Enclosure 2

City of Edmonton

Whistle Cessation Report

Prepared by:

AECOM
101 – 18817 Stony Plain Road NW
Edmonton, AB, Canada T5S 0C2
www.aecom.com

780 486 7000 tel
780 486 7070 fax

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Project Number: 60519258

Distribution List

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1	Yes	Dennis Mark – City of Edmonton

Revision History

Revision #	Date	Revised By:	Revision Description
1	2016/12/02	Allan Erickson	90% Report
2	2017/01/23	Allan Erickson	Final Report

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AECOM
101 – 18817 Stony Plain Road NW
Edmonton, AB, Canada T5S 0C2
www.aecom.com

780 486 7000 tel
780 486 7070 fax

January 23, 2017

Dennis Mark P.Eng
Traffic Engineer
Transportation Operations Branch
Transportation Engineering
15th Floor, Century Place
9803 – 102 A Avenue NW
Edmonton AB T5J 3A3

SENT VIA EMAIL: dennis.mark@edmonton.ca

Dear Mr. Mark:

Project No: **60519258**

Regarding: **City of Edmonton Whistle Cessation Report**

Enclosed is one copy of the above noted report for the city of Edmonton. We trust this submission meets your current needs.

Thank you for this opportunity to provide this service to the City of Edmonton, we look forward to the opportunity to work with you again in the future.

Sincerely,
AECOM Canada Ltd.

Allan Erickson
al.erickson@aecom.com

AE:ln
Encl.

Quality Information

Report Prepared By:

Allan Erickson

Report Reviewed By:

Kevin Bain, P. Eng.

PROFESSIONAL ENGINEER ALBERTA
KEVIN L. BAIN
JAN 24/2017

PERMIT TO PRACTICE
AECOM CANADA LTD.
Signature
Date Jan 24, 2017
PERMIT NUMBER: P10450
The Association of Professional Engineers and Geoscientists of Alberta

Executive Summary

The City of Edmonton commissioned AECOM to conduct a whistle cessation report and crossing assessment for 16 crossing sites within the City limits..

The purpose of the report is to provide a detailed assessment of the crossings pursuant to Transport Canada's *Grade Crossing Regulations* dated November 27, 2014, Grade Crossing Standards dated July 2014, and CN's requirements for crossing assessments. Identify any non-compliance issues, and recommend mitigation and estimated cost to bring the crossings into compliance for whistle cessation.

In our review of the crossings, AECOM found the following crossing sites are already covered by whistle cessation or removed:
Site 2: 117 Street east of 167 Street, CN mile 0.74 Norwester Ind. Lead
Site 4: 17 Street north of Whitemud Drive, CN mile 6.22 Camrose Subdivision
Site 5: 167 Avenue and Fort Road, CN mile 0.64 Coronado Subdivision.
Site 7: 137 Avenue east of 184 Street CN confirmed crossing closed and whistle posts removed.
Site 8 118 Avenue west of 163 Street, CN mile 0.56 Norwester Ind. Lead
Site 9: Maple Road east of 12 Street, CN mile 7.21 Camrose Subdivision
Site 15 76 Avenue east of 34 Street, CN mile 4.32 Camrose Subdivision

AECOM's review also identified several non-compliant items that need to be addressed to comply with Transport Canada's Grade Crossing Standards and meet the requirements for Whistle Cessation.
The identified items and their estimated costs are summarized as follows:
All estimated costs are 2016 Canadian dollars including GST and are subject to change.

Site 1: 162 Avenue east of 142 Street, CN mile 2.90 Westlock Subdivision
>Extend paved crossing surface minimum of 0.5m beyond edge of road, both sides. Estimated cost = $8,000

>Install 2 advance warning signs. Estimated Costs = $3,000

>Address trespassing 210m north of crossing, Close off opening in wood fence. = $1,000

>Install road crossing warning system consisting of flashing lights and bell. Estimated cost = $350,000

Total estimated cost = $362,000

Option 2 : Upgrade to a gated crossing with sidewalk and widened road section

>Extend paved crossing surface minimum of 0.5m beyond edge of road, both sides. Estimated cost = $8,000

>Install 2 advance warning signs. Estimated Costs = $3,000

>Address trespassing 210m north of crossing, Close off opening in wood fence. = $1,000

>Install Flashing lights and bell with gates. Estimated cost = $391,200

>Widen road section to urban standard including sidewalk. Estimated cost = $61,000

>Relocate two power poles. Estimated cost = $20,000 (Ball Park estimate)

Total Estimated cost Option 2 = $484,200

Note: Extending the sidewalk east, past the crossing will also involve drainage modifications which are not part of the above estimates.
Note triggers for installing gates. One or more of the following conditions at the crossing are usually present for installing gates:
Forecast cross product is 50,000 or more
2 or more tracks

Rail speed is more than 50mph
There is stop sign for an intersection less than 30 m from the nearest rail.
There is an intersection with traffic lights within 60m of the crossing.
None of the above conditions currently exist at the crossing at the time of this report.

Site 3: 17 Street south of 195 Avenue, CN mile 120.72 Vegreville Subdivision
>Clear brush around advance warning signs. Estimated cost = $5000

>Re-grade road profile to achieve a 2% or less grade within 8m of nearest rail for both approaches. See Figure 3B. Estimated Cost = $35,470

>Install road crossing warning system consisting of flashing lights and bell and gates. Estimated cost = $450,000

Total estimated cost = $490,470

Site 6: Meridian Street north of 178 Avenue, CN mile 121.96 Vegreville Subdivision
>Re-grade road profile to achieve a 2% or less grade within 8m of nearest rail for the south approach. Estimated cost = $40,835

>Paint stop lines on both road approaches to crossing. Estimated cost = $2,000

Total estimated cost = $42,835

Site 10: 127 Avenue at Dunvegan Road, CN mile 0.05 Westlock Subdivision
>Paint stop line on westbound approach. Estimated cost = $1000

>Install 3 advance warning signs. Estimated cost = $4,500

>Install short arm gate for sidewalk in northwest quadrant. Estimated cost = $100,000

Total estimated cost = $105,500

Site 11: 167 Avenue east of 142 Street, CN mile 3.26 Westlock Subdivision
>Paint stop line on westbound approach. Estimated cost = $1,000

>Install 2 advance warning signs. Estimated cost = $3,000

Total estimated cost = $4,000

Site 12: 101 Street South of Ellerslie Road, CPR Mile 90.02 Leduc Subdivision (Tag 600509)
>Install 2 advance warning signs. Estimated cost = $3,000

>Relocate access. Estimated cost = $ 68,500 (*25% contingency added*) * Note this estimated cost is ball park, as no survey or field investigation was conducted.

Total estimated cost = $71,500

Site 13: 64 Avenue East of 30 Street, CN Mile 5.08 Camrose Subdivision
>Re-grade road profile to achieve a 2% or less grade within 8m of nearest rail for both approaches.- See Figure 13B Estimated Cost = $20,420

>Install 2 advance warning signs. Estimated cost = $3,000

Total estimated cost = $23,420

Site 14: 34 Street & 94 Avenue, CPR Mile 168.38 Scotford Subdivision (Tag 30726)
>Install 2 advance warning signs. Estimated cost = $3,000

Total estimated cost = $3,000

Site 16: Celanese Road & 17 Street, CN Mile 259.89 Wainwright Subdivision
>Install advance warning sign. Estimated cost = $1,500.

>Paint stop lines at both approaches to crossing. Estimated costs = $2,000

>Extend paved crossing surface. Estimated costs = $16,000

>Re-grade approach to crossing (See Figure 16-B) Estimated cost = $54,280

Total estimated cost = $73,780

Assessments

Site 14

Site 14:
Road Name: 34 Street & 94 Avenue

CPR Mile 168.38 Scotford Subdivision (Tag 30726)

Road Authority: City of Edmonton

General Information

Crossing protected with Flashing lights, bell (FLB's) and gates

Number of tracks: 1

No. of tracks sign on crossing posts: Yes ___ / No_X_

Stop sign on Railway post East: Yes ___ / No_X_ , If No are there stop signs at the crossing: Yes ___ / No_X_
Stop sign on Railway post West: Yes ___ / No_X_ , If No are there stop signs at the crossing: Yes ___ / No_X_

Railway emergency sign on the crossing posts or signal mast: Yes _X_ / No___

Number of Traffic Lanes: _2_

Railway Speed: 20mph

Road crossing design speed: Posted road speed 60 km/h

Width of travelled lane: 3.6m, 3.9m, paved surface

Width of shoulder (*where evident*): 2.5m, 1.7m

Sidewalks: Yes____ / No_X_

Crossing Impact: Re: Switching Operations: Yes _X_ / No ___

Track Switches within 1000 ft. of Crossing Location: West: 12.0m Switch for Imperial Oil Limited, East: 32.0m switch for Alta Steel.

Crossing Impact Re: Seasonal Traffic (*if applicable*): NA

Crossing Pedestrian Volume: 0

Crossing Cyclist Volume: 0

Crossing Impact: School Bus Route/Dangerous Goods Route/Emergency Services: Dangerous Goods Route/Emergency Services

Crossing Accessibility Designation: Vehicles

Assisted Devices or other special users: None

Forecasted AADT: Unknown 2015 count = 11512

Crossing Special Applications Exemptions (*Active or Future Request*): Anti-Whistling Request

Surrounding Land: Residential ___ / Industrial _X_ / Rural ____ / Urban _X_

Other examples: Schools/Emergency Services: NA

Design Considerations: None

Location of Grade Crossing

Is there a road intersection within 30m of the crossing and if so what is the distance: Yes 75 feet (22.8m) 94 Avenue in southeast quadrant. CPR access within CPR right of way in the other quadrants
Recommendations for any mitigation work: NA

Grade Crossing Surface
Section 5
Crossing surface extends a min. of 0.5m beyond the road surface: Yes _X_ / No____
Recommendations for any mitigation work: NA

Type and Length of Crossing Surface Material: Concrete _X_62.7 feet (19.1m) / Rubber ___ / Asphalt ___ / Wood
Recommended Crossing Surface Material: NA

Location of crossing with respect to track design: Tangent _X_ / Curve ___ / Super-elevated _____

Angle of crossing: 50 Degrees.

Other Special Vehicle Requirements or Restrictions: NA

Road Geometry
Section 6 – Road Profile Grades

Grades at stopped, 5 m from rail: North 0.10%, South 0.97%

Drainage Conditions: Open Ditch _X_ / Catch Basin ___

Additional Road Design Impacts:
Steep approaches: NA
Horizontal Curves in roads: NA

Access points within 100 feet (30m): CPR access within CPR right of way in the northeast, southeast and southwest Quadrants.

Entrances/Private Driveways/Parallel Roads: see above

Recommendations for any mitigation work: NA

Sightlines
Section 7

Clear view at 5m from nearest rail along railway corridor: Yes _X_ / No_____

See Figure 14-A for sightlines
See Appendix 14-B for calculations

Recommendations for any mitigation work if required: NA

Signage
Section 8

Height of standard reflectorized crossing sign (SRCS) from ground to center of standard reflectorized crossing sign (SRCS) and ground to bottom of stop sign: North / East: ____ SRCS, ___ South / West: ____SRCS, ___ :
NA, crossing has flashing lights, bell (FLB's) and gates

Location Specific Signage, Example: Multi-track signage, speed tabs, advance warning: No advance warning sign on south approach. North approach advance sign too close to crossing.

Condition of Retro-reflectorization on railway crossing signs: Good condition, see Appendix 14-A for photos

Recommendations for any mitigation work: Install 2 advance warning signs. See Figure 14-A

Warning System Specifications:
Section 9
Flashing lights and bell _X_ / Cantilevers _____ / Gates _X_

Interconnected with traffic lights: NA

Grade Crossing Standard Section 9 and 10 (*Departure time gate delay etc. from Signal Board Plans*.):

Cross Product = 115,120

Intersections within 60m: 94 Avenue

Recommendations for any mitigation work: NA

Whistling Cessation Study
Table D-1 of the Grade Crossing Standards

Fencing requirement and condition: Railway Fenced, see Figure 14-A

Local Stakeholders: Commercial development in all quadrants.

Confirm known development plan for area: Commercial or industrial zoned.

Review Collision history last 5 years: No collisions reported: 2013 – 2015

Nearby Crossing and Impacts: None

Intersections/parallel roads: None

Trespassing: No evidence of trespassing

Recommendations for any mitigation work: NA

Additional Safety Concerns and Local Observations
Comment on the following
Human Factors: NA

Control Device Visibility/ Background Visual Clutter: NA

Driver Workload through this area (*are there a number of factors that simultaneously require the driver's attention such as traffic lights, pedestrian activity, merging traffic, commercial signage*): NA

Driver expectancy of the environment (*are the control measures within the design levels of the road system and adjacent environment?)*: NA

Need for positive guidance: NA

Conflicts between road and railway signage: NA

Environmental Factors:
Extreme Weather Conditions: NA
Lighting Issues (*night, dawn/dusk, tunnels, adjacent facilities, headlight or sunlight glare etc*.): NA
Landscaping or vegetation: NA

Integration with surrounding land use (*parked vehicles, parking spots blocking sightlines merging traffic lanes etc*.): NA

Pedestrians (*strollers, blind persons*): NA, No sidewalk at crossing

Children/Elderly: NA

Assistive Devices: NA

Bicyclists : NA

Motorcyclists: Yes

Over-sized trucks: Permit required

Buses: NA

Recreational Vehicles: Not authorized on road

Golfcarts: Not authorized on road

Hazardous Material Vehicles: Yes, DC route

Significant Volume of Pedestrians requiring special safety measures: NA

Maze Barriers: NA

Guide Fencing: NA

Pedestrian Bell/Gates: NA

Additional Signage (*2nd track, etc.):* NA

Other: NA

Review closure of this crossing if inactivity or presence of nearby adjacent crossings. Crossing provides legal access for commercial developments in all quadrants.

Detailed Conclusions and Recommendations
All estimated costs are 2016 Canadian dollars and subject to change.

>Install 2 advance warning signs. Estimated cost = $3,000.

Drawings and Appendixes:
See Crossing Drawing Figure 14-A
See Appendix 14-A for Photos
See Appendix 14-B for Calculations

Railways Comments:

Road Authority Comments:

Figure 14-A

Project Management Initials: ____ Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm

AECOM

Figure: 14-A

Site 14
34 St. & 94 Ave.
CP Mile 168.38 Scotford Subdivision

City of Edmonton
Whistle Cessation Study
City of Edmonton
Project No.: 60519258 Date: 2016-11-04

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N

AltaSteel

NORWOOD WATERWORKS

Dstopped 133m

Dssd 90m

8 FOOT CHAINLINK FENCE

6 FOOT CHAINLINK FENCE

FLB w/ GATE

INSTALL ADVANCED WARNING SIGN WA-18

94 Ave.

50°

SSD 130m

SSD 130m

34 St.

WA-18

INSTALL ADVANCED WARNING SIGN WA-18

PROCOR LTD.

FLB w/ GATE

EXISTING SIGNAL BUNGALOW

6 FOOT CHAINLINK FENCE

Dssd 90m

Dstopped 133m

CP RW

Imperial Oil LTD.

PP

PROCOR LTD.

MAIN SHOP

FINISHING SHOP

CLEANING STATION

TABLE

LEGEND:

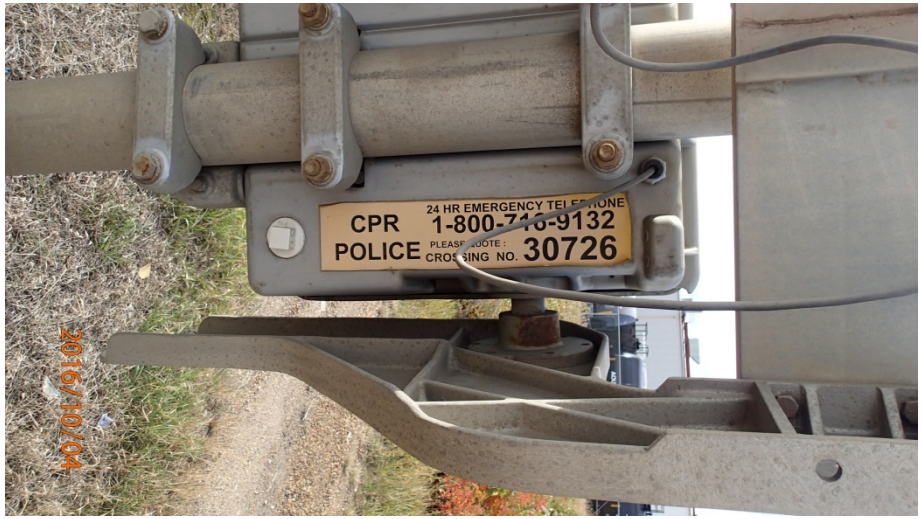
- EXISTING WOOD FENCE
- EXISTING CHAINLINK FENCE
- EXISTING BARBED WIRE FENCE
- EXISTING PAIGE WIRE FENCE
- EXISTING SNOW FENCE
- OVERHEAD POWER LINE WITH POLE
- SSD SIGHTLINES
- Dstopped SIGHTLINES
- EXISTING SIGNAL BUNGALOW
- EXISTING RAILWAY CROSSING SIGNAGE: FLASHING LIGHTS AND BELLS with GATE
- PROPOSED WA-18 ADVANCED WARNING SIGN

PLAN

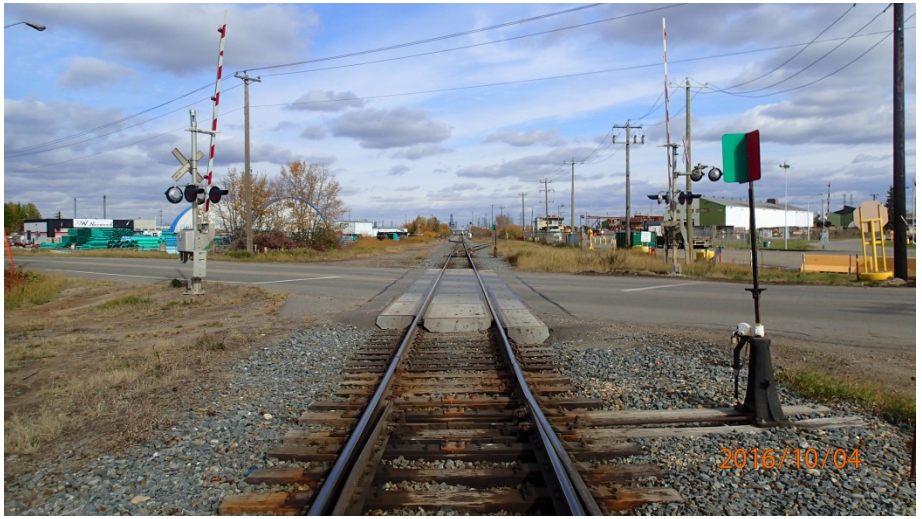
0 15 30 45 m SCALE 1:1500

Appendix 14-A

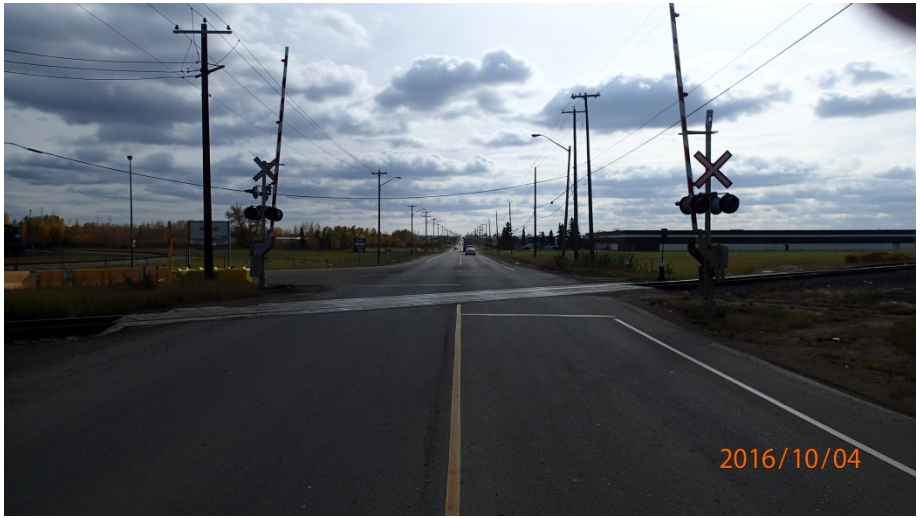
Photos



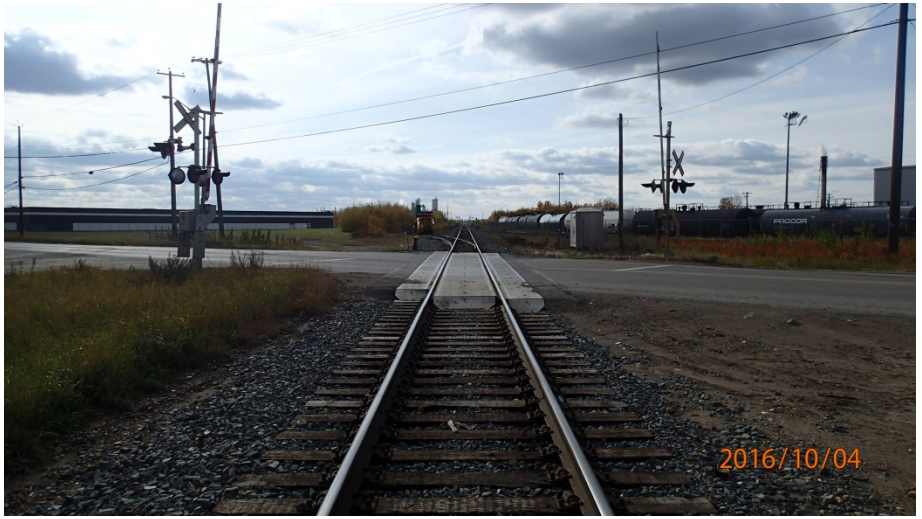
Emergency contact CP Tag 30726



Looking East

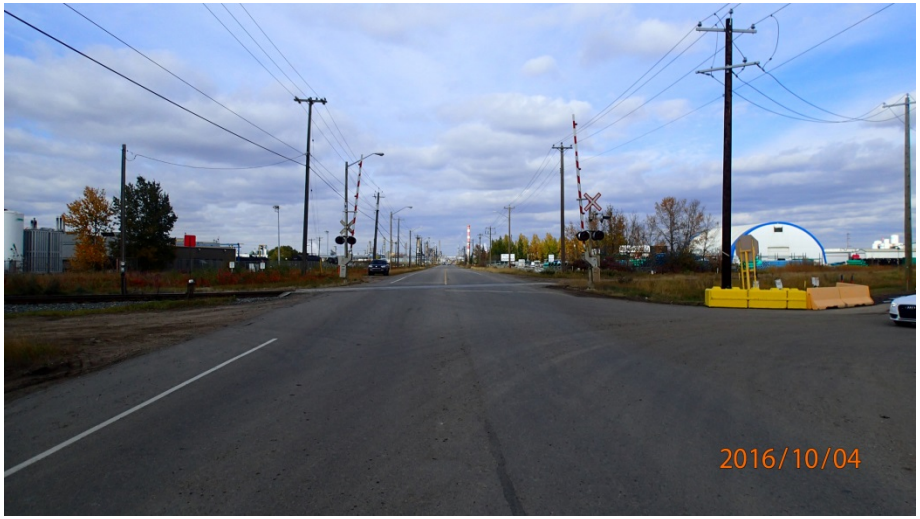


Looking South



Looking West

Site 14: 34 Street near 94 Avenue - CP Mile 168.38 Scotford Subdivision



Looking North

Site 14: 34 Street near 94 Avenue - CP Mile 168.38 Scotford Subdivision

Appendix 14-B

Calculations

CROSSING SIGHTLINE CALCULATIONS

34 Street - 94 Avenue **Mile 168.38 CP Scotford Subdivision**

Design Vehicle

General Vehicle Description	B-Train Doubles (BTD)			Length	
Design Vehicle Class	Truck		L	25.0	m

Road Crossing Design Speed (V) V 60 km/h

Railway Design Speed (Vt) Vt 20 mph

Road Approach Gradients North 0.8 % Ruling 0.5 %
- from survey data South 0.5 % Gradient

Stopping Sight Distance (SSD) North SSD 130 m
- from Table 3 for truck class South SSD 130 m

Grade Crossing Clearance Distance (cd) No. Of Tracks 1 ea
- 1 track cd = 8.87 m 2 tracks cd = 13.44 m cd 8.87 m

Minimum Stopping Sight Distance Time (Tssd)

Tssd = [(SSD + cd + L / (0.278 x V)] Tssd 9.82 sec

Minimum Sightlines Along Rail Line From SSD Approach Point (Dssd)

- from Table 4 OR Dssd 90 m
Dssd = .278 x Vt x Tssd (m) 87 m

Distance To Travel During Acceleration (s)

s = cd + L s 33.87 m

Acceleration Time (t)

- from Graph 1 t 11.6 sec

Road Departure Gradients North 0.3 % Ruling 0.6 %
- from survey data South 0.6 % Gradient

Ratios of Acceleration Times on Grades (G)

- from Table 5 G 1.10

Design Vehicle Departure Time (Td)

Td = 2 + (t*G) Td 14.8 sec

Departure Time - Pedestrians, Cyclists, Persons Using Assistive Devices (Tp)

Tp = cd/Vp Vp = 1.22 m/sec Tp 7.3 sec

Minimum Sightlines Along Rail Line From Stopped Position (Dstopped)

- from Table 6 using greater of Td or Tp Dstopped 133 m
Dstopped = .278 x Vt x Tstopped (m) 131 m

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