance time

(2) In the case of a grade crossing that corresponds to the specifications set out in article 9.2 of the Grade Crossings Standards, the gate arm of the warning system must start to descend at the end of the time calculated in accordance with article 10.4 of those Standards.

Interconnected traffic signal

46 A warning system installed at a grade crossing that corresponds to the specifications set out in article 19.1 of the Grade Crossings Standards must be interconnected with the traffic signal, and the interconnection must meet the standards set out in articles 19.2 to 19.4 of those Standards.
Private Grade Crossing

Application

47 Sections 48 to 56 apply to a new grade crossing that is a private grade crossing.

Signs

Railway Crossing sign and Number of Tracks sign

48 If a Railway Crossing sign and a Number of Tracks sign are installed at a grade crossing, they must meet the standards set out in article 8.1 of the Grade Crossings Standards.

Stop Ahead sign

49 A Stop Ahead sign must be installed if the Stop sign is not clearly visible within the stopping sight distance, and must meet the standards set out in article 8.3 of the Grade Crossings Standards.

Railway Crossing Ahead sign and Advisory Speed Tab sign

50 (1) A Railway Crossing Ahead sign with an Advisory Speed Tab sign must be installed if

(a) the Railway Crossing sign is not clearly visible within the stopping sight distance; or

(b) the speed of a motor vehicle on the road approach needs to be reduced in order to correspond to the road crossing design speed.

Standards

(2) The Railway Crossing Ahead sign and the Advisory Speed Tab sign must meet the standards set out in article 8.2 of the Grade Crossings Standards.

Prepare to Stop at Railway Crossing sign

51 (1) A Prepare to Stop at Railway Crossing sign must be installed if

(a) at least one set of front light units on the warning system is not clearly visible within the stopping sight distance of at least one of the lanes of a road approach; or

Passage à niveau privé

Application

47 Les articles 48 à 56 s’appliquent aux nouveaux passages à niveau qui sont des passages à niveau privés.

Panneaux

Panneau Passage à niveau et panneau Nombre de voies ferrées

48 Si un panneau Passage à niveau et un panneau Nombre de voies ferrées sont installés à un passage à niveau, ils doivent respecter les normes prévues à la section 8.1 des Normes sur les passages à niveau.

Panneau Signal avancé d’arrêt

49 Un panneau Signal avancé d’arrêt doit être installé si le panneau Stop n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt et il doit respecter les normes prévues à la section 8.3 des Normes sur les passages à niveau.

Panneau Signal avancé d’un passage à niveau et panonceau Vitesse recommandée

50 (1) Un panneau Signal avancé d’arrêt comportant un panonceau Vitesse recommandée doit être installé dans les cas suivants :

(a) le panneau Passage à niveau n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt;

(b) la vitesse des véhicules automobiles sur l’abord routier doit être réduite pour correspondre à la vitesse de référence au franchissement routier.

Normes

(2) Le panneau Signal avancé d’un passage à niveau et le panonceau Vitesse recommandée doivent respecter les normes prévues à la section 8.2 des Normes sur les passages à niveau.

Panneau Préparez-vous à arrêter à un passage à niveau

51 (1) Un panneau Préparez-vous à arrêter à un passage à niveau doit être installé dans les cas suivants :

(a) au moins un ensemble de dispositifs lumineux avant sur le système d’avertissement n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt d’au moins une des voies de l’abord routier;
(b) the weather conditions at the grade crossing repeatedly obscure the visibility of the warning system.

Standards

(2) The Prepare to Stop at Railway Crossing sign must meet the standards set out in article 18 of the Grade Crossings Standards.

Warning System

Application

52 Sections 53 to 56 do not apply to a grade crossing with a railway design speed of 25 km/h or less if

(a) access to the road leading to the grade crossing is controlled by a locked barrier; or

(b) the grade crossing is for the exclusive use of the private authority and is not used by the public.

Warning system

53 (1) A warning system must be installed at a grade crossing that corresponds to the specifications set out in article 9.3 of the Grade Crossings Standards and must meet the applicable standards set out in articles 12 to 16 of those Standards.

Alternative — limited use

(2) If the grade crossing provides access to fewer than three private dwelling-places and does not provide access to a business, a limited use warning system, and signs, that meet the standards set out in Appendix B of the Grade Crossings Standards may be installed at the grade crossing, instead of the warning system referred to in subsection (1).

Alternative — walk light

(3) A limited use warning system with a walk light, and signs, which meet the standards set out in Appendix C of the Grade Crossings Standards, may be installed at the grade crossing instead of the warning system referred to in subsection (1) or (2), if

(a) access to the road is controlled by a locked barrier; or

(b) the grade crossing is for the exclusive use of the private authority and is not used by the public.
Exception

(4) If railway equipment is required to stop at the grade crossing, a traffic signal that is activated by the presence of the railway equipment may be installed at the grade crossing instead of a warning system or the railway company may manually protect the grade crossing instead of installing a warning system.

Sidewalk, path or trail

54 A warning system must be installed at a grade crossing that corresponds to the specifications set out in article 9.5 of the Grade Crossings Standards and must meet the applicable standards set out in articles 12 to 16 of those Standards.

Warning system with a gate

55 (1) A warning system with a gate must be installed at a grade crossing that corresponds to the specifications set out in article 9.4 or 9.6 of the Grade Crossings Standards, as applicable, and must meet the standards set out in articles 12 to 16 of those Standards.

Gate arm clearance time

(2) The gate arm of the warning system must start to descend at the end of the time calculated in accordance with article 10.4 of the Grade Crossings Standards.

Interconnected traffic signal

56 A warning system installed at a grade crossing that corresponds to the specifications set out in article 19.1 of the Grade Crossings Standards must be interconnected with the traffic signal, and the interconnection must meet the standards set out in articles 19.2 to 19.4 of those Standards.

Existing Grade Crossing

Public Grade Crossing

Design Vehicle

Selection

57 A design vehicle that corresponds to the use of an existing grade crossing that is a public grade crossing must be selected.

Exception

(4) Si le matériel ferroviaire doit s’arrêter au passage à niveau, un feu de circulation activé par la présence du matériel ferroviaire peut y être installé au lieu d’un système d’avertissement ou la compagnie de chemin de fer peut protéger manuellement le passage à niveau au lieu d’installer un système d’avertissement.

Trottoir, chemin ou sentier

54 Un système d’avertissement doit être installé à un passage à niveau qui correspond aux spécifications prévues à la section 9.5 des Normes sur les passages à niveau et il doit respecter les normes applicables prévues aux sections 12 à 16 de ces normes.

Système d’avertissement avec barrière

55 (1) Un système d’avertissement avec barrière doit être installé à un passage à niveau qui correspond aux spécifications prévues aux sections 9.4 ou 9.6 des Normes sur les passages à niveau, selon le cas, et il doit respecter les normes prévues aux sections 12 à 16 de ces normes.

Délai de descente de la barrière

(2) La barrière du système d’avertissement doit commencer à descendre à la fin du délai calculé conformément à la section 10.4 des Normes sur les passages à niveau.

Feu de circulation interconnecté

56 Le système d’avertissement installé à un passage à niveau qui correspond aux spécifications prévues à la section 19.1 des Normes sur les passages à niveau doit être interconnecté au feu de circulation et l’interconnexion doit respecter les normes prévues aux sections 19.2 à 19.4 de ces normes.

Passage à niveau existant

Passage à niveau public

véhicule type

Choix

57 Un véhicule type qui correspond à l’utilisation du passage à niveau existant qui est un passage à niveau public doit être choisi.
Cumulative Requirements

Basic requirements

58 An existing grade crossing that is a public grade crossing must meet the standards set out in Part B of the Grade Crossings Standards.

Additional requirements — seven years

59 In addition to meeting the requirement of section 58, an existing grade crossing that is a public grade crossing must meet the requirements of sections 60 to 71 beginning on the day that is seven years after the day on which these Regulations come into force.

Crossing Surface and Road Approach

Crossing surface

60 A crossing surface must meet the standards set out in article 5 of the Grade Crossings Standards.

Road approach

61 A road approach must meet the standards set out in article 6.1 of the Grade Crossings Standards.

Signs

Railway Crossing sign

62 A Railway Crossing sign must meet the standards set out in articles 8.1.3 and 8.1.4 of the Grade Crossings Standards.

Emergency Notification sign

63 An Emergency Notification sign must be installed at a grade crossing in accordance with the standards set out in article 8.5 of the Grade Crossings Standards.

Stop sign

64 (1) A Stop sign must be installed at a grade crossing without a warning system if the road crossing design speed is less than 15 km/h.

Standards

(2) The Stop sign and its installation must meet the standards set out in article 8.4 of the Grade Crossings Standards.

Stop Ahead sign

65 A Stop Ahead sign must be installed if the Stop sign is not clearly visible within the stopping sight distance,
and must meet the standards set out in article 8.3 of the Grade Crossings Standards.

Railway Crossing Ahead sign and Advisory Speed Tab sign

66 (1) A Railway Crossing Ahead sign with an Advisory Speed Tab sign must be installed if

(a) the Railway Crossing sign is not clearly visible within the stopping sight distance; or

(b) the speed of a motor vehicle on the road approach needs to be reduced in order to correspond to the road crossing design speed.

Standards

(2) The Railway Crossing Ahead sign and the Advisory Speed Tab sign must meet the standards set out in article 8.2 of the Grade Crossings Standards.

Prepare to Stop at Railway Crossing sign

67 (1) A Prepare to Stop at Railway Crossing sign must be installed if

(a) the road approach is an expressway, taking into account the characteristics set out for expressways in Table 10-4 of the Grade Crossings Standards;

(b) at least one set of front light units on the warning system is not clearly visible within the stopping sight distance of at least one of the lanes of the road approach; or

(c) the weather conditions at the grade crossing repeatedly obscure the visibility of the warning system.

Standards

(2) The Prepare to Stop at Railway Crossing sign must meet the standards set out in articles 18.1 and 18.2 of the Grade Crossings Standards.

Warning System

Light distribution and intensity

68 (1) The distribution and intensity of the light from a warning system must meet the standards set out in article 13 of the Grade Crossings Standards.
Alignment of light units

(2) The alignment of each set of light units must meet the standards set out in articles 14.2 to 14.6 of the Grade Crossings Standards.

Warning time

69 Before railway equipment reaches a crossing surface, the warning system must operate in accordance with articles 16.1.1(a) to (c) and 16.2.2 of the Grade Crossings Standards.

Cut-out circuits

70 If railway equipment is operated, left standing or stopped in a manner that regularly causes, or will regularly cause, the activation of the warning system at a grade crossing other than for the purpose of crossing that grade crossing, the warning system must contain circuits that meet the standards set out in article 16.3.1 of the Grade Crossings Standards.

Directional stick circuit

71 The directional stick circuit of a warning system must meet the standards set out in article 16.4 of the Grade Crossings Standards.

Private Grade Crossing

Design Vehicle

Selection

72 A design vehicle that corresponds to the use of an existing grade crossing that is a private grade crossing must be selected.

Cumulative Requirements

Railway Crossing sign and Number of Tracks sign

73 A Railway Crossing sign and a Number of Tracks sign that are installed at an existing grade crossing that is a private grade crossing must meet the standards set out in Part B of the Grade Crossings Standards.

Additional requirements — seven years

74 In addition to meeting the requirement of section 73, an existing grade crossing that is a private grade crossing must meet the requirements of sections 76 to 81 beginning on the day that is seven years after the day on which these Regulations come into force.
Requirements respecting warning systems — seven years

75 (1) An existing grade crossing that is a private grade crossing must meet the requirements of sections 82 to 85 beginning on the day that is seven years after the day on which these Regulations come into force.

Exception — certain private grade crossings

(2) Sections 82 to 85 do not apply to a grade crossing with a railway design speed of 25 km/h or less if

(a) access to the road leading to the grade crossing is controlled by a locked barrier; or

(b) the grade crossing is for the exclusive use of the private authority and is not used by the public.

Exception — limited use warning systems

(3) Sections 82 to 85 do not apply to a limited use warning system of a type referred to in Appendix B of the Grade Crossings Standards or to a limited use warning system with a walk light of a type referred to in Appendix C of those Standards.

Crossing Surface and Road Approach

Crossing surface

76 A crossing surface must meet the standards set out in article 5 of the Grade Crossings Standards.

Road approach

77 A road approach must meet the standards set out in article 6.1 of the Grade Crossings Standards.

Road crossing design speed

78 A road crossing design speed must be selected for the grade crossing.

Signs

Stop Ahead sign

79 A Stop Ahead sign must be installed if the Stop sign is not clearly visible within the stopping sight distance, and must meet the standards set out in article 8.3 of the Grade Crossings Standards.

Exigences relatives aux systèmes d’avertissement — sept ans

75 (1) Le passage à niveau existant qui est un passage à niveau privé doit respecter les exigences des articles 82 à 85 à compter de l’expiration des sept ans suivant la date d’entrée en vigueur du présent règlement.

Exception — certains passages à niveau privés

(2) Les articles 82 à 85 ne s’appliquent pas à un passage à niveau dont la vitesse de référence sur la voie ferrée est de 25 km/h ou moins dans les cas suivants :

a) l’accès à la route menant au passage à niveau est contrôlé par une barrière verrouillée;

b) le passage à niveau est destiné à l’usage exclusif de l’autorité privée et n’est pas utilisé par le public.

Exception — système d’avertissement à usage restreint

(3) Les articles 82 à 85 ne s’appliquent ni à un système d’avertissement à usage restreint d’un type visé à l’annexe B des Normes sur les passages à niveau ni à un système d’avertissement à usage restreint comportant un feu de signalisation piétonnier d’un type visé à l’annexe C de ces normes.

Surface de croisement et abord routier

Surface de croisement

76 La surface de croisement doit respecter les normes prévues à la section 5 des Normes sur les passages à niveau.

Abord routier

77 L’abord routier doit respecter les normes prévues à la section 6.1 des Normes sur les passages à niveau.

Vitesse de référence au franchissement routier

78 Une vitesse de référence au franchissement routier doit être choisie pour le passage à niveau.

Panneaux

Panneau Signal avancé d’arrêt

79 Un panneau Signal avancé d’arrêt doit être installé si le panneau Stop n’est pas clairement visible dans les limites de la distance de visibilité d’arrêt et il doit respecter les normes prévues à la section 8.3 des Normes sur les passages à niveau.
Railway Crossing Ahead sign and Advisory Speed Tab sign

80 (1) A Railway Crossing Ahead sign with an Advisory Speed Tab sign must be installed if

(a) the Railway Crossing sign is not clearly visible within the stopping sight distance; or

(b) the speed of a motor vehicle on the road approach needs to be reduced in order to correspond to the road crossing design speed.

Standards
(2) The Railway Crossing Ahead sign and Advisory Speed Tab sign must meet the standards set out in article 8.2 of the Grade Crossings Standards.

Prepare to Stop at Railway Crossing sign

81 (1) A Prepare to Stop at Railway Crossing sign must be installed if

(a) at least one set of front light units on the warning system is not clearly visible within the stopping sight distance of at least one of the lanes of the road approach; or

(b) the weather conditions at the grade crossing repeatedly obscure the visibility of the warning system.

Standards
(2) The Prepare to Stop at Railway Crossing sign must meet the standards set out in articles 18.1 and 18.2 of the Grade Crossings Standards.

Warning System

Light distribution and intensity

82 (1) The distribution and intensity of the light from a warning system must meet the standards set out in article 13 of the Grade Crossings Standards.

Alignment of light units
(2) The alignment of each set of light units must meet the standards set out in articles 14.2 to 14.6 of the Grade Crossings Standards.
Warning time
83 Before railway equipment reaches a crossing surface, the warning system must operate in accordance with articles 16.1.1(a) to (c) and 16.2.2 of the Grade Crossings Standards.

Cut-out circuits
84 If railway equipment is operated, left standing or stopped in a manner that regularly causes, or will regularly cause, the activation of the warning system at a grade crossing other than for the purpose of crossing that grade crossing, the warning system must contain circuits that meet the standards set out in article 16.3.1 of the Grade Crossings Standards.

Directional stick circuit
85 The directional stick circuit of a warning system must meet the standards set out in article 16.4 of the Grade Crossings Standards.

Changes to Grade Crossing

Signs
86 If a Railway Crossing sign or a Number of Tracks sign is replaced at an existing grade crossing, the sign must meet the standards set out in article 8.1 of the Grade Crossings Standards.

New warning system
87 (1) If a warning system is installed at a grade crossing, it must meet the applicable standards set out in articles 12 to 16 of the Grade Crossings Standards.

Modification or installation of component
(2) When a component of a warning system is modified or is installed, the component must, except in the case of a replacement in kind for maintenance purposes, meet the applicable standards set out in articles 12 to 16 of the Grade Crossings Standards.

Increase in railway design speed
(3) If the installation of a warning system — or the modification or installation of a component of a warning system — results from an increase in the railway design speed, the warning system or component must meet the applicable standards set out in articles 12 to 16 of the
Grade Crossings Standards before the increase in the railway design speed takes effect.

**Change to road geometry**

88 (1) If the location, gradient or crossing angle of a grade crossing changes, articles 6 and 11 of the Grade Crossings Standards must be applied in a manner that improves the overall safety of the grade crossing.

**Prohibition — gradient**

(2) It is prohibited to increase the absolute gradient of a road approach to an existing grade crossing if the gradient does not meet the standards set out in article 6.3 of the Grade Crossings Standards.

**Change to road approach**

89 If the number or width of traffic lanes of a road approach is increased, or if a shoulder is added or a shoulder’s width is increased, the grade crossing must meet the standards set out in articles 5.1 and 6.4 of the Grade Crossings Standards.

**Interconnected traffic signals**

90 If a traffic signal is installed at a grade crossing that corresponds to the specifications set out in article 19.1 of the Grade Crossings Standards, the warning system must be interconnected with the traffic signal, and the interconnection must meet the standards set out in articles 19.2 to 19.4 of those Standards.

**Change in design vehicle**

91 If the design vehicle changes, the period of time that the warning system must operate before railway equipment reaches the crossing surface must meet the standards set out in article 16.1 of Grade Crossings Standards.

**General Requirements**

**Instrument Housing**

**Locked housing**

92 A railway company must ensure that the instrument housing for a warning system is locked when it is unattended.

**Exigences générales**

**Boîtier des instruments**

**Verrouillage du boîtier**

92 La compagnie de chemin de fer veille à ce que le boîtier des instruments d’un système d’avertissement soit verrouillé lorsqu’il est laissé sans surveillance.
Inspection, Testing and Maintenance

Design plan — railway company

93 (1) The design plan for a warning system at a grade crossing must be kept at the location of the grade crossing and must clearly indicate the following information:

(a) the configuration of the components of the warning system;
(b) the layout of the circuitry and signal equipment;
(c) the parameters for the operation of the components of the warning system;
(d) the type of light, including the lens deflection angles, if applicable, and the alignment coordinates of the light units; and
(e) the details of any interconnection with a traffic control device.

Maintenance of warning system

(2) The warning system must conform to the design plan and must be maintained in accordance with article 17.1 of the Grade Crossings Standards.

Design plan — modification or installation

(3) When a component of the warning system is modified or installed, a design plan reflecting the modification or installation must be prepared and must be kept at the location of the grade crossing until it is replaced by a revised design plan.

Initial installation

94 (1) Immediately after the initial installation of a warning system, but before it is placed in service, all of the components of the warning system must be inspected and tested in accordance with article 17.1 of the Grade Crossings Standards.

Modification or installation of a component

(2) Immediately after the modification or installation of a component of the warning system, but before the warning system is placed in service, the component and all other components that are directly affected by that modification or installation must be inspected and tested in accordance with article 17.1 of the Grade Crossings Standards.

Inspection, mise à l’essai et entretien

Plan de conception — compagnie de chemin de fer

93 (1) Le plan de conception du système d’avertissement d’un passage à niveau doit être conservé à l’emplacement de celui-ci et indiquer clairement les renseignements suivants :

(a) la configuration des composants du système d’avertissement;
(b) le schéma de l’ensemble des circuits et de l’équipement de signalisation;
(c) les paramètres relatifs au fonctionnement des composants du système d’avertissement;
(d) le type de feux, y compris l’angle de déflexion des lentilles, le cas échéant, et les coordonnées d’alignement des dispositifs lumineux;
(e) les détails relatifs à toute interconnexion avec un dispositif de contrôle de la circulation.

Entretien du système d’avertissement

(2) Le système d’avertissement doit être conforme au plan de conception et être entretenu conformément à la section 17.1 des Normes sur les passages à niveau.

Plan de conception — installation ou modification

(3) Lorsqu’un composant du système d’avertissement est modifié ou installé, un plan de conception reflétant la modification ou l’installation doit être préparé et être laissé à l’emplacement du passage à niveau jusqu’à ce qu’il soit remplacé par un plan de conception révisé.

Installation initiale

94 (1) Immédiatement après l’installation initiale d’un système d’avertissement, mais avant la mise en service de celui-ci, tous ses composants doivent être inspectés et mis à l’essai conformément à la section 17.1 des Normes sur les passages à niveau.

Installation ou modification d’un composant

(2) Immédiatement après l’installation ou la modification d’un composant du système d’avertissement, mais avant la mise en service du système d’avertissement, ce composant et tous les autres composants qui sont directement touchés par l’installation ou la modification doivent être inspectés et mis à l’essai conformément à la section 17.1 des Normes sur les passages à niveau.
Environmental conditions

(3) In the event of severe weather or other environmental conditions that may affect the operation of the warning system or its components, the warning system or the components must be inspected within a reasonable period of time to ensure that they are working properly.

Conditions environnementales

(3) Si des conditions météorologiques particulièrement mauvaises ou d’autres conditions environnementales peuvent nuire au fonctionnement du système d’avertissement ou de ses composants, le système d’avertissement ou les composants doivent être inspectés dans un délai raisonnable pour s’assurer qu’ils fonctionnent convenablement.

Periodic inspection and testing

95 The inspection and testing of the elements set out in column 2 of Table 17-2 of the Grade Crossings Standards must be conducted at the frequency — as defined in Table 17-1 of those Standards — set out in column 3, 4 or 5 of Table 17-2.

Interconnexion avec un système d’avertissement

96 (1) Before a traffic control device that is interconnected with a warning system is placed in service, a road authority must inspect and test the traffic control device to ensure that the standards set out in articles 18 and 19 of the Grade Crossings Standards are met.

Frequency

(2) The inspection and testing of the elements set out in column 2 of Table 20-1 of the Grade Crossings Standards must be conducted at the frequency — as defined in Table 17-1 of those Standards — set out in column 3 of Table 20-1.

Information

(3) When the road authority inspects, tests or maintains the traffic control device, the road authority must have, at the site, information respecting the parameters for the operation of the device.

Obstruction of Grade Crossing

Prohibitions

Unnecessary activation of warning system

97 (1) It is prohibited for railway equipment to be left standing in a manner that causes the activation of the warning system at a public grade crossing other than for the purpose of crossing that grade crossing.

Obstruction of public grade crossing

(2) It is prohibited for railway equipment to be left standing on a crossing surface, or for switching opera-
tions to be conducted, in a manner that obstructs a public grade crossing — including by the activation of the gate of a warning system — for more than five minutes when vehicular or pedestrian traffic is waiting to cross it.

**Safety Concern**

**Collaboration**

98 (1) If railway equipment is operated in a manner that regularly causes the obstruction of a public grade crossing, including by the activation of a warning system, and the municipality where the grade crossing is located declares in a resolution that obstruction of the grade crossing creates a safety concern, the railway company and the road authority must collaborate to resolve the safety concern.

**Notice**

(2) The road authority must notify the Minister and the railway company in writing that the resolution has been passed and must provide them with the information used in support of the resolution, including

(a) a detailed description of the safety concern;

(b) the details of specific occurrences involving the obstruction of the grade crossing, including the date and time of the obstruction; and

(c) the details of the traffic congestion that resulted from each specific occurrence referred to in paragraph (b).

**Timeline and mediation**

(3) The railway company and the road authority must attempt to resolve the safety concern — including through the use of mediation — within 90 days after the day on which the road authority notifies the railway company under subsection (2).

**Notice to Minister**

(4) The road authority must notify the Minister if the railway company and the road authority are not able to resolve the safety concern within the 90-day period.

**Emergency Vehicles**

**Passage of emergency vehicles**

99 Despite sections 97 and 98, if an emergency vehicle requires passage across a grade crossing, a company manoeuvres, de façon à obstruer plus de cinq minutes le passage à niveau public — y compris par l’activation de la barrière d’un système d’avertissement — lorsque des véhicules automobiles ou des piétons attendent de le franchir.

**Question de sécurité**

**Collaboration**

98 (1) Si le matériel ferroviaire est exploité de façon à obstruer régulièrement un passage à niveau public, y compris par l’activation d’un système d’avertissement, et que la municipalité dans laquelle le passage à niveau est situé déclare par résolution que l’obstruction du passage à niveau soulève une question de sécurité, la compagnie de chemin de fer et l’autorité responsable du service de voirie collaborent en vue de résoudre cette question.

**Avis**

(2) L’autorité responsable du service de voirie avise par écrit le ministre et la compagnie de chemin de fer que la résolution a été adoptée et leur fournit les renseignements invoqués à l’appui de celle-ci, y compris :

(a) une description détaillée de la question de sécurité;

(b) des renseignements détaillés sur des cas précis d’obstruction du passage à niveau, y compris la date et l’heure de l’obstruction;

(c) des renseignements détaillés de la congestion routière ayant résulté de chaque cas précis visé à l’alinéa b).

**Échéancier et médiation**

(3) La compagnie de chemin de fer et l’autorité responsable du service de voirie s’efforcent de résoudre la question de sécurité — y compris par la médiation — dans les quatre-vingt-dix jours suivant la date à laquelle l’autorité responsable du service de voirie avise la compagnie de chemin de fer en application du paragraphe (2).

**Avis au ministre**

(4) Si la compagnie de chemin de fer et l’autorité responsable du service de voirie ne parviennent pas à résoudre la question de sécurité dans les quatre-vingt-dix jours, l’autorité responsable du service de voirie en avise le ministre.

**Véhicules d’urgence**

**Franchissement par un véhicule d’urgence**

99 Malgré les articles 97 et 98, si un véhicule d’urgence doit franchir un passage à niveau, la compagnie prend
must take all necessary measures to immediately clear the grade crossing.

Stopping on Crossing Surface

Measures

100 (1) A road authority must take measures to ensure that motor vehicles do not stop on the crossing surface of a public grade crossing, if there is evidence that queued traffic regularly stops on that crossing surface.

Interconnection

(2) If the measures include interconnection with a warning system, the interconnection must meet the standards set out in articles 19.2 to 19.4 of the Grade Crossings Standards.

Construction of Intersection or Access Road

Intersection or access road

101 A person may construct a road intersection or an access road on a road approach to a public grade crossing if

(a) the railway design speed is 25 km/h or less; or

(b) the location of the grade crossing meets the standards set out in article 11 of the Grade Crossings Standards.

Temporary Protection Measures

Threat or interference

102 (1) When a railway company or a road authority undertakes, at a public grade crossing, an activity that could constitute a threat to, or that interferes with, the safety of railway operations, the railway company and the road authority must put in place the necessary protection measures to address the threat or the interference.

Details of activity

(2) Within a reasonable period of time before the activity begins, whichever of the two — the railway company or the road authority — undertakes the activity must provide the other with sufficient details about the activity to determine the necessary protection measures to be put in place.

toutes les mesures nécessaires pour libérer immédiatement le passage à niveau.

Arrêt sur la surface de croisement

Mesures

100 (1) L’autorité responsable du service de voirie prend des mesures pour que les véhicules automobiles ne s’arrêtent pas sur la surface de croisement d’un passage à niveau public s’il est démontré que des véhicules automobiles en attente s’y arrêtent régulièrement.

Interconnexion

(2) Si les mesures prises comportent une interconnexion avec un système d’avertissement, l’interconnexion doit respecter les normes prévues aux sections 19.2 à 19.4 des Normes sur les passages à niveau.

Construction — carrefour routier ou voie d’accès

Carrefour routier ou voie d’accès

101 Il est permis de construire un carrefour routier ou une voie d’accès sur l’abord routier d’un passage à niveau public dans les cas suivants :

a) la vitesse de référence sur la voie ferrée est de 25 km/h ou moins;

b) l’emplacement du passage à niveau respecte les normes prévues à la section 11 des Normes sur les passages à niveau.

Mesures de protection temporaires

Compromettre ou entraver

102 (1) Lorsque la compagnie de chemin de fer ou l’autorité responsable du service de voirie poursuit, à un passage à niveau public, une activité qui risque de compromettre la sécurité ferroviaire ou qui l’entrave, elles mettent en place les mesures de protection nécessaires pour répondre à ce risque ou à cette entrave.

Détails sur l’activité

(2) Dans un délai raisonnable avant le début de l’activité, celle des deux — la compagnie de chemin de fer ou l’autorité responsable du service de voirie — qui poursuit l’activité fournit à l’autre des détails suffisants sur l’activité pour établir les mesures de protection nécessaires à mettre en place.
Malfunction, failure or condition

103 When a railway company or a road authority is advised or becomes aware that a warning system, or a traffic control device that is interconnected with a warning system, has malfunctioned or failed, or that a condition exists that may cause a malfunction or failure, the railway company or the road authority, as the case may be, must

(a) notify the other of the malfunction, failure or condition, even if the existence of the malfunction, failure or condition is not confirmed;

(b) immediately put in place the necessary protection measures to address any threat to, or interference with, the safety of railway operations;

(c) immediately after putting in place the protection measures, notify the other of those measures; and

(d) within a reasonable period of time, take the necessary measures to restore the use of the grade crossing or remedy the malfunction, failure or condition.

Audible Warning

Prescribed requirements

104 For the purposes of section 23.1 of the Railway Safety Act, the following requirements are prescribed:

(a) the area must be located

(i) within a railway right-of-way, on each side of a public grade crossing, and within 0.4 km from the outer edge of the crossing surface, as shown in Figure D-1 of the Grade Crossings Standards, and

(ii) within the road approach;

(b) the area must have a public grade crossing that has the applicable protection referred to in sections 105 to 107;

(c) the area must not have repeated incidents of unauthorized access to the line of railway; and

(d) the area must not require whistling for a grade crossing located outside the area.

Défaillance, mauvais fonctionnement ou condition

103 Lorsqu’elle est informée ou a connaissance d’une défaillance ou d’un mauvais fonctionnement d’un système d’avertissement ou d’un dispositif de contrôle de la circulation qui est interconnecté à un système d’avertissement, ou d’une condition qui peut causer une défaillance ou un mauvais fonctionnement, la compagnie de chemin de fer ou l’autorité responsable du service de voirie, selon le cas, est tenue :

a) d’aviser l’autre de la défaillance, du mauvais fonctionnement ou de la condition, même si l’existence de ceux-ci n’est pas confirmée;

b) de mettre en place sans délai les mesures de protection nécessaires pour répondre à toute menace ou entrave à la sécurité ferroviaire;

c) après la mise en place des mesures de protection, d’aviser sans délai l’autre de ces mesures;

d) de prendre, dans un délai raisonnable, les mesures nécessaires pour rétablir l’usage du passage à niveau ou remédier à la défaillance, au mauvais fonctionnement ou à la condition.

Avertissement audible

Exigences

104 Pour l’application de l’article 23.1 de la Loi sur la sécurité ferroviaire, les exigences ci-après sont prévues :

a) le territoire est situé :

(i) d’une part, dans les limites d’une emprise du chemin de fer, de chaque côté d’un passage à niveau public et à une distance d’au plus 0,4 km à partir du bord extérieur de la surface de croisement, comme l’illustre la figure D-1 des Normes sur les passages à niveau,

(ii) d’autre part, dans les limites de l’abord routier;

b) il comporte un passage à niveau public doté de la protection applicable visée aux articles 105 à 107;

c) il ne fait pas l’objet d’incidents répétés d’accès non autorisé à la voie ferrée;

d) il ne requiert pas l’utilisation du sifflet pour un passage à niveau situé à l’extérieur du territoire.
Public grade crossing — motor vehicles

105 (1) A public grade crossing set out in column A of Table D-1 of the Grade Crossings Standards and located in an area referred to in section 104 must be equipped with the warning system set out in Table D-1 of those Standards that corresponds to the number of tracks and the railway design speed set out in that Table, and the warning system must meet the applicable standards set out in articles 12 to 16 of those Standards.

Gate

(2) If a gate is not indicated as being required in Table D-1 of the Grade Crossings Standards, it is nonetheless required if the grade crossing corresponds to the applicable specifications set out in article 9.2 of those Standards.

Public grade crossing — sidewalk, path or trail

106 (1) A public grade crossing set out in column B of Table D-1 of the Grade Crossings Standards and located in an area referred to in section 104 must be equipped with the warning system that corresponds to the number of tracks and the railway design speed set out in that Table, and the warning system must meet the applicable standards set out in articles 12 to 16 of those Standards.

Gate

(2) If a gate is not indicated as being required in Table D-1 of the Grade Crossings Standards, it is nonetheless required if the grade crossing corresponds to the applicable specifications set out in article 9.6 of those Standards.

Guide fencing

(3) If a warning system without a gate is indicated as being required in Table D-1 of the Grade Crossings Standards, guide fencing must be installed to deter persons from crossing the line of railway other than at the grade crossing.

Guide fencing and barriers

(4) If a warning system is not indicated as being required in column 5 of Table D-1 of the Grade Crossings Standards, guide fencing must be installed, as well as a barrier that is intended to slow a person’s approach to the grade crossing and to encourage a person to look both ways before crossing the grade crossing.
Stop and proceed

107 Despite sections 105 and 106, if railway equipment must stop before proceeding across a public grade crossing that is located in an area referred to in section 104 and that is used by motor vehicles,

(a) a warning system with flashing lights and bells must be installed at the grade crossing and must meet the applicable standards set out in articles 12 to 16 of the Grade Crossings Standards; or

(b) the railway company must manually protect the grade crossing.

Records

Information Sharing

Railway company

108 A railway company must keep the most recent information provided to a road authority under sections 4 to 11 and the most recent information received from a road authority under sections 12 to 18.

Inspection, Testing and Maintenance

Content

109 (1) On the day on which a railway company inspects, tests or maintains a warning system, it must record the following information:

(a) the identity of the person who conducts the inspection, testing or maintenance;

(b) the date of the inspection, testing or maintenance;

(c) the precise location of the warning system;

(d) the reason for the inspection, testing or maintenance;

(e) a description of the inspection, testing or maintenance that is conducted;

(f) an indication of any malfunction or failure of a component of the warning system; and

(g) an indication of any deviation from the Grade Crossings Standards and the action taken to remedy it.

Arrêt avant de franchir le passage à niveau

107 Malgré les articles 105 et 106, si l’équipement ferroviaire doit arrêter avant de franchir un passage à niveau public situé dans un territoire visé à l’article 104 et utilisé par des véhicules automobiles, l’une ou l’autre des mesures suivantes doit être prise :

(a) un système d’avertissement avec feux clignotants et sonnerie est installé au passage à niveau et il respecte les normes applicables prévues aux sections 12 à 16 de ces normes;

(b) la compagnie de chemin de fer protège manuellement le passage à niveau.

Registres

Partage des renseignements

Compagnie de chemin de fer

108 La compagnie de chemin de fer conserve les renseignements les plus récents qui ont été fournis à l’autorité responsable du service de voirie en application des articles 4 à 11 et les renseignements les plus récents qui ont été reçus de celle-ci en application des articles 12 à 18.

Inspection, mise à l’essai et entretien

Contenu

109 (1) Le jour où elle effectue l’inspection, la mise à l’essai ou l’entretien d’un système d’avertissement, la compagnie de chemin de fer inscrit, dans ses registres, les renseignements suivants :

(a) l’identité de la personne qui effectue l’inspection, la mise à l’essai ou l’entretien;

(b) la date de l’inspection, de la mise à l’essai ou de l’entretien;

(c) l’emplacement exact du système d’avertissement;

(d) la raison de l’inspection, de la mise à l’essai ou de l’entretien;

(e) une description de l’inspection, de la mise à l’essai ou de l’entretien effectués;

(f) une mention indiquant toute défaillance ou tout mauvais fonctionnement d’un composant du système d’avertissement;
Integrity of record

(2) The record must not be changed once it has been created.

Duration

(3) The record must be kept for two years after the day on which it is created. However, if the Grade Crossings Standards specify an interval of two or more years between each inspection, each test or each maintenance activity, the record of the two latest inspections, tests or maintenance activities must be kept.

Temporary Protection Measures

Malfunction, failure or condition

110 (1) A railway company must keep a record of any warning system malfunction or failure, or any condition that exists that may cause a malfunction or failure, of which it has been advised or has become aware under section 103 — even if the existence of the malfunction, failure or condition is not confirmed — and the record must contain the following information:

(a) the nature of the malfunction, failure or condition;
(b) the precise location of the grade crossing;
(c) the date and time that the railway company was advised or became aware of the malfunction, failure or condition;
(d) all of the measures taken by the railway company to address any threat to, or interference with, the safety of railway operations;
(e) the date and time that a representative of the railway company arrived at the grade crossing to
   (i) take the measures referred to in paragraph (d), and
   (ii) remedy the malfunction, failure or condition;
(f) all the measures taken by the railway company to restore the grade crossing to use or to remedy the malfunction, failure or condition, or the reason why no remedial action was taken, if applicable; and

g) a mention indicating any deviation from the Grade Crossings Regulations and the measures taken to remedy.

Intégrité des renseignements

(2) Les renseignements contenus dans les registres ne doivent pas être modifiés après leur inscription.

Durée

(3) Les renseignements contenus dans les registres doivent être conservés pendant deux ans après la date de leur inscription. Toutefois, si les Normes sur les passages à niveau prévoient un intervalle de deux ans ou plus entre chaque inspection, mise à l’essai ou entretien, les renseignements des deux dernières inspections ou mises à l’essai ou des deux derniers entretiens doivent être conservés.

Mesures de protection temporaires

Défaillance, mauvais fonctionnement ou condition

110 (1) La compagnie de chemin de fer conserve, dans ses registres, les renseignements ci-après concernant toute défaillance ou tout mauvais fonctionnement d’un système d’avertissement, ou toute condition qui peut causer une défaillance ou un mauvais fonctionnement, dont elle a été informée ou a eu connaissance en application de l’article 103, même si leur existence n’est pas confirmée :

a) la nature de la défaillance, du mauvais fonctionnement ou de la condition;

b) l’emplacement exact du passage à niveau;

c) la date et l’heure où la compagnie de chemin de fer a été informée ou a eu connaissance de la défaillance, du mauvais fonctionnement ou de la condition;

d) toutes les mesures qu’elle a prises pour répondre à toute menace ou entrave à la sécurité ferroviaire;

e) la date et l’heure de l’arrivée d’un représentant de celle-ci au passage à niveau pour :
   (i) prendre les mesures visées à l’alinéa d),
   (ii) remédier à la défaillance, au mauvais fonctionnement ou à la condition;

f) toutes les mesures qu’elle a prises pour rétablir l’usage du passage à niveau ou remédier à la défaillance, au mauvais fonctionnement ou à la condition, ou la raison de ne prendre aucune mesure à cet effet, le cas échéant;
(g) the date and time that the grade crossing was restored to use or the malfunction, failure or condition was remedied.

**Duration**

(2) The record must be kept for two years after the day on which the railway company was advised or became aware of the malfunction, failure or condition.

**Repeals**

111 [Repeal]

112 [Repeal]

**Coming into Force**

Day of registration

113 These Regulations come into force on the day on which they are registered.

**Abrogations**

111 [Abrogation]

112 [Abrogation]

**Entrée en vigueur**

Date d’enregistrement

113 Le présent règlement entre en vigueur à la date de son enregistrement.
APPENDIX D:
GRADE CROSSING STANDARDS
GRADE CROSSINGS STANDARDS

July, 2014
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PART A – INTRODUCTION

1 CITATIONS

The following are the citations for documents referred to in the Standards:


“AREMA Communications and Signals Manual” is the 2013 edition of the Communications and Signals Manual of Recommended Practice, published by the Communications and Signals Group of the American Railway Engineering and Maintenance of Way Association, in effect on December 31, 2013;


“GCS” means the Grade Crossings Standards;


2 INTERPRETATION

The following definitions apply in this Standard:

“crossing user” means drivers of vehicles, pedestrians, cyclists and persons using assistive devices;

“cross-product” means the product of the average annual daily railway movements and the average annual daily traffic of vehicles on the road that pass across the grade crossing;

“travelled way” means that part of a road intended for vehicular use, excluding shoulders.
PART B - EXISTING GRADE CROSSINGS

3 CROSSING SURFACE

3.1 The crossing surface must be of a width that is equal to the width of the travelled way and shoulders of the road, plus 0.5 m on each side, measured at right angles to the centreline of the road, as shown in Figure 3-1(a) or (b), as the case may be.

3.2 A flangeway must be provided between the gauge side of the rail and the road surface and must be between 65 mm and 120 mm wide, and between 50 mm and 75 mm deep.

Figure 3-1 – Crossing Surface

a)

b)
4 RAILWAY CROSSING SIGN AND NUMBER OF TRACKS SIGN

4.1 A sign providing warning of a grade crossing (Railway Crossing sign) must have a 50 mm border of transparent red ink that is silk-screen processed over silver-white sheeting material, as shown in Figure 4-1(a). A sign indicating the number of tracks (Number of Tracks sign) must have a digit and symbol that is transparent red or black ink that is silk-screened processed over silver-white sheeting material, as shown in Figure 4-1(b).

4.1.1 Without Warning Systems

A grade crossing without a warning system must have the following:

(a) A railway crossing sign;

(b) The railway crossing signs must be located as shown in Figure 4-2(a) and (b) and must be clearly visible to persons approaching the grade crossing on the road approach;

(c) The railway crossing signs must be located between 0.3 m and 2.0 m from the face of curb, or outer edge of road approach shoulder; or, where there is no curb or shoulder, 2.0 m to 4.5 m from the edge of the travelled way;

(d) The railway crossing signs must be located no closer than 3.0 m from the nearest rail;

(e) Where there is more than one track at a grade crossing, an additional sign indicating the number of tracks to be crossed, must be installed on the supporting post of each railway crossing sign as shown in Figure 4-2(c).

(f) A sidewalk, path or trail with its centreline more than 3.6 m (12 ft.) from a railway crossing sign supporting post beside a road approach for vehicle traffic must have separate railway crossing signs.

4.1.2 With Warning Systems

A grade crossing with a warning system must have the following:

(a) A railway crossing sign must be installed as shown in Figures 4-3 and 4-4.

(b) Where there is more than one track at a grade crossing, a sign indicating the number of tracks to be crossed, as shown in Figure 4-1(b), must be installed on the supporting post of each railway crossing sign.

4.1.3 Reflective Marking Material Specifications

(a) The reflective material of the signs, referred to in 4.1, must cover the entire front surface of the signs.

(b) The reflective material must meet the Level 2 reflective intensity values in Table 2 of the 62-GP-11M standard (cited in Part A).
Figure 4-1 – Railway Crossing Sign and Number of Tracks Sign
Figure 4-2 – Location of Railway Crossing Signs and Number of Tracks Signs (public grade crossings without warning systems)

a)  

b)  

MULTI-LANE ONE-WAY OR DIVIDED ROAD

Sidewalk path or trail greater than 3.6 m

3 m minimum

90°

3 m minimum

3 m minimum

ANGLE GREATER THAN 90°

ANGLE 90° OR LESS

3 m minimum

Railway Crossing sign

Number of Tracks sign

0.5 m

1.5 m to 2.5 m

Crown of Road
Figure 4-3 – Railway Crossing Sign and Number of Tracks Sign on a Grade Crossing Warning Signal of Flashing Light Type
Figure 4-4 – Railway Crossing Sign and Number of Tracks Sign where Gates at a Grade Crossing
PART C - NEW STANDARDS

5 CROSSING SURFACE

5.1 Crossing surface of a grade crossing, and a crossing surface of a sidewalk, path or trail must be as shown in Figure 5-1 and in accordance with Table 5-1, and must be smooth and continuous.

Figure 5-1 – Grade Crossing Surface Dimensions

(a) Road, including a path or trail

(b) Sidewalk, path, or trail along a road

1- Sidewalk, path, or trail

2- 0.5 m or more beyond sidewalk; or beyond shoulder where there is one

3- Crossing surfaces may be separate only where the space between them is 1.0 m or more; otherwise crossing surface must be continuous.

4- Sidewalk, path, or trail

5- 0.5 m or more beyond sidewalk
Table 5-1 – Grade Crossing Surface – Cross Section

<table>
<thead>
<tr>
<th>a) Flangeway:</th>
<th>Width</th>
<th>Minimum</th>
<th>65 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sidewalks, paths or trails designated by the road authority for use by persons using assistive devices</td>
<td></td>
<td>75 mm</td>
<td></td>
</tr>
<tr>
<td>All other grade crossings</td>
<td></td>
<td>120 mm</td>
<td></td>
</tr>
<tr>
<td>Depth:</td>
<td>Minimum</td>
<td>50 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sidewalks, paths and trails designated by the road authority for use by persons using assistive devices</td>
<td></td>
<td>75 mm</td>
<td></td>
</tr>
<tr>
<td>All other grade crossings</td>
<td></td>
<td>No limit</td>
<td></td>
</tr>
</tbody>
</table>

| (b) Field side gap | Maximum width | 120 mm |
| | Maximum depth | No limit |

| (c) Elevation of the top of the rail with respect to the crossing surface | Public sidewalk, path or trail designated by the road authority for use by persons using assistive devices | |
| | Maximum distance of the top of the rail above crossing surface | 13 mm |
| | Maximum distance of the top of the rail below crossing surface | 7 mm |
| All other public grade crossings; the maximum distance of the top of the rail above or below the crossing surface | 25 mm |
| Private grade crossings; the maximum distance of the top of the rail above or below the crossing surface | 50 mm |
6 ROAD GEOMETRY (GRADE CROSSINGS AND ROAD APPROACHES)

6.1 The horizontal and vertical alignment of the road approach and the crossing surface must be smooth and continuous.

6.2 The allowable difference between the road approach gradient and railway cross-slope, or the railway gradient and the road approach cross-slope, must be in accordance with Table 6-1 Difference in Gradient.

6.3 The maximum gradients for road approaches must not exceed the following:
   
   (a) ratio of 1:50 (2 per cent) within 8 m of the nearest rail and 1:20 (5 per cent) for 10 m beyond, at public grade crossings for vehicular use;
   
   (b) ratio of 1:50 (2 per cent) within 8 m of the nearest rail and 1:10 (10 per cent) for 10 m beyond, at private grade crossings for vehicular use;
   
   (c) ratio of 1:50 (2 per cent) within 5 m of the nearest rail at a sidewalk, path or trail ; and
   
   (d) ratio of 1:100 (1 per cent) within 5 m of the nearest rail at a sidewalk, path or trail designated by the road authority for use by persons using assistive devices.

6.4 The width of the travelled way and shoulders at the crossing surface must not be less than the width of the travelled way and shoulders on the road approaches.

6.5 A grade crossing angle, measured from the tangent of the centreline of the road approach at the crossing surface, to the tangent of the centreline of the line of railway, shall, where the railway design speed is more than 25 km/h (15 mph) be:

   (a) not less than 70 and not greater than 110 degrees for grade crossings without a warning system; or

   (b) not less than 30 and not greater than 150 degrees for grade crossings with a warning system.
Table 6-1 – Difference in Gradient

<table>
<thead>
<tr>
<th>Classification</th>
<th>Difference in Gradient (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLU</td>
<td>2</td>
</tr>
<tr>
<td>RCU</td>
<td>1</td>
</tr>
<tr>
<td>RCD</td>
<td>1</td>
</tr>
<tr>
<td>RAU</td>
<td>0</td>
</tr>
<tr>
<td>RAD</td>
<td>0</td>
</tr>
<tr>
<td>RFD</td>
<td>-</td>
</tr>
<tr>
<td>ULU</td>
<td>3</td>
</tr>
<tr>
<td>UCU</td>
<td>2</td>
</tr>
<tr>
<td>UCD</td>
<td>2</td>
</tr>
<tr>
<td>UAU</td>
<td>0</td>
</tr>
</tbody>
</table>

*Legend*

| Urban (U) | Rural (R) | Local (L) | Collector (C) | Arterial (A) | Expressway (E) | Freeway (F) | Divided (D) | Undivided (U) |

Source: Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada and dated September 1999
7 SIGHTLINES

7.1 General

7.1.1 Sightlines are measured from a point 1.05 m above the road surface to a point 1.2 m above top of lowest rail.

7.1.2 For the purposes of section 28(b) of the GCR, refer to the Class of Track in the Table below:

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of Track</td>
<td>The maximum allowable operating speed for freight trains is -</td>
<td>The maximum allowable operating speed for passenger trains is -</td>
</tr>
<tr>
<td>Class 1 track</td>
<td>17 km/h (10 mph)</td>
<td>25 km/h (15 mph)</td>
</tr>
<tr>
<td>Class 2 track</td>
<td>41 km/h (25 mph)</td>
<td>49 km/h (30 mph)</td>
</tr>
<tr>
<td>Class 3 track</td>
<td>65 km/h (40 mph)</td>
<td>97 km/h (60 mph)</td>
</tr>
<tr>
<td>Class 4 track</td>
<td>97 km/h (60 mph)</td>
<td>129 km/h (80 mph)</td>
</tr>
<tr>
<td>Class 5 track</td>
<td>129 km/h (80 mph)</td>
<td>153 km/h (95 mph)</td>
</tr>
</tbody>
</table>

7.2 Determination of sightlines

In Figure 7-1,

(a) SSD is the stopping sight distance and is calculated using the following formula:

$$SSD = 0.278 \times 2.5 \times V + d$$

$d =$ braking distance (m)

$V =$ initial speed (km/h)

(b) $D_{SSD}$ is the minimum distance along the line of railway that a crossing user must see approaching railway equipment from the stopping sight distance, and does not apply if the grade crossing is equipped with a Stop sign or warning system.

$D_{SSD}$ is equal to the distance required for the design vehicle at its road crossing design speed to go from the stopping sight distance completely past the clearance point on the other side of the grade crossing.

$$D_{SSD} = 0.278 V_T \times T_{SSD} (m)$$

$$D_{SSD} = 1.47V_T \times T_{SSD} (ft.)$$

Where,

$V_T =$ railway design speed in km/h or mph, and

$T_{SSD} = [(SSD + cd + L)/0.278V]$ (s)

Where,

$V =$ road crossing design speed (km/h)

$cd =$ grade crossing clearance distance (m)

$L =$ length of the grade crossing design vehicle (m)
(c) $D_{\text{stopped}}$ is the minimum distance along the line of railway that a crossing user must be able to see approaching railway equipment from the stopped position at a grade crossing. $D_{\text{stopped}}$ is equal to the greater of the distances that railway equipment at the railway design speed will travel during

(i) the Departure Time for the grade crossing design vehicle calculated in accordance with article 10.3.2, or

(ii) the Departure Time for pedestrians, cyclists, and persons using assistive devices calculated in accordance with article 10.3.3.

$D_{\text{stopped}}$ must be calculated by the following formula:

$$D_{\text{stopped}} = 0.278 V_T \times T_{\text{stopped}} \text{ (m)}$$

$$D_{\text{stopped}} = 1.47 V_T \times T_{\text{stopped}} \text{ (ft.)}$$

Where,

$V_T =$ railway design speed in km/h or mph

$T_{\text{stopped}} =$ the Departure Times, calculated in accordance with article 10.3
Figure 7-1 – Minimum Sightlines – Grade Crossings

(a) Sightlines for Users Stopped at a Grade Crossing (applicable to all quadrants).

(b) Sightlines for Users Approaching a Grade Crossing (applicable to all quadrants).
8 SIGNS

8.1 Railway Crossing Sign and Number of Tracks Sign

All grade crossings:

8.1.1 A sign providing warning of a grade crossing (Railway Crossing sign) must be as shown in Figure 8-1(a) and must:
   a. have a retroreflective coating that covers the entire front surface of the sign;
   b. have a 50 mm border on the front of each blade, with transparent red ink silk-screen processed over sheeting material;

8.1.2 A sign indicating the number of tracks at a grade crossing (Number of Tracks sign) must be as shown in Figure 8-1(b) and must:
   a. have a retroreflective coating that covers the entire front surface of the sign;
   b. have a digit and symbol that is transparent red inked silk-screened processed; and
c. be installed on the supporting post of each railway crossing sign as shown in Figure 8-3(c)

Additional requirements for grade crossings without Warning Systems

8.1.3 A 100 mm retroreflective strip must be applied on the back of each blade of the Railway Crossing Sign, for the full length of each blade;

8.1.4 A 50 mm strip of silver white sheeting must be applied on the front and back of the supporting post, extending from no higher than 300 mm above the crown of the adjacent road surface to 70 mm above the centre of the Railway Crossing sign and must be as shown in Figure 8-2.

8.1.5 The railway crossing sign must be located:
   a. between 0.3 m and 2.0 m from the face of the curb, or the outer edge of the road shoulder or, where there is no curb or shoulder, 2.0 m to 4.5 m from the edge of the travelled way; and
   b. must not be located closer than 3 m measured to the nearest rail, as shown in Figure 8-3(a) and 8-3(b).

8.1.6 A sidewalk, path or trail with a centreline that is more than 3.6 m (12 ft.) from a Railway Crossing sign supporting post beside a road approach for vehicle traffic must have separate Railway Crossing signs, as shown in Figure 8-3(a).

8.1.7 The supporting post, on which is installed the Railway Crossing sign and the Number of Tracks sign, must:
   a. Unless the Railway Crossing sign is installed on the mast of a warning system, the supporting posts must be of such construction that a 820 kg vehicle striking it at speeds 32 km/h or more, will not have a change in velocity greater than 4.57 m per second.

Retroreflective Material

8.1.8 Retroreflective material referred to in 8.1.1 to 8.1.4 must meet the specifications for Type IV material, white sheeting, as specified in sections 4.2.4 and 6.1.4 of ASTM D4956 (cited in Part A) when tested in accordance with the Test Methods for Type IV material specified in sections 7 and 9 of that Standard.
8.1.9 The retroreflection coefficient of the retroreflective material referred to in 8.1.8 is to be maintained above 50 per cent of the value specified for Type IV material specified in article 6.1.4 of ASTM D4956 (cited in Part A).
Figure 8-1 – Railway Crossing Sign and Number of Tracks Sign
Figure 8-2 – Retroreflective Stripes on the Back of the Railway Crossing Sign and on the Sign Supporting Post (public grade crossings without a grade crossing warning system)
Figure 8-3 – Location of Railway Crossing Signs and Number of Tracks Signs (public grade crossings without warning systems)

a)

b)

c)

Railway Crossing sign

Number of Tracks sign

Crown of Road
8.2 Railway Crossing Ahead Sign and Advisory Speed Tab Sign

8.2.1 A sign providing advanced warning of a grade crossing (Railway Crossing Ahead sign) and a sign specifying a recommended speed (Advisory Speed Tab sign) must be as shown in articles A3.4.2 and A3.2.5 in the Manual of Uniform Traffic Control Devices for Canada (cited in Part A) and must meet the applicable standards set out in article A1.6 of that Manual, as the case may be.

8.3 Stop Ahead Sign

8.3.1 A Stop Ahead sign must be as shown in article A3.6.1 of the Manual of Uniform Traffic Control Devices for Canada (cited in Part A) and must meet the applicable standards set out in article A1.6 of that Manual.

8.4 Stop Sign

8.4.1 A Stop sign must be as shown in article A2.2.1 of the Manual of Uniform Traffic Control Devices for Canada (cited in Part A) and must meet the applicable standards set out in article A1.6 of that Manual. Where required by law, the word “Arrêt” will replace the word “Stop”, or may be added to the Stop sign.

8.4.2 When a Stop sign is installed on the same post as a Railway Crossing sign, it must be installed as shown in Figure 8-4.

Figure 8-4 – Stop Signs
8.5 Emergency Notification Sign

8.5.1 An Emergency Notification sign that provides information on the location of the grade crossing and the railway company's emergency telephone number, must be installed
   a) parallel to the road, or
   b) on each side of the grade crossing, facing traffic approaching the grade crossing.

8.5.2 the emergency notification sign must be clearly legible
9 WARNING SYSTEMS SPECIFICATION

9.1 The specifications for a public grade crossing at which a warning system without gates is required are as follows:

a) where the forecast cross-product is 2,000 or more;
b) Where there is no sidewalk, path or trail and the railway design speed is more than 129 km/hr (80 mph);
c) Where there is a sidewalk, path or trail and the railway design speed is more than 81 km/hr (50 mph); or
d) where the railway design speed is more than 25 km/hr (15 mph) but less than the railway design speed referred to in b) or c), as the case may be, and
   i. where there are two or more lines of railway where railway equipment may pass each other; or
   ii. the distance as shown in Figure 9-1(a) between a Stop sign at an intersection and the nearest rail in the crossing surface is less than 30 m; or
   iii. in the case of an intersection with a traffic signal, the distance between the stop line of the intersection and the nearest rail in the crossing surface, as shown in Figure 9-1(b), is less than 60 m, or where there is no stop line, the distance between the travelled way and the nearest rail in the crossing surface is less than 60 m.

9.2 The specifications for a public grade crossing at which a warning system with gates is required are as follows:

9.2.1 a warning system is required under article 9.1 and;

   a) the forecast cross-product is 50,000 or more;
   b) there are two or more lines of railway where railway equipment may pass each other;
   c) the railway design speed is more than 81 km/hr (50 mph);
   d) the distance as shown in Figure 9-1(a) between a Stop sign at an intersection and the nearest rail in the crossing surface is less than 30 m; or
   e) in the case of an intersection with a traffic signal, the distance between the stop line of the intersection and the nearest rail in the crossing surface, as shown in Figure 9-1(b), is less than 60 m, or where there is no stop line, the distance between the travelled way and the nearest rail in the crossing surface is less than 60 m.

9.3 The specifications for a private grade crossing at which a warning system without gates is required are as follows:

9.3.1 where the forecast cross-product is 2,000 or more, or

9.3.2 where the railway design speed is more than 25 km/hr (15 mph), and;
   a) the forecast cross-product is 100 or more and there are two or more lines of railway where railway equipment may pass each other;
   b) the forecast cross-product is 100 or more and grade crossing does not includes a sidewalk, path or trail and the railway design speed is more than 129 km/hr (80 mph); or
   c) the grade crossing includes a sidewalk, path or trail and the railway design speed is more than 81 km/hr (50 mph).
9.4 The specifications for a private grade crossing at which a warning system with gates is required are as follows:

9.4.1 a warning system is required under article 9.3 and:

(a) the forecast cross-product is 50,000 or more;
(b) there are two or more lines of railway where railway equipment may pass each other; or
(c) the railway design speed is more than 81 km/hr (50 mph).

9.5 The specifications for a grade crossing for a sidewalk, path or trail where a warning system is required are as follows:

(a) the sidewalk, path or trail is outside the island circuit of an adjacent warning system, and
(b) the railway design speed is more than 81 km/hr (50 mph).

9.6 The specifications for a grade crossing for a sidewalk, path or trail where a warning system with gates is required are as follows:

(a) the sidewalk, path or trail is outside the island circuit of an adjacent warning system,
(b) the railway design speed is more than 25 km/hr (15 mph), and
(c) there are two or more lines of railway.

Figure 9-1 – Proximity of Warning Systems to Stop Signs and Traffic Signals

(a) Intersection with Stop Sign

(b) Intersection with Traffic Signal
PART D – DESIGN CALCULATIONS

10 DESIGN CONSIDERATIONS

10.1 Clearance Distance (cd)

10.1.1 Clearance Distance (cd) is defined as the distance, in metres, between the departure point in advance of the grade crossing, to the clearance point beyond the farthest rail, as shown in Figure 10-1.

10.1.2 The clearance point is the point 2.4 m beyond the outside edge of the farthest rail from the departure point measured perpendicular to the rail.

10.2 Vehicle Travel Distance (S)

10.2.1 The total distance, in metres, the design vehicle must travel during acceleration to pass completely through the Clearance Distance (cd) is calculated using the following formula:

\[ S = cd + L \]  

where,

- \( cd \) = the Clearance Distance, in metres; and
- \( L \) = the total length, in metres, of the design vehicle.
Grade Crossings Standards, July 2014

Figure 10-1 – Clearance Distance (cd) for Grade Crossings

(a) For Grade Crossings with a Warning System or Railway Crossing Sign

(b) For Grade Crossings without a Warning System or Railway Crossing Sign
10.3 Departure Time - General

10.3.1 The *Departure Time* is the greater of the time required for the design vehicle to pass completely through the *Clearance Distance* (cd) from a stopped position \((T_D)\) or the time required for pedestrians, cyclists and persons using assistive devices to pass completely through the *Clearance Distance* (cd) \((T_P)\).

Table 10-1 *Ratios of Acceleration Times on Grades* must be used to account for the effects of road gradient on the design vehicle for the grade crossing. The established ratio of acceleration time \((G)\) must be incorporated into the *Acceleration Time* \((T)\) by multiplying the acceleration time on level ground \((t)\) by the ratio of acceleration time \((G)\).

10.3.2 Departure Time - Design Vehicle \((T_D)\)

The total time, in seconds, the design vehicle must travel to pass completely through the *Clearance Distance* (cd) is calculated using the following formula:

\[
T_D = J + T
\]

where,

\[J = \text{the perception-reaction time, in seconds, of the crossing user to look in both directions, shift gears, if necessary, and prepare to start (must use 2 seconds at minimum); and}\]

\[T = \text{the time, in seconds, for the grade crossing design vehicle to travel through the Vehicle Travel Distance (S) taking into account the actual road gradient at the grade crossing.}\]

\[T\] may be obtained through direct measurement or calculated using the following formula:

\[
T = (t \times G)
\]

where,

\[t = \text{the time, in seconds, required for the design vehicle to accelerate through the Vehicle Travel Distance (S) on level ground established from Figure 10-2 Assumed Acceleration Curves; and}\]

\[G = \text{the ratio of acceleration time established from Table 10-1 Ratios of Acceleration Times on Grade or may be obtained through direct measurement.}\]

10.3.3 Departure Time – Pedestrians, Cyclists and Persons Using Assistive Devices \((T_P)\)

The total time, in seconds, that pedestrians, cyclists and persons using assistive devices must travel to pass completely through the *Clearance Distance* (cd) is calculated using the following formula:

\[
T_P = \frac{cd}{V_P}
\]

where,

\[cd = \text{the Clearance Distance, in metres (Article 10.1); and}\]

\[V_P = \text{the average travel speed, in metres per second (m/s), for pedestrians, cyclists, and persons using assistive devices (to a maximum value of 1.22 m/s).}\]
10.4 Gate Arm Clearance Time

10.4.1 Gate Arm Clearance Time is the greater of $T_{G,ssd}$ or $T_{G,stop}$ and represents the time, in seconds, it takes the design vehicle to travel from either the Stopping Sight Distance (SSD) position or the Stop position to the point past the gate arm.

Gate Arm Clearance Time from the SSD position ($T_{G,ssd}$) is calculated as follows:

$$T_{G,ssd} = \frac{cd_{G,ssd}}{(0.27 \times V_{road})}$$  \hspace{1cm} \text{equation 10.4a}

where,

$V_{road}$ = the road crossing design speed over the crossing in kilometres per hour (km/h); and

$cd_{G,ssd} = SSD + 2 \text{ m} + L$

where,

SSD is the stopping sight distance, in metres, and is calculated using the following formula:

$$SSD = 0.278 \times 2.5 \times V + d$$

$d$ = braking distance (m)

$V$ = initial speed (km/h)

$L$ = the total length, in metres, of the design vehicle.

Gate Arm Clearance Time from the Stop position ($T_{G,stop}$) is calculated as follows:

$$T_{G,stop} = J + (t \times G)$$  \hspace{1cm} \text{equation 10.4b}

where,

$J = 2$ seconds, and is the perception-reaction time, in seconds, of the crossing user to look in both directions, shift gears, if necessary, and prepare to start; and

$G = \frac{t - 2}{t}$ the ratio of acceleration time established from Table 10-1 \textit{Ratios of Acceleration Times on Grade} or may be obtained through direct measurement; and

$t = \text{the time, in seconds, required for the design vehicle to accelerate through the Gate Arm Clearance Distance (} cd_{G,stop} \text{) on level ground established from Figure 10-2 \textit{Assumed Acceleration Curves}}; \text{ and}$

$cd_{G,stop} = 2 \text{ m} + L$

where,

$L = \text{the total length, in metres, of the design vehicle.}$
Figure 10-2 Assumed Acceleration Curves

Source: Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada and dated September 1999
Table 10-1  Ratios of Acceleration Times on Grades

<table>
<thead>
<tr>
<th>Design Vehicle</th>
<th>Road Grade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-4</td>
</tr>
<tr>
<td>Passenger Car</td>
<td>0.7</td>
</tr>
<tr>
<td>Single Unit Truck &amp; Buses</td>
<td>0.8</td>
</tr>
<tr>
<td>Tractor-Semitrailer</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada and dated September 1999
Table 10-2  Road Design Specification for Road Approach

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td></td>
<td>Local</td>
<td>Divided</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arterial</td>
<td>Not Divided</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expressway</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freeway</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural Locals</td>
<td>Rural Collectors</td>
<td>Rural Arterials</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>Service function</strong></td>
<td>Traffic movement secondary consideration</td>
<td>Traffic and land access of equal importance</td>
<td>Traffic movement primary consideration</td>
</tr>
<tr>
<td><strong>Land service</strong></td>
<td>Land access primary consideration</td>
<td>Traffic movement and land access of equal importance</td>
<td>Land access secondary consideration</td>
</tr>
<tr>
<td><strong>Traffic volume</strong></td>
<td>&lt;1000 AADT</td>
<td>&lt;5000 AADT</td>
<td>&lt;1 2000 AADT</td>
</tr>
<tr>
<td><strong>vehicles per day (typically)</strong></td>
<td>Interrupted flow</td>
<td>Interrupted flow</td>
<td>Uninterrupted flow except at free flow (grade separated) major intersections</td>
</tr>
<tr>
<td><strong>Flow characteristics</strong></td>
<td>Interrupted flow</td>
<td>Interrupted flow</td>
<td>Uninterrupted flow except at free flow (grade separated) major intersections</td>
</tr>
<tr>
<td><strong>Design speed (km/h)</strong></td>
<td>50 – 110</td>
<td>60 - 110</td>
<td>80 – 130</td>
</tr>
<tr>
<td><strong>Average running speed (km/h) (free flow conditions)</strong></td>
<td>50 – 90</td>
<td>50 – 90</td>
<td>60 – 100</td>
</tr>
<tr>
<td><strong>Vehicle type</strong></td>
<td>Predominantly passenger cars, light to medium trucks and occasional heavy trucks</td>
<td>All types, up to 30% trucks in the 3 t to 5 t range</td>
<td>All types, up to 20% trucks</td>
</tr>
<tr>
<td><strong>Normal connections</strong></td>
<td>Locals collectors</td>
<td>Locals collectors</td>
<td>Collectors arterials</td>
</tr>
</tbody>
</table>

### Table 10-4 Characteristics of Urban Roads

<table>
<thead>
<tr>
<th>Public Lanes</th>
<th>Locals</th>
<th>Collectors</th>
<th>Arterials</th>
<th>Expressways</th>
<th>Freeways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Indust./Comm.</td>
<td>Residential</td>
<td>Indust./Comm.</td>
<td>Minor</td>
<td>Major</td>
</tr>
<tr>
<td>Traffic service function</td>
<td>Traffic movement not a consideration</td>
<td>Traffic movement secondary consideration</td>
<td>Traffic movement and land access of equal importance</td>
<td>Traffic movement major consideration</td>
<td>Traffic movement primary consideration</td>
</tr>
<tr>
<td>Land service/access</td>
<td>Land access only function</td>
<td>Land access primary function</td>
<td>Traffic movement and access of of equal importance</td>
<td>Some access control</td>
<td>Rigid access control</td>
</tr>
<tr>
<td>Traffic volume (veh/day) (typical)</td>
<td>&lt;500</td>
<td>&lt;1000</td>
<td>&lt;1000</td>
<td>&lt;3000</td>
<td>1000-12000</td>
</tr>
<tr>
<td>Flow characteristics</td>
<td>Interrupted flow</td>
<td>Interrupted flow</td>
<td>Interrupted flow</td>
<td>Uninterrupted flow except at signals and crosswalks</td>
<td>Uninterrupted flow except at signals</td>
</tr>
<tr>
<td>Design speed (km/h)</td>
<td>30-40</td>
<td>30 – 50</td>
<td>50-80</td>
<td>40-60</td>
<td>50-90</td>
</tr>
<tr>
<td>Average Running speeds (km/h) (off-peak)</td>
<td>20 - 30</td>
<td>20 - 40</td>
<td>30 – 70</td>
<td>40 - 60</td>
<td>50 - 90</td>
</tr>
<tr>
<td>Vehicle type</td>
<td>Passenger and service vehicles</td>
<td>All types</td>
<td>Passenger and service vehicles</td>
<td>All types</td>
<td>All types</td>
</tr>
<tr>
<td>Desirable connections</td>
<td>Public lanes, locals</td>
<td>Public lanes, locals, collectors</td>
<td>Locals, collectors, arterials</td>
<td>Collectors, arterials, expressways, freeway</td>
<td>Arterials, expressway, freeways</td>
</tr>
<tr>
<td>Transit service</td>
<td>Public lanes, locals</td>
<td>Public lanes, locals, collectors</td>
<td>Locals, collectors, arterials</td>
<td>Express and local busses permitted</td>
<td>Express buses only</td>
</tr>
<tr>
<td>Accommodation of cyclists</td>
<td>No restriction or special facilities</td>
<td>No restriction or special facilities</td>
<td>No restriction or special facilities</td>
<td>Lanes widening or separate facilities desirable</td>
<td>prohibited</td>
</tr>
<tr>
<td>Accommodation of pedestrians</td>
<td>Pedestrian permitted, no special facilities</td>
<td>Sidewalks normally on one or both sides</td>
<td>Sidewalks provided where required</td>
<td>Sidewalks may be provided, separation for traffic lanes preferred</td>
<td>Pedestrian Prohibited</td>
</tr>
<tr>
<td>Parking (typically)</td>
<td>Some restrictions</td>
<td>No restrictions or restrictions on one side only</td>
<td>Few restrictions other than peak hour</td>
<td>Peak hour restriction</td>
<td>Prohibited or peak hour restriction</td>
</tr>
<tr>
<td>Min. Intersection spacing (m)</td>
<td>As needed</td>
<td>60</td>
<td>60</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Right-of-way width (m) (typically)</td>
<td>6 - 10</td>
<td>15 - 22</td>
<td>20 - 24</td>
<td>20 - 45</td>
<td>&gt;45</td>
</tr>
</tbody>
</table>

Source: Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada and dated September 1999
11 LOCATION OF GRADE CROSSINGS

11.1 A public grade crossing where the railway design speed is more than 25 km/h (15 mph) must be constructed so that no part of the travelled way of an intersecting road or entranceway (other than a railway service road), is closer than 30 m (D) to the nearest rail of the grade crossing (see Figure 11-1).

*Figure 11-1 – Restrictions on the Proximity of Intersections and Entranceways to Public Grade Crossings*
12 WARNING SYSTEM OPERATION - GENERAL

12.0 Except as otherwise specified in articles 12 to 16 and Appendix B of these Standards or in the Grade Crossings Regulations, warning systems must be in accordance with the requirements and recommended practices of Part 3 of the AREMA Communications and Signals Manual (cited in Part A).

12.01 For the purposes of these Standards, the following interpretations and adjustments apply with respect to AREMA:

(a) Any guidelines, recommendations, and similar matters are to be considered mandatory;
(b) Any references to “should” are to be read as “must”;
(c) The term “highway-rail grade crossing warning system” is to be read as “warning system”;
(d) The term “railroad” and the phrase “operators of the passenger or commuter rail system” is to be read as “railway company”;
(e) The term “lights” is to be read as “light units”;
(f) The term “train” is to be read as “railway equipment”;
(g) The term “roadway” and “roadway approach” is to be read as “road approach”;
(h) All references to the “MUTCD” are to be disregarded;
(i) All “Purpose” articles, paragraph 2 of article 3.1.16 G.1.(b)(ii) and article 3.2.35 K.5. are to be disregarded;
(j) The following are to be disregarded:
   (i) all references to and requirements related to the “Diagnostic Team”;
   (ii) all references to and requirements related to the “highway agency” or “highway agency or authority with jurisdiction”;
   (iii) all references to and requirements related to the “agency” or “public agency”;
   (iv) all references to and requirements related to “manufacturers” except where the requirement is to do something in accordance with the manufacturer’s instructions;
   (v) all references to “unless otherwise specified” or “other considerations”, all references to approvals or orders, and any other reference to the exercise of discretion;
   (vi) all purchase order requirements;
   (vii) all requirements to create or keep records;
   (viii) all requirements for a diagnostic review, an engineering study, a study of train operations, a risk analysis, a safety analysis, and all requirements to provide special instructions, operating rules, orders, or operational procedures.

12.1 Signal assemblies must be as shown in Figure 12-1, and gate assemblies must be as shown in Figure 12-2 and the cantilever assembly’s clearance must be as shown in Figure 12-3, and must meet the following specifications:

(a) The minimum clearance distance from the face of a curb to the clearance line must be 625 mm (2 ft);
(b) Where there is no curb, the minimum clearance distance must be 1.875 m (6 ft) from the edge of the travelled way to the clearance line and a minimum of 625 mm (2 ft) from the outer edge of the road approach shoulder to the clearance line, if there is a shoulder;

(c) The top of the warning signal foundation must be at a minimum of 100 mm (4 inches) above the surrounding ground. The slope of the surrounding ground away from the foundation toward the travelled way must not exceed the ratio of 4:1;

(d) The gate arm reflective materials shall have:

   (i) stripes of 406 mm (16 inches), and must be affixed with white and red alternately and be aligned vertically;

   (ii) Retroreflective material must meet the specifications for Type XI, white sheeting, in sections 4 and 6 of ASTM D4956 (cited in Part A), when tested in accordance with the Test Methods for Type XI specified in sections 7 and 9 of that Standard; and

   (iii) The retroreflection coefficient of the retroreflective material referred to in (ii) is to be maintained above 50 per cent of the value specified for Type XI, white sheeting, in sections 4 and 6 of ASTM D4956 (cited in Part A).

(e) For grade crossings used by vehicles, gate arms must extend to no more than 1 m (3 ft) from the longitudinal axis of the road approach. Where gates are installed on each side of the same road approach, gate ends must extend to within 1 m (3 ft) of each other.

(f) Where gates are installed at sidewalks, paths or trails:

   (i) Each gate arm must extend across the full width of the sidewalk, path or trail; and

   (ii) in the case of a sidewalk, path or trail that is less than 3.5 m (11.5 ft) wide, two lights are required on each gate arm located so that the lights are over the two points dividing the sidewalk, path or trail into thirds. The two gate arm lights must flash alternately.

(g) The height of the cantilever assembly clearance must be between 5.2 m (17 ft) and 6.0 m (20 ft) above the crown of the road as shown in Figure 12-3.

12.2 In addition, warning systems must have monitoring devices that gather and retain the date and time of the following information for a minimum of 30 days:

   (a) Activation and deactivation of Interconnected devices;

   (b) Gates have returned to or left the vertical position (Gate up Position);

   (c) Gates have descended to a point 10 degrees from horizontal (Gate down Position);

   (d) Activation of the warning system test switch

   (e) Activation and deactivation of all track circuits used in the control of the warning system, including electronic track circuits;

   (f) Activation of the warning system;

   (g) Activation and deactivation of all devices used to control the warning systems at adjacent crossings; and

   (h) Activation and deactivation of all devices used to activate the warning system from a location other than the crossing.

12.3 All control circuits that affect the safe operation of a warning system must operate in a manner that activates the warning system if there is a failure of a safety-critical component of that system.
12.4 The electromagnetic, electronic, or electrical apparatus of a warning system must be operated and maintained in accordance with the limits to which the system is designed to operate.

12.5 Railway track circuits must:

(a) detect railway equipment in any part of the track circuit;

(b) detect a shunt of 0.06 ohm resistance when the shunt is connected across the track rails of any part of the circuit;

(c) provide a set of fouling wires that consist of at least two discrete conductors and must ensure proper operation of the track circuit when the circuit is shunted. Single duplex wire with single plug is not permitted;

(d) in the case of a non-insulated rail joint within the limits of a track circuit, be bonded by means other than joint bars and the bonds must ensure electrical conductivity; and

(e) in the case of an insulated rail joint used to separate track circuits, prevent current from flowing between rails separated by the insulation.

12.6 Warning system battery back-up of 8 hours of continuous activation and 24 hours of normal railway operations must be provided.
Figure 12-1 – Warning Signal Assemblies
Figure 12-2 – Gates

Gate arm at rest not to intrude beyond dashed lines

11.6 m (38 ft) maximum

355 - 915 mm (14 - 36 in) 2.74 m minimum (9 ft)

Equally spaced

5.2 m Minimum (17 ft)

Clearance Line

650 mm (26 in) maximum

1.1 m to 1.4 m (3.5 to 4.5 ft)

Crown of road
Figure 12-3 – Cantilevers

Cantilever Assembly Clearance
5.2 m (17 ft) minimum
6.0 m (20 ft) maximum

Crown of road
13 NUMBER AND LOCATION OF LIGHT UNITS

13.0 Where incandescent lights are installed, the light unit voltage must be maintained between 90 and 110 per cent of the rated voltage under standby power conditions.

13.1 Light units must be installed in a warning system and located to ensure that the crossing user, on a road approach, or accessing a road approach:

(a) is within the effective distribution pattern of luminous intensity of a set of light units within the distances specified for the front light units within SSD; and

(b) is able to see at least one set of front light units clearly.

13.2 Except for when the visibility of units is obstructed by railway equipment, light units must be provided in a warning system and located to ensure that a crossing user in the stopped position at the grade crossing:

(a) is within the effective distribution pattern of luminous intensity of a set of back lights;

(b) so that at least one set of back lights is clearly visible to crossing users in each lane.

13.3 Cantilevered Light Units

13.3.1 Except on a one-way road where a second warning signal is installed on the left side of the lane, a cantilevered light unit must be provided in a warning system if:

(a) the distance between the centre of a warning signal mast and the edge of the lane of the road that is the farthest from the mast, measured perpendicular to the road, exceeds 7.7 m for Dr. and 8.7 m for Dl as shown in Figure 13-1;

(b) the front light units of the warning signal (i.e. those on the same side of the track as approaching traffic) are not clearly visible within the distance for the set of light units as specified in article 14.4.

13.3.2 Cantilevered light units must be installed for a warning system on a road that meets the specifications for an expressway as specified in Table 10-2.

13.4 Light Units for a Sidewalk, Path or Trail

13.4.1 A sidewalk, path or trail with a centre line more than 3.6 m (12 feet) from the centre of a warning signal mast must have separate light units for each direction of travel, as shown in Figure 13-2(a).

13.4.2 Lights must be installed for persons travelling in the direction opposite to vehicle traffic where there is a sidewalk, path or trail along a one-way road as shown in Figure 13-2(b).
**Figure 13-1 – Warning Signal Offsets Requiring Cantilevered Light Units**

(a) **Two-Way Road**

(b) **One-Way or Divided Road**
Figure 13-2 – Sidewalks, Paths and Trails

(a) Two Way

(b) One-Way
14 LIGHT UNITS - ALIGNMENT

14.1 General – Light Units

14.1.1 Light units must be 200 mm or 300 mm Light Emitting Diode (LED) signal module type and as specified in Appendix A.

14.1.2 Sets of light units of warning systems must flash alternately and uniformly at a rate of 45 to 65 flashes per minute.

14.2 Alignment Height – Front and Back Lights for Vehicles

14.2.1 Light units must be aligned so that the axes of the light units pass through a point 1.6 m above the road surface at stopping sight distance.

14.3 Alignment Distance – Front Light Units for Vehicles

14.3.1 Front light units must be aligned through the centre of the approaching traffic lane for which they are intended as follows:

   (a) at a minimum, to the stopping sight distance; or

   (b) at the point at which the light units are first visible, if this point is less than the distance specified in (a).

14.4 Alignment – Intermediate Front Light Units for Vehicles

14.4.1 Additional sets of light units must be aligned to cover any intermediate areas of the road approaches between the coverage provided by the front light units aligned as required in article 14.3 and the back lights aligned as required in article 14.5.

14.4.2 Additional sets of light units provided for a crossing user must be aligned through the point that is 1.6 m above the surface of the road, at the point at which the crossing user enters the road approach.

14.5 Alignment – Back Light Units for Vehicles

14.5.1 Back light units intended for motor vehicles approaching the grade crossing from a lane on the opposite side of the line of railway from the warning signal on which they are installed, must be aligned through the centre of that lane, 15 m in advance of the warning signal for that side of the line of railway.

14.6 Alignment – Light Units installed exclusively for sidewalks, paths, or trails

14.6.1 Light units installed exclusively for sidewalks, paths, or trails, must be aligned to be visible through a point 1.6 m above the centre of the sidewalk, path or trail and 30 m (100 ft) in advance of the nearest rail on both sides of the line of railway or the point at which the set of lights units first become visible if less than 30 m (100 ft).

15 BELLS AND GATES

15.1 Bells

15.1.1 A bell is required for all warning systems, except for limited use warning systems referred to in Appendix B and for limited use warning systems with walk lights referred to in Appendix C.

15.1.2 Where there is only one sidewalk, path or trail along a road approach, the bell must be located on the signal mast adjacent to the sidewalk, path or trail.
Grade Crossings Standards, July 2014

15.1.3 A bell is required on a signal mast adjacent to a sidewalk, path or trail if separated from any other signal mast with a bell by more than 30 m (100 ft).

15.1.4 All bells must continue to operate for the same duration as the light units.

15.2 Gates

15.2.1 The gate arm must be installed perpendicular to the longitudinal axis of the road approach.

15.2.2 The descent of the gate arm must take 10 to 15 seconds and its ascent must take 6 to 12 seconds.

15.2.3 The gate arm must begin its descent once the gate arm clearance time has elapsed, calculated in accordance with article 10.4.

15.2.4 For a grade crossing where railway equipment enters the grade crossing at more than 25 km/h (15 mph), the gate arm must rest in the horizontal position not less than 5 seconds before the arrival at the crossing surface of railway equipment.

15.2.4.1 For a grade crossing where the railway equipment enters the grade crossing at 25 km/h (15 mph) or less, the gate arm must rest in the horizontal position when the railway equipment arrives at the crossing surface.

15.2.5 The gate arms must operate uniformly, smoothly, and complete all movements without rebound, and must be securely held when in the raised position.

15.2.6 If the gate arm strikes or fouls any object during its ascent or descent, it must readily stop and, on removal of an obstruction, assume the position corresponding with the control apparatus.

16 CIRCUITRY

16.1 Warning Time

16.1.1 The time during which the warning system must operate, before the arrival of railway equipment at the crossing surface, must be the greatest of:

   (a) 20 seconds, unless the grade crossing clearance distance (Figure 10-1) is more than 11 m (35 ft), in which case, the 20 seconds must be increased by one second for each additional 3 m (10 ft), or fraction thereof;
   (b) the Departure Time for the design vehicle (article 10.3.2);
   (c) the Departure Time for pedestrians, cyclists, and persons using assistive devices (article 10.3.3);
   (d) the gate arm clearance time, plus the time to complete the gate arm descent, plus 5 seconds;
   (e) the minimum warning time required for traffic signal interconnection as referred to in article 19.3(a);
   (f) the time for the design vehicle to travel from the stopping sight distance, and pass completely through the clearance distance.

16.2 Consistency of Warning Times

16.2.1 Operating control circuits must provide consistent warning times for railway equipment regularly operating over the grade crossing.

16.2.2 Where the maximum railway operating speed has been reduced, the approach warning times for railway equipment, regularly operating over the grade crossing, must not be more than 13 seconds longer than the warning time for the railway design speed.
Grade Crossings Standards, July 2014

16.3 Cut-Outs

16.3.1 Where railway equipment regularly stops, or railway equipment is left standing, within the activating limits of a warning system, the warning system must be equipped with a control feature to minimize the operation of the warning system.

16.3.2 A switch, when equipped with a switch circuit controller connected to the point and interconnected with the warning system circuitry, must cut out only when the switch point is within one-half inch of full reverse position.

16.4 Directional Stick Circuits

16.4.1 Where a warning system is equipped with directional stick circuits, the circuit must:

(a) include a stick release timer to activate the warning system after a preset time if there is failure of an approach circuit; or

(b) cause a train control signal system to restrict railway equipment speed to 25 km/h (15 mph) or less.

16.5 Identification

16.5.1 Each wire in all housings, including switch circuit controllers and terminal or junction boxes, must be identified at each terminal and the identification must not interfere with moving parts of the warning system. Material used for identification purposes must be made of insulating material. This requirement does not apply to light units or wiring that is an integral part of solid state equipment.
17 WARNING SYSTEMS AND TRAFFIC SIGNALS INSTALLED AT A GRADE CROSSING IN LIEU OF A WARNING SYSTEM - INSPECTION AND TESTING

17.1 Inspection and testing of warning systems must be done in accordance with article 3.3.1 and 3.1.15 of AREMA Communications and Signals Manual (cited in Part A).

17.2 Inspection and testing of traffic signals installed at a grade crossing in lieu of a warning system must be done in accordance with the road authority’s procedures.

Table 17-1 – Interpretation of Frequencies of Inspections and Tests for Warning Systems and Traffic Signals installed at a grade crossing in lieu of a warning system

<table>
<thead>
<tr>
<th>COLUMN 1</th>
<th>COLUMN 2</th>
<th>COLUMN 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGNATED FREQUENCY</td>
<td>DEFINITION</td>
<td>MAXIMUM INTERVAL BETWEEN EACH INSPECTION OR TEST</td>
</tr>
<tr>
<td>Weekly</td>
<td>Once every week (Sunday to Saturday)</td>
<td>10 clear days</td>
</tr>
<tr>
<td>Monthly</td>
<td>Once every calendar month</td>
<td>40 clear days</td>
</tr>
<tr>
<td>Quarterly</td>
<td>Once every 3 months (January to March, April to June, July to September, and October to December)</td>
<td>100 clear days</td>
</tr>
<tr>
<td>Twice annually</td>
<td>Once every 6 months (January to June and July to December)</td>
<td>200 clear days</td>
</tr>
<tr>
<td>Annually</td>
<td>Once every calendar year</td>
<td>13 months</td>
</tr>
<tr>
<td>Every 2 years</td>
<td>Once every 2 calendar years</td>
<td>26 months</td>
</tr>
<tr>
<td>Every 4 years</td>
<td>Once every 4 calendar years</td>
<td>52 months</td>
</tr>
<tr>
<td>Every 10 years</td>
<td>Once every 10 calendar years</td>
<td>130 months</td>
</tr>
</tbody>
</table>

Table 17-2 – Required Frequencies of Inspections and Tests for Warning Systems and Traffic Signals installed at a grade crossing in lieu of a warning system

<table>
<thead>
<tr>
<th>COLUMN 1</th>
<th>COLUMN 2</th>
<th>COLUMN 3</th>
<th>COLUMN 4</th>
<th>COLUMN 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td><strong>Elements: Inspection and Testing requirements</strong></td>
<td>Frequency for Warning Systems and Traffic Signals installed at a grade crossing in lieu of a warning system</td>
<td>Frequency for Limited Use Warning Systems</td>
<td>Frequency for Limited Use Warning Systems with Walk Light</td>
</tr>
<tr>
<td>1</td>
<td>Warning Systems: for operation of lights, bell, gates, and power-off light.</td>
<td>Weekly or no more than 7 days before the operation of railway</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td>Monthly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>2</td>
<td>Light units: for misalignment, physical damage and conspicuity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Standby power: for operating bank voltage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Light units, and gates: for damage, cleanliness, and conspicuity.</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>Bell: for operation</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>Gate arm: for operation</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>Surge protection: for condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Circuits: for grounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Battery: for isolation faults</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Batteries: for voltage, current, electrolyte level, and plate deterioration where plates are visible</td>
<td>Monthly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>11</td>
<td>Interconnection components: for energization of circuits as intended.</td>
<td>Monthly</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12</td>
<td>Switch circuit controller: for adjustment</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>13</td>
<td>Batteries: for degree of exhaustion, voltage and current</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>14</td>
<td>Fouling circuits: for continuity</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>15</td>
<td>Direct Current relays: visual check of condition</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
</tr>
<tr>
<td>16</td>
<td>Bond wires, track connections, insulated joints, and other insulated track appliances: visual check of condition</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
</tr>
<tr>
<td>17</td>
<td>Cut-out circuits (any circuit that overrides the operation of a warning system) : for operation</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
<td>Twice Annually</td>
</tr>
<tr>
<td>18</td>
<td>Gate mechanism and circuit controller: visual inspection of condition</td>
<td>Twice Annually</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>19</td>
<td>Control circuits operation of traffic signals installed at a grade crossing in lieu of a warning system</td>
<td>Twice Annually</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20</td>
<td>Light units: for proper alignment, focus, and visibility.</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>21</td>
<td>Light Unit: for voltage</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>22</td>
<td>Track circuits: for proper functioning</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>23</td>
<td>Flash controller: for flash rate</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>24</td>
<td>Battery: load test</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Frequency 1</td>
<td>Frequency 2</td>
<td>Frequency 3</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>25</td>
<td>Warning time: for required time</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>26</td>
<td>Electronic railway equipment detection devices, including processor-based systems: for programming and function ability.</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>27</td>
<td>Timing relays and timing devices: for required time</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>28</td>
<td>Cable and wire entrances: for condition</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>29</td>
<td>Switch circuit controller centering device: for condition</td>
<td>Annually</td>
<td>Annually</td>
<td>Annually</td>
</tr>
<tr>
<td>30</td>
<td>Interconnection operation between of warning systems and traffic control devices</td>
<td>Annually</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>31</td>
<td>Pole line and attachments: for condition</td>
<td>Every Two Years</td>
<td>Every Two Years</td>
<td>Every Two Years</td>
</tr>
<tr>
<td>32</td>
<td>Gate mechanism: for electrical values, mechanical clearances and torque</td>
<td>Every Four Years</td>
<td>Every Four Years</td>
<td>Every Four Years</td>
</tr>
<tr>
<td>33</td>
<td>DC Polar, AC Vane, and Mechanical Timer relays: for electrical values and operating characteristics</td>
<td>Every Two Years</td>
<td>Every Two Years</td>
<td>Every Two Years</td>
</tr>
<tr>
<td>34</td>
<td>Relays that affect proper functioning of a warning system (except for DC polar, AC Vane and Mechanical Timer): for electrical values and operation</td>
<td>Every Four Years</td>
<td>Every Four Years</td>
<td>Every Four Years</td>
</tr>
<tr>
<td>35</td>
<td>Ground: for resistance value</td>
<td>Every Ten Years</td>
<td>Every Ten Years</td>
<td>Every Ten Years</td>
</tr>
<tr>
<td>36</td>
<td>Wire and cable insulation: for resistance</td>
<td>Every Ten Years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
PART F – INTERCONNECTED DEVICES

18 PREPARE TO STOP AT RAILWAY CROSSING SIGN

18.1 The Prepare to Stop at Railway Crossing sign must be as shown in A3.6.6 of the Manual of Uniform Traffic Control Devices for Canada (cited in Part A), must meet the applicable specifications in article A1.6 of that Manual, and must operate:

(a) in advance of the activation of the light units of the warning system; and

(b) during the time of the operation of the light units of the warning system.

18.2 The advance activation time must be the greater of the time it takes a vehicle travelling at the road crossing design speed to pass a deactivated Prepare to Stop at Railway Crossing sign and the vehicle to:

(a) clear the grade crossing before the arrival of railway equipment at the crossing surface where there is a warning system without gates; or

(b) clear the grade crossing before the gate arms start to descend where there is a warning system with gates.

18.3 Where a Prepare to Stop at Railway Crossing sign is installed, 4 hours continuous battery back-up power must be provided for the Prepare to Stop at Railway Crossing signs.

19 INTERCONNECTION OF TRAFFIC SIGNALS WITH WARNING SYSTEMS

19.1 Interconnection is to be provided at grade crossings where the railway design speed is 25 km/h (15 mph) or more and where there is less than 30 m between the nearest rail of a grade crossing and the travelled way of an intersection with traffic signals.

19.2 Except as otherwise specified in these standards or in the Grade Crossings Regulations, the design and operation of the interconnection of traffic signals with a warning system, at a grade crossing that corresponds to the specifications of 19.1, must be in accordance with Part 3.1.10 of the AREMA Communications and Signals Manual (cited in Part A).

19.3 The interconnection of traffic signals with a warning system must:

(a) provide sufficient time for vehicles to clear the grade crossing before the arrival of railway equipment at the crossing surface.

(b) prevent movement of road traffic from the intersection towards the grade crossing.

19.4 Where traffic signals are interconnected by warning systems, 4 hours continuous battery back-up must be provided for the traffic signals.
## Table 20-1 – Required Frequencies of Inspections and Tests for Prepare to Stop at Railway Crossing Signs or an Interconnected Traffic Signal

<table>
<thead>
<tr>
<th>COLUMN 1</th>
<th>COLUMN 2</th>
<th>COLUMN 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>Elements and Inspection and Testing requirements</td>
<td>Frequency</td>
</tr>
<tr>
<td>1</td>
<td>Prepare to Stop at Railway Crossing sign: for visibility of light units</td>
<td>Annually</td>
</tr>
<tr>
<td>2</td>
<td>Traffic Signals installed at a grade crossing in lieu of a warning system: for cleanliness, visibility of signal heads, and physical damage</td>
<td>Annually</td>
</tr>
<tr>
<td>3</td>
<td>Traffic signal interconnection activation and operation with warning systems</td>
<td>Annually</td>
</tr>
<tr>
<td>4</td>
<td>Prepare to Stop at Railway Crossing Sign activation and operation</td>
<td>Annually</td>
</tr>
</tbody>
</table>
APPENDIX A – LIGHT EMITTING DIODE (LED) SIGNAL MODULES

Standards for LED Signal Modules in Warning Systems

1 DEFINITIONS

**Candela (cd)** – SI unit of luminous intensity. The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540 nm and that has a radiant intensity in that direction of 1/683 W per steradian (1 cd = 1 lm/sr).

**Lumen (lm)** – SI unit of luminous flux. Luminous flux emitted in unit solid angle [steradian (sr)] by a uniform point source having a luminous intensity of 1 candela (1 lm = 1 cd x 1 sr).

**Luminance Lₜ (in a given direction, at a given point on a real or imaginary surface)** – quantity defined by the formula:

\[ Lₜ = \frac{d\Phiₜ}{dA \cdot d\Omega \cdot \cos \theta} \]

where d\(\Phiₜ\) is the luminous flux transmitted by an elementary beam passing through the given point and propagating in the solid angle d\(\Omega \) containing the given direction; dA is the area of a section of that beam containing the given point; \(\theta\) is the angle between the normal to that section and the direction of the beam (footlambert, cd/m²).

**Luminous Efficacy of Radiation (K)** – the luminous flux \(\Phiₜ\) divided by the corresponding radiant flux \(\Phiₑ\) (K = \(\Phiₜ/\Phiₑ\)).

**Luminous Intensity (Iₜ) (of a source in a given direction)** – the luminous flux d\(\Phiₜ\), leaving the source and propagating in the element of solid angle d\(\Omega \) containing the given direction, divided by the element of solid angle (Iₜ = d\(\Phiₜ\) / d\(\Omega \) candela).

**Luminous Flux (Φₑ)** – quantity derived from radiant flux \(\Phiₑ\) by evaluating the radiation according to its action upon the CIE standard photometric observer (lumen).

**Rated Voltage** – the nominal or design operating voltage of the LED signal module; the voltage at which rated watts, candelas, and life are determined.

**Rated Watts** – the average initial power (watts) consumed when the lamp is operated at rated voltage.

2 PHOTOMETRIC REQUIREMENTS

2.1 Luminous Intensity

When LED signal modules are in use at a warning system, they must meet the minimum luminous intensity values shown in Table A-1.

| Table A-1 – Minimum Luminous Intensity (Candela) over Temperature and Lifetime |
|---------------------------------|---|---|---|---|---|---|---|
|                               | 0' | 5'Left (L)/Right (R) | 10'L/R | 15'L/R | 20'L/R | 25'L/R | 30'L/R |
| 0'                            | 400| 375| 250| 150| 75| 40| 15 |
| 5'Down (D)                    | 350| 325| 250| 150| 75| 40| 15 |
| 10'D                          | 130| 125| 110| 85| 60| 35| 15 |
| 15'D                          | 45 | 40 | 35 | 30 | 25 | 20 | 15 |
| 20'D                          | 15 | 15 | 15 | 15 | 15 | 15 | 10 |
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2.2 Chromaticity
A signal module must produce a uniform red light output as specified in article 4.2 of the Vehicle Traffic Control Signal Heads – Light Emitting Diode Circular Supplement, published by the Institute of Transportation Engineers, dated June 2005.

2.3 Uniformity
The ratio of the greatest and least luminance on the signal module must not be more than 5:1, when measured over average areas of 500 mm$^2$.

2.4 Rise/Fall Time
The maximum rise time from zero intensity to full intensity, and the maximum fall time from full intensity to zero intensity, must be 75 ms.

3 PHYSICAL AND MECHANICAL REQUIREMENTS

3.1 LED Signal Module Design

3.1.1 The LED signal module must be designed to fit the grade crossing light unit housings, described in Part 3.2.35 of the AREMA Communications and Signals Manual (cited in Part A), without requiring modification of the mechanical, structural, or electrical components.

3.1.2 The LED signal module must be either 200 mm or 300 mm in size.

3.1.3 The LED signal module must have either a clear or a red lens.

3.1.4 Any gasket or similar sealing provisions must be made of a material as specified in Part 15.2.10 of the AREMA Communications and Signals Manual (cited in Part A).

3.2 Environmental Requirements

3.2.1 The LED signal module must operate over an ambient temperature range of -40°C (-40°F) to 70°C (158°F) in accordance with sections 1 to 3 of the "Method 1010.8 Temperature Cycling", dated June 18, 2004, of MIL-STD-883H, Test Method Standard, Microcircuits, published by the United States Department of Defence, dated February 26, 2010 and must satisfy the failure criteria set-out in article 3.3 of that standard, and any reference to end-point measurements and examinations are to be read as those provided by the supplier.

3.2.2 The LED signal module must be protected against dust and moisture intrusion in a Type 4 enclosure in a manner that meets the requirement of article 8.6.2 of the Canadian Standards Association standard CAN/CSA-C22.2 No. 94.2-07 entitled Enclosures for Electrical Equipment, Environmental Considerations, as amended from time to time, when tested in accordance with article 8.6.1 of that Standard.

3.2.3 The LED signal module must meet mechanical vibration and shock requirements as specified in Part 11.5.1 of the AREMA Communications and Signals Manual (cited in Part A).

3.2.4 The LED signal module lens must be UV stabilized.

3.3 Identification

3.3.1 The LED signal module must have a label containing the following information:
   a) the LED colour;
   b) the beam deflection classification;
   c) the operating voltage;
   d) the current consumption at operating voltage;
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e) the module’s serial number; and

f) the date of manufacture.

3.3.2 If the module or its components require orientation, they must be prominently and permanently marked with an indexing arrow.

4 ELECTRICAL REQUIREMENTS

4.1 Transient Voltage Protection
LED signal module circuitry must include voltage surge protection as specified in Part 11.3.3 of AREMA Communications and Signals Manual (cited in Part A).

4.2 LED Drive Circuitry
LED signal module circuitry must operate as specified in Part 3.2.35 of the AREMA Communications and Signals Manual (cited in Part A).

4.3 Dielectric and Electromagnetic Interference
LED signal module circuitry must conform to dielectric and electromagnetic interference requirements for Class B equipment in Part 11.5.1 of AREMA Communications and Signals Manual (cited in Part A).
APPENDIX B - LIMITED USE WARNING SYSTEMS AND SIGNS

1 Operating Requirements
1.1 Battery backup for a minimum of 24 hours of normal railway operations must be provided.
1.2 Power monitor lights must be provided.

2 Warning System Requirements
2.1 Limited Use Warning System must meet the specifications of articles 12 to 16 of the Grade Crossings Standards (GCS) except:
   a) it does not require a gate;
   b) height of the light unit may be different than that stated in the AREMA Communications and Signals Manual (cited in Part A) or the GCS (cited in Part A) as to improve conspicuity;
   c) Signal mast may be located closer to the road approach than that stated in the AREMA Communications and Signals Manual (cited in Part A) or the GCS (cited in Part A) to improve conspicuity.
   d) A bell is not required; and
   e) Front and back lights must be provided on each warning signal assembly.

3 Signage Requirements
3.1 An Emergency Notification sign must be installed at each location.
3.2 A sign indicating that the road is private must be posted near the entrance to the private road.
APPENDIX C - LIMITED USE WARNING SYSTEM WITH WALK LIGHT

Operating Requirements
1.1 Battery backup of a minimum of 8 hours must be provided.
1.2 Power monitor lights must be provided.

Signal Requirements
1.3 A Limited Use Warning System with Walk Light must meet the specifications below:
   a) must be installed on each side of the grade crossing and face a crossing user approaching the grade crossing;
   b) must include a signal head that displays a signal indicating to a crossing user that it is safe to proceed when railway equipment is not approaching. This signal head must be extinguished when railway equipment is approaching;
   c) The signal head must be as specified in sections 2 to 5, excluding the last paragraph of section 4.1.1, of the ITE “Pedestrian Traffic Control Signal Indications - Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules” prepared by the Joint Industry and Traffic Engineering Council Committee, published by the Institute of Transportation Engineers, dated March 19, 2004, except for the following aspects:
      i. 12VDC pedestrian module is to be used instead of a 120VAC input voltage;
      ii. the operating voltage range must be 9 – 15VDC, and the light must shut off at 7.3VDC or less; and
      iii. References to “LED Pedestrian Signal Module” or “Module” are to be read as “Walk Light”.
   d) The walk light indicating that it is safe to proceed must be extinguished a minimum of 20 seconds plus the clearance time before the arrival of railway equipment at the crossing surface.
   e) The clearance time must be based on design vehicle and must be calculated in accordance with article 10 of the GCS (cited in Part A).

Signage and Post Requirements
1.4 Signage indicating how to use a Limited Use Warning Systems with Walk Light must be as shown in Figure C-2 and must:
   a) be mounted on the mast under the walk light signal head as indicated in Figure C-1; and
   b) have a silver background that is reflective with silk screened black or vinyl lettering. Where required by law, the word “Arrêt” may replace the word “Stop”, or may be added to the Stop Sign.
1.5 A Stop sign must be as shown in article A2.2.1 of the Manual of Uniform Traffic Control Devices for Canada (cited in Part A) and must meet the applicable specifications A1.6 of that Manual. Where required by law, the word “Arrêt” will replace the word “Stop”, or may be added to the Stop sign. The Stop sign must be mounted on the mast as shown in Figure C-1.
1.6 An Emergency Notification sign must be located at each Limited Use Warning System with Walk Light Assembly.
Figure C-1 – Limited Use Warning System with Walk Light Assembly
Figure C-2 – Instruction Sign

CROSS TRACKS ONLY
WHEN BOTH SIGNALS ARE ILLUMINATED.

FRANCHIR LES VOIES SEULEMENT LORSQUE LES DEUX DISPOSITIFS LUMINEUX SONT ALLUMÉS.
## APPENDIX D – WHISTLING CESSATION

### Table D-1 – Requirements for Warning Systems at Public Grade Crossings within an Area without Whistling

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railway Design Speed</td>
<td>Grade Crossings for Vehicle Use</td>
</tr>
<tr>
<td></td>
<td>Grade Crossings For Sidewalks, Paths, or Trails with the centreline no closer than 3.6 m (12 ft) to a warning signal for vehicles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Tracks</th>
<th>No. of Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 or more</td>
</tr>
<tr>
<td>1</td>
<td>2 or more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 25 km/h (15 mph)</td>
<td>FLB</td>
<td>FLB</td>
<td>No warning system requirement</td>
<td>No warning system requirements</td>
</tr>
<tr>
<td>25 – 81 km/h (16 – 50 mph)</td>
<td>FLB</td>
<td>FLB &amp; G</td>
<td>FLB</td>
<td>FLB &amp; G</td>
</tr>
<tr>
<td>Over 81 km/h (50 mph)</td>
<td>FLB &amp; G</td>
<td>FLB &amp; G</td>
<td>FLB &amp; G</td>
<td>FLB &amp; G</td>
</tr>
</tbody>
</table>

**Legend:**

FLB is a warning system consisting of flashing lights and a bell.

FLB & G is a warning system consisting of flashing lights, a bell and gates

**Figure D-1 – prescribed area for whistling cessation as per article 23.1 of the RSA**