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**APPENDIX D – Roadway Improvement Cost Estimate Detail**

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Estimate Summary						
<b>Township Road 560</b> Gravel to ACP 9.0m top 6.5m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Earthwork Cost	77,880	cu.m	\$ 8.00		\$ 623,040.00	
Borrow	62,370	cu.m	\$ 20.00		\$ 1,247,400.00	
Drainage-Culverts*	150	metre	\$ 240.00		\$ 36,000.00	
Intersection Improvement (Hwy 831)					\$ 300,000.00	
Rail Crossing(s)					\$ 80,000.00	
Utilities					\$ 165,000.00	
Bridge File					\$ 46,000.00	
Contingency and Other (@ 20%)					\$ 381,300.00	
Engineering (@ 10%)					\$ 190,700.00	
<b>Total</b>					<b>\$ 3,070,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	13,500	sq.m/km	\$ 2.00	6.60	\$ 178,200.00	
GBC	8,900	tonne/km	\$ 30.00	6.60	\$ 1,762,200.00	300mm thickness, Width = 12.3m (av)
ACP	2,600	tonne/km	\$ 90.00	6.60	\$ 1,544,400.00	100mm thickness, Width = 10.7m (av)
Contingency and Other (@ 20%)					\$ 697,000.00	
Engineering (@ 10%)					\$ 348,500.00	
<b>Total</b>					<b>\$ 4,531,000.00</b>	
<b>Range Road 195</b> Gravel to ACP 9.0m top 6.0m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Earthwork Cost	49,005	cu.m	\$ 8.00		\$ 392,040.00	
Borrow	38,273	cu.m	\$ 20.00		\$ 765,460.00	
Drainage-Culverts*	70	metre	\$ 240.00		\$ 16,800.00	
Intersection Improvement (Hwy 29)					\$ 250,000.00	
Removal Bridge File 00323					\$ 100,000.00	
Installation of Culvert Bridge					\$ 103,000.00	
Utilities					\$ 95,000.00	
Contingency and Other (@ 20%)					\$ 234,900.00	
Engineering (@ 10%)					\$ 117,500.00	
<b>Total</b>					<b>\$ 2,078,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	13,500	sq.m/km	\$ 2.00	4.05	\$ 109,350.00	
GBC	8,900	tonne/km	\$ 30.00	4.05	\$ 1,081,350.00	300mm thickness, Width = 12.3m (av)
ACP	2,600	tonne/km	\$ 90.00	4.05	\$ 947,700.00	100mm thickness, Width = 10.7m (av)
Contingency and Other (@ 20%)					\$ 427,700.00	
Engineering (@ 10%)					\$ 213,900.00	
<b>Total</b>					<b>\$ 2,780,000.00</b>	
<b>Range Road 200</b> Gravel to ACP 9.0m top 6.5m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Earthwork Cost	47,790	cu.m	\$ 8.00		\$ 382,320.00	
Borrow	38,273	cu.m	\$ 20.00		\$ 765,460.00	
Drainage-Culverts*	150	metre	\$ 240.00		\$ 36,000.00	
Intersection Improvement (Hwy 29)					\$ 250,000.00	
Rail Crossing(s)					\$ 70,000.00	
Utilities					\$ 45,000.00	
Bridge File					\$ 31,000.00	
Contingency and Other (@ 20%)					\$ 236,800.00	
Engineering (@ 10%)					\$ 118,400.00	
<b>Total</b>					<b>\$ 1,955,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	13,500	sq.m/km	\$ 2.00	4.05	\$ 109,350.00	
GBC	8,900	tonne/km	\$ 30.00	4.05	\$ 1,081,350.00	300mm thickness, Width = 12.3m (av)
ACP	2,600	tonne/km	\$ 90.00	4.05	\$ 947,700.00	100mm thickness, Width = 10.7m (av)
Contingency and Other (@ 20%)					\$ 427,700.00	
Engineering (@ 10%)					\$ 213,900.00	
<b>Total</b>					<b>\$ 2,780,000.00</b>	

Range Road 201 Gravel to ACP 9.0m top 6.0m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Earthwork Cost	49,005	cu.m	\$ 8.00		\$ 392,040.00	
Borrow	36,273	cu.m	\$ 20.00		\$ 765,460.00	
Drainage-Culverts*	90	metre	\$ 240.00		\$ 21,600.00	
Intersection Improvement (Hwy 15)					\$ 350,000.00	
Rail Crossing(s)					\$ 70,000.00	
Utilities					\$ 70,000.00	
Contingency and Other (@ 20%)					\$ 235,900.00	
Engineering (@ 10%)					\$ 118,000.00	
<b>Total</b>					<b>\$ 1,948,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	13,500	sq.m/km	\$ 2.00	4.05	\$ 109,350.00	
GBC	8,900	tonne/km	\$ 30.00	4.05	\$ 1,081,350.00	300mm thickness, Width = 12.3m (av)
ACP	2,600	tonne/km	\$ 90.00	4.05	\$ 947,700.00	100mm thickness, Width = 10.7m (av)
Contingency and Other (@ 20%)					\$ 427,700.00	
Engineering (@ 10%)					\$ 213,900.00	
<b>Total</b>					<b>\$ 2,780,000.00</b>	
Range Road 202 Gravel to ACP 11.0m top 6.0m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Construction **					\$ 5,142,100.00	Includes: Grading, Intersection
Contingency (@ 10%) **					\$ 514,300.00	Treatments, RR Crossings, and RR
Engineering (@ 11%) **					\$ 565,700.00	crossing protection for 3.45 km
<b>Total</b>					<b>\$ 6,223,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	15,600	sq.m/km	\$ 2.00	3.25	\$ 100,750.00	
GBC	10,300	tonne/km	\$ 30.00	3.25	\$ 1,004,250.00	300mm thickness, Width = 14.3m (av)
ACP	3,100	tonne/km	\$ 80.00	3.25	\$ 906,750.00	100mm thickness, Width = 12.7m (av)
Contingency and Other (@ 20%)					\$ 402,400.00	
Engineering (@ 10%)					\$ 201,200.00	
<b>Total</b>					<b>\$ 2,616,000.00</b>	
Range Road 203 Gravel to ACP 9.0m top 6.0m subgrade widening						
<b>Grading</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Earthwork Cost	39,325	cu.m	\$ 8.00		\$ 314,600.00	
Borrow	30,713	cu.m	\$ 20.00		\$ 614,260.00	
Drainage-Culverts*	80	metre	\$ 240.00		\$ 19,200.00	
Intersection Improvement (Hwy 15)					\$ 350,000.00	
Intersection Improvement (Hwy 45)					\$ 250,000.00	
Rail Crossing(s)					\$ 450,000.00	
Utilities					\$ 180,000.00	
Contingency and Other (@ 20%)					\$ 189,700.00	
Engineering (@ 10%)					\$ 94,900.00	
<b>Total</b>					<b>\$ 2,446,000.00</b>	
<b>Base/Pave</b>						
Item	Quantity	Unit	Unit Cost	Length (km)	Total Cost	Remarks
Subgrade Preparation	13,500	sq.m/km	\$ 2.00	3.25	\$ 87,750.00	
GBC	8,900	tonne/km	\$ 30.00	3.25	\$ 887,750.00	300mm thickness, Width = 12.3m (av)
ACP	2,600	tonne/km	\$ 90.00	3.25	\$ 760,500.00	100mm thickness, Width = 10.7m (av)
Contingency and Other (@ 20%)					\$ 343,200.00	
Engineering (@ 10%)					\$ 171,600.00	
<b>Total</b>					<b>\$ 2,250,000.00</b>	
<b>Comments</b>						

\*Only considered quantity of culvert extensions required for widening. Assumed 600 mm dia. C.S.P. for determination of unit price.

\*\*Based on 2010 Resource Road Grant Funding estimate provided by Lamont County, with escalation to 2013 dollar values using 2.5% compounded annually.

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APPENDIX E – Traffic Counts

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**AADT Calculations from Traffic Count Data Collected in April 2013.**

(File No. ED55 36342)

Twp. Rd. 560 ~ 2.0 km East of Rge. Rd. Permanent traffic counter used for factoring is on Hwy. 45, Near Bruderheim (ATR# 50450450)

Hour Starting at:	Tuesday 02-Apr-13	Wednesday 03-Apr-13	Thursday 04-Apr-13
0:00	0	0	0
1:00	0	0	0
2:00	0	0	0
3:00	0	0	0
4:00	0	0	0
5:00	0	0	0
6:00	1	1	0
7:00	4	3	3
8:00	4	4	1
9:00	2	2	3
10:00	2	3	1
11:00	6	3	2
12:00	3	1	0
13:00	0	0	3
14:00	4	6	3
15:00	1	4	4
16:00	0	5	3
17:00	7	2	4
18:00	1	2	2
19:00	1	1	2
20:00	1	3	5
21:00	1	0	0
22:00	0	0	1
23:00	0	2	0
<b>Totals:</b>	<b>38</b>	<b>42</b>	<b>37</b>
<b>Total 24Hr Volume**:</b>	<b>38</b>	<b>42</b>	<b>37</b>
<b>DEF*:</b>	<b>6.406</b>	<b>6.205</b>	<b>6.486</b>
<b>Average Daily Traffic (Using DEF):</b>	<b>35</b>	<b>37</b>	<b>34</b>
<b>MEF*:</b>	<b>1.082</b>	<b>1.082</b>	<b>1.082</b>
<b>AADT (Using MEF):</b>	<b>38</b>	<b>40</b>	<b>37</b>

 = Data not used

**AVERAGE AADT:**

**38**  
115

Directional split Lane1 (WBL) / Lane2 (EBL)  
52.63157895 47.36842105

Vehicle Classification	No. Counted	Total Vehicles	% of Total	# of AADT
Motorcycles, Small Trucks & Cars	97.73333333	100	97.73%	37.47
Buses & SUT	2.26666667		2.27%	0.87
Tractor & Trailers	0		0.00%	0.00
		117	100.00%	38.34

\*\* Note: Not using HEF because the traffic counts were done in full 24 hours

**AADT Calculations from Traffic Count Data Collected in April 2013.**

(file No. ED55 36342)

**Rge. Rd. 195 ~ 0.8 km North of Hwy. 29** Permanent traffic counter used for factoring is on Hwy. 45, Near Bruderheim (ATR# 50450450)

	02-Apr-13	03-Apr-13	04-Apr-13
Hour Starting at:	Tuesday	Wednesday	Thursday
0:00	0	0	0
1:00	0	0	0
2:00	0	0	0
3:00	0	0	0
4:00	0	0	1
5:00	1	3	2
6:00	6	2	5
7:00	8	3	2
8:00	6	9	6
9:00	9	12	6
10:00	11	5	7
11:00	9	5	5
12:00	10	4	2
13:00	1	6	6
14:00	7	9	3
15:00	11	6	10
16:00	7	8	7
17:00	12	12	11
18:00	0	4	8
19:00	2	5	3
20:00	1	3	1
21:00	3	3	0
22:00	0	3	0
23:00	0	1	0
<b>Totals:</b>	<b>104</b>	<b>103</b>	<b>85</b>

<b>Total 24Hr Volume** :</b>	<b>104</b>	<b>103</b>	<b>85</b>
<b>DEF *:</b>	<b>6.406</b>	<b>6.205</b>	<b>6.486</b>
<b>Average Daily Traffic (Using DEF):</b>	95	91	79
<b>MEF *:</b>	1.082	1.082	1.082
<b>AADT (Using MEF):</b>	<b>103</b>	<b>99</b>	<b>85</b>

  = Data not used

**AVERAGE AADT:**

**96**  
287

	Lane1 (NBL) /	Lane2 (SBL)
Directional split	47.11538462	52.88461538

Vehicle Classification	No. Counted	Total Vehicles	% of Total	# of AADT
Motorcycles, Small Trucks & Cars	73.36666667	99.38333333	73.82%	70.63
Buses & SUT	22.8		22.94%	21.95
Tractor & Trailers	3.216666667		3.24%	3.10
		292	100.00%	95.67

\*\* Note: Not using HEF because the traffic counts were done in full 24 hours

- AADT Calculations from Traffic Count Data Collected In April 2013.

(File No. ED55 36342)

Rge. Rd. 201 ~ 2.3 km South of Twp. Rd. Permanent traffic counter used for factoring is on Hwy. 45, Near Bruderheim (ATR# 50450450)

Hour Starting at:	Tuesday 02-Apr-13	Wednesday 03-Apr-13	Thursday 04-Apr-13
0:00	1	0	0
1:00	0	0	0
2:00	0	0	0
3:00	0	0	0
4:00	0	0	0
5:00	1	1	1
6:00	0	1	1
7:00	2	1	4
8:00	4	4	5
9:00	2	4	5
10:00	4	3	2
11:00	2	1	1
12:00	3	6	3
13:00	2	2	5
14:00	4	5	2
15:00	3	3	3
16:00	3	2	3
17:00	3	3	1
18:00	5	4	5
19:00	0	1	2
20:00	2	1	0
21:00	0	0	0
22:00	1	2	0
23:00	1	8	0
<b>Totals:</b>	<b>43</b>	<b>52</b>	<b>43</b>
<b>Total 24Hr Volume**:</b>	<b>43</b>	<b>52</b>	<b>43</b>
<b>DEF*:</b>	<b>6.406</b>	<b>6.205</b>	<b>6.486</b>
<b>Average Daily Traffic (Using DEF):</b>	<b>39</b>	<b>46</b>	<b>40</b>
<b>MEF*:</b>	<b>1.082</b>	<b>1.082</b>	<b>1.082</b>
<b>AADT (Using MEF):</b>	<b>43</b>	<b>50</b>	<b>43</b>

= Data not used

**AVERAGE AADT:**

**45**  
136

Directional split  
Lane1 (NBL) / Lane2 (SBL)  
34.88372093 65.11627907

Vehicle Classification	No. Counted	Total Vehicles	% of Total	# of AADT
Motorcycles, Small Trucks & Cars	83.43333333	100.85	82.73%	37.39
Buses & SUT	15.55		15.42%	6.97
Tractor & Trallers	1.86666667		1.85%	0.84
		138	100.00%	45.19

\*\* Note: Not using HEF because the traffic counts were done in full 24 hours

**AADT Calculations from Traffic Count Data Collected in April 2013.**

(File No. ED55 36342)

**Rge. Rd. 203 ~ 2 km North of Hwy. 15** Permanent traffic counter used for factoring is on Hwy. 45, Near Bruderheim (ATR# 50450450)

	02-Apr-13	03-Apr-13	04-Apr-13
Hour Starting at: Tuesday	Wednesday	Thursday	
0:00	0	0	2
1:00	0	0	0
2:00	0	1	0
3:00	1	0	1
4:00	0	1	1
5:00	0	0	2
6:00	29	24	23
7:00	27	28	19
8:00	19	10	8
9:00	13	7	5
10:00	17	7	7
11:00	13	16	11
12:00	13	10	13
13:00	7	10	8
14:00	13	18	8
15:00	10	7	10
16:00	10	12	12
17:00	17	20	31
18:00	25	30	13
19:00	2	4	3
20:00	3	1	2
21:00	0	1	0
22:00	2	0	0
23:00	0	0	1
<b>Totals:</b>	<b>221</b>	<b>207</b>	<b>180</b>
<b>Total 24Hr Volume**:</b>	<b>221</b>	<b>207</b>	<b>180</b>
<b>DEF *:</b>	<b>6.406</b>	<b>6.205</b>	<b>6.486</b>
<b>Average Daily Traffic (Using DEF):</b>	202	183	167
<b>MEF *:</b>	1.082	1.082	1.082
<b>AADT (Using MEF):</b>	<b>219</b>	<b>199</b>	<b>180</b>

  = Data not used

**AVERAGE AADT:**

**199**  
598

Directional split    Lane1 (NBL) /    Lane2 (SBL)  
50.67873303    49.32126697

Vehicle Classification	No. Counted	Total Vehicles	% of Total	# of AADT
Motorcycles, Small Trucks & Cars	88		88.00%	175.38
Buses & SUT	8.333333333	100	8.33%	16.61
Tractor & Trailers	3.666666667		3.67%	7.31
		608	100.00%	199.29

\*\* Note: Not using HEF because the traffic counts were done in full 24 hours



Turning Movements Summary Diagram

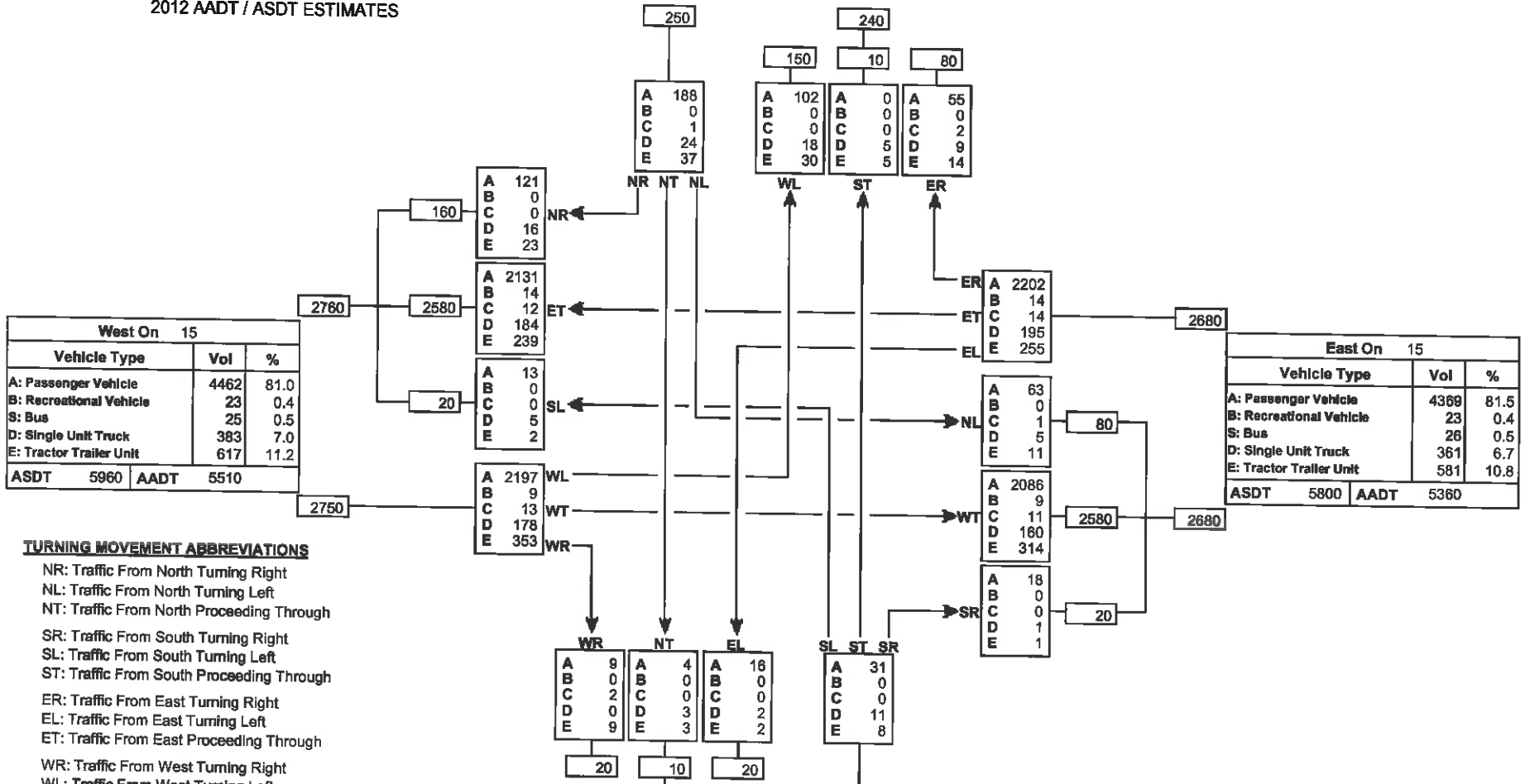
Reference No.: 70000533

Intersection of:

15 & RGE RD 202 22-55-20-400000000

2012 AADT / ASDT ESTIMATES

North On Rge Rd 202		
Vehicle Type	Vol	%
A: Passenger Vehicle	345	70.4
B: Recreational Vehicle	0	0.0
S: Bus	3	0.6
D: Single Unit Truck	56	11.4
E: Tractor Trailer Unit	86	17.6
ASDT	530	AADT 490



**TURNING MOVEMENT ABBREVIATIONS**

- NR: Traffic From North Turning Right
- NL: Traffic From North Turning Left
- NT: Traffic From North Proceeding Through
- SR: Traffic From South Turning Right
- SL: Traffic From South Turning Left
- ST: Traffic From South Proceeding Through
- ER: Traffic From East Turning Right
- EL: Traffic From East Turning Left
- ET: Traffic From East Proceeding Through
- WR: Traffic From West Turning Right
- WL: Traffic From West Turning Left
- WT: Traffic From West Proceeding Through

**TURNING MOVEMENT ABBREVIATIONS**

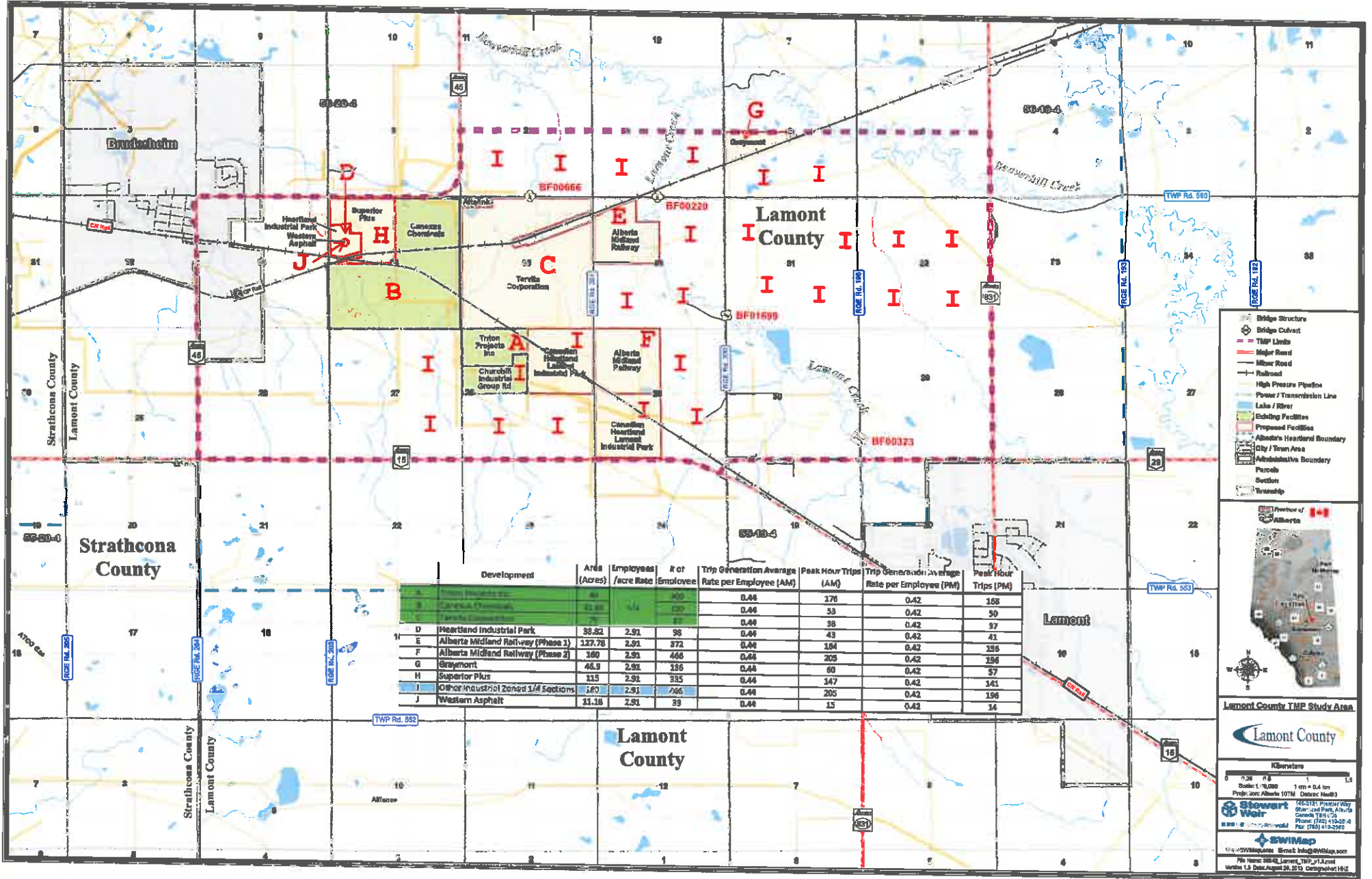
- AADT: Average Annual Daily Traffic  
Average daily traffic expressed as vehicles per day for period of January 1 to December 31 (365 days)
- ASDT: Average Summer Daily Traffic  
Average daily traffic expressed as vehicles per day for period of May 1 to September 30 (153 days)

South On Rge Rd 202		
Vehicle Type	Vol	%
A: Passenger Vehicle	60	60.0
B: Recreational Vehicle	0	0.0
S: Bus	2	2.0
D: Single Unit Truck	16	16.0
E: Tractor Trailer Unit	22	22.0
ASDT	110	AADT 100

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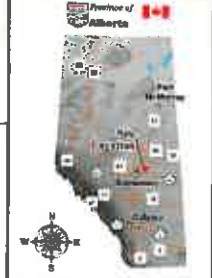
APPENDIX F – Trip Generation

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Development	Area (Acres)	Employees /acre Rate	# of Employee	Trip Generation Average Rate per Employee (AM)	Peak Hour Trips (AM)	Trip Generation Average Rate per Employee (PM)	Peak Hour Trips (PM)
A	30	300	9000	0.44	176	0.42	168
B	32.86	120	3945	0.44	53	0.42	50
C	77	77	2310	0.44	38	0.42	37
D Heartland Industrial Park	98.82	2.91	98	0.44	43	0.42	41
E Alberta Midland Railway (Phase 1)	127.78	2.91	372	0.44	164	0.42	156
F Alberta Midland Railway (Phase 2)	360	2.91	466	0.44	205	0.42	198
G Graymont	46.3	2.91	336	0.44	60	0.42	57
H Superior Plus	115	2.91	335	0.44	147	0.42	141
I Other industrial Zoned 1/4 Sections	160	2.91	466	0.44	205	0.42	196
J Western Asphalt	31.18	2.91	39	0.44	15	0.42	14

- Bridge Structure
- Bridge Culvert
- TMP Limits
- Major Road
- Minor Road
- Railroad
- High Pressure Pipeline
- Power / Transmission Line
- Lake / River
- Existing Facility
- Proposed Facilities
- Alberta's Heartland Boundary
- City / Town Area
- Administrative Boundary
- Parcels
- Section
- Township



Lamont County TMP Study Area

**Lamont County**

Kilometers  
0 0.5 1 1.5

Scale: 1:50,000 1 cm = 0.4 km  
 Projection: Alberta 10TM (Distance Measured)

**Stewart Waples**  
 140-2151, Provincial Hwy  
 Okotoks, Alberta  
 Canada T8A 1C4  
 Phone: (403) 419-8214  
 Fax: (403) 419-2268

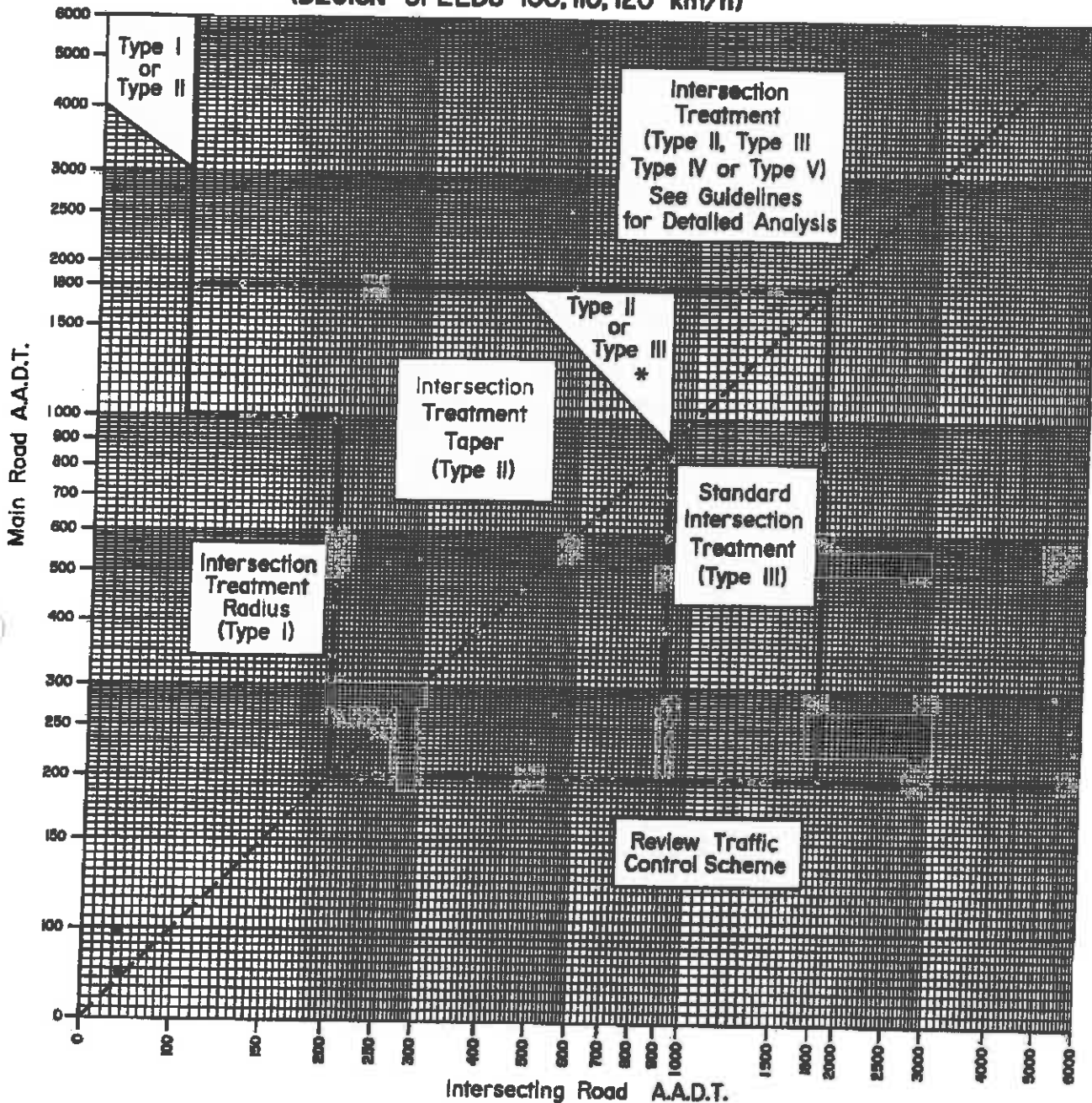
**SWMap**  
 www.swmap.com Email: info@swmap.com  
 File Name: 8884\_Lamont\_TWP\_1112.mxd  
 Version: 1.0 Date: August 26, 2013 City: Okotoks 1402

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**APPENDIX G – Intersection Treatment Analysis**

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FIGURE D-7.4 TRAFFIC VOLUME WARRANT CHART FOR AT-GRADE INTERSECTION TREATMENT ON TWO-LANE RURAL HIGHWAYS (DESIGN SPEEDS 100, 110, 120 km/h)



**Notes:**

1. If main road, or intersecting road, is <100 AADT provide Type I Intersection Treatment (15m radius), except as shown for the higher volume main roads on this chart (Type I or II zone) where engineering judgement may be used to select the appropriate treatment.
2. If main road is >4000 AADT Review Access Management  
 --- If Intersecting Road AADT is > Main Road AADT: Review Traffic Control Scheme
3. Use projected traffic volumes for design  
 Sloping line is defined by Main Road AADT x Intersecting Road AADT = 800,000

### Intersection Analysis

Main Rd Hwy 15 AM Peak  
Direction: EB to NB

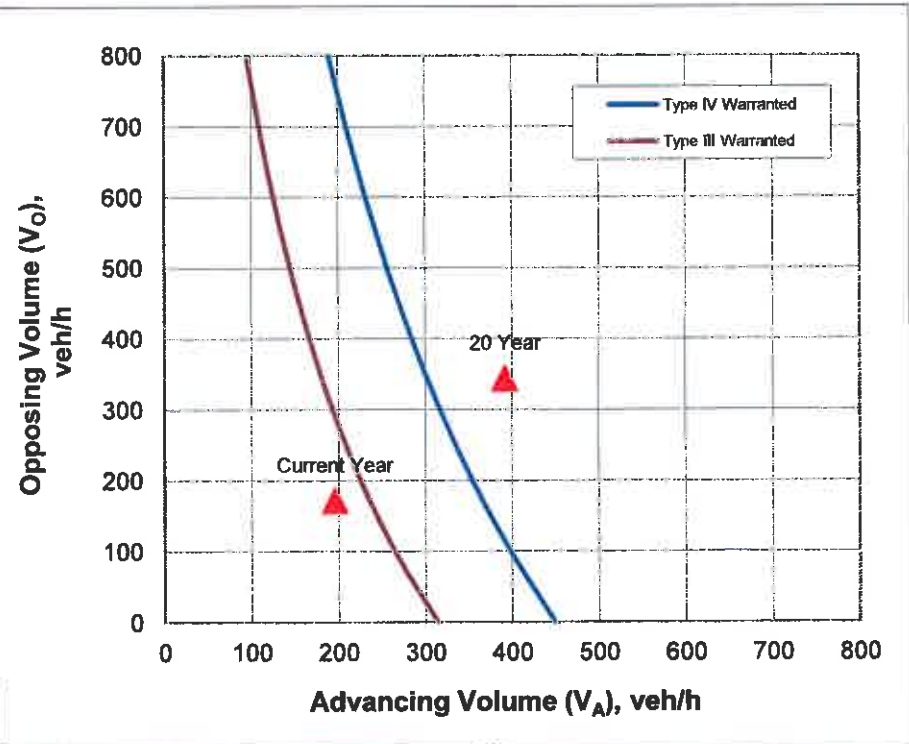
Minor Rd RR 203

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	9
Advancing volume ( $V_A$ ), veh/h:	196
Opposing volume ( $V_O$ ), veh/h:	172
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	4.6%	
20 year advancing volume, veh/h:	392	
20 year opposing volume, veh/h:	344	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	0.17%
	veh/h:	0.66
<b>Type II treatment warranted</b>		
<b>Type IV treatment warranted in year 20</b>		

### CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.9



# Intersection Analysis

Main Rd Hwy 15 PM Peak  
Direction: WB to SB

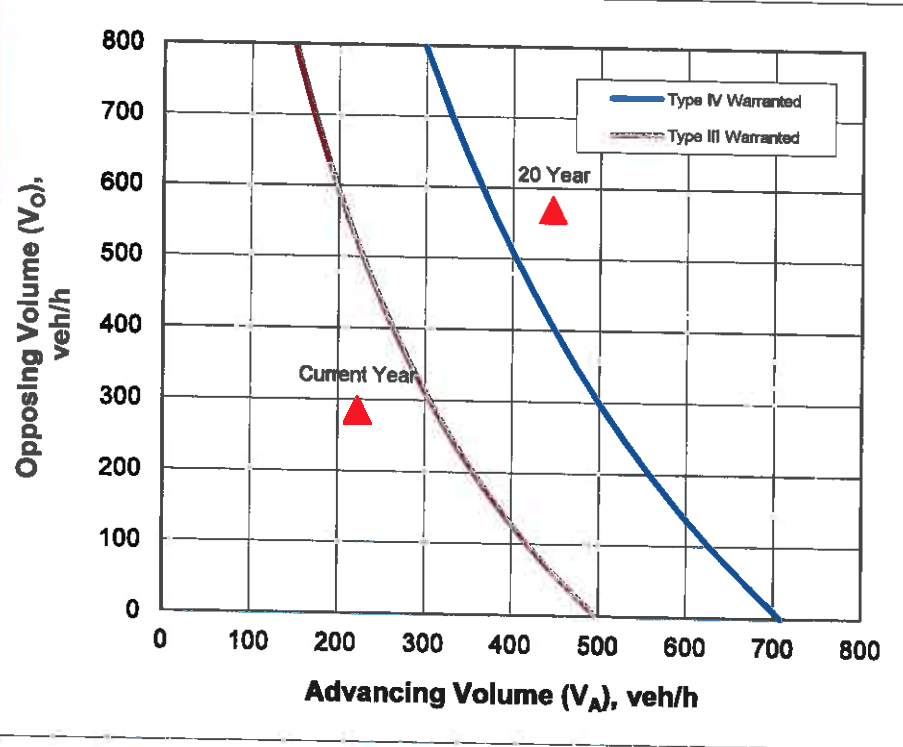
Minor Rd RR 201

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	4
Advancing volume ( $V_A$ ), veh/h:	223
Opposing volume ( $V_O$ ), veh/h:	285
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	1.8%	
20 year advancing volume, veh/h:	446	
20 year opposing volume, veh/h:	570	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	0.11%
	veh/h:	0.50
<b>Type II treatment warranted</b>		
<b>Type IV treatment warranted in year 20</b>		

## CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.9



### Intersection Analysis

Main Rd Hwy 29 PM Peak  
 Direction: EB to NB

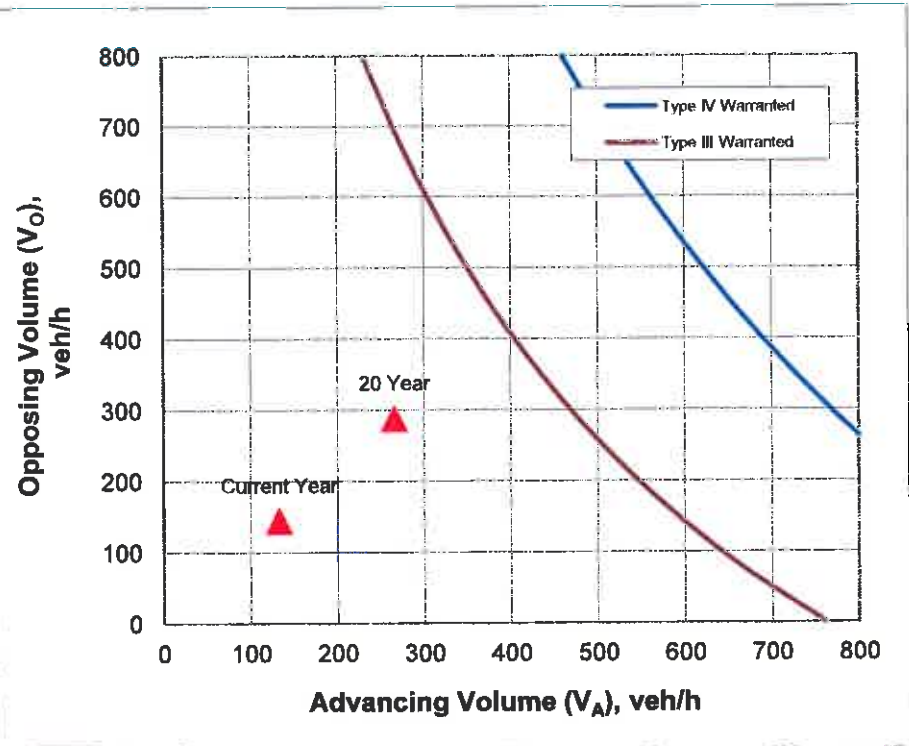
Minor Rd RR 200

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	1
Advancing volume ( $V_A$ ), veh/h:	133
Opposing volume ( $V_O$ ), veh/h:	144
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	0.8%	
20 year advancing volume, veh/h:	266	
20 year opposing volume, veh/h:	288	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	0.01%
	veh/h:	0.03
<b>Type II treatment warranted</b>		
<b>Type II treatment warranted in year 20</b>		

#### CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.9





# Intersection Analysis

Main Rd Hwy 45 AM Peak  
Direction: EB to NB

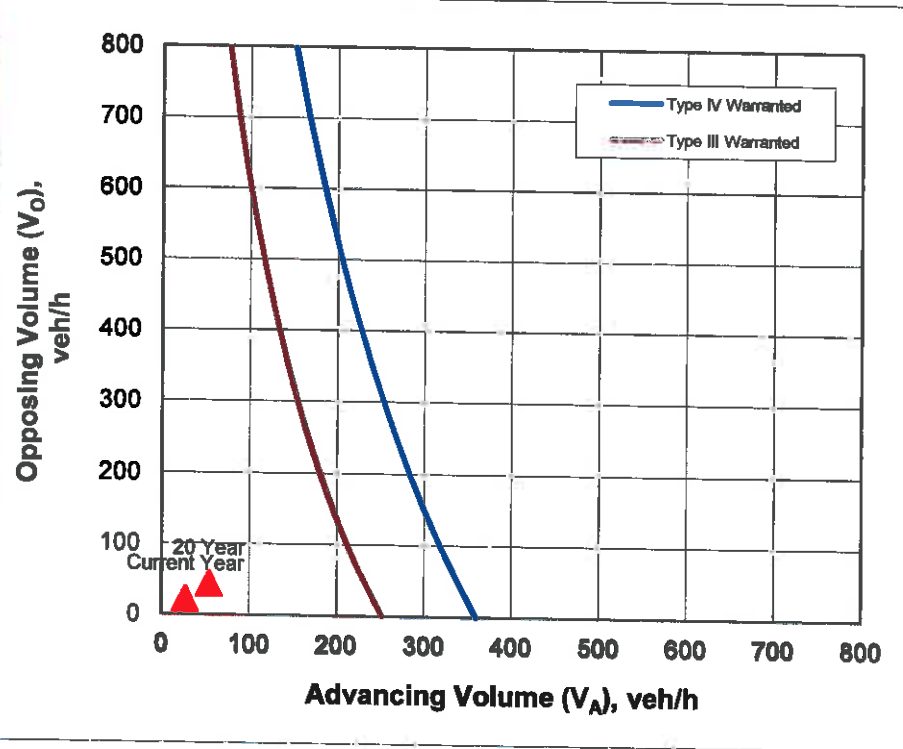
Minor Rd RR 203

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	2
Advancing volume ( $V_A$ ), veh/h:	27
Opposing volume ( $V_O$ ), veh/h:	22
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	7.4%	
20 year advancing volume, veh/h:	54	
20 year opposing volume, veh/h:	44	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	0.00%
	veh/h:	0.00
<b>Type II treatment warranted</b>		
<b>Type II treatment warranted in year 20</b>		

## CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.3



### Intersection Analysis

Main Rd Hwy 831 PM Peak  
 Direction: NB to WB

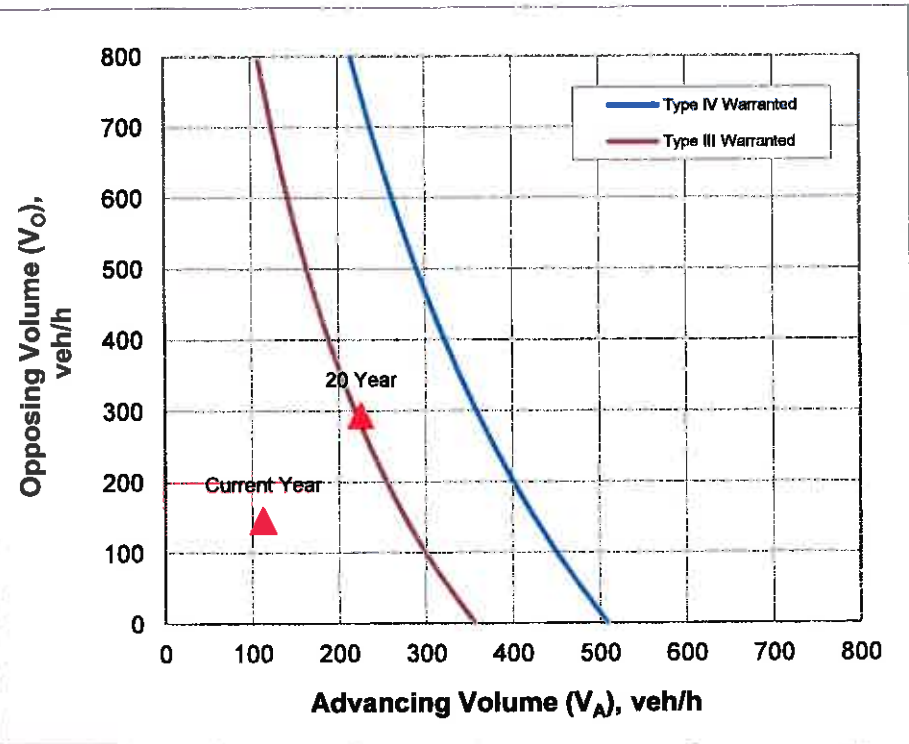
Minor Rd Twp Rd 560

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	4
Advancing volume ( $V_A$ ), veh/h:	113
Opposing volume ( $V_O$ ), veh/h:	147
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	3.5%	
20 year advancing volume, veh/h:	226	
20 year opposing volume, veh/h:	294	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	0.04%
	veh/h:	0.09
<b>Type II treatment warranted</b>		
<b>Type III treatment warranted in year 20</b>		

#### CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.9



# Intersection Analysis

Main Rd Hwy 15 AM Peak  
Direction: EB to NB

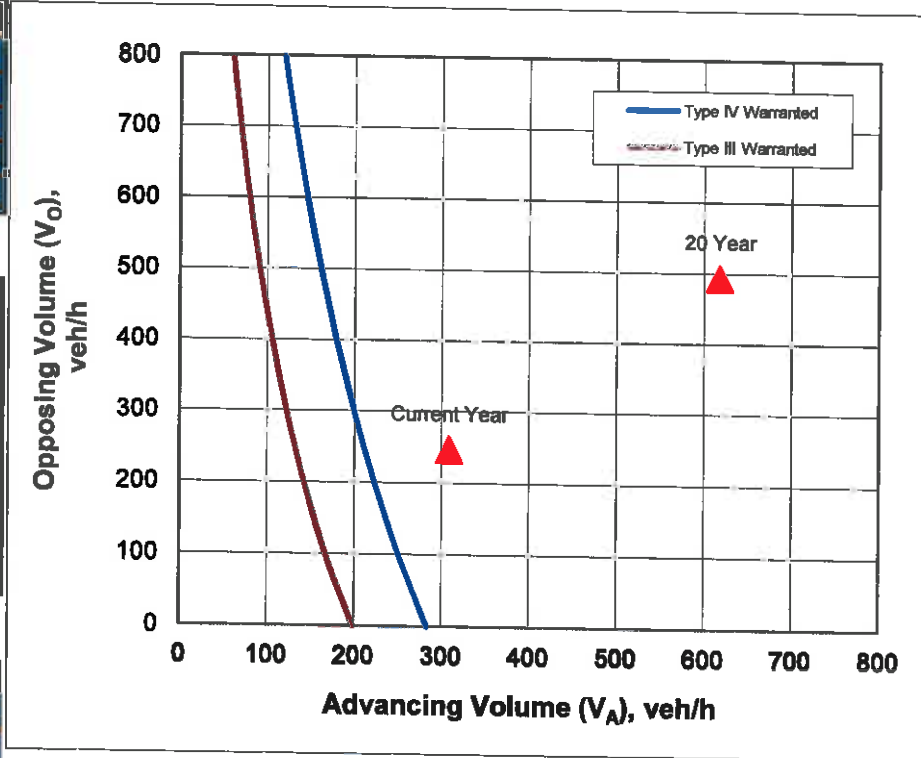
Minor Rd RR 202

INPUT	Value
85 <sup>th</sup> percentile speed, km/h:	110
Left turn volume ( $V_L$ ), veh/h:	39
Advancing volume ( $V_A$ ), veh/h:	309
Opposing volume ( $V_O$ ), veh/h:	247
Yearly Linear Growth Rate, %:	5.0%

OUTPUT	Value	
Percent of left-turns in advancing volume ( $V_L/V_A$ ), %:	12.6%	
20 year advancing volume, veh/h:	618	
20 year opposing volume, veh/h:	494	
Confidence:	99.42%	
Conflicts per hour:	% of advancing volume:	1.24%
	veh/h:	7.67
<b>Type IV treatment warranted</b>		
<b>Type IV treatment warranted in year 20</b>		

## CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time to clear, s:	1.9



Summary of Intersection Warrant Analysis		
Intersection	Current Type	20 yr Warrant
RR 203 & Hwy 15	1	4
RR 203 & Hwy 45	1	2
RR 202 & Hwy 15	4	4
RR 202 & Twp Rd 560	1	1
RR 201 & Hwy 15	1	4
RR 201 & Twp Rd 560	1	1
RR 200 & Hwy 29	1	2
RR 200 & Twp Rd 560	1	1
RR 195 & Hwy 29	1	2
RR 195 & Twp Rd 560	1	1
Twp Rd 560 & Hwy 831	1	3