Appendix N
Roundabout Analysis

Region of Peel
Roundabout Feasibility Screening Tool for
Mississauga Road at Old Base Line Road

		Roundabout Supportive?
1)	Project name, File #, Intersection Location (B/C/M, Street name, distance from major intersections, etc.): Belfountain EA (6776) – Intersection of Mississauga Road (Regional Road 1) at Old Base Line Road (Regional Road 12), in the Municipality of Caledon.	
2)	Brief description of Intersection (No. of legs, Lanes on each leg, Total AADT, ADDT on each road). Attach or sketch a diagram of existing and horizon year TMCs: 4 Legs. Each leg has one lane per direction. Total AADT: 5150; Mississauga Road AADT: 2850; Old Base Line Road AADT 2230. Attached is a diagram containing Existing, 2021, and 2031 weekday AM and PM peak hour volumes.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
3)	What operational problems are being experienced at this location? Existing and future traffic operations are acceptable. Possible sight line issues from Old Base Line Road. Collision history could be considered as well.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
4)	Is it a new intersection or a retrofit of an existing intersection? If existing, what is the existing type of traffic control? Existing intersection – TWSC for Old Base Line Road.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

5)	Is the intersection near a major intersection or a railroad crossing? If so, how close and what type of traffic control exists at the adjacent intersection(s)? Will queues be a problem? Describe the corridor (eg.: average intersection spacing). No. Nearest major intersection is >1km away. Queues are not expected to be a problem.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
6)	Would the intersection be located within a coordinated signal network? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
7)	Would the intersection be located on a preferred roundabout corridor? If yes why? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
8)	What is the collision history of the intersection over the past five years? Is there a collision problem that needs to be addressed? There have been 10 reported collisions at this intersection over the past five years (9 Property Damage Only and 1 Non-Fatal Injury).	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
9)	Is the intersection scheduled for improvements or is it located within a corridor that is scheduled for improvements in the next 10 years? What is the ultimate cross-section of the approaching legs? Intersection currently under review as part of the Belfountain EA. Ultimate cross-section for approaching legs to remain at two lanes (one lane per direction).	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

10)	Are there expected to be special users at this intersection in the near future (ie. a person with disability, pedestrians, cyclists, large agricultural machinery, horses, etc.)? If yes, what special considerations would be required? Potential for Cyclists, large agricultural machinery, and horses. Special considerations such as paved shoulders for cyclist may be implemented.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
11)	What traditional improvements are proposed for this intersection (traffic signals, all-way stop, auxiliary lanes, off-set re-alignment, etc)? No traditional improvements are proposed for this intersection.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
12)	If traffic signals are considered, does it meet the warrant for the horizon year? Signal warrant analysis shows that traffic signals are not warranted at this intersection under Existing, 2021, and 2031 traffic conditions.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
13)	What size of roundabout is being considered for this intersection (ie. single, two, three lane entry)? Please attach a Traffic Flow Worksheet, a lane configuration diagram and a sketch of how a roundabout would fit into the ROW. Single lane roundabout (ICD of 45m) with single lane entries and exits is proposed. Traffic flow worksheets (for Existing, 2021, and 2031 AM and PM peak hours) and a sketch of roundabout are attached.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
14)	Are there property constraints at/near the intersection or is it restricted by a watercourse/parks/cemeteries/etc? If yes, what are they? Intersection surrounded by rural forest - potential for some tree removal. Minor property impact in north-west quadrant.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

15) Terrain – Is the area on a grade/flat/rolling?

Rural – approaches rolling but level at intersection. Roundabout would be acceptable.

YES ☒
NO ☐
NEUTRAL ☐

16) 20 Year Life Cycle Cost Estimate

Injury Collision Cost (ICC): $30,000

Discount Rate (i): 6%

YES ☒
NO ☐
NEUTRAL ☐

20 YEAR LIFE- CYCLE COST COMPARISON		
Cost Item	Other Traffic Control	Roundabout
Implementation Cost	$100,000	$750,000
Injury Collision Cost (Present Value)	$7,052,162	$3,526,081
Total Life Cycle Cost	$7,152,162	$4,276,081

Notes:

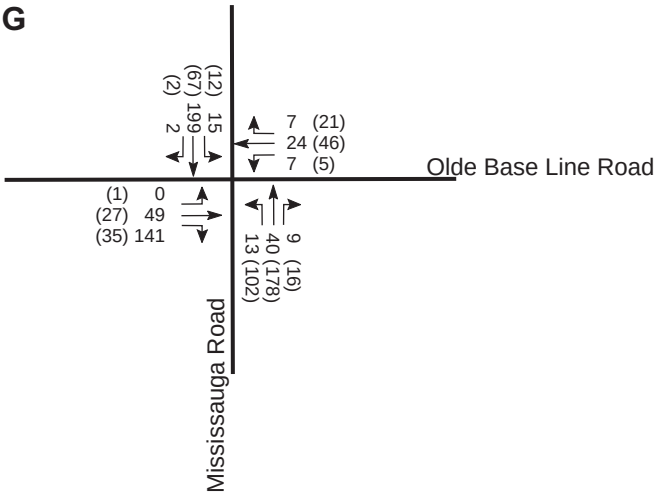
- Implementation Cost
  = sum of costs for construction, property, utility relocation, illumination, engineering (20%), contingency (20%) and maintenance (5%)
- Present Value of 20 Year Injury Collision Cost
  = expected annual collision frequency x ICC $((1+i)^{20}-1)/i(1+i)^{20}$
- Monte Carlo Analysis may be required. If so, a range for the implementation cost (i.e. 10%, 50%, 90% probability) is required

17) Conclusions and Recommendations:

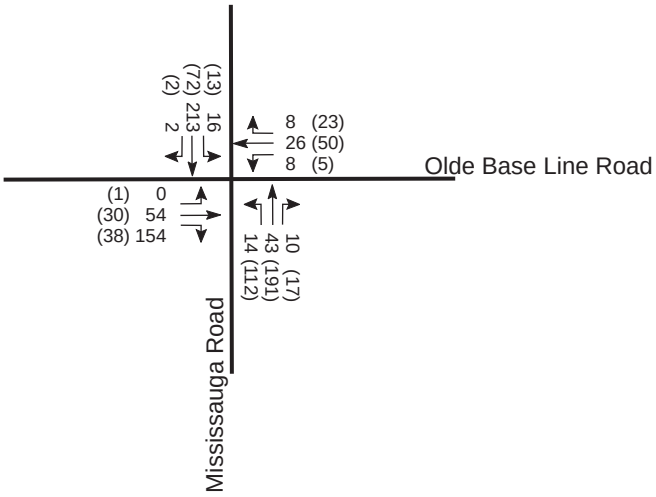
Although operations at this intersection are satisfactory and no future improvements are required, a roundabout could be considered due to the high number of collisions.

YES ☒
NO ☐

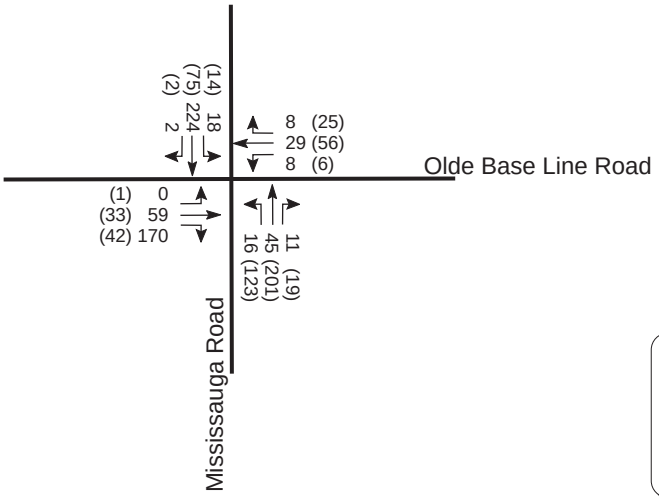
EXISTING



2021



2031



Legend

Turning Movements

18 (56) AM (PM) Peak Hour Traffic Volumes

Mississauga Road at Old Base Line Road
Existing and Future Turning Movements

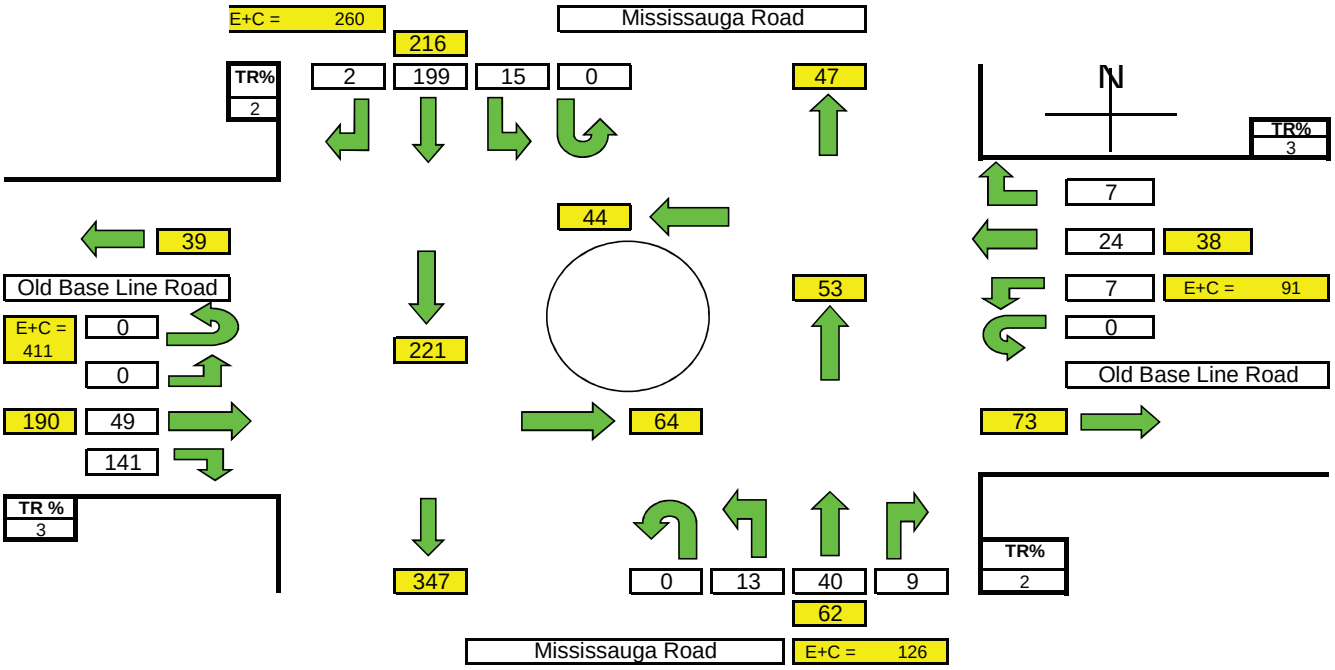
Not To Scale

March 2013

REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 1 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: Existing AM

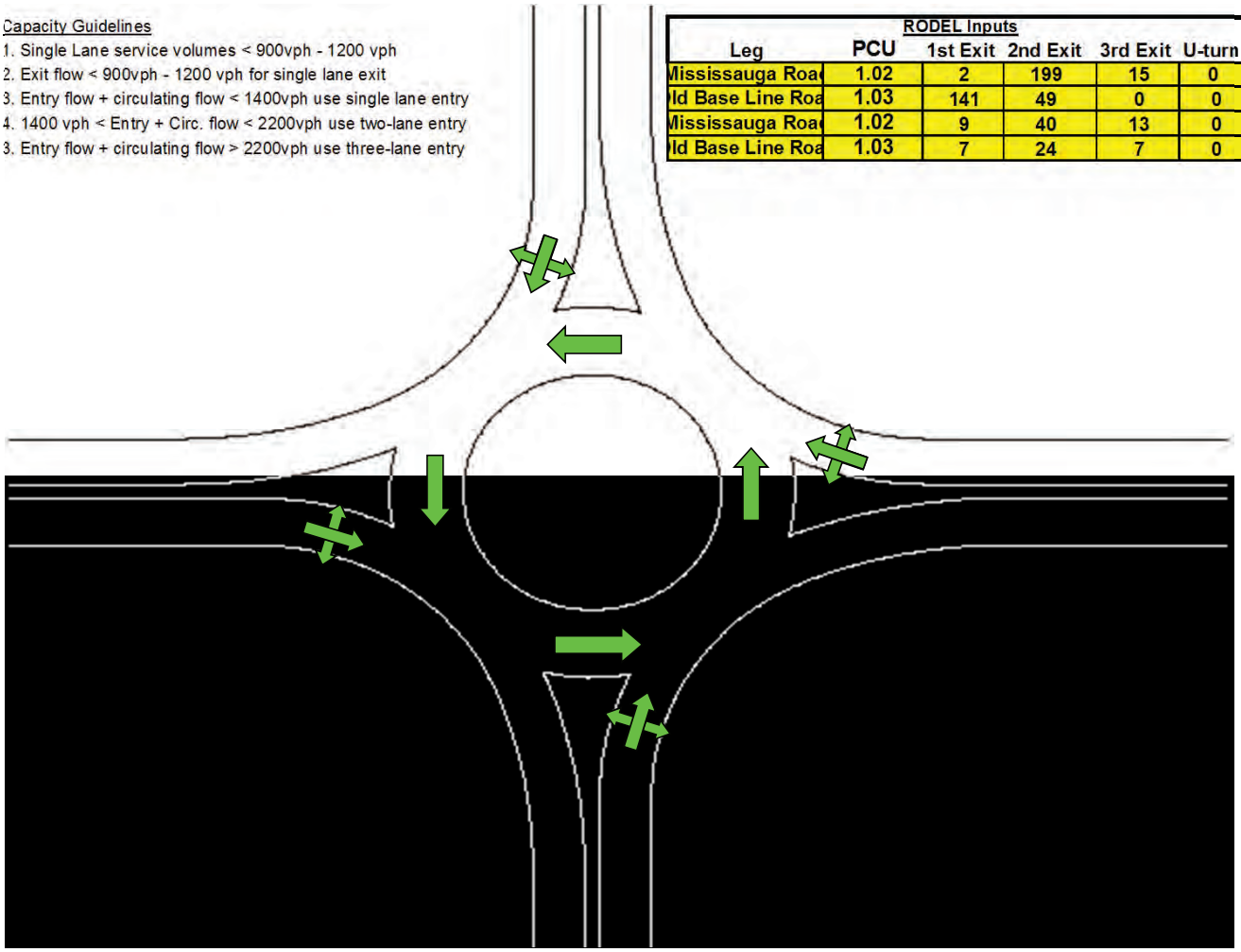


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

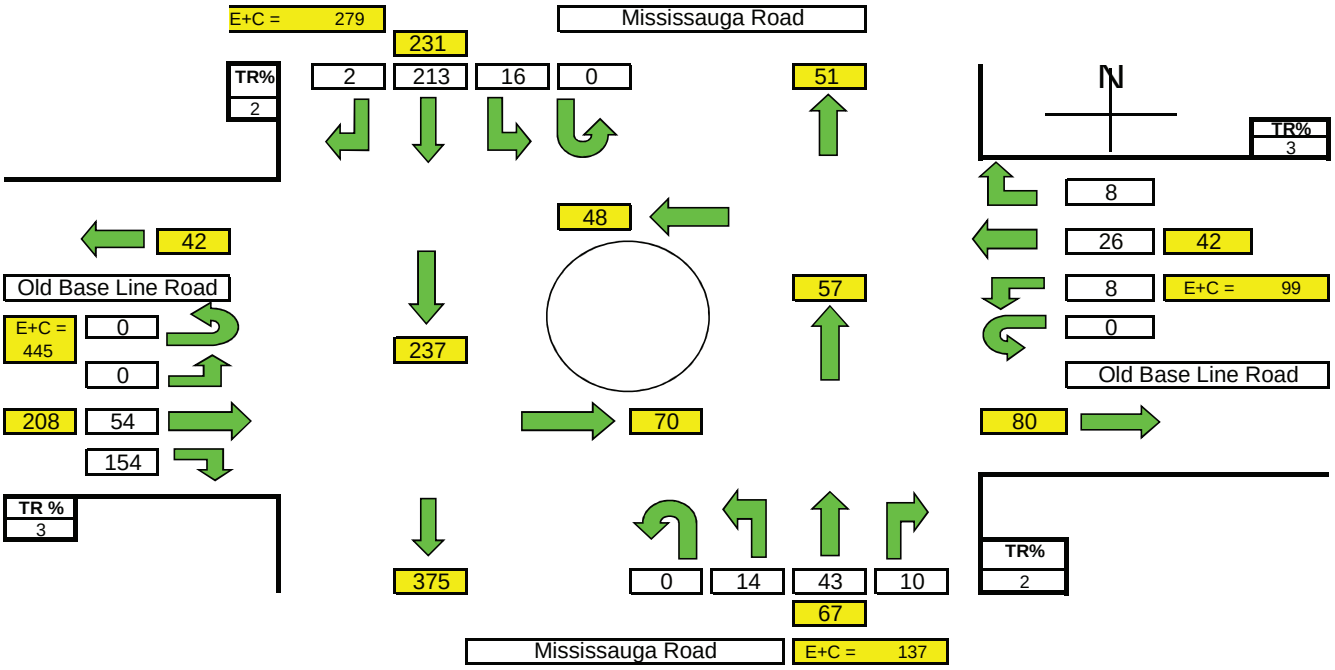
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.02	2	199	15	0
ld Base Line Roa	1.03	141	49	0	0
Mississauga Roa	1.02	9	40	13	0
ld Base Line Roa	1.03	7	24	7	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 2 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: 2021 AM



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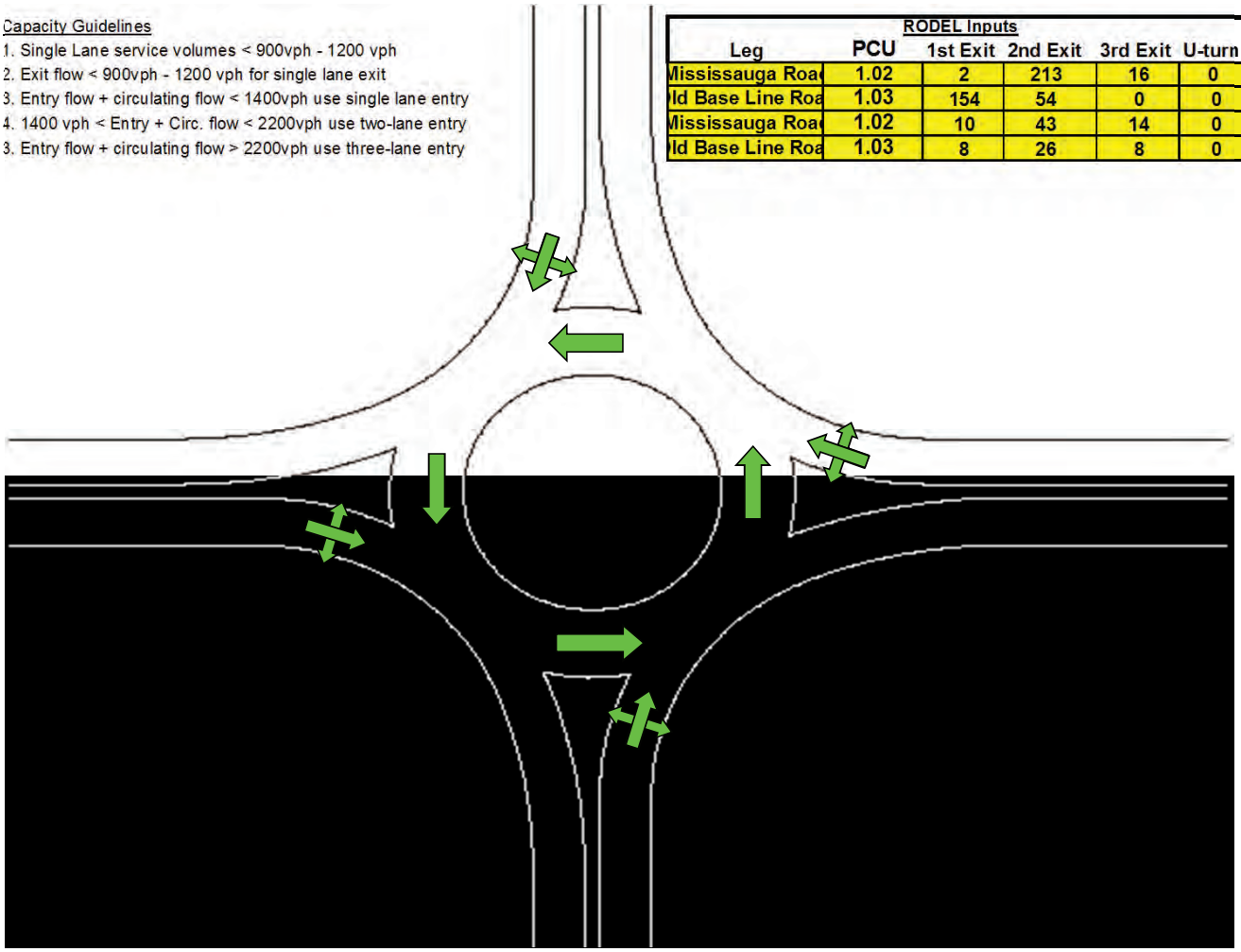
RODEL Inputs

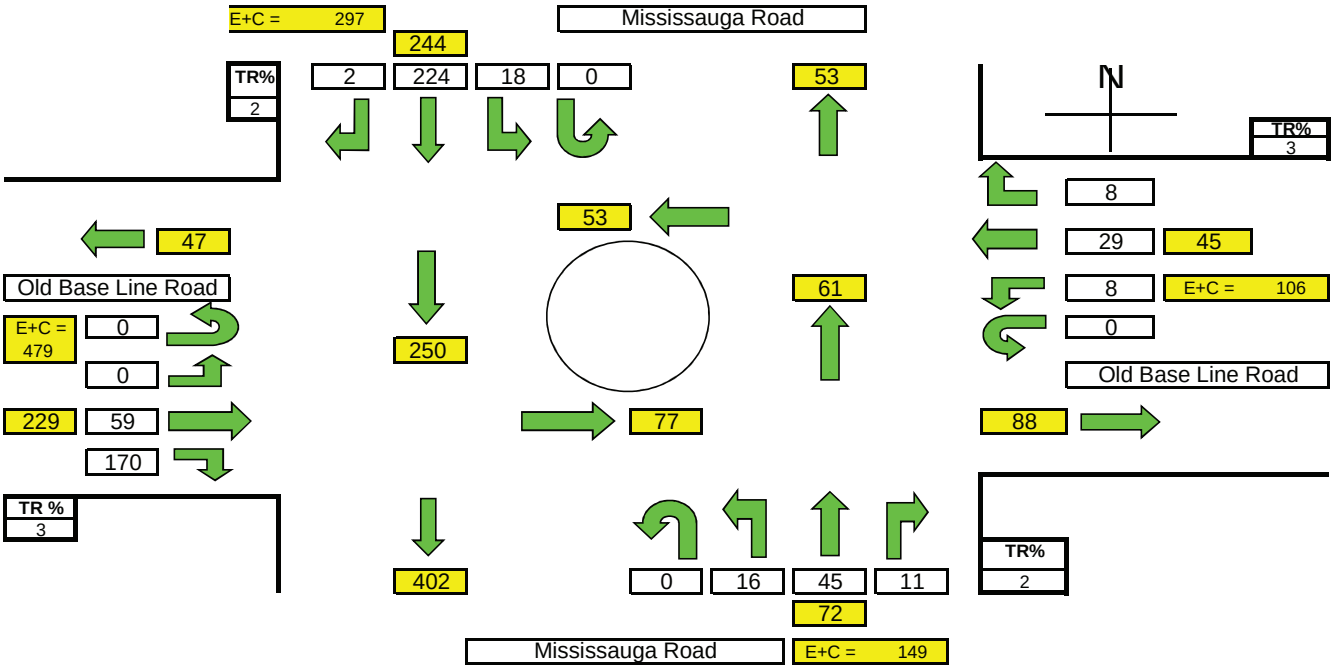
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.02	2	213	16	0
ld Base Line Roa	1.03	154	54	0	0
Mississauga Roa	1.02	10	43	14	0
ld Base Line Roa	1.03	8	26	8	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 3 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: 2031 AM



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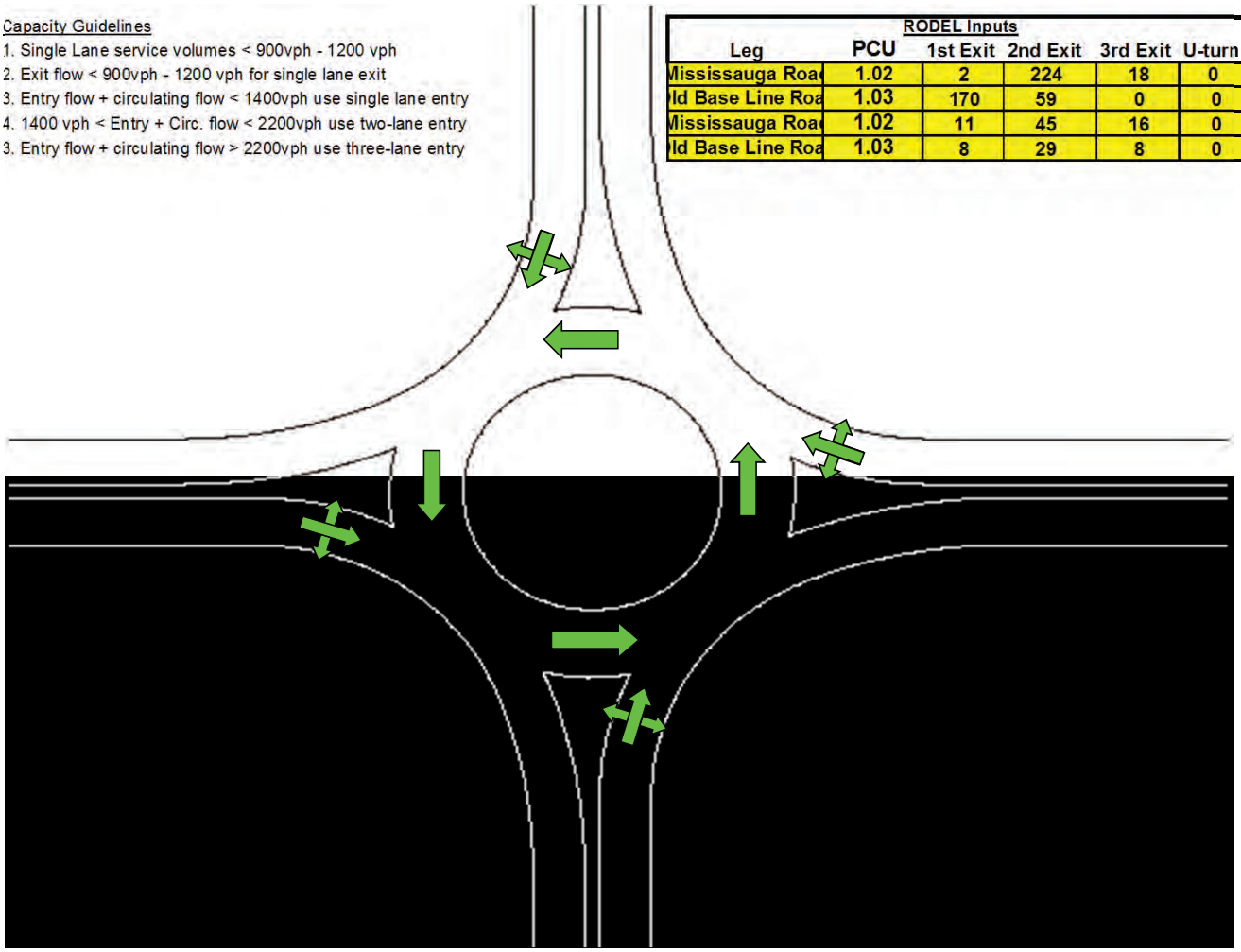
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

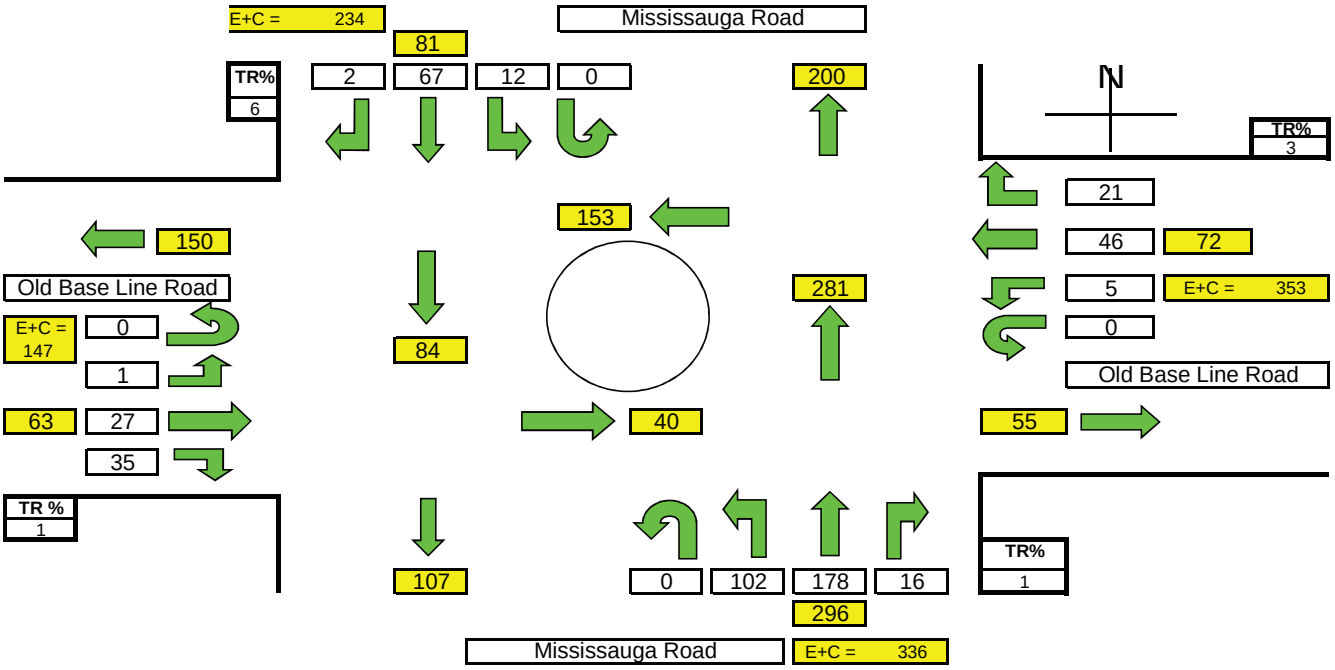
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.02	2	224	18	0
ld Base Line Roa	1.03	170	59	0	0
Mississauga Roa	1.02	11	45	16	0
ld Base Line Roa	1.03	8	29	8	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 4 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: Existing PM



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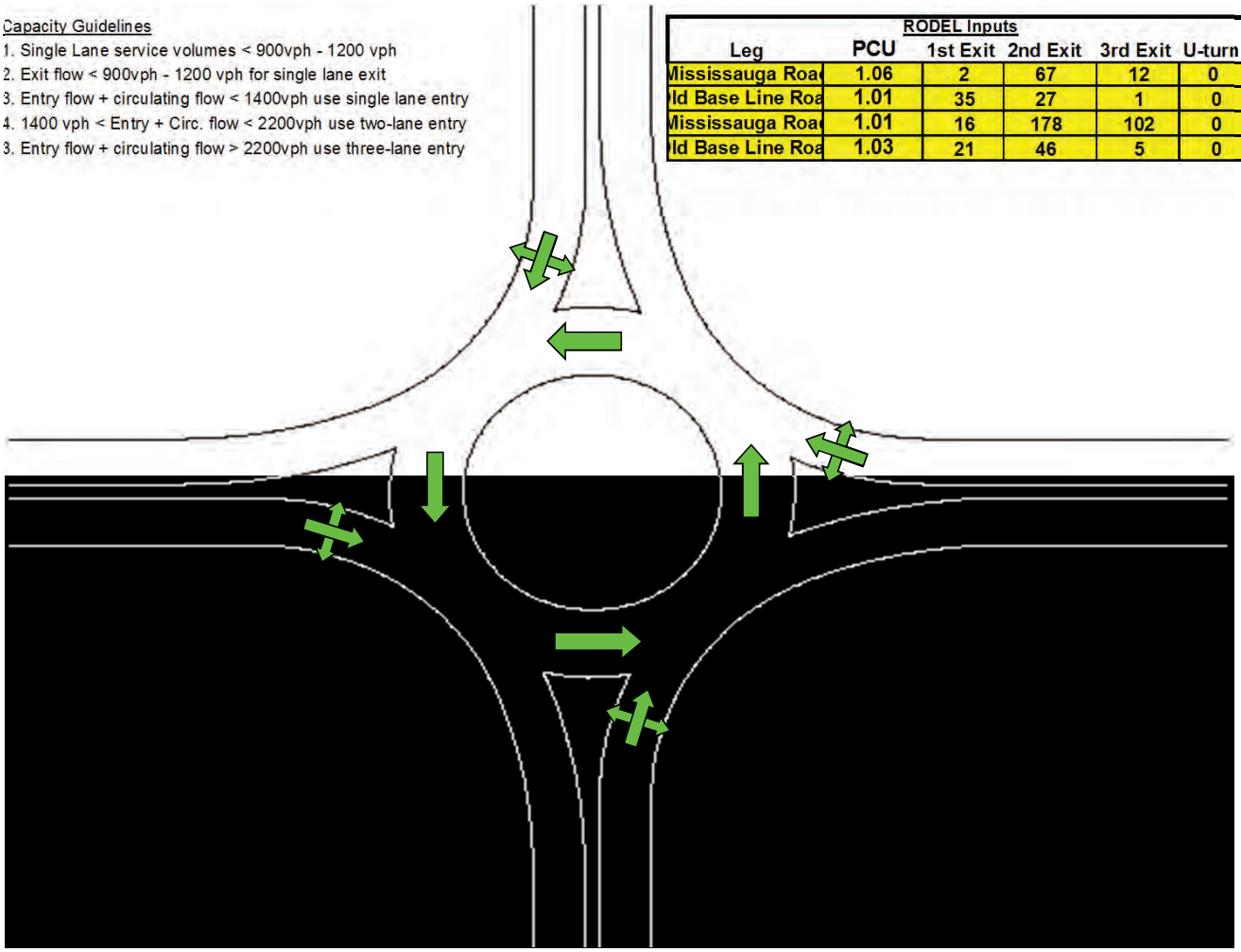
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

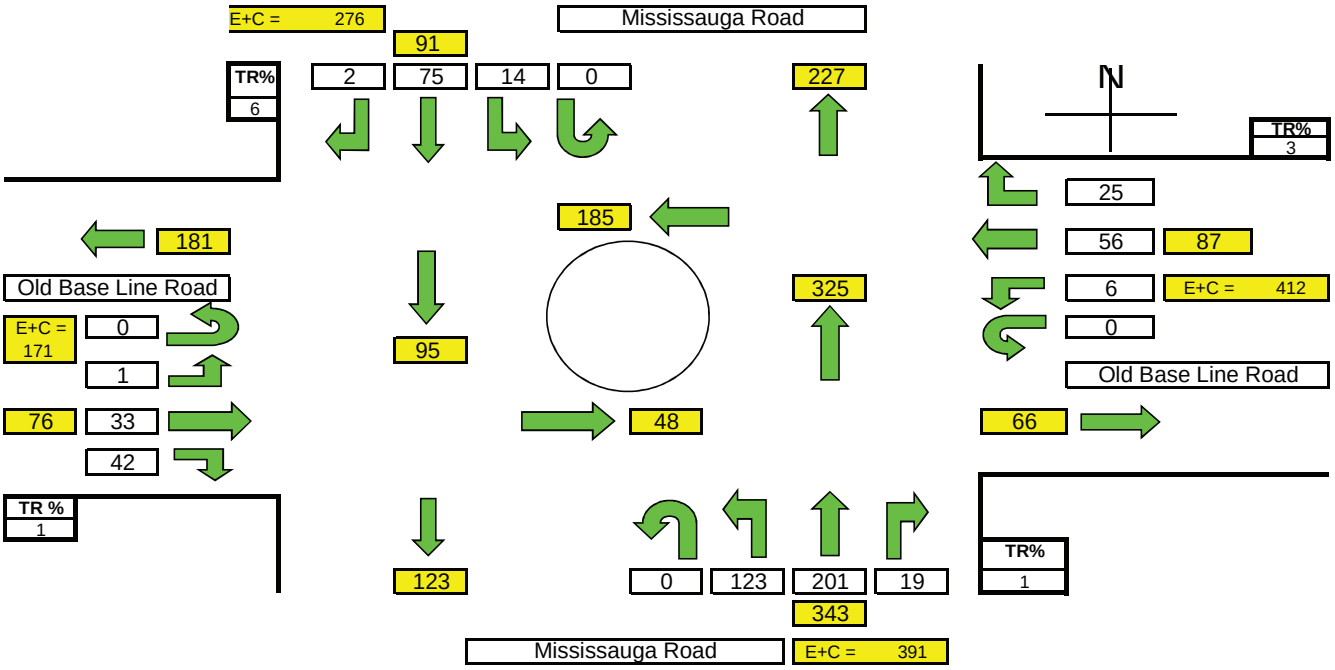
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.06	2	67	12	0
ld Base Line Roa	1.01	35	27	1	0
Mississauga Roa	1.01	16	178	102	0
ld Base Line Roa	1.03	21	46	5	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 6 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: 2031 PM



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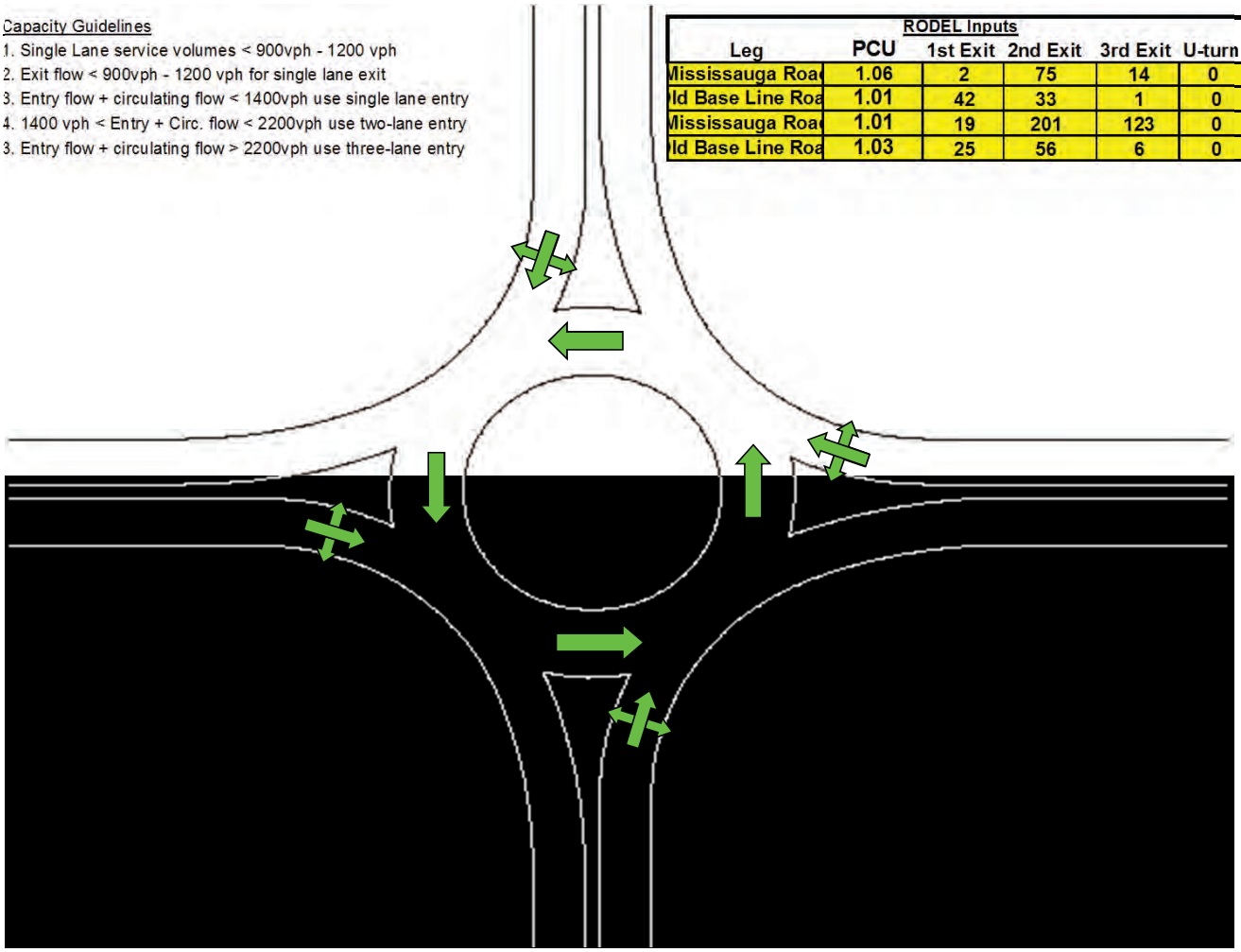
RODEL Inputs

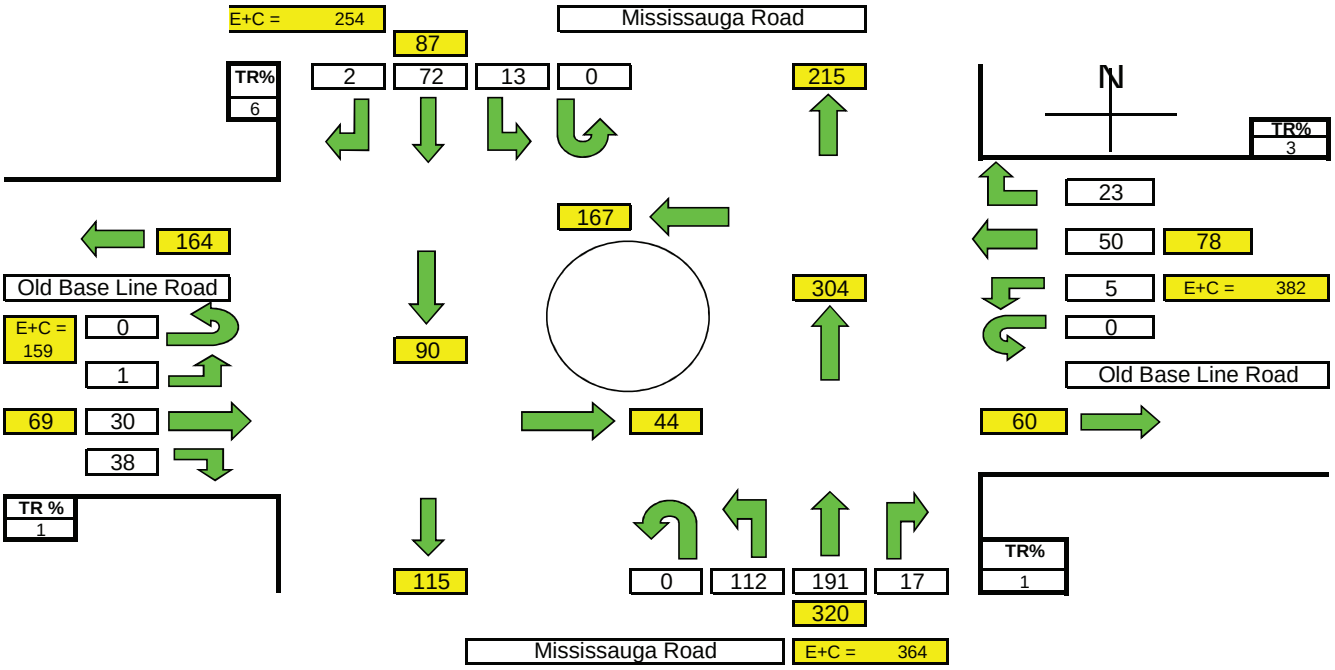
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.06	2	75	14	0
ld Base Line Roa	1.01	42	33	1	0
Mississauga Roa	1.01	19	201	123	0
ld Base Line Roa	1.03	25	56	6	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 5 **of** 6
Intersection: Mississauga Rd. @ Old Base Line Rd.
Time Period: 2021 PM



Capacity Guidelines

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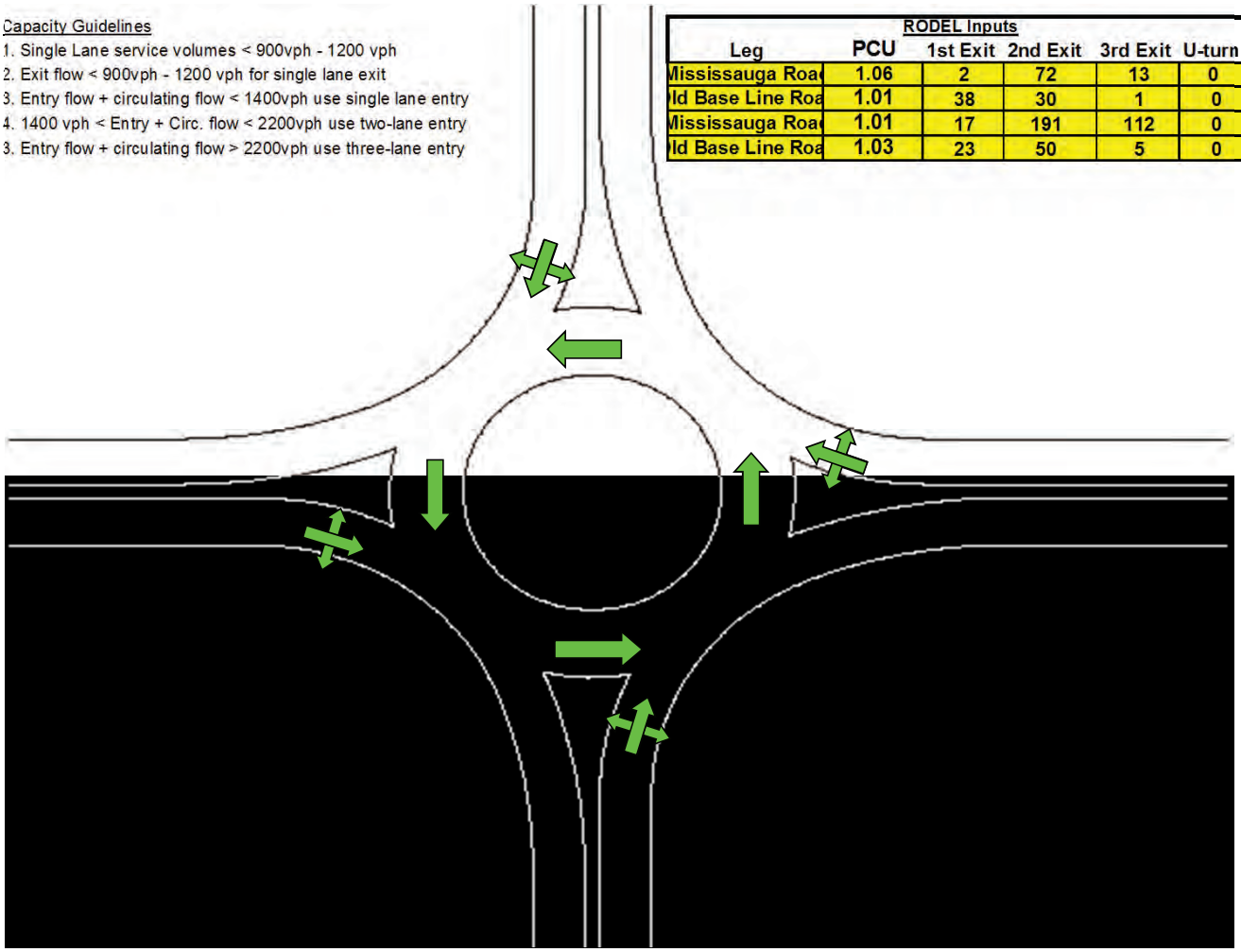
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Mississauga Roa	1.06	2	72	13	0
ld Base Line Roa	1.01	38	30	1	0
Mississauga Roa	1.01	17	191	112	0
ld Base Line Roa	1.03	23	50	5	0



MISSISSAUGA ROAD

OLDE BASE LINE ROAD

ICD=45m

142580156

MISSISSAUGA ROAD
AT OLDE BASE LINE
PRELIMINARY
ROUNDABOUT LAYOUT
SCALE: 1:1000

20 year Present Value Injury Collision Costs - Existing unsignalized or future intersections

Mississauga Rd at Old Base Line Road

AADT	5150
Injury Collision Rate	1.06
ACIF	1.992535
ICC	30000
i	0.06
Pvsig	$7,052,162
PVrd	$3,526,081

Implementation Costs

Signal	$100,000
Roundabout	$750,000

Total Life Cycle Costs

Signals	$7,152,162
Roundabout	$4,276,081
Diff	-$2,876,081

ARCADY 8

Filename: Mississauga Road at Olde Base Line Road.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool\Miss at OBL
Report generation date: 3/21/2013 1:55:55 PM

Summary of intersection performance

	AM												
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	
	A1 - 2021												
Olde Base Line East	0.03	?	2.89	0.03	A	3.40	A	258% [Olde Base Line West]	0.07	?	3.37	0.07	
Mississasuga North	0.22	?	3.36	0.18	A				0.08	?	3.27	0.07	
Olde Base Line West	0.21	?	3.69	0.18	A				0.06	?	2.95	0.05	
Mississauga South	0.05	?	2.94	0.05	A				0.32	?	3.61	0.24	
	A1 - 2031												
Olde Base Line East	0.04	?	2.91	0.04	A	3.47	A	231% [Olde Base Line West]	0.08	?	3.44	0.08	
Mississasuga North	0.23	?	3.41	0.19	A				0.08	?	3.31	0.08	
Olde Base Line West	0.24	?	3.81	0.19	A				0.06	?	2.97	0.06	
Mississauga South	0.06	?	2.96	0.06	A				0.35	?	3.70	0.26	
	A1 - Existing												
Olde Base Line East	0.03	?	2.88	0.03	A	3.33	A	289% [Olde Base Line West]	0.07	?	3.31	0.06	
Mississasuga North	0.20	?	3.30	0.17	A				0.07	?	3.23	0.07	
Olde Base Line West	0.19	?	3.59	0.16	A				0.05	?	2.93	0.05	
Mississauga South	0.05	?	2.92	0.05	A				0.29	?	3.51	0.22	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

"D1 - Existing, AM" model duration: 8:00 AM - 9:00 AM

"D2 - 2021, AM" model duration: 8:00 AM - 9:00 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:00 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:00 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:00 PM
"D6 - 2031, PM " model duration: 5:00 PM - 6:00 PM

Run using ARCADY 8.0.0.296 at 3/21/2013 1:55:33 PM

File summary

File Description

Title	Belfountain EA Roundabout Analysis
Location	Region of Peel
Site Number	
Date	11/13/2012
Version	
Status	(new file)
Identifier	
Client	Region of Peel
Jobnumber	6776
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓	✓	Delay	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		DIRECT	08:00	09:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.33	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	289	Olde Base Line West

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	
Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)

Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	**Olde Base Line East**	38.00	39.14	N/A	N/A
08:00-09:00	**Mississasuga North**	216.00	220.32	N/A	N/A
08:00-09:00	**Olde Base Line West**	190.00	195.70	N/A	N/A
08:00-09:00	**Mississauga South**	62.00	63.24	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.03	2.88	0.03	?	A	38.00	38.00	1.81	2.86	0.03	1.81	2.86
Mississasuga North	0.17	3.30	0.20	?	A	216.00	216.00	11.81	3.28	0.20	11.81	3.28

Olde Base Line West	0.16	3.59	0.19	?	A	190.00	190.00	11.29	3.57	0.19	11.30	3.57
Mississauga South	0.05	2.92	0.05	?	A	62.00	62.00	3.00	2.91	0.05	3.00	2.91

(Default Analysis Set) - 2021, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2021, AM	2021	AM		DIRECT	08:00	09:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.40	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	258	Olde Base Line West

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	

Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	Olde Base Line East	42.00	43.26	N/A	N/A
08:00-09:00	Mississasuga North	231.00	235.62	N/A	N/A
08:00-09:00	Olde Base Line West	208.00	214.24	N/A	N/A
08:00-09:00	Mississauga South	67.00	68.34	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.03	2.89	0.03	?	A	42.00	42.00	2.01	2.88	0.03	2.02	2.88
Mississasuga North	0.18	3.36	0.22	?	A	231.00	231.00	12.83	3.33	0.21	12.83	3.33
Olde Base Line West	0.18	3.69	0.21	?	A	208.00	208.00	12.71	3.67	0.21	12.71	3.67
Mississauga South	0.05	2.94	0.05	?	A	67.00	67.00	3.27	2.93	0.05	3.27	2.93

(Default Analysis Set) - 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, AM	2031	AM		DIRECT	08:00	09:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.47	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	231	Olde Base Line West

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	
Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	Olde Base Line East	45.00	46.35	N/A	N/A
08:00-09:00	Mississasuga North	244.00	248.88	N/A	N/A
08:00-09:00	Olde Base Line West	229.00	235.87	N/A	N/A
08:00-09:00	Mississauga South	72.00	73.44	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.04	2.91	0.04	?	A	45.00	45.00	2.17	2.89	0.04	2.17	2.89
Mississasuga North	0.19	3.41	0.23	?	A	244.00	244.00	13.76	3.38	0.23	13.76	3.38
Olde Base Line West	0.19	3.81	0.24	?	A	229.00	229.00	14.40	3.77	0.24	14.41	3.77
Mississauga South	0.06	2.96	0.06	?	A	72.00	72.00	3.54	2.95	0.06	3.54	2.95

(Default Analysis Set) - Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.37	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	296	Mississauga South

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	
Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	Olde Base Line East	72.00	74.16	N/A	N/A
17:00-18:00	Mississasuga North	81.00	85.86	N/A	N/A
17:00-18:00	Olde Base Line West	63.00	63.63	N/A	N/A
17:00-18:00	Mississauga South	296.00	298.96	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.06	3.31	0.07	?	A	72.00	72.00	3.95	3.29	0.07	3.95	3.29
Mississasuga North	0.07	3.23	0.07	?	A	81.00	81.00	4.33	3.21	0.07	4.33	3.21
Olde Base Line West	0.05	2.93	0.05	?	A	63.00	63.00	3.05	2.91	0.05	3.05	2.91
Mississauga South	0.22	3.51	0.29	?	A	296.00	296.00	17.19	3.48	0.29	17.19	3.49

(Default Analysis Set) - 2021, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2021, PM	2021	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.44	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	266	Mississauga South

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	
Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	Olde Base Line East	78.00	80.34	N/A	N/A
17:00-18:00	Mississasuga North	87.00	92.22	N/A	N/A
17:00-18:00	Olde Base Line West	69.00	69.69	N/A	N/A
17:00-18:00	Mississauga South	320.00	323.20	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.07	3.37	0.07	?	A	78.00	78.00	4.35	3.35	0.07	4.35	3.35
Mississasuga North	0.07	3.27	0.08	?	A	87.00	87.00	4.71	3.25	0.08	4.71	3.25
Olde Base Line West	0.05	2.95	0.06	?	A	69.00	69.00	3.37	2.93	0.06	3.37	2.93
Mississauga South	0.24	3.61	0.32	?	A	320.00	320.00	19.07	3.58	0.32	19.07	3.58

(Default Analysis Set) - 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship

2031, PM	2031	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Mississauga at Olde Base Line	Roundabout	1,2,3,4				3.51	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	241	Mississauga South

Legs

Legs

Name	Name	Description
Olde Base Line East	Olde Base Line East	
Mississasuga North	Mississasuga North	
Olde Base Line West	Olde Base Line West	
Mississauga South	Mississauga South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Olde Base Line East	0.00	99999.00		0.00
Mississasuga North	0.00	99999.00		0.00
Olde Base Line West	0.00	99999.00		0.00
Mississauga South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Olde Base Line East	3.50	4.50	30.00	20.00	40.00	25.00	
Mississasuga North	3.50	4.50	30.00	20.00	40.00	25.00	
Olde Base Line West	3.50	4.50	30.00	20.00	40.00	25.00	
Mississauga South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Olde Base Line East	None
Mississasuga North	None
Olde Base Line West	None
Mississauga South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Olde Base Line East		(calculated)	(calculated)	0.579	1357.445
Mississasuga North		(calculated)	(calculated)	0.579	1357.445
Olde Base Line West		(calculated)	(calculated)	0.579	1357.445
Mississauga South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Olde Base Line East	DIRECT	✓	N/A	100.000
Mississasuga North	DIRECT	✓	N/A	100.000
Olde Base Line West	DIRECT	✓	N/A	100.000
Mississauga South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	Olde Base Line East	87.00	89.61	N/A	N/A
17:00-18:00	Mississasuga North	91.00	96.46	N/A	N/A
17:00-18:00	Olde Base Line West	76.00	76.76	N/A	N/A
17:00-18:00	Mississauga South	343.00	346.43	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Olde Base Line East	0.08	3.44	0.08	?	A	87.00	87.00	4.95	3.42	0.08	4.95	3.42

Mississasuga North	0.08	3.31	0.08	?	A	91.00	91.00	4.99	3.29	0.08	4.99	3.29
Olde Base Line West	0.06	2.97	0.06	?	A	76.00	76.00	3.74	2.96	0.06	3.74	2.96
Mississauga South	0.26	3.70	0.35	?	A	343.00	343.00	20.96	3.67	0.35	20.97	3.67

Region of Peel
Roundabout Feasibility Screening Tool for
Winston Churchill Boulevard and Bush Street

		Roundabout Supportive?
1)	Project name, File #, Intersection Location (B/C/M, Street name, distance from major intersections, etc.): Belfountain EA – Winston Churchill Boulevard (RR 19) at Bush Street (RR 11). Next major intersection is Bush Street (RR 11) at Old Main Street (RR 1) - approximately 2.1 km to the east.	
2)	Brief description of Intersection (No. of legs, Lanes on each leg, Total AADT, ADDT on each road). Attach or sketch a diagram of existing and horizon year TMCs: Currently a staggered intersection – WCB South at Bush in Peel region is 3 legged. Approximately 85m to the west is WCB North leg at Bush which is currently a 3 leg intersection as well. Total AADT: 3860; Winston Churchill Blvd AADT: 2147; Bust St. AADT: 2257. Attached is a diagram containing Existing, 2021, and 2031 weekday AM and PM peak hour volumes (as well as for a realigned intersection).	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
3)	What operational problems are being experienced at this location? No operational issues currently being experienced.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
4)	Is it a new intersection or a retrofit of an existing intersection? If existing, what is the existing type of traffic control? Existing intersection with Winston Churchill Blvd. having stop control for both staggered approaches.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

5)	Is the intersection near a major intersection or a railroad crossing? If so, how close and what type of traffic control exists at the adjacent intersection(s)? Will queues be a problem? Describe the corridor (eg.: average intersection spacing). No, nearest major intersection is > 1km away. Queues are not expected to be a problem.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
6)	Would the intersection be located within a coordinated signal network? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
7)	Would the intersection be located on a preferred roundabout corridor? If yes why? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
8)	What is the collision history of the intersection over the past five years? Is there a collision problem that needs to be addressed? There have been 5 reported collisions at the intersection over the past five years (4 Property Damage Only and 1 Non-Fatal Injury).	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
9)	Is the intersection scheduled for improvements or is it located within a corridor that is scheduled for improvements in the next 10 years? What is the ultimate cross-section of the approaching legs? Intersection currently under review as part of the Belfountain EA. Ultimate cross-section for approaching legs to remain at two lanes (one lane per direction). Potential for a realignment of the north and south legs of Winston Churchill Boulevard.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐

10)	Are there expected to be special users at this intersection in the near future (ie. a person with disability, pedestrians, cyclists, large agricultural machinery, horses, etc.)? If yes, what special considerations would be required? Potential for cyclists, agricultural machinery, and horses. These modes are typically not suited towards a roundabout.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
11)	What traditional improvements are proposed for this intersection (traffic signals, all-way stop, auxiliary lanes, off-set re-alignment, etc)? There is the possibility of realigning the north leg of WCB with the south leg. No other improvements are proposed.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
12)	If traffic signals are considered, does it meet the warrant for the horizon year? Signal warrant analysis shows that traffic signals are not warranted at this intersection under Existing, 2021, and 2031 traffic conditions.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
13)	What size of roundabout is being considered for this intersection (ie. single, two, three lane entry)? Please attach a Traffic Flow Worksheet, a lane configuration diagram and a sketch of how a roundabout would fit into the ROW. 3 Roundabout Alternatives proposed (all single lane roundabout (40m ICD) with single lane entries and exits): Alt 1: 1 - 3 leg roundabout with Winston Churchill Blvd South Leg Alt 2: 2 – 3 leg roundabouts Alt 3: 1 – 4 leg roundabout Traffic flow worksheets and sketch of roundabout for all 3 alternatives are attached.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
14)	Are there property constraints at/near the intersection or is it restricted by a watercourse/parks/cemeteries/etc? If yes, what are they? Residential house located in South/East quadrant fairly close to intersection could be impacted in Alternatives 1 and 2. Major property impact in Alternative 3 due to realignment of Winston Churchill Blvd. and Bust St.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

15) Terrain – Is the area on a grade/flat/rolling?

Rural – gently rolling terrain on Winston Churchill south leg. At intersection, terrain is relatively level.

YES ☒
NO ☐
NEUTRAL ☐

16) 20 Year Life Cycle Cost Estimate

Injury Collision Cost (ICC): $30,000
Discount Rate (i): 6%

YES ☒
NO ☐
NEUTRAL ☐

ALTERNATIVE 1

20 YEAR LIFE- CYCLE COST COMPARISON		
Cost Item	Other Traffic Control	Roundabout
Implementation Cost	$100,000	$750,000
Injury Collision Cost (Present Value)	$3,540,420	$1,770,210
Total Life Cycle Cost	$3,640,420	$2,520,210

ALTERNATIVE 2

20 YEAR LIFE- CYCLE COST COMPARISON		
Cost Item	Other Traffic Control	Roundabout
Implementation Cost	$200,000	$1,500,000
Injury Collision Cost (Present Value)	$3,540,420	$1,770,210
Total Life Cycle Cost	$3,740,420	$3,270,210

ALTERNATIVE 3

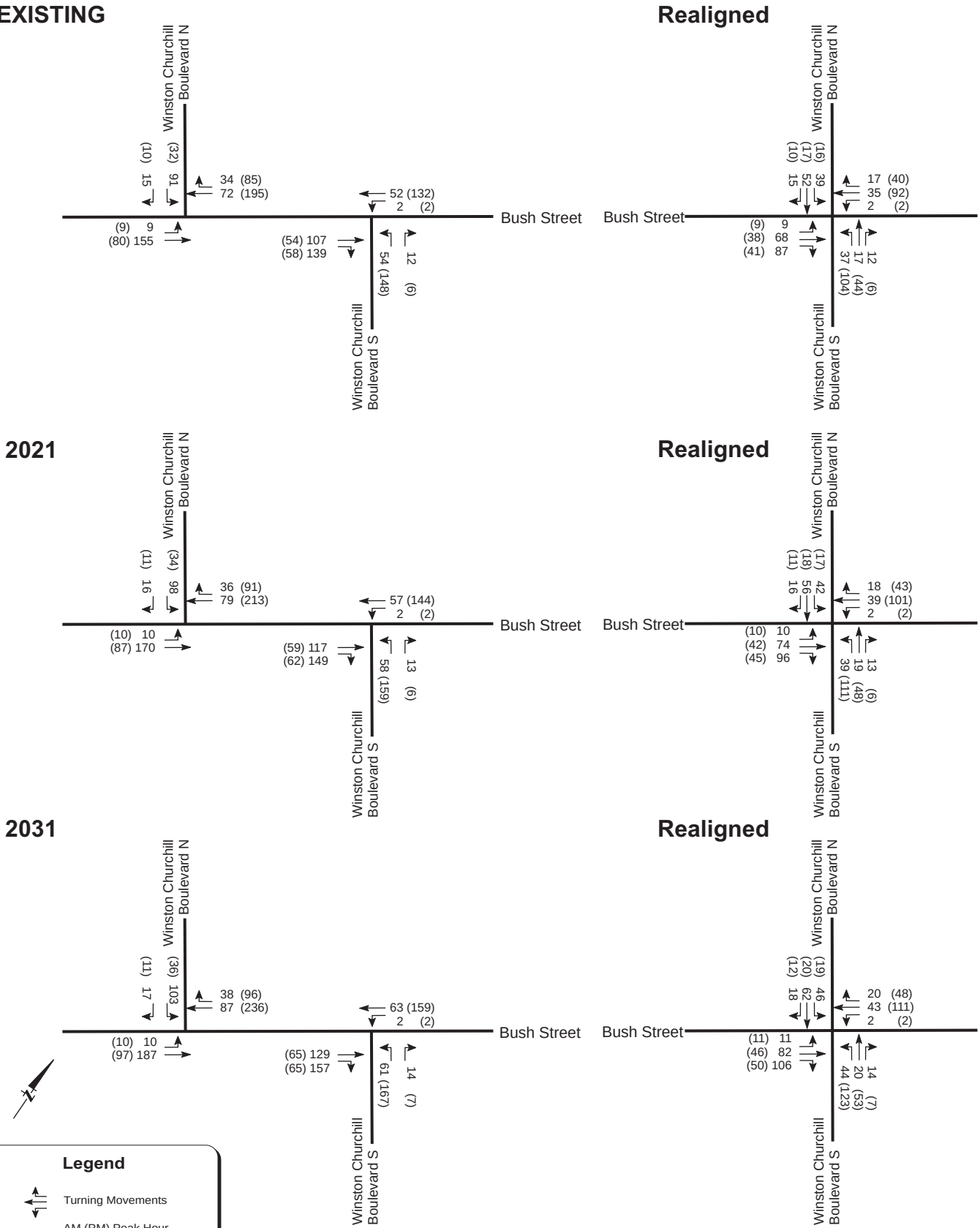
20 YEAR LIFE- CYCLE COST COMPARISON		
Cost Item	Other Traffic Control	Roundabout
Implementation Cost	$1,100,000	$2,000,000
Injury Collision Cost (Present Value)	$3,540,420	$1,770,210
Total Life Cycle Cost	$4,640,420	$3,770,210

Notes:

- Implementation Cost
  = sum of costs for construction, property, utility relocation, illumination, engineering (20%), contingency (20%) and maintenance (5%)
- Present Value of 20 Year Injury Collision Cost
  = expected annual collision frequency x ICC $((1+i)^{20}-1)/i(1+i)^{20}$
- Monte Carlo Analysis may be required. If so, a range for the implementation cost (i.e. 10%, 50%, 90% probability) is required

17) Conclusions and Recommendations:
Alternative 1 roundabout could be considered for further analysis. Alternatives 2 and 3 are not recommended due to impacts to property and costs involved.

YES ☒
NO ☐



Mississauga Road at Old Base Line Road
Existing and Future Turning Movements

Not To Scale

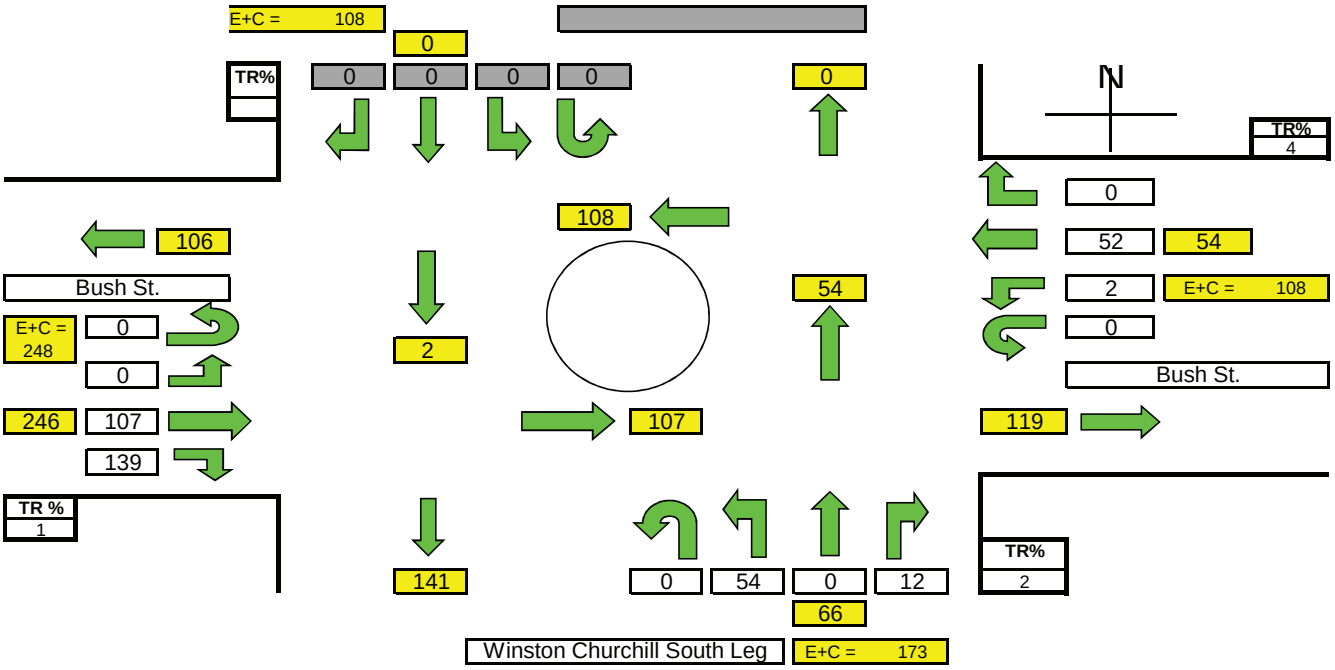
March 2013

HDR Corporation
Project # 6776

REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 1 **of** 6
Intersection: Winston Churchill Blvd at Bush St.
Time Period: Existing AM

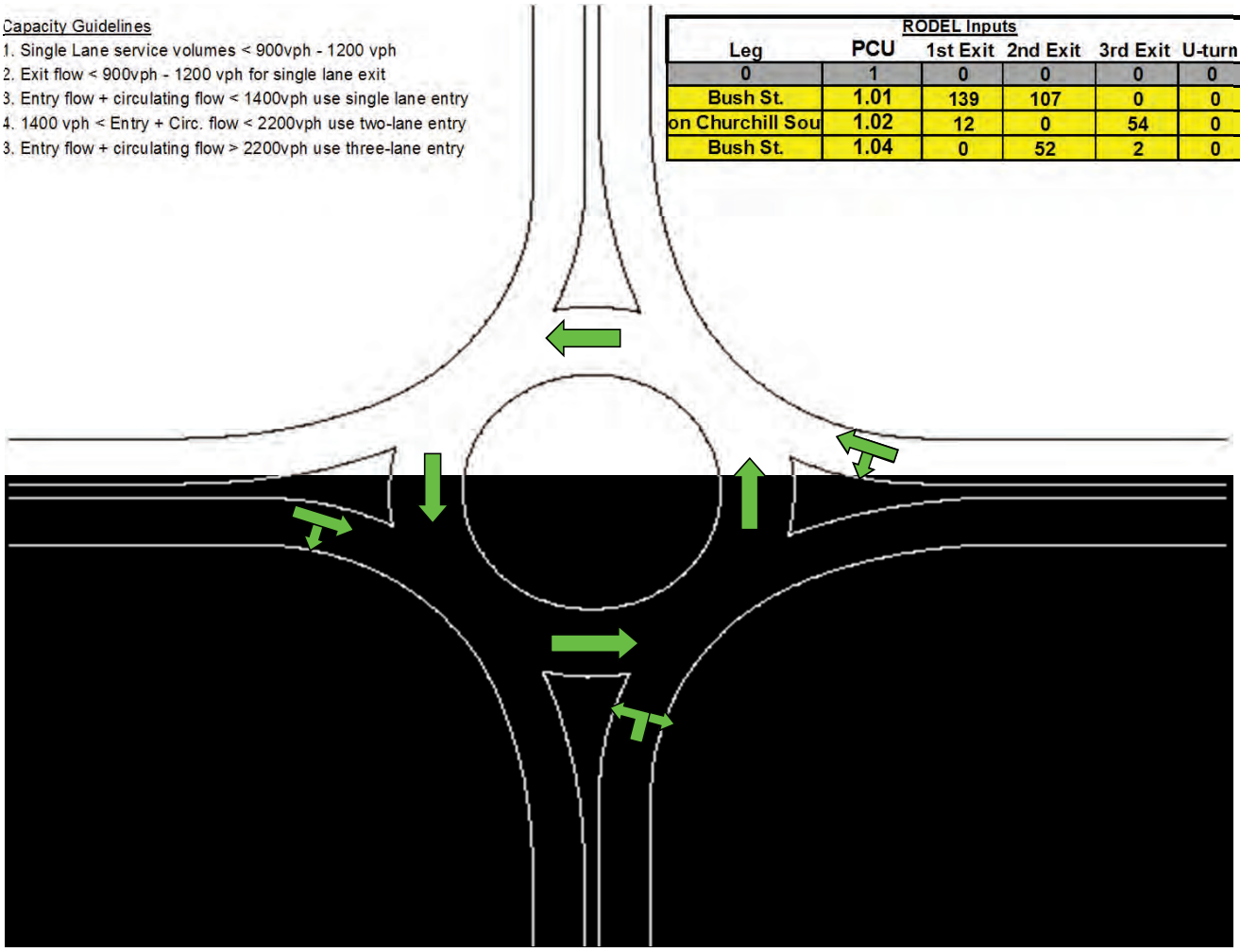


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

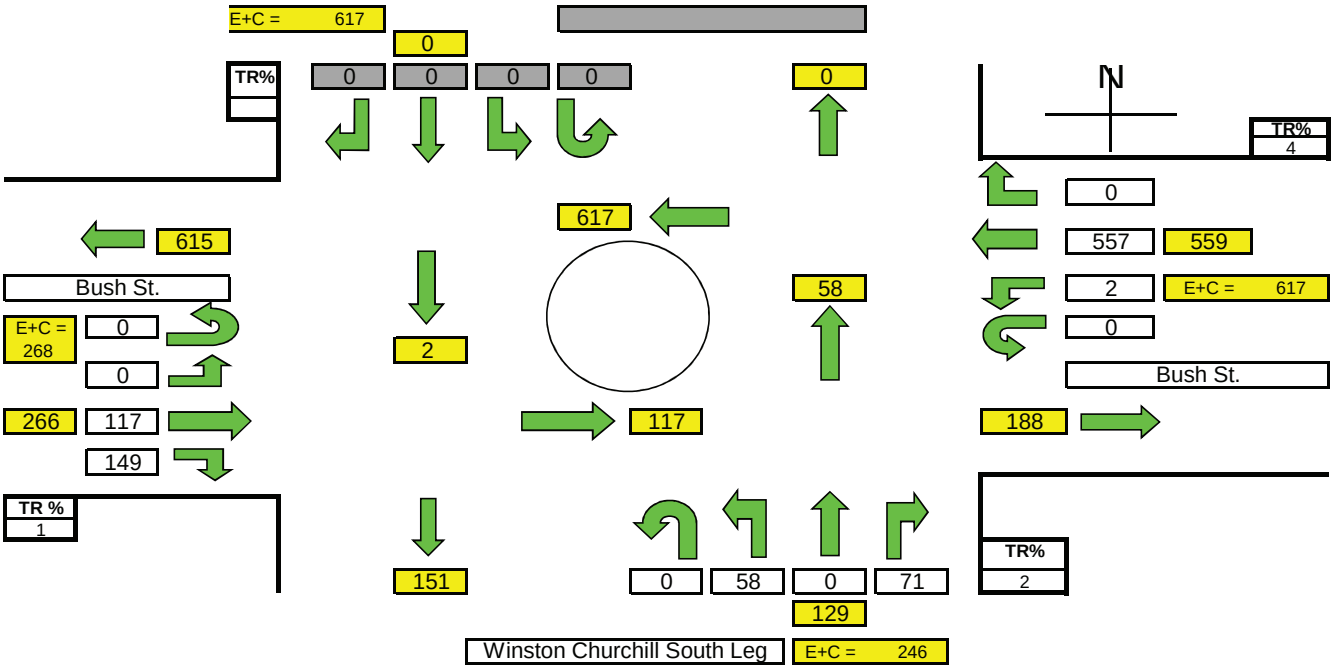
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	139	107	0	0
on Churchill Sou	1.02	12	0	54	0
Bush St.	1.04	0	52	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 2 **of** 6
Intersection: Winston Churchill Blvd at Bush St.
Time Period: 2021 PM



Capacity Guidelines
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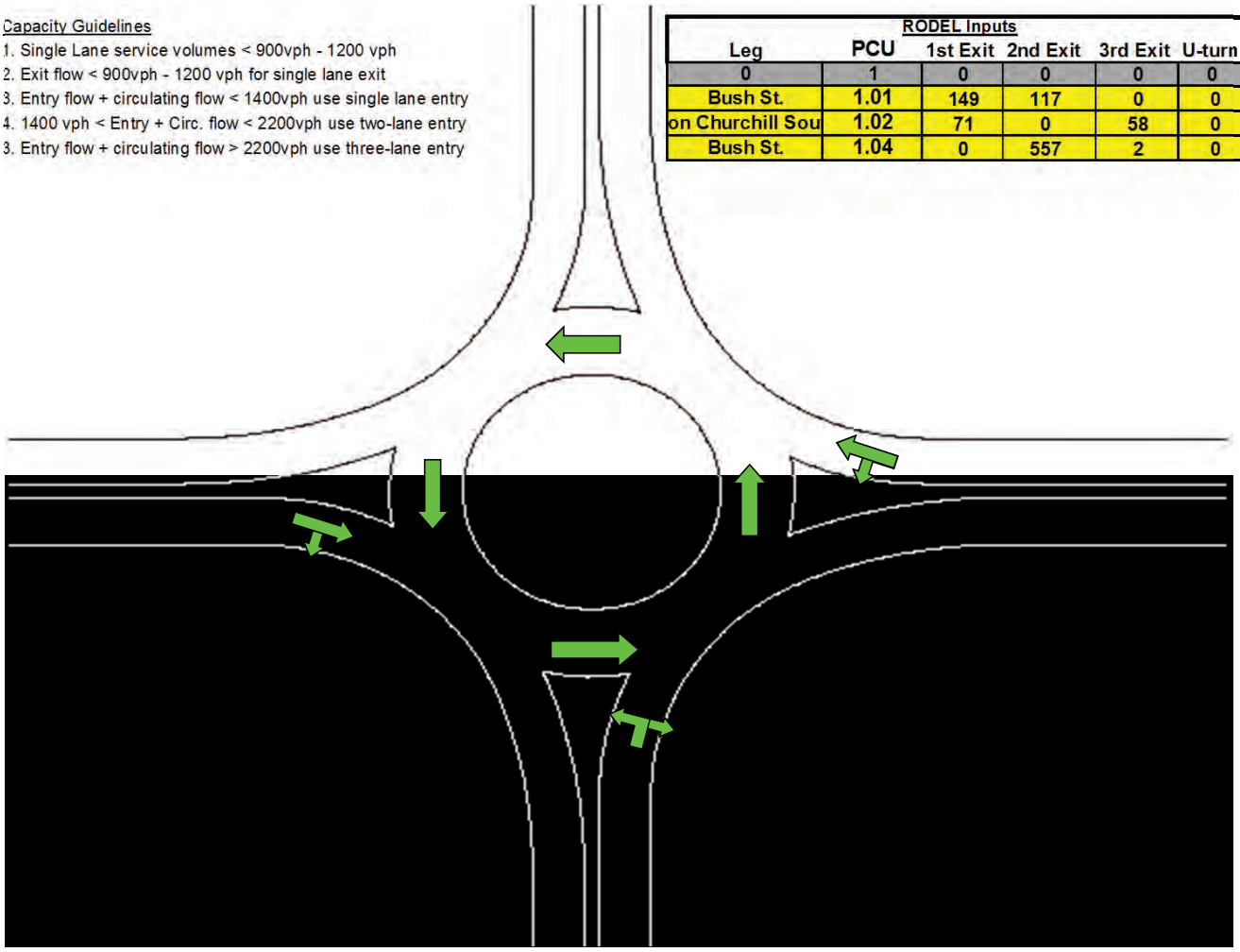
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

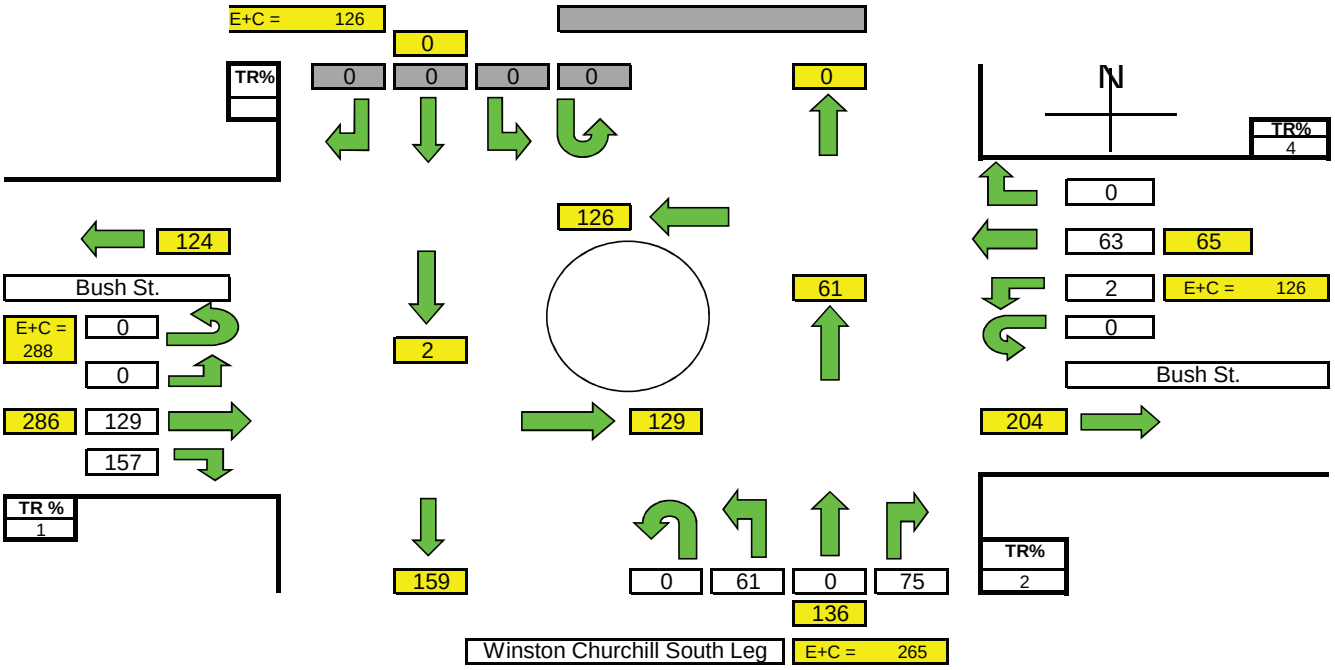
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	149	117	0	0
on Churchill Sou	1.02	71	0	58	0
Bush St.	1.04	0	557	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 3 **of** 6
Intersection: Winston Churchill Blvd at Bush St.
Time Period: XX PEAK 20XX



Capacity Guidelines

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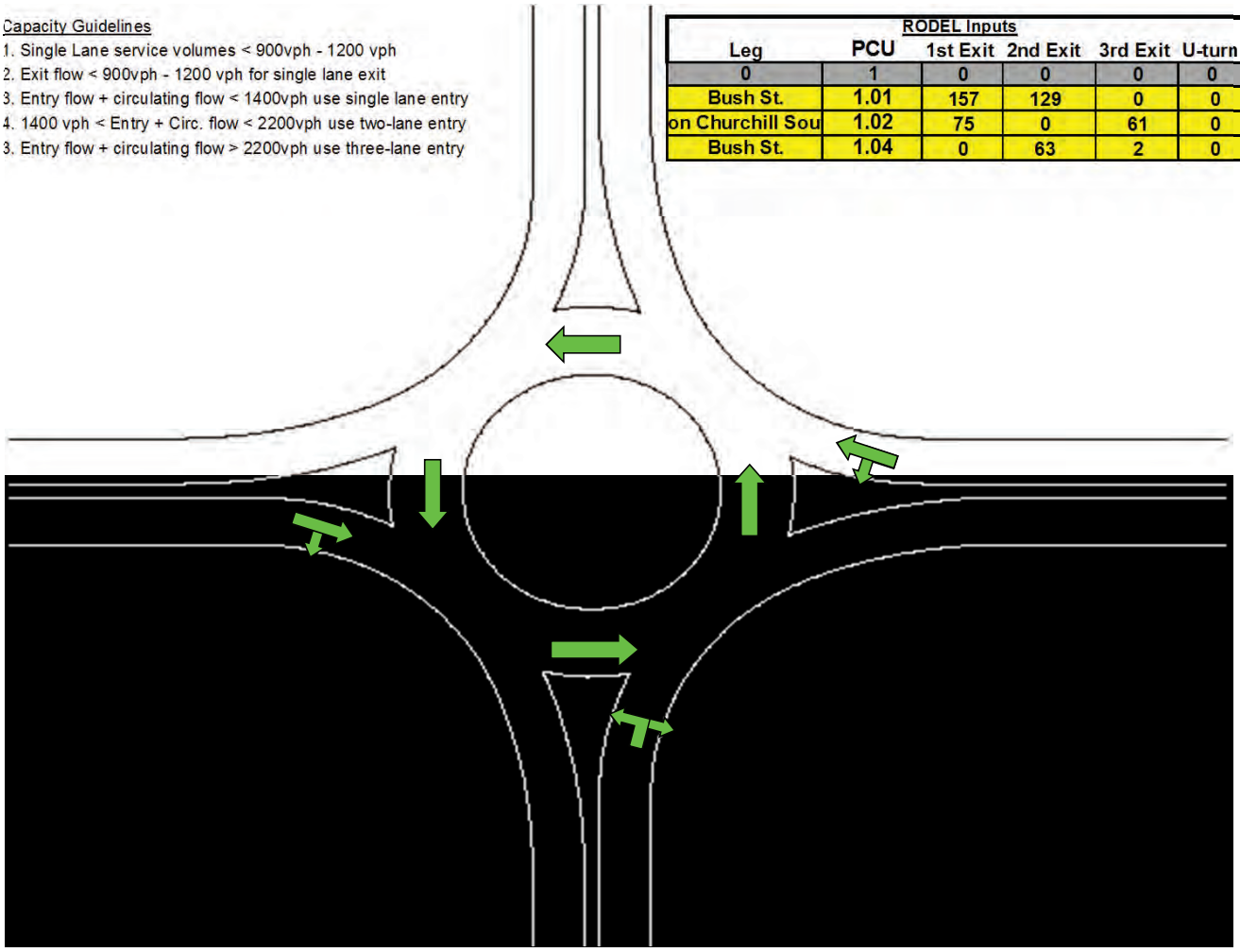
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	157	129	0	0
on Churchill Sou	1.02	75	0	61	0
Bush St.	1.04	0	63	2	0

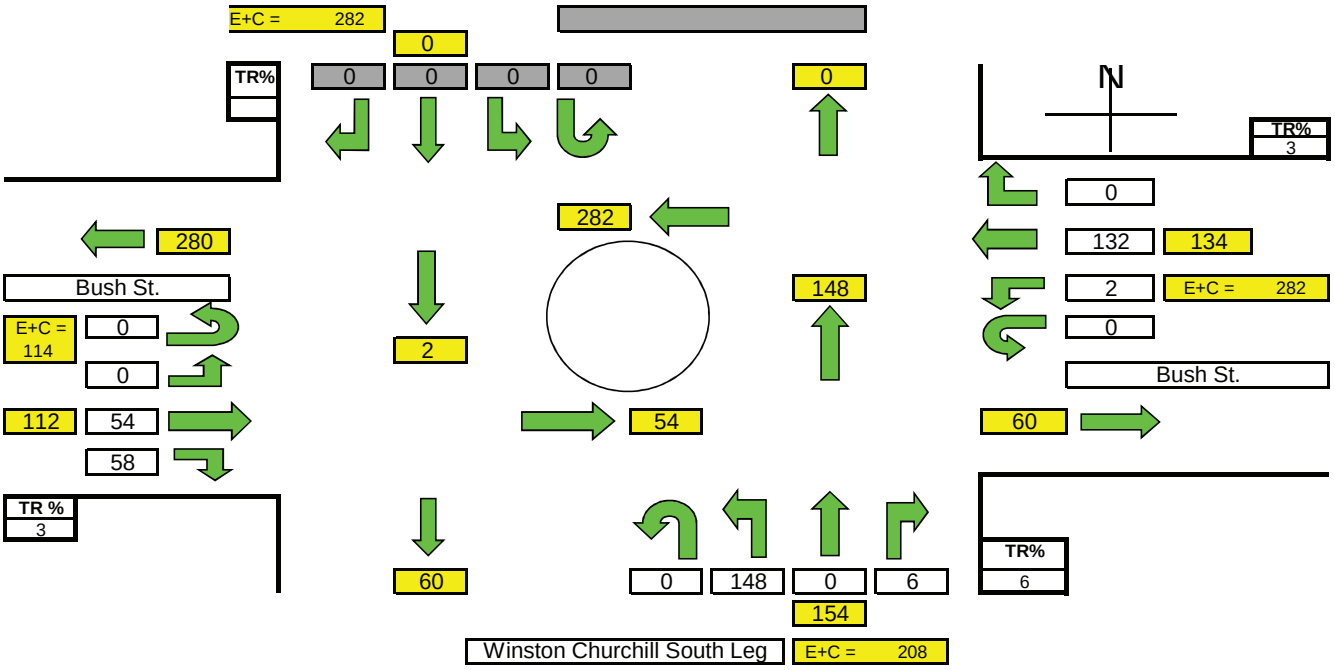


REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Project No.: 6776
Intersection: Winston Churchill Blvd at Bush St.
Time Period: Existing PM

Drawn By: HDR
Sheet 4 **of** 6



Capacity Guidelines

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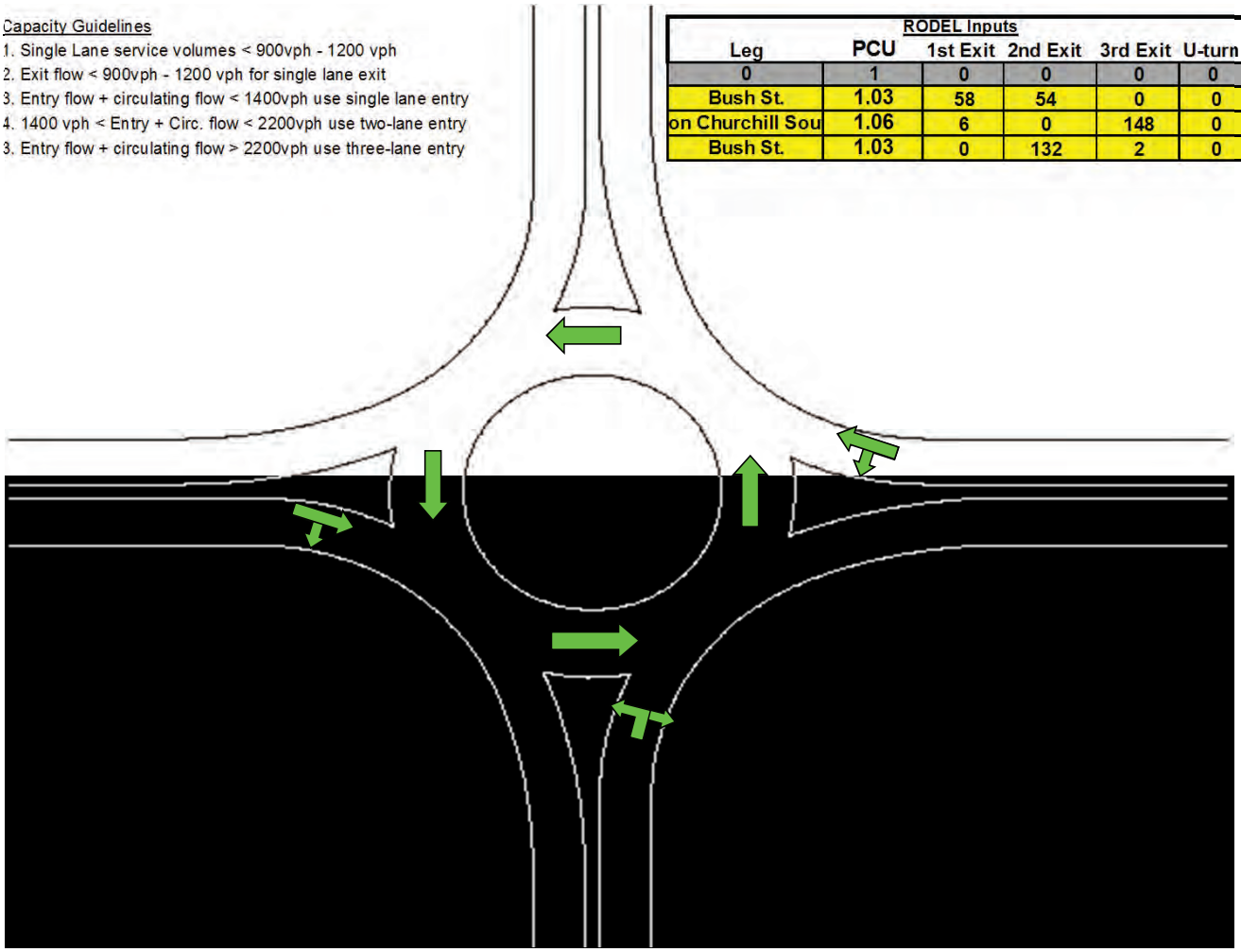
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

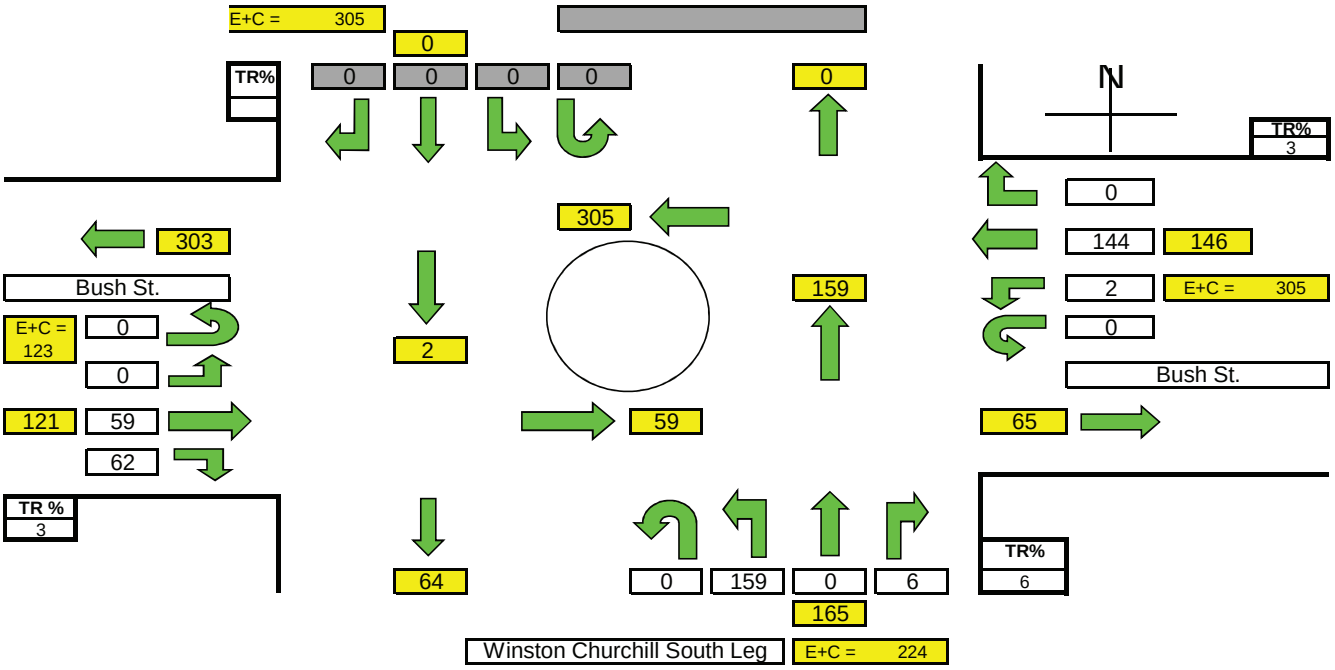
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	58	54	0	0
on Churchill Sou	1.06	6	0	148	0
Bush St.	1.03	0	132	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 5 **of** 6
Intersection: Winston Churchill Blvd at Bush St.
Time Period: 2021 PM



Capacity Guidelines
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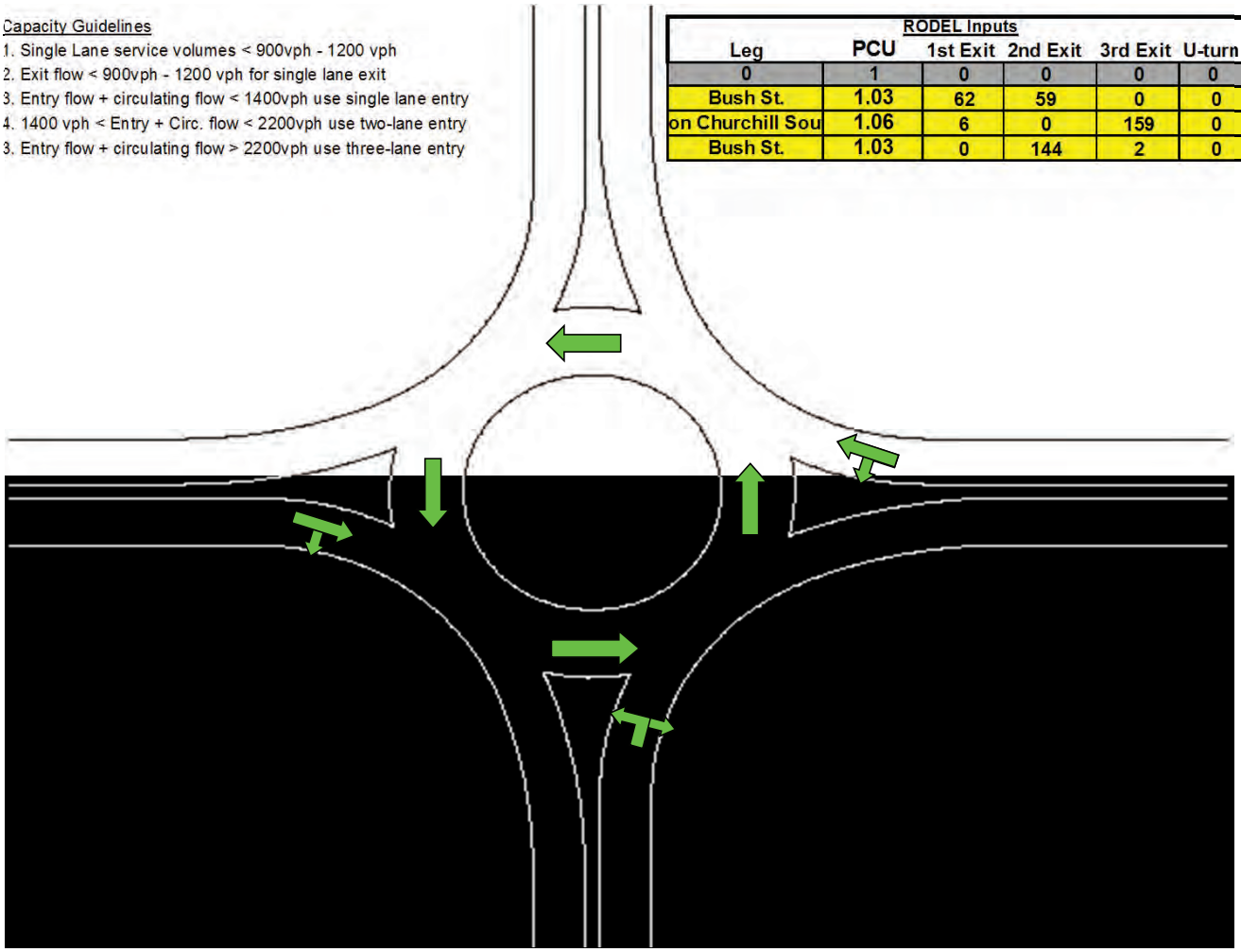
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

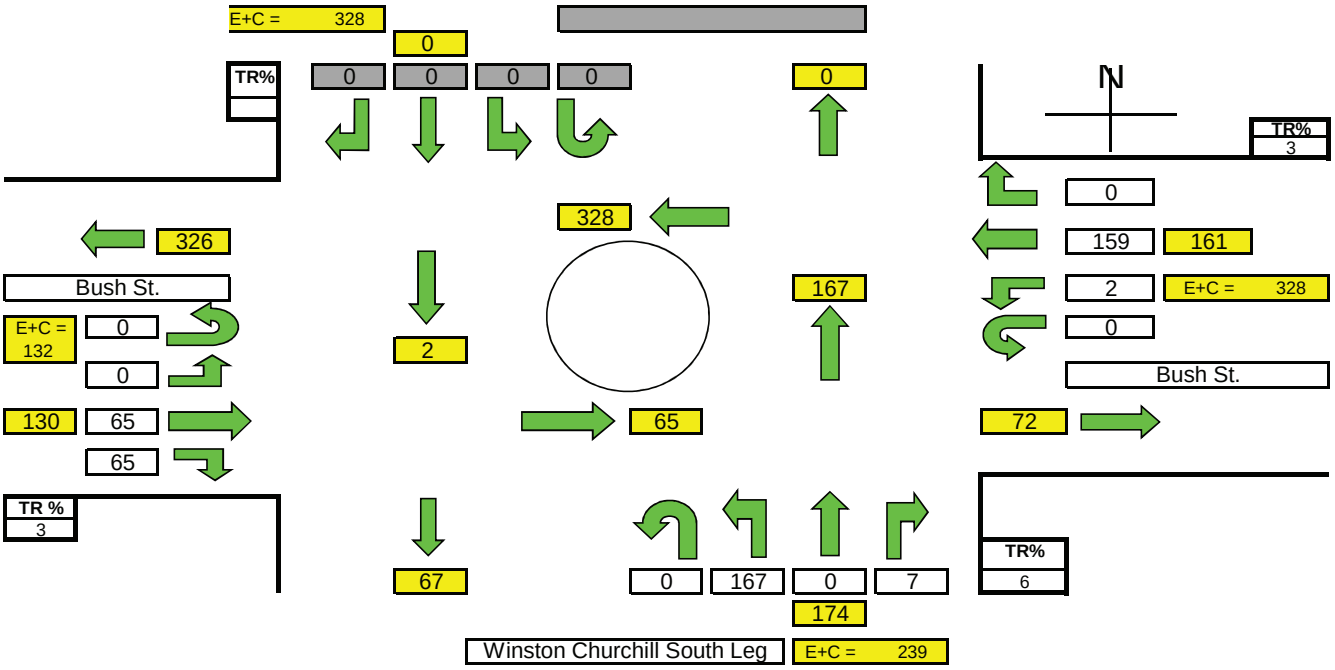
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	62	59	0	0
on Churchill Sou	1.06	6	0	159	0
Bush St.	1.03	0	144	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 6 **of** 6
Intersection: Winston Churchill Blvd at Bush St.
Time Period: 2031 PM



Capacity Guidelines

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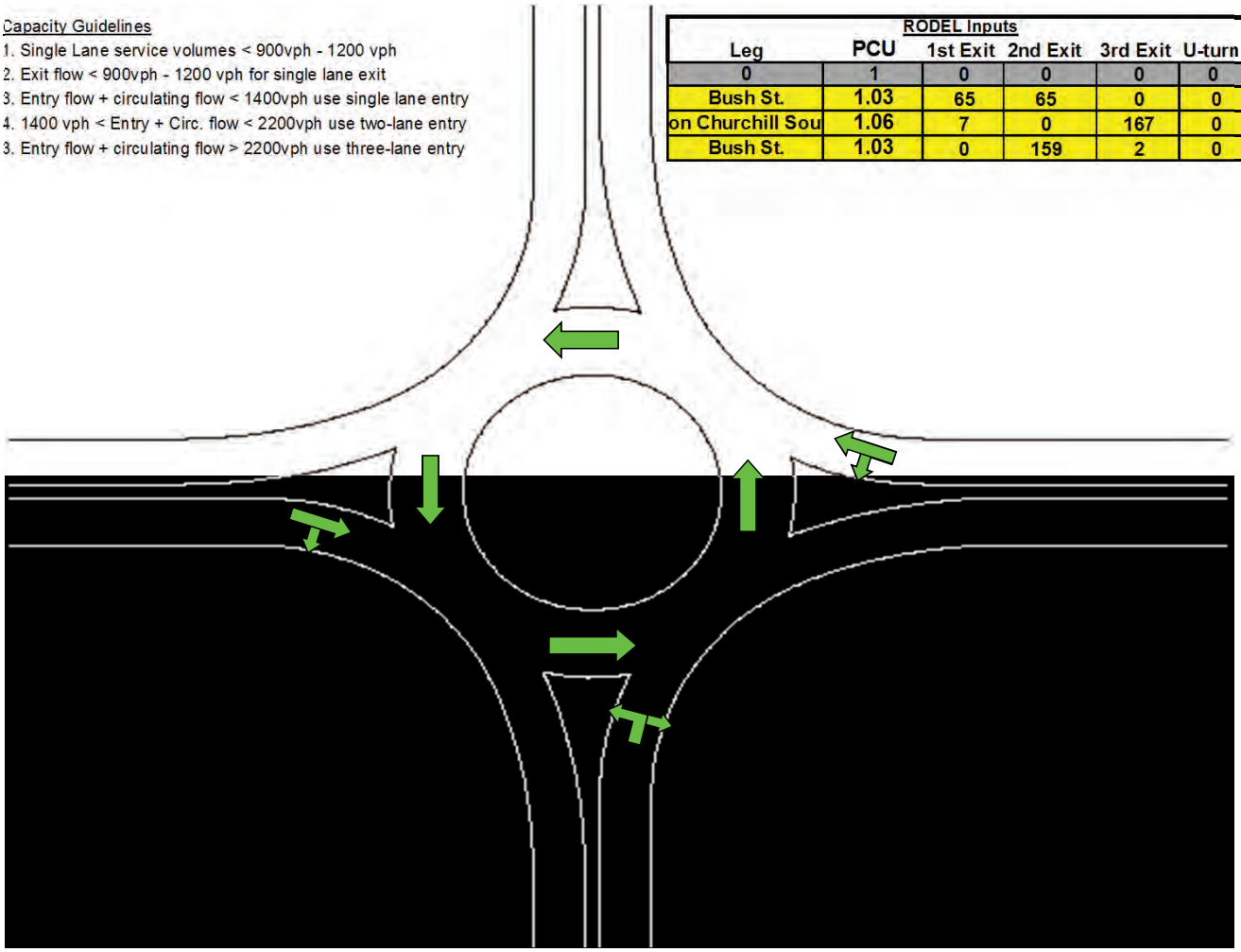
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

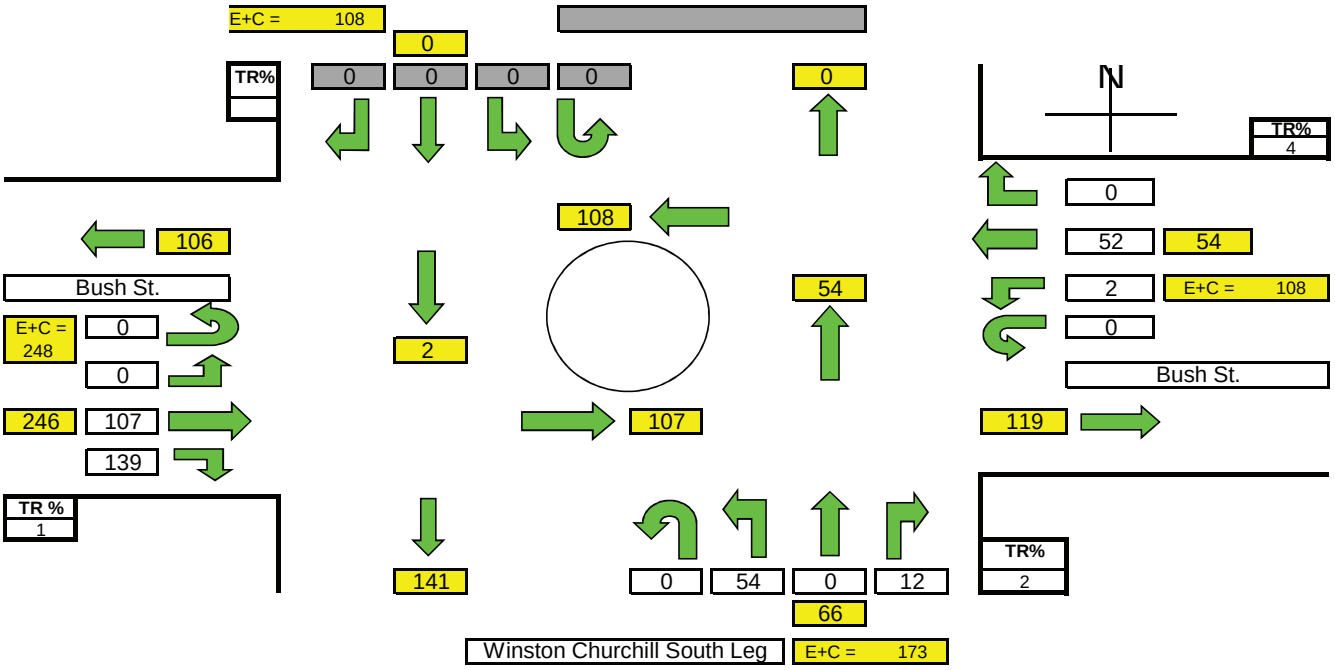
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	65	65	0	0
on Churchill Sou	1.06	7	0	167	0
Bush St.	1.03	0	159	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 1 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: Existing AM

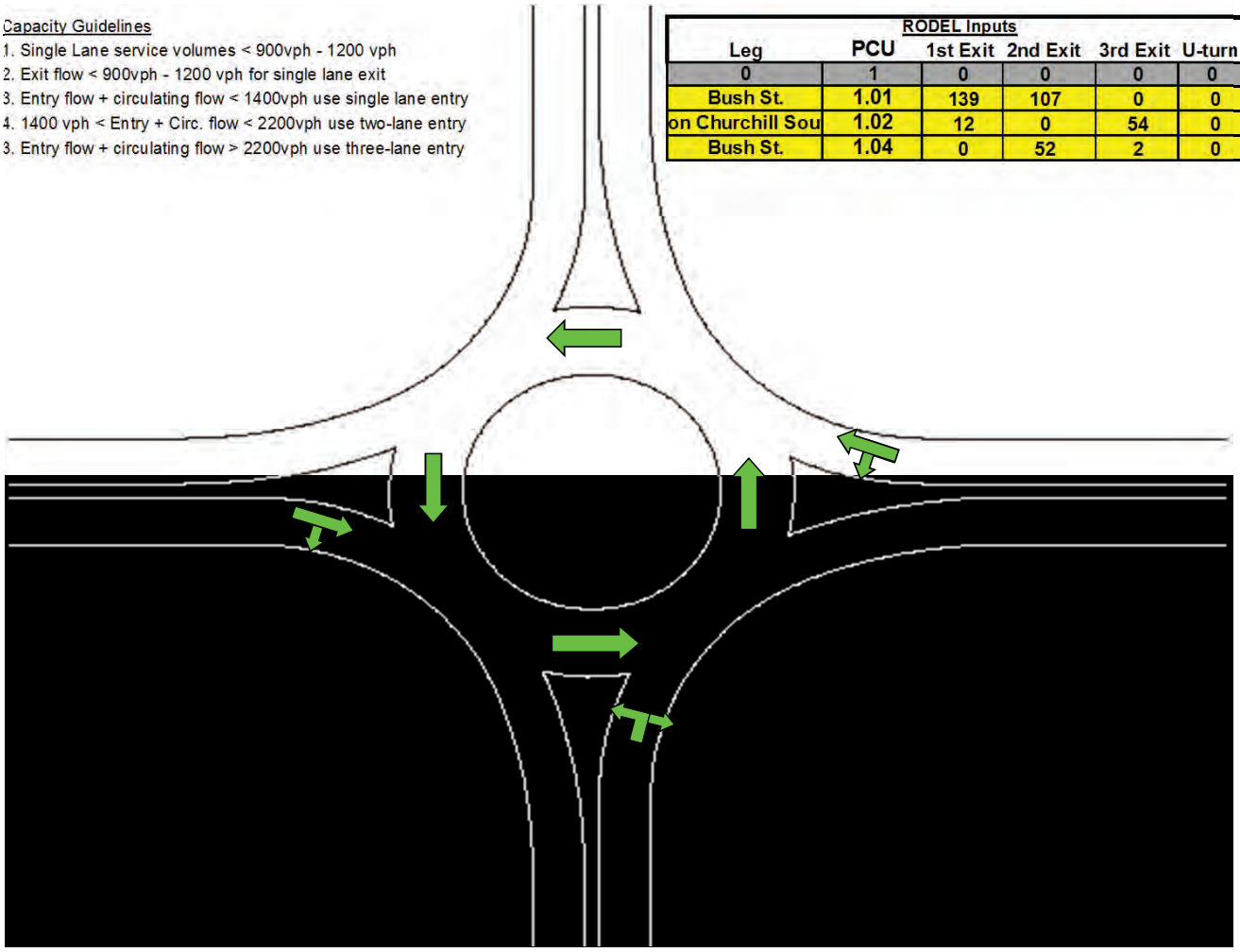


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

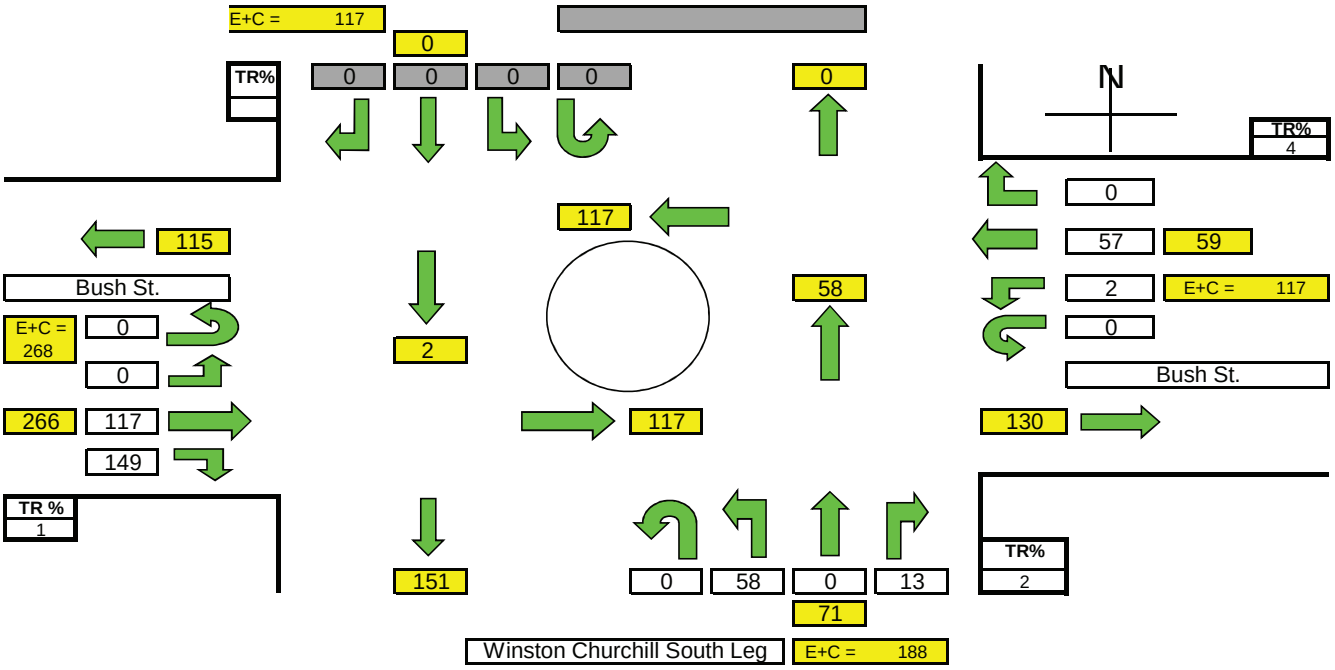
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	139	107	0	0
on Churchill Sou	1.02	12	0	54	0
Bush St.	1.04	0	52	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 2 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: 2021 PM

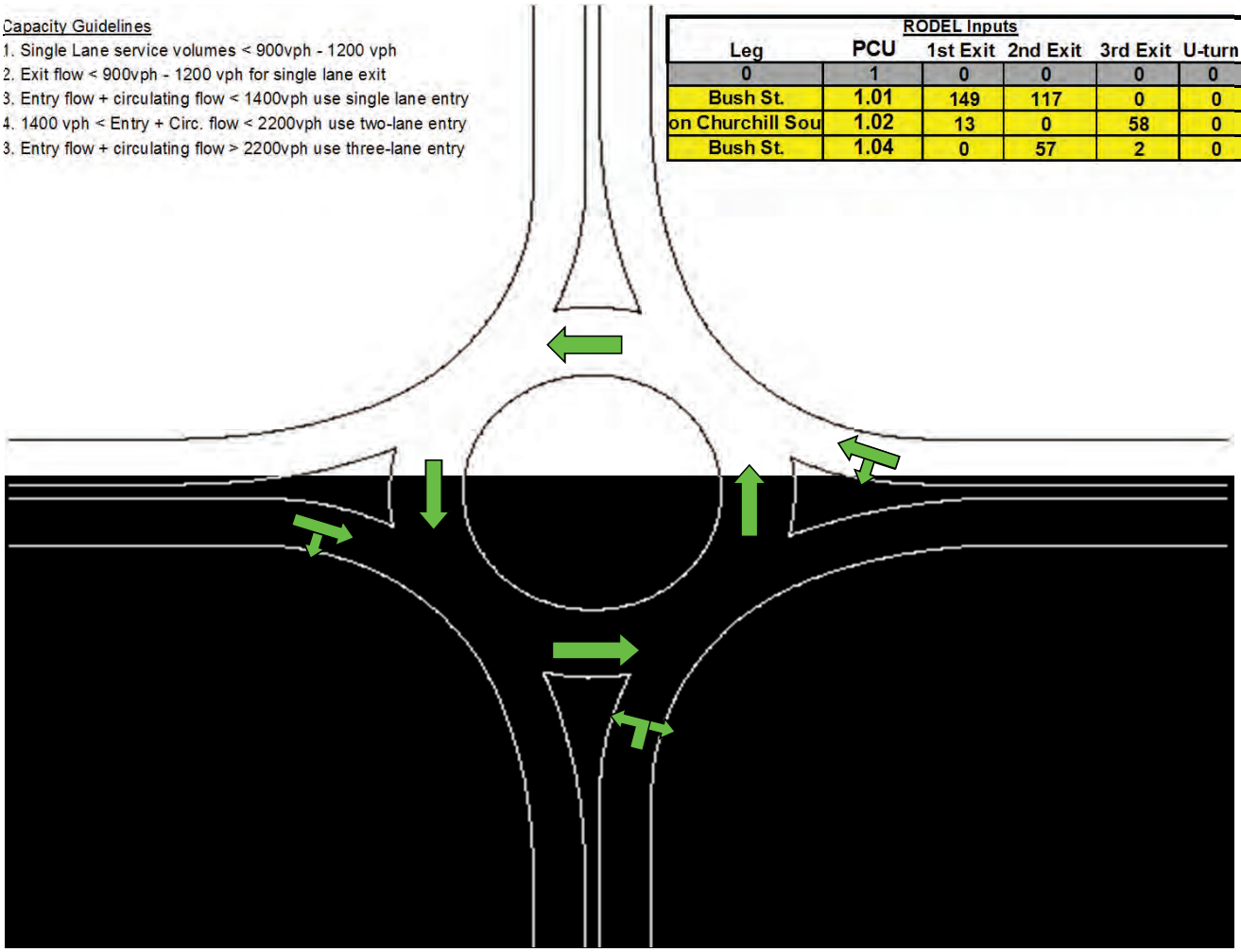


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

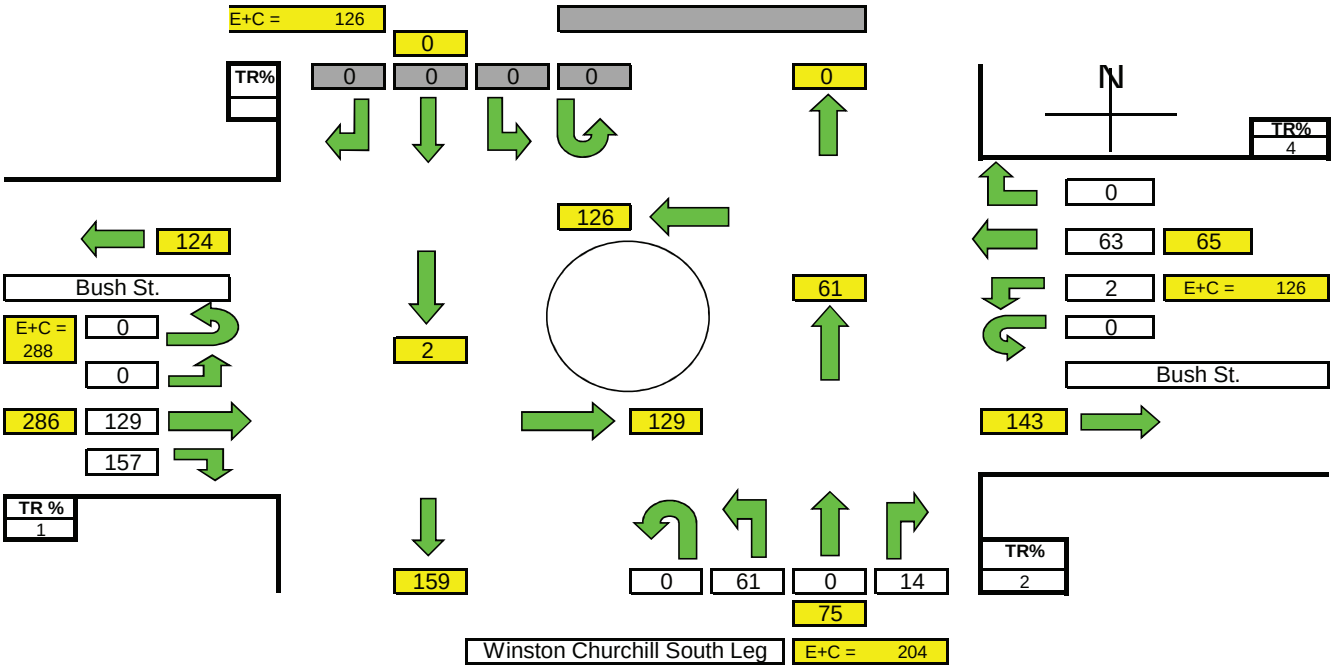
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	149	117	0	0
on Churchill Sou	1.02	13	0	58	0
Bush St.	1.04	0	57	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 3 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: 2031 AM

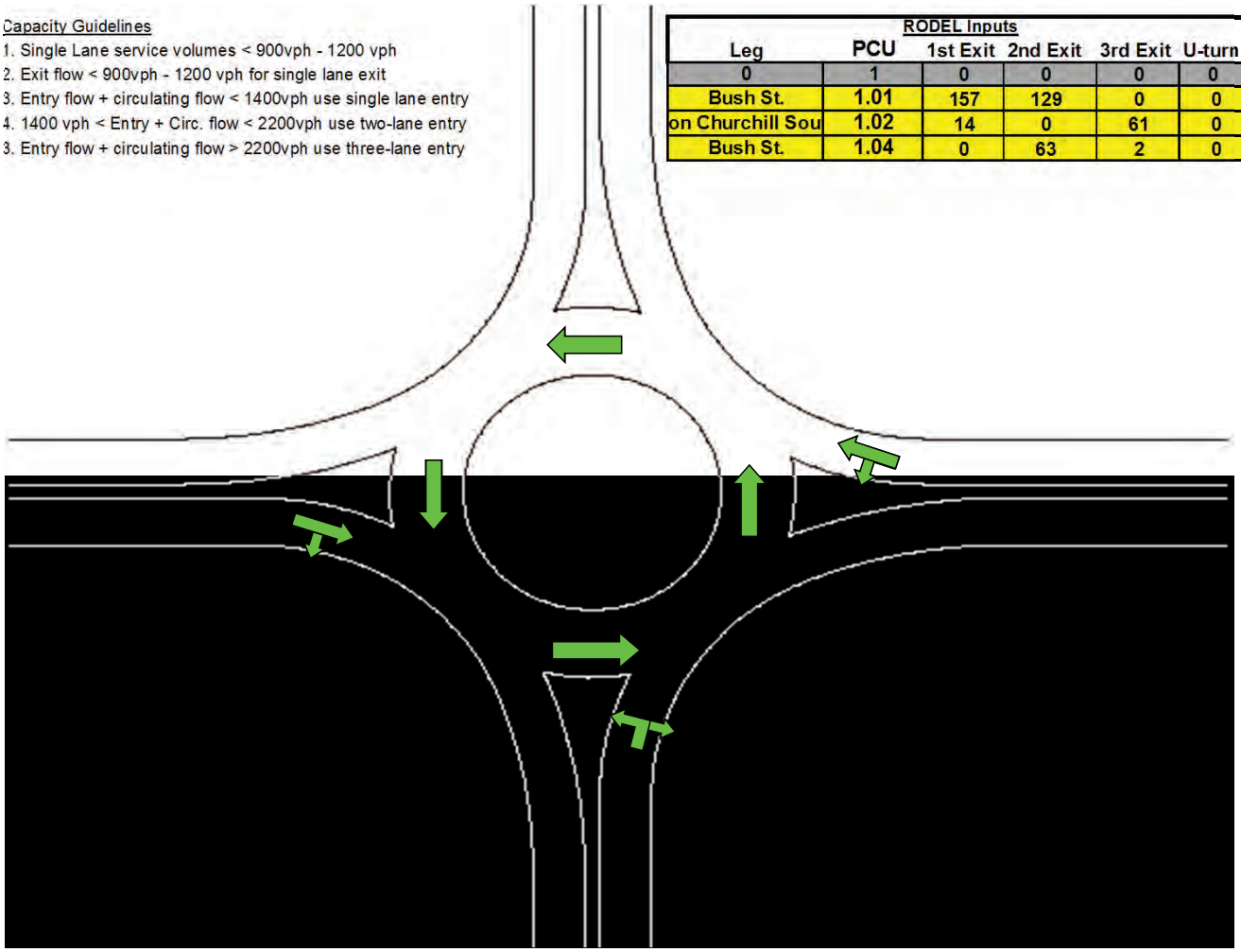


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

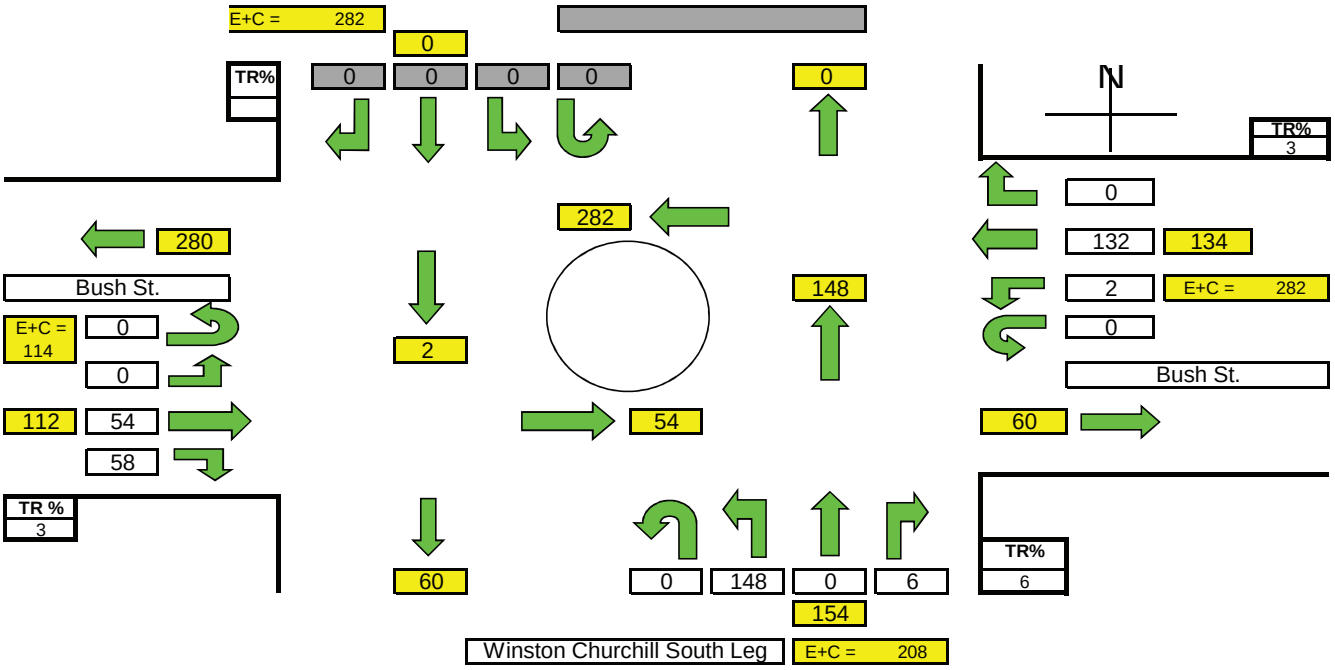
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.01	157	129	0	0
on Churchill Sou	1.02	14	0	61	0
Bush St.	1.04	0	63	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 4 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: Existing PM

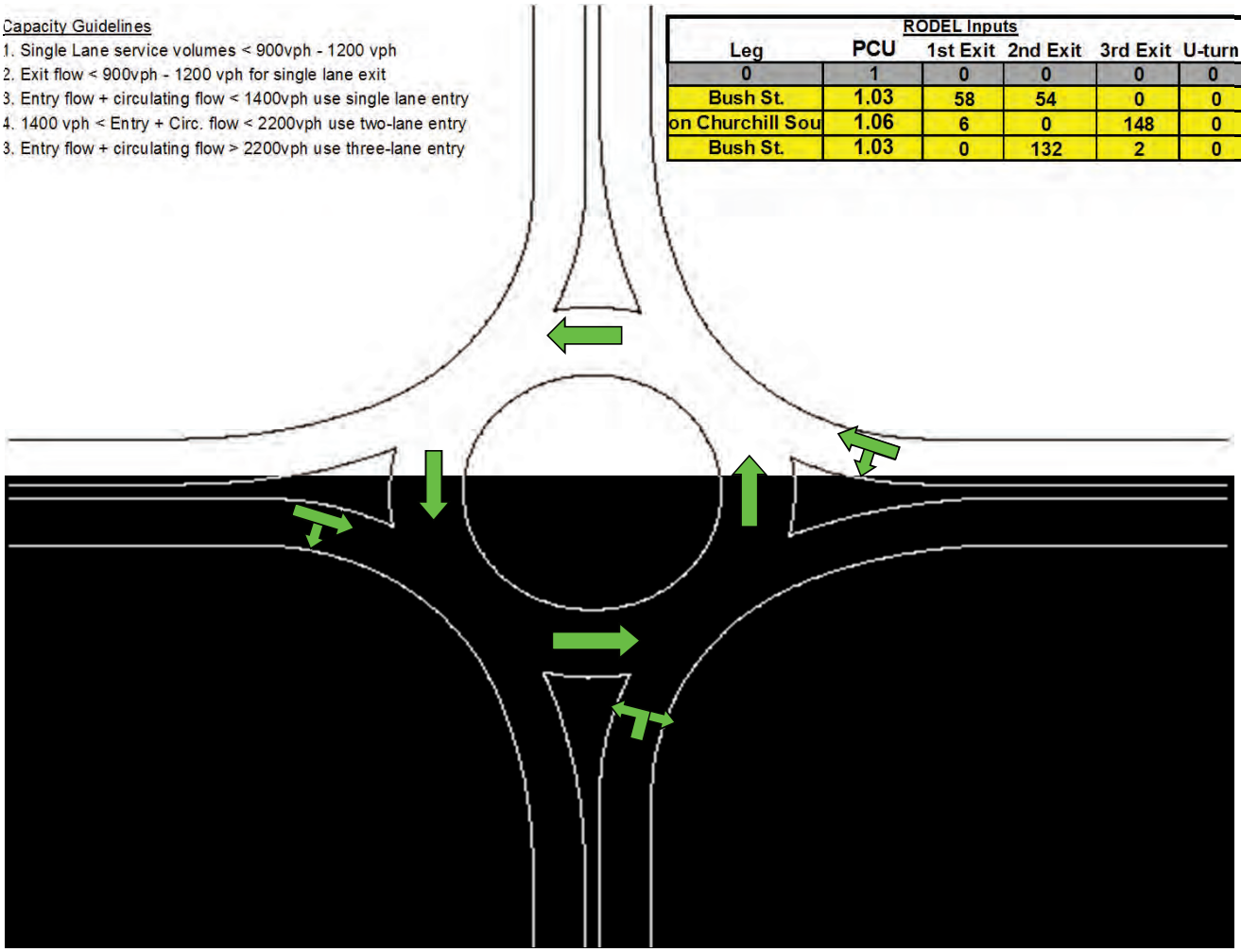


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

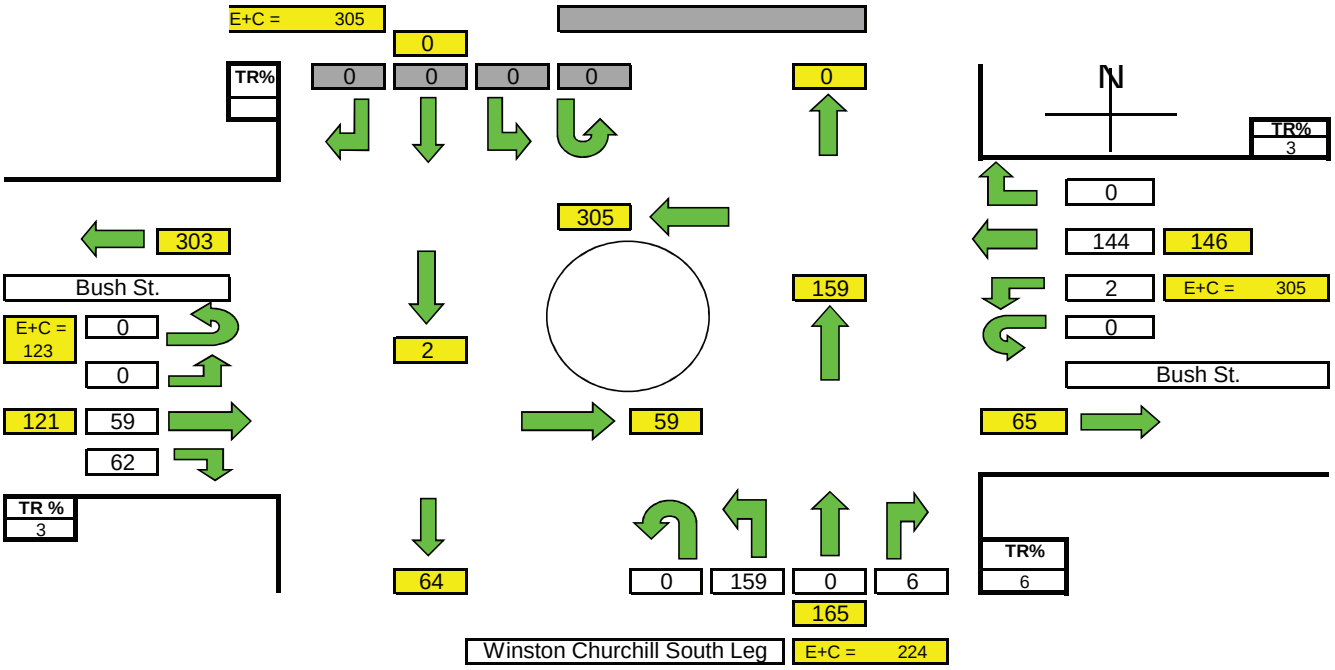
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	58	54	0	0
on Churchill Sou	1.06	6	0	148	0
Bush St.	1.03	0	132	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 5 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: 2021 PM

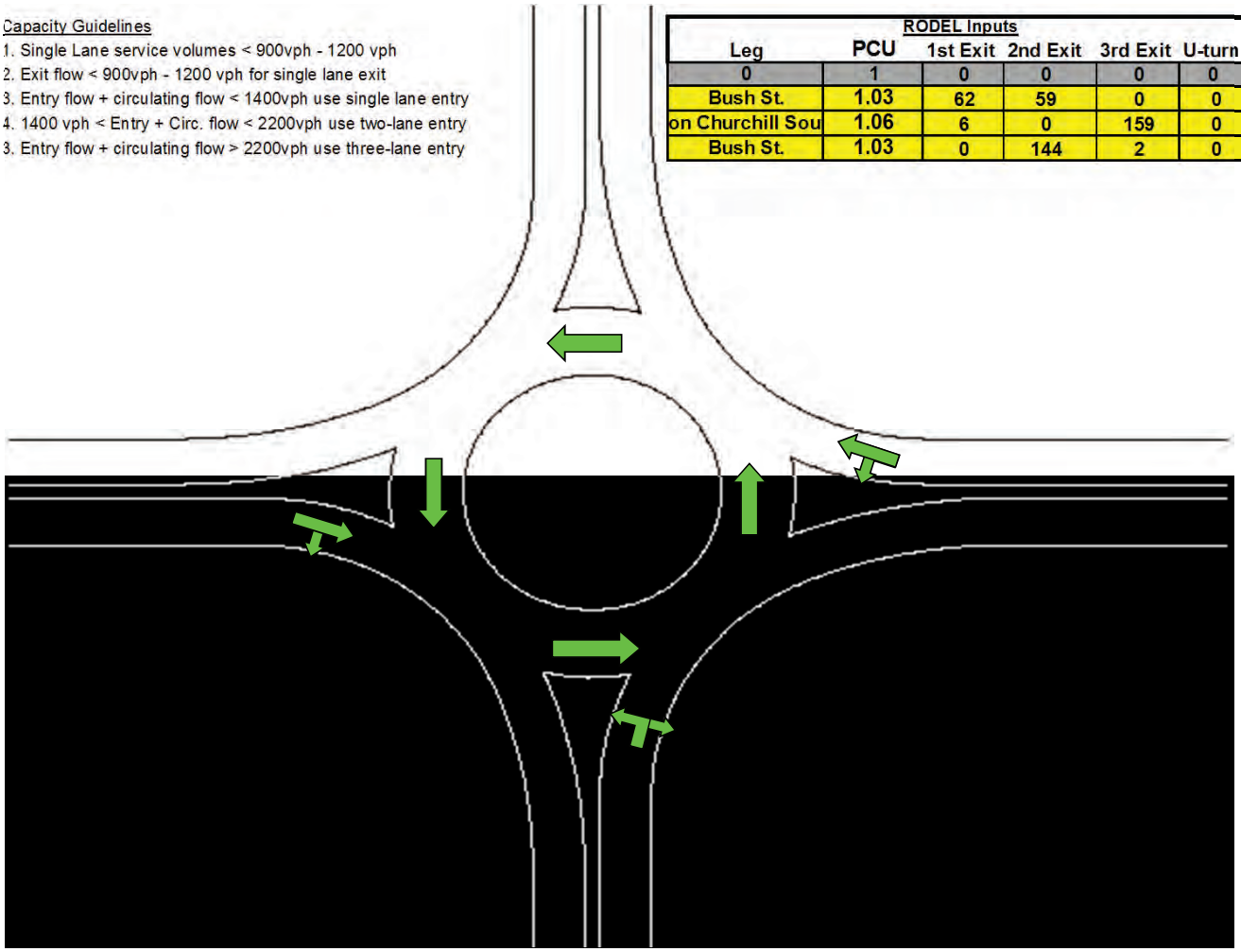


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

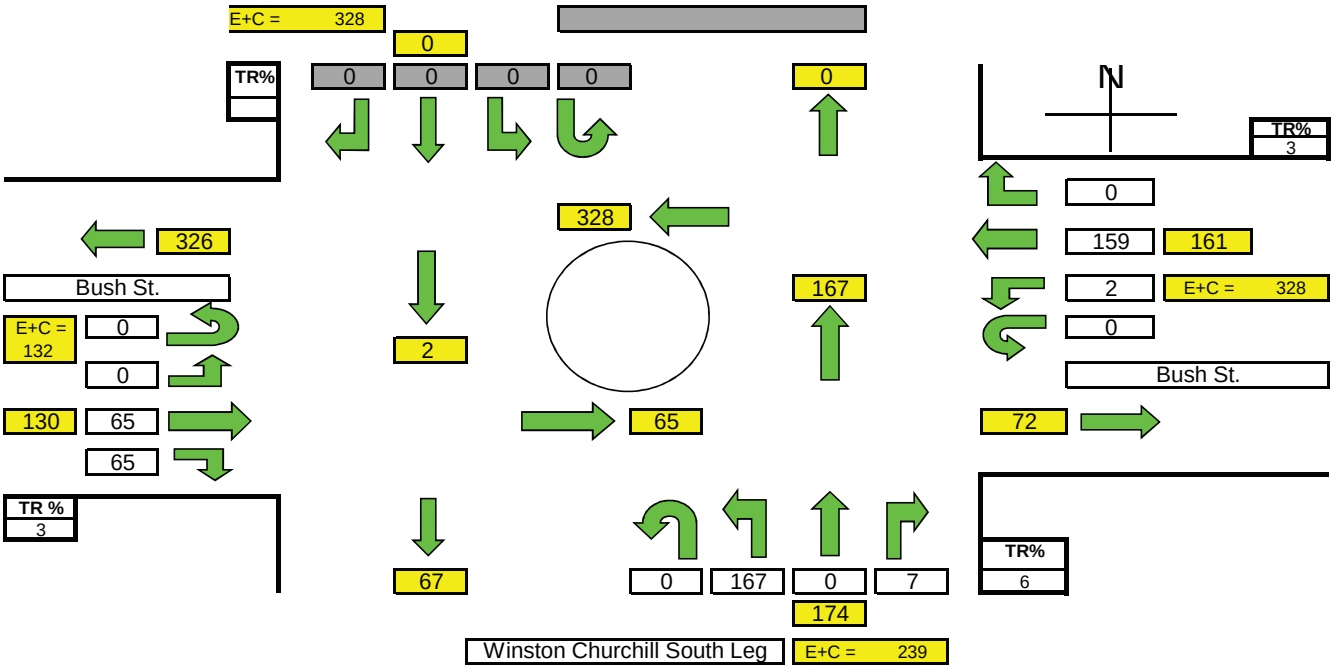
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	62	59	0	0
on Churchill Sou	1.06	6	0	159	0
Bush St.	1.03	0	144	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 6 **of** 12
Intersection: Winston Churchill Blvd South at Bush St.
Time Period: 2031 PM

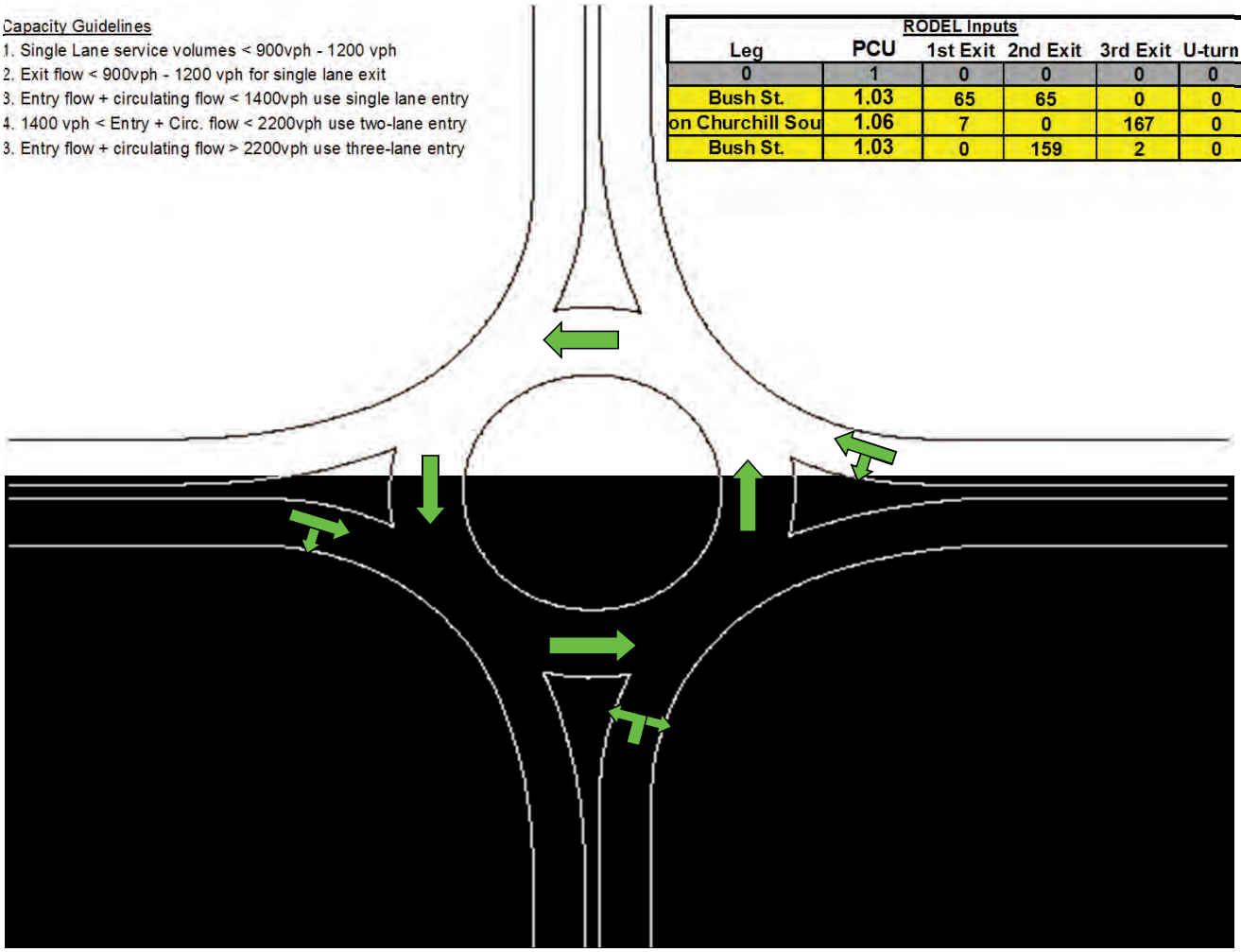


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

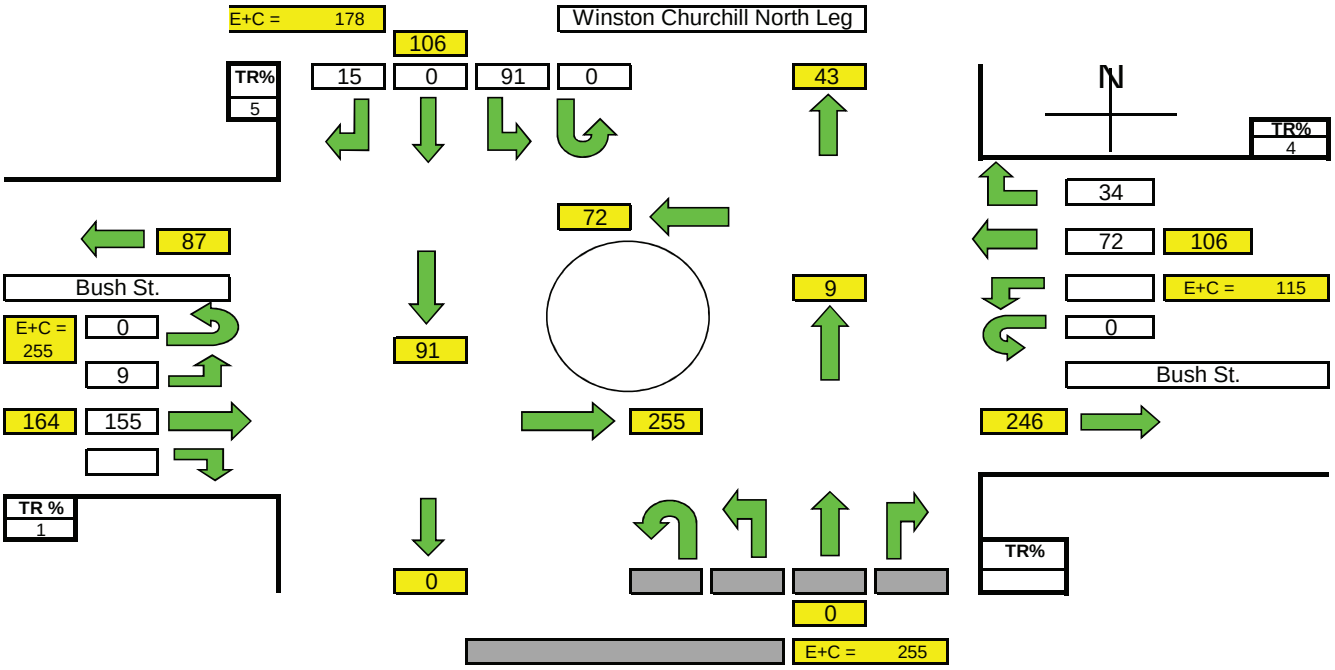
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
0	1	0	0	0	0
Bush St.	1.03	65	65	0	0
on Churchill Sou	1.06	7	0	167	0
Bush St.	1.03	0	159	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 7 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: Existing AM

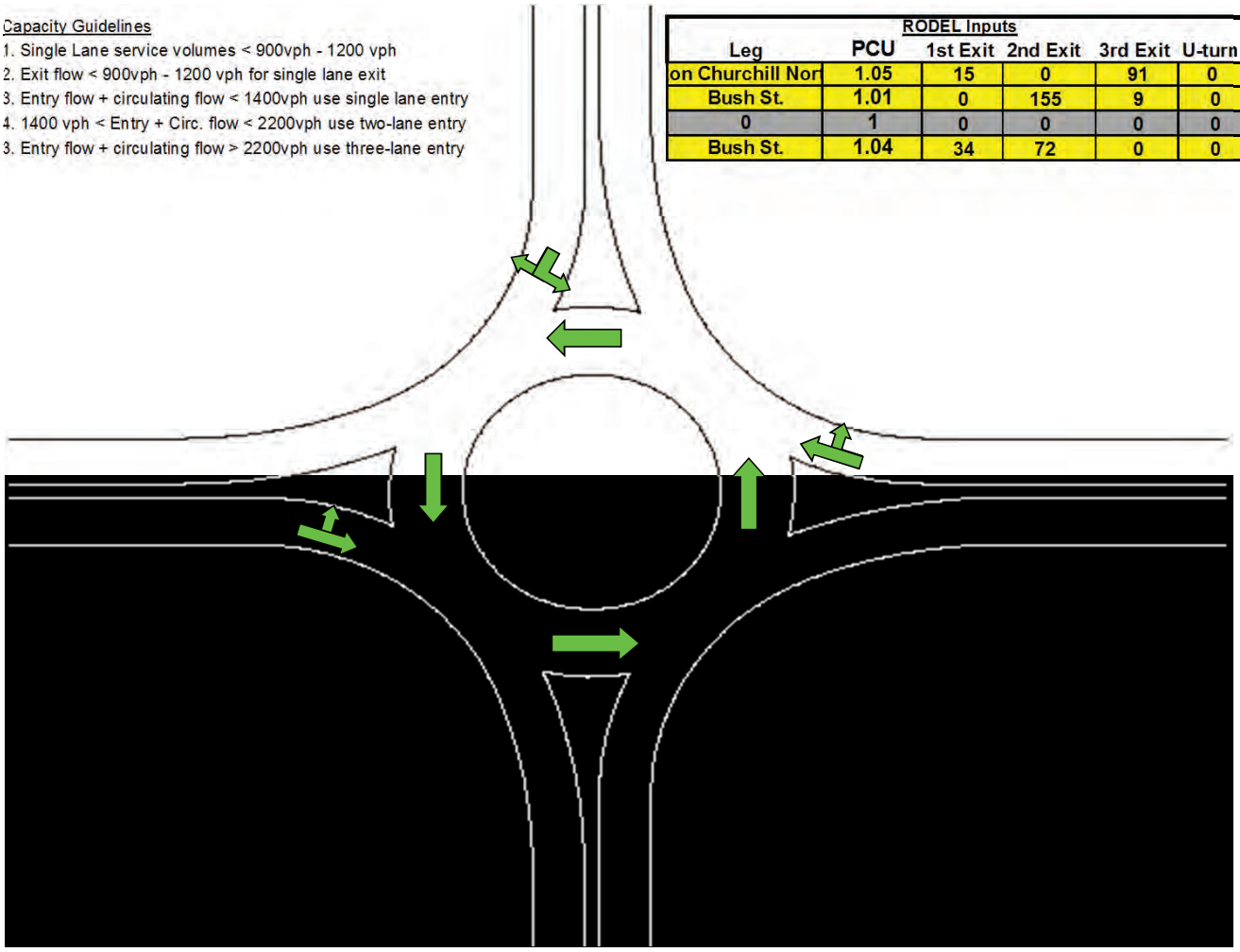


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

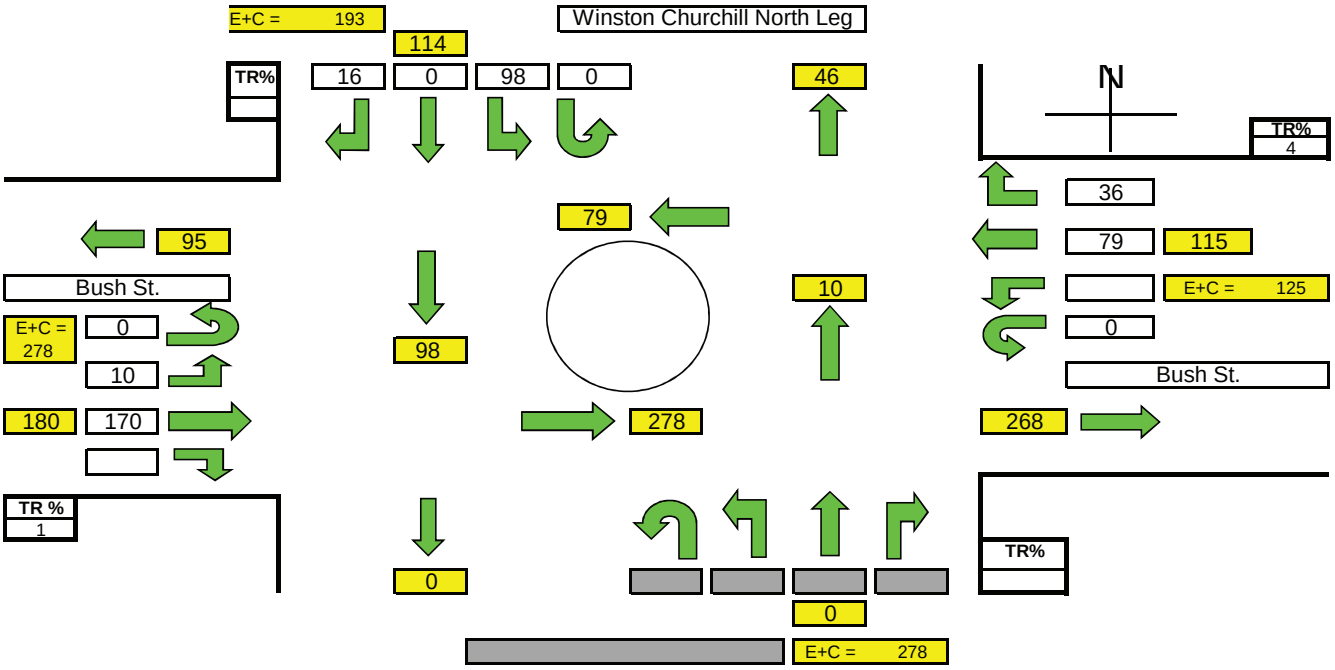
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1.05	15	0	91	0
Bush St.	1.01	0	155	9	0
0	1	0	0	0	0
Bush St.	1.04	34	72	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 8 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: 2021 AM

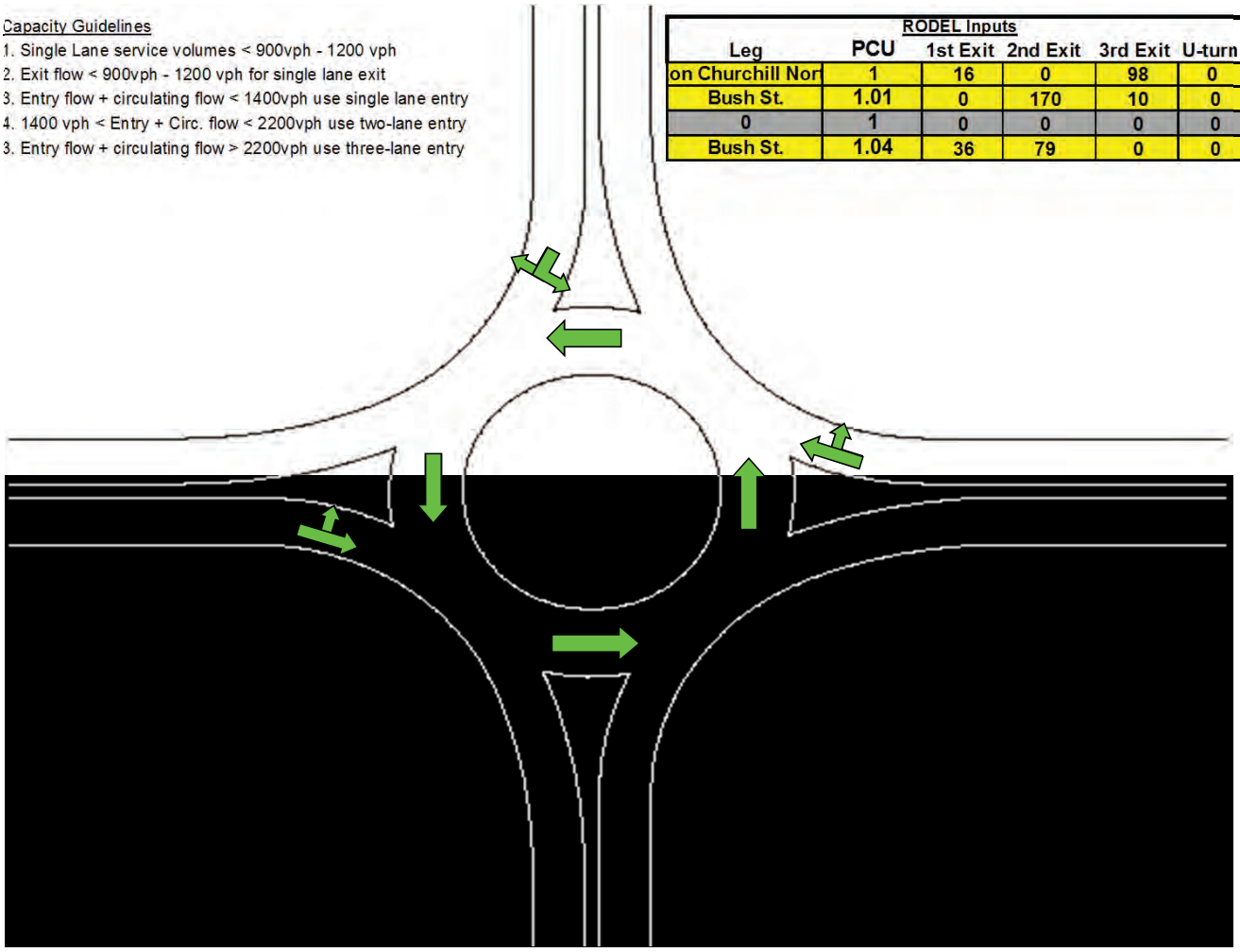


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

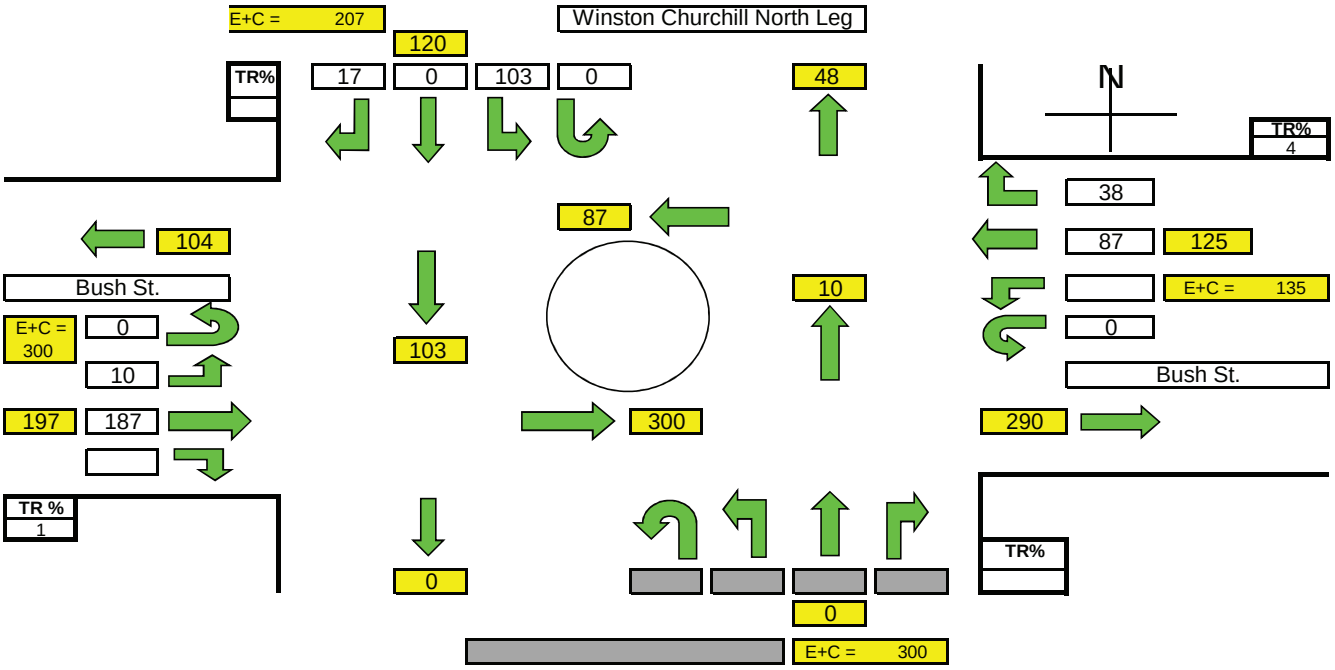
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1	16	0	98	0
Bush St.	1.01	0	170	10	0
0	1	0	0	0	0
Bush St.	1.04	36	79	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 9 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: 2031 AM

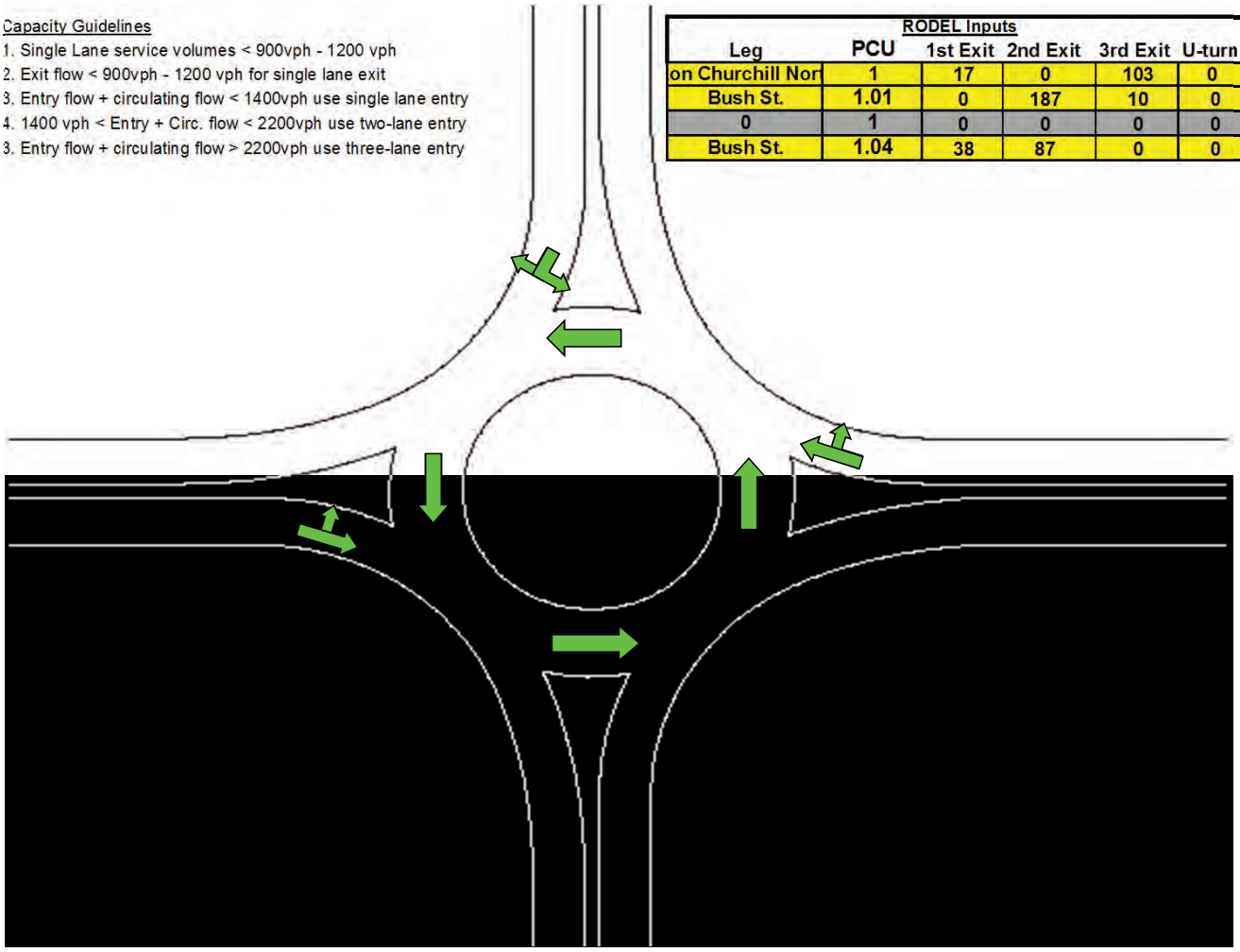


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

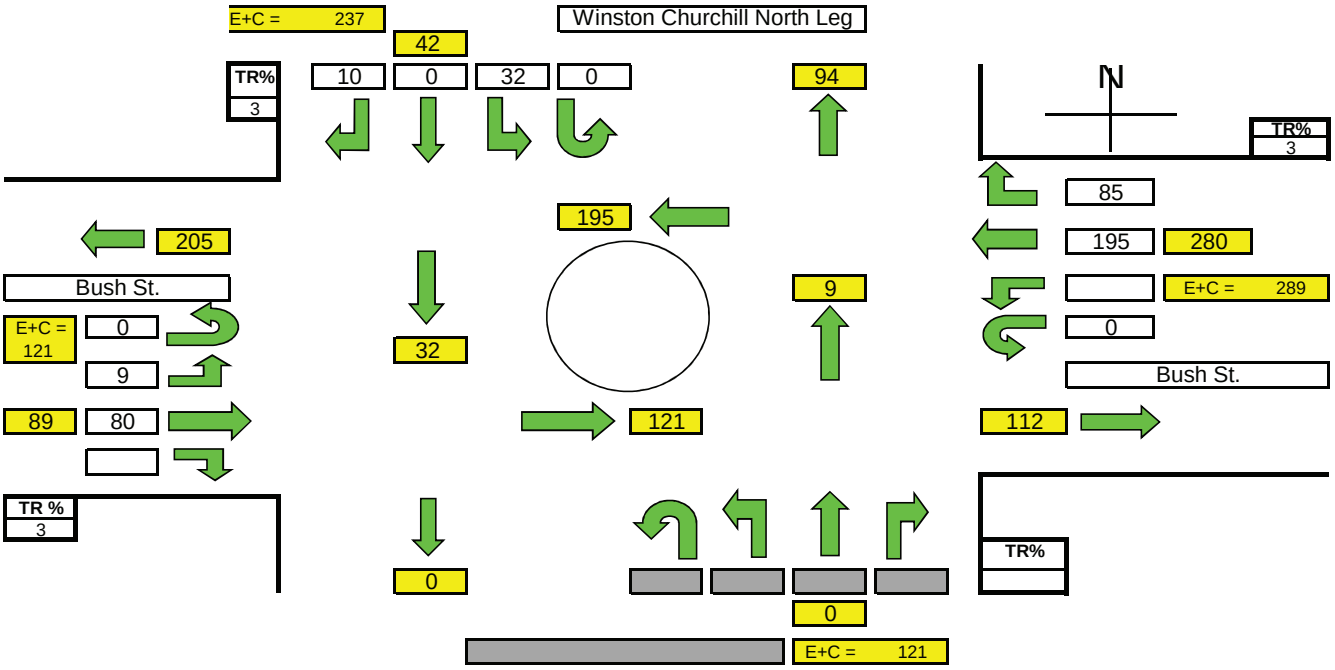
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1	17	0	103	0
Bush St.	1.01	0	187	10	0
0	1	0	0	0	0
Bush St.	1.04	38	87	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 10 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: Existing PM

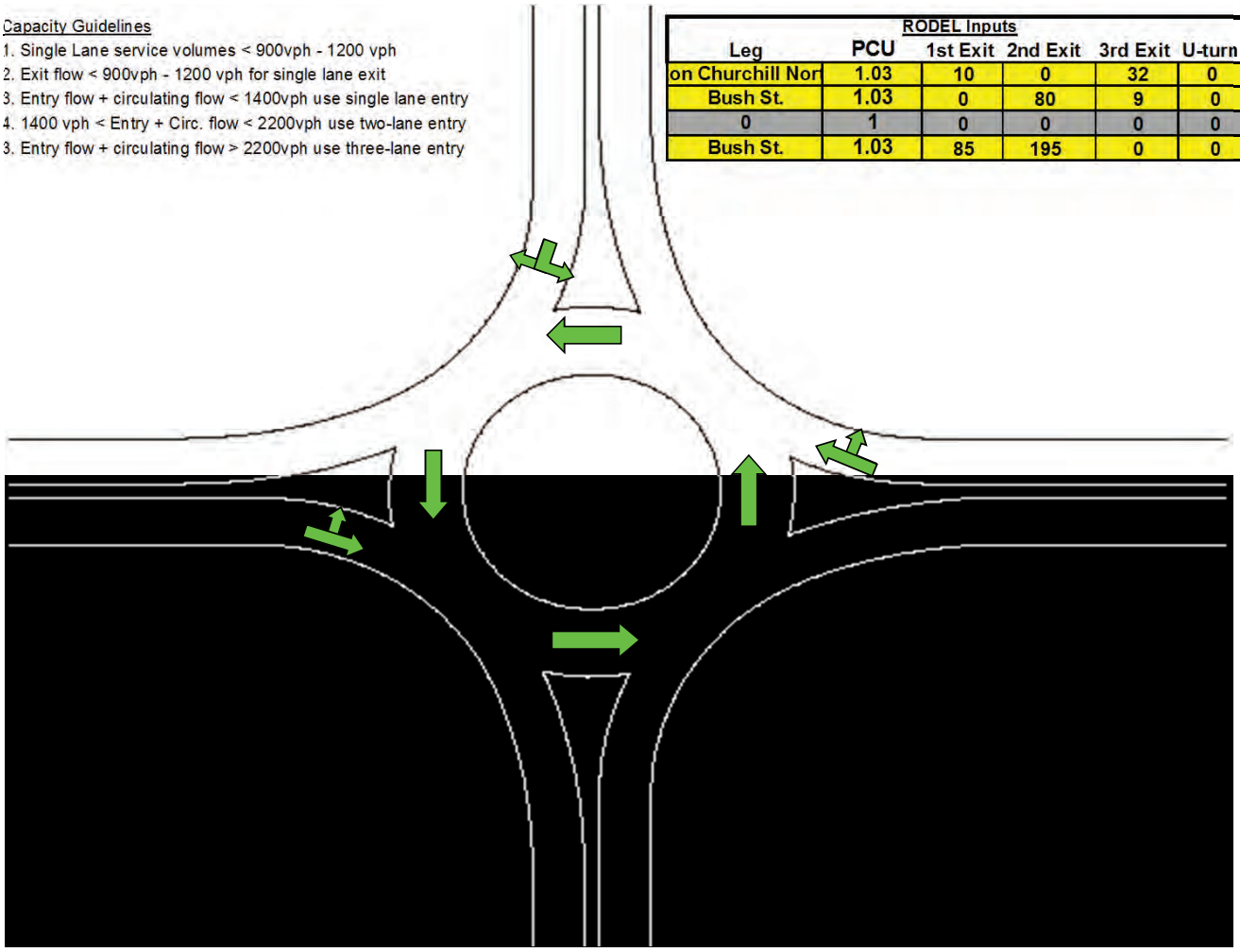


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

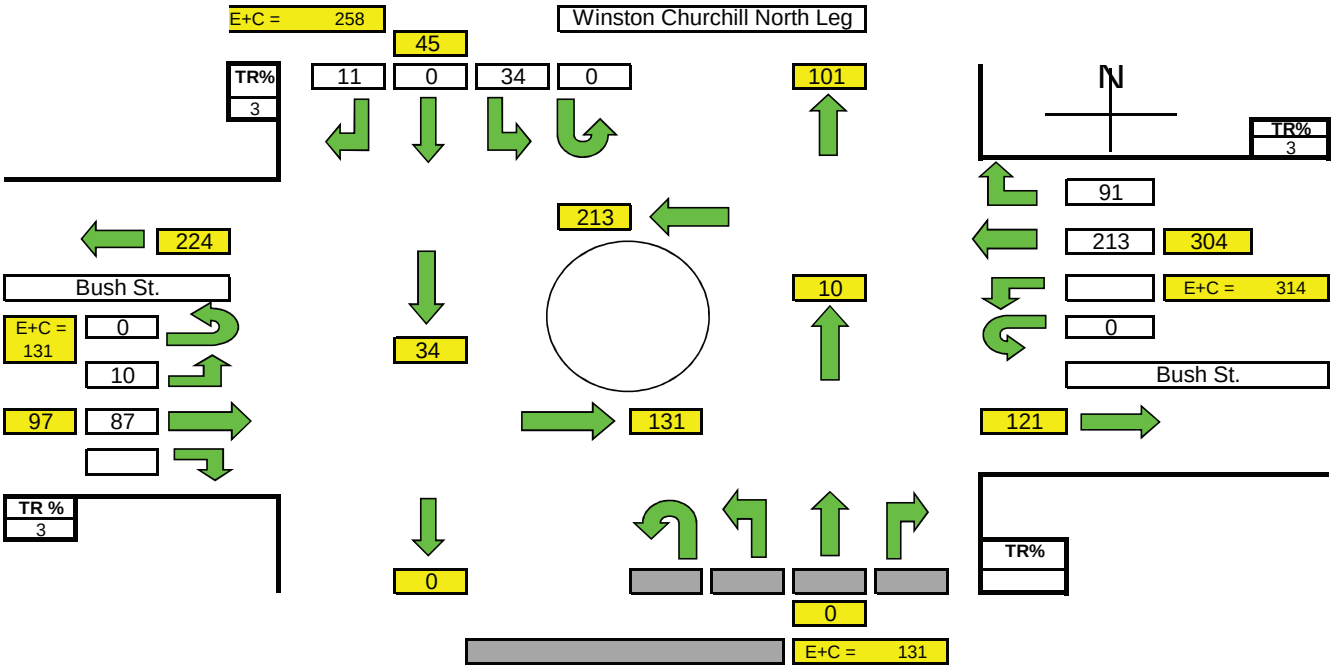
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1.03	10	0	32	0
Bush St.	1.03	0	80	9	0
0	1	0	0	0	0
Bush St.	1.03	85	195	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 11 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: 2021 PM

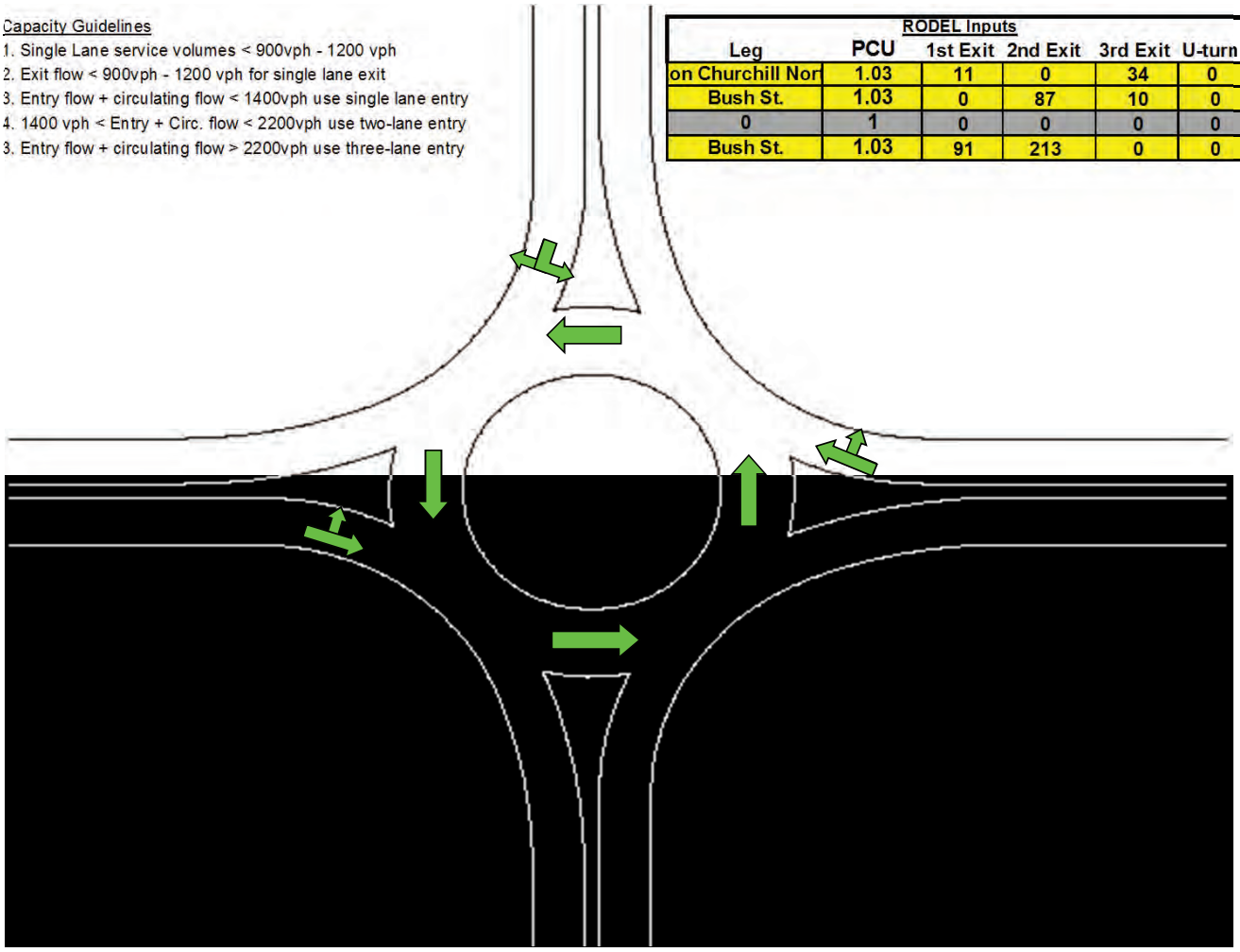


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

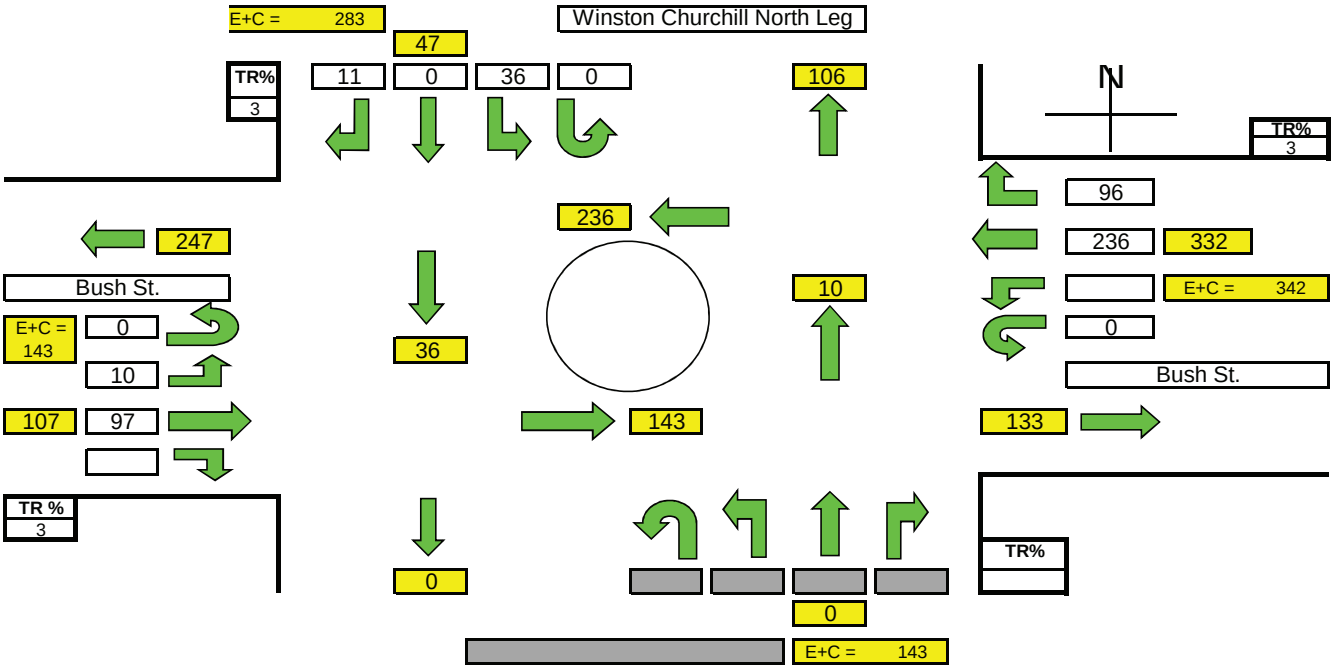
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1.03	11	0	34	0
Bush St.	1.03	0	87	10	0
0	1	0	0	0	0
Bush St.	1.03	91	213	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 12 **of** 12
Intersection: Winston Churchill Blvd North at Bush St.
Time Period: 2031 PM

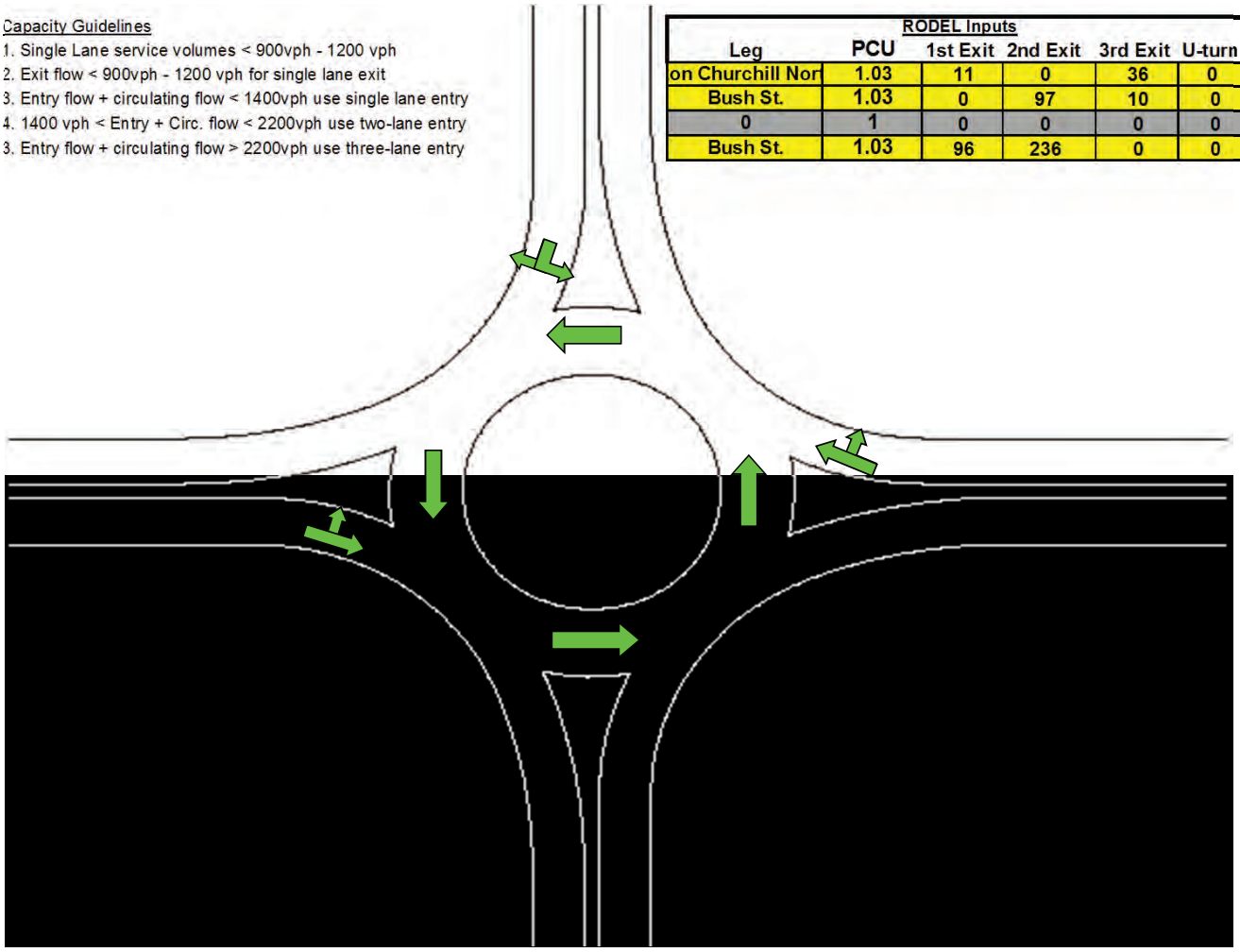


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

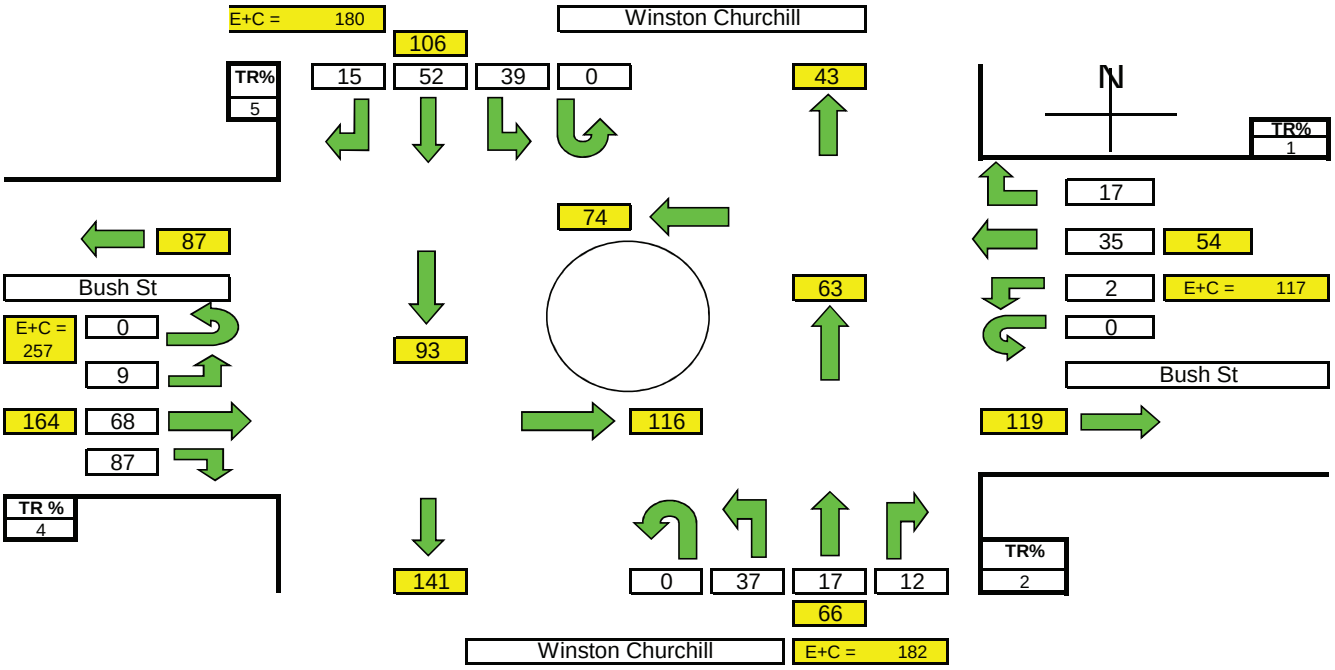
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
on Churchill Nor	1.03	11	0	36	0
Bush St.	1.03	0	97	10	0
0	1	0	0	0	0
Bush St.	1.03	96	236	0	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 1 of 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: Existing AM

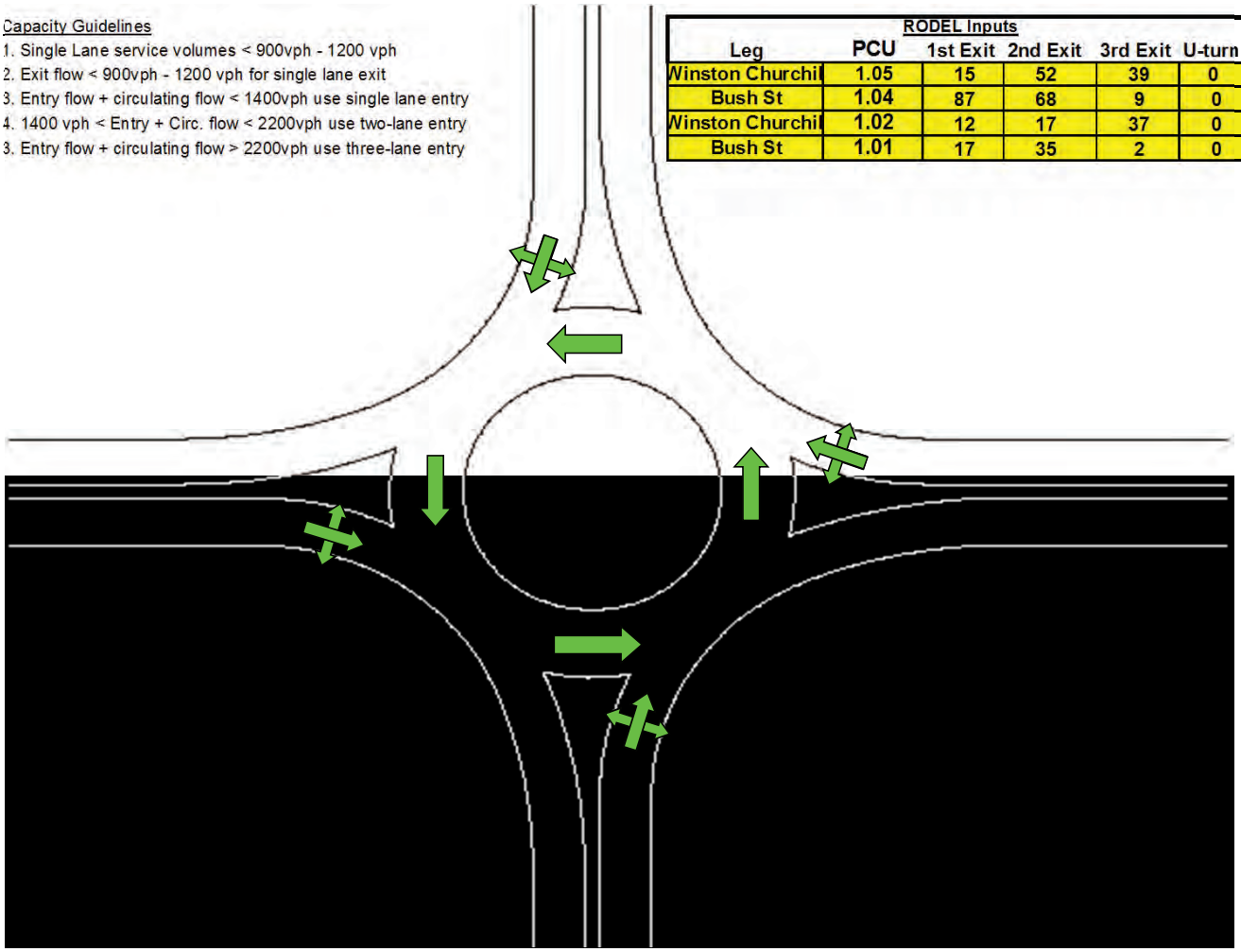


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

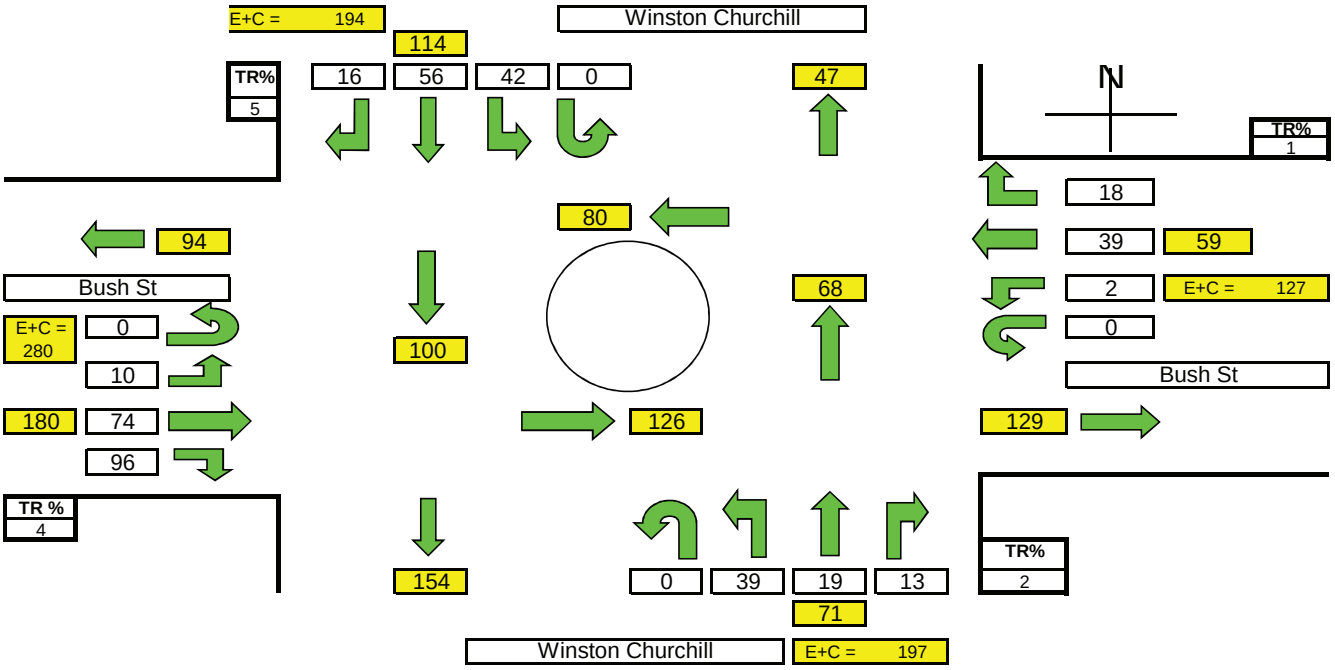
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	15	52	39	0
Bush St	1.04	87	68	9	0
Winston Churchil	1.02	12	17	37	0
Bush St	1.01	17	35	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 2 **of** 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: 2021 AM

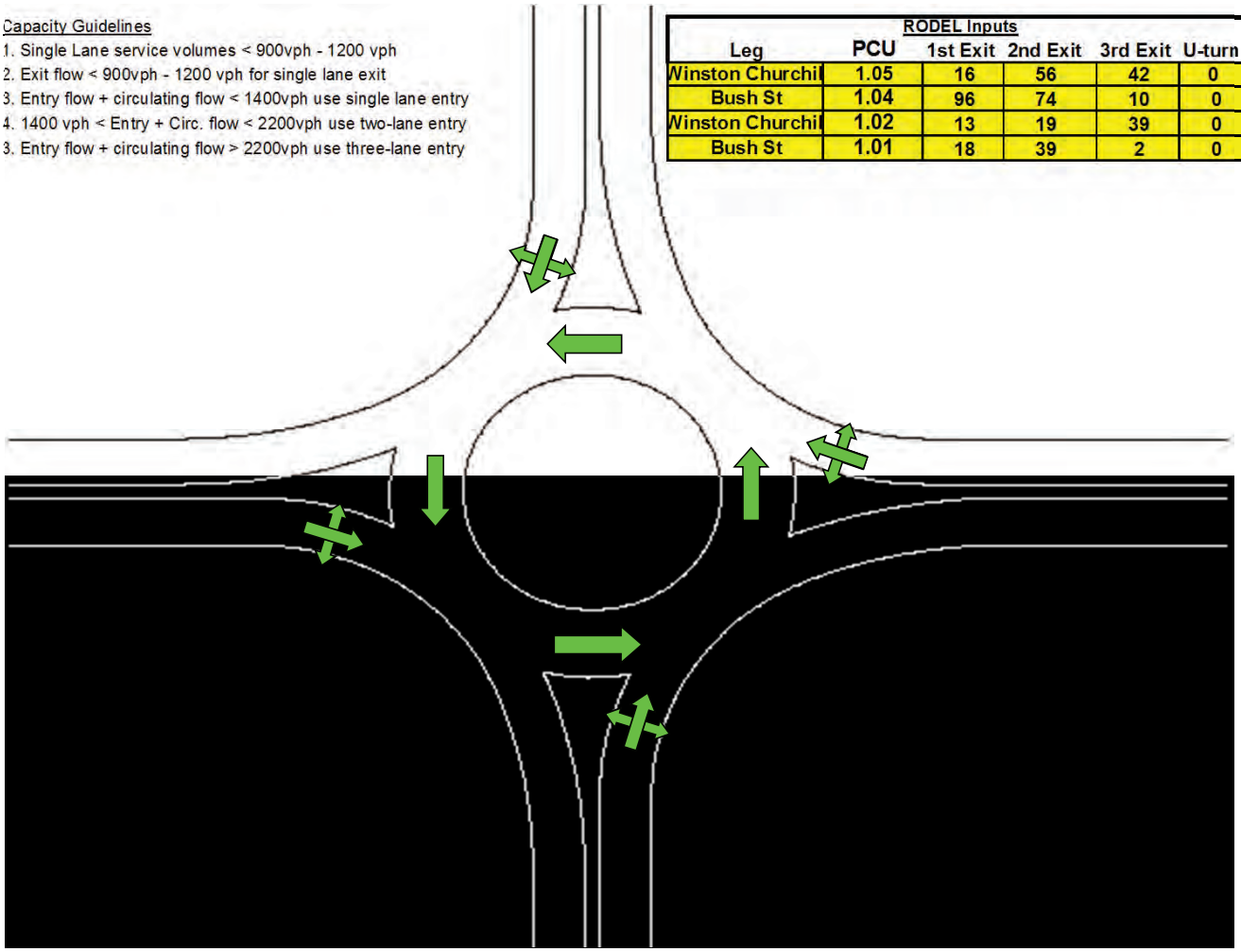


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

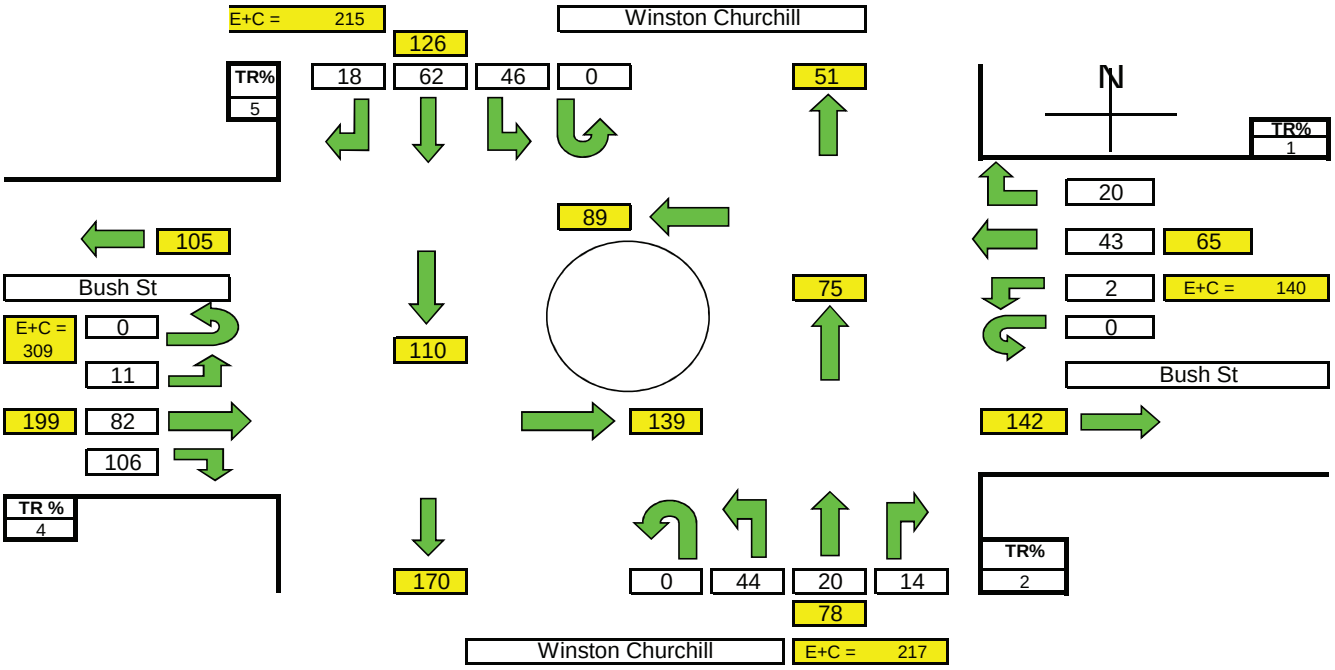
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	16	56	42	0
Bush St	1.04	96	74	10	0
Winston Churchil	1.02	13	19	39	0
Bush St	1.01	18	39	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 3 **of** 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: 2031 AM

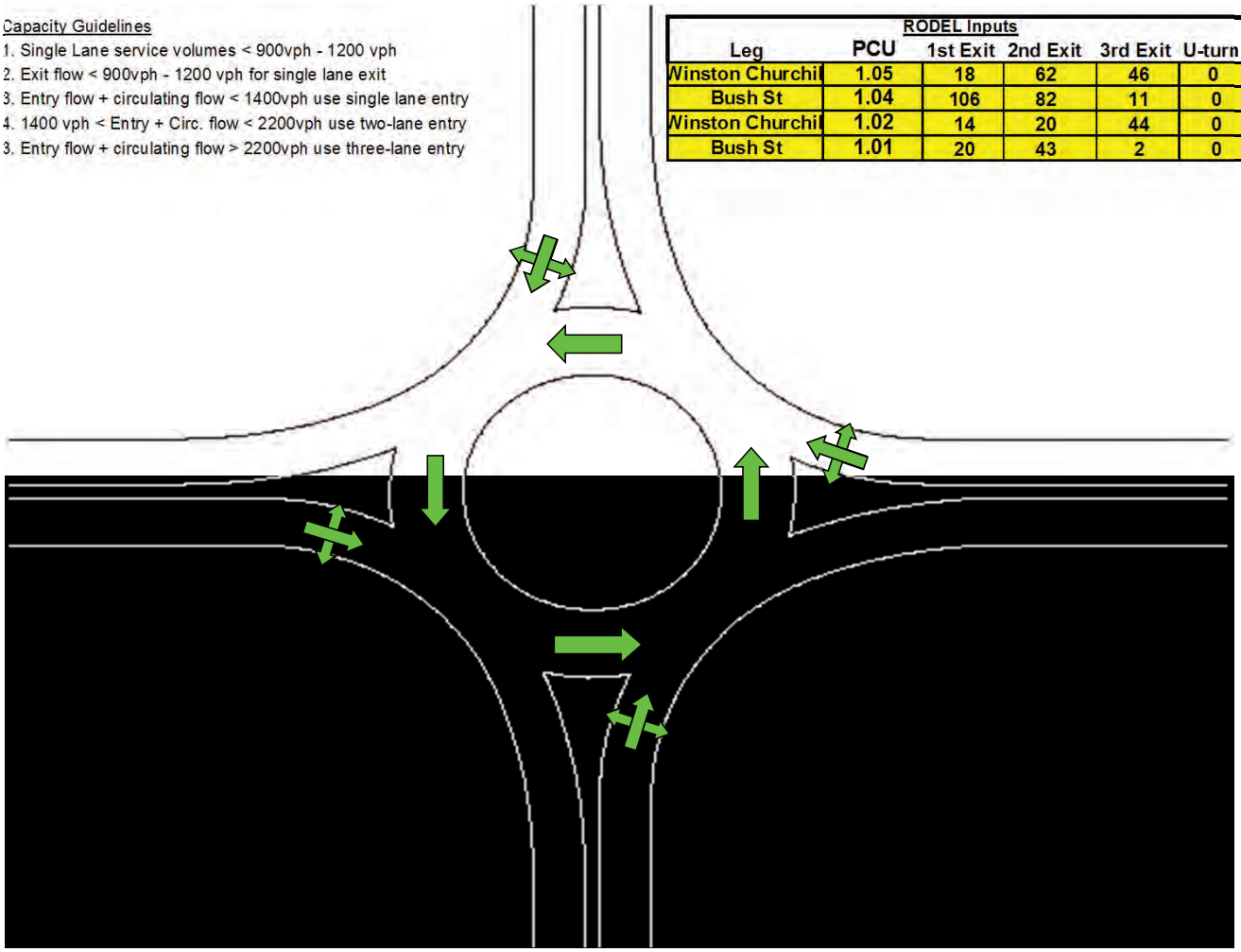


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

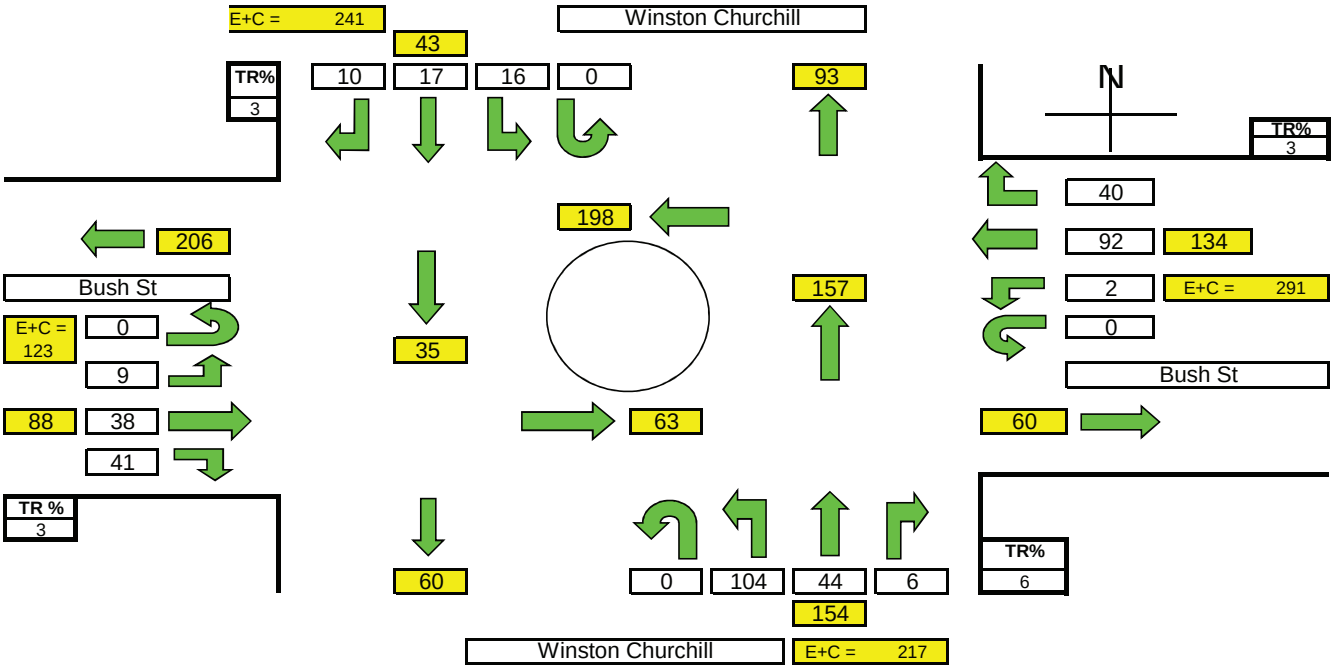
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	18	62	46	0
Bush St	1.04	106	82	11	0
Winston Churchil	1.02	14	20	44	0
Bush St	1.01	20	43	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 4 **of** 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: Existing PM

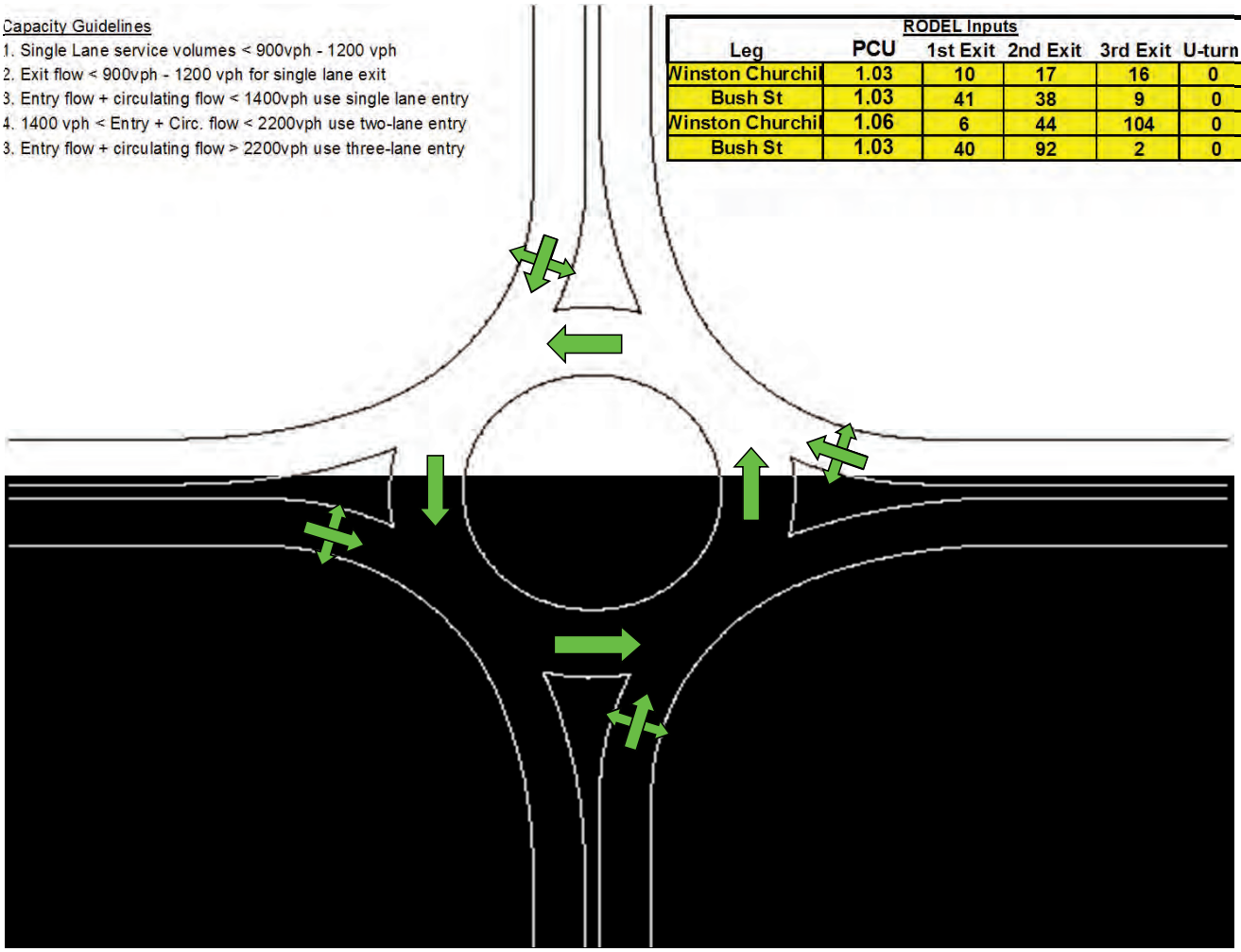


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

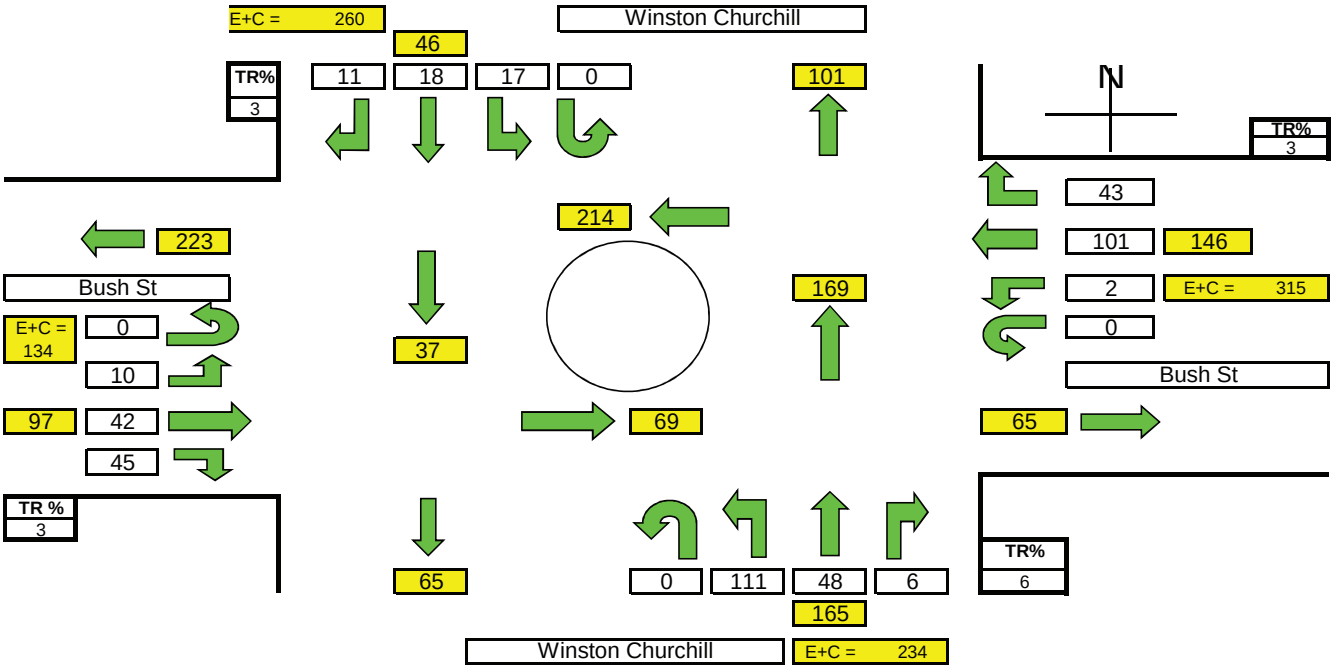
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.03	10	17	16	0
Bush St	1.03	41	38	9	0
Winston Churchil	1.06	6	44	104	0
Bush St	1.03	40	92	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 5 **of** 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: 2021 PM

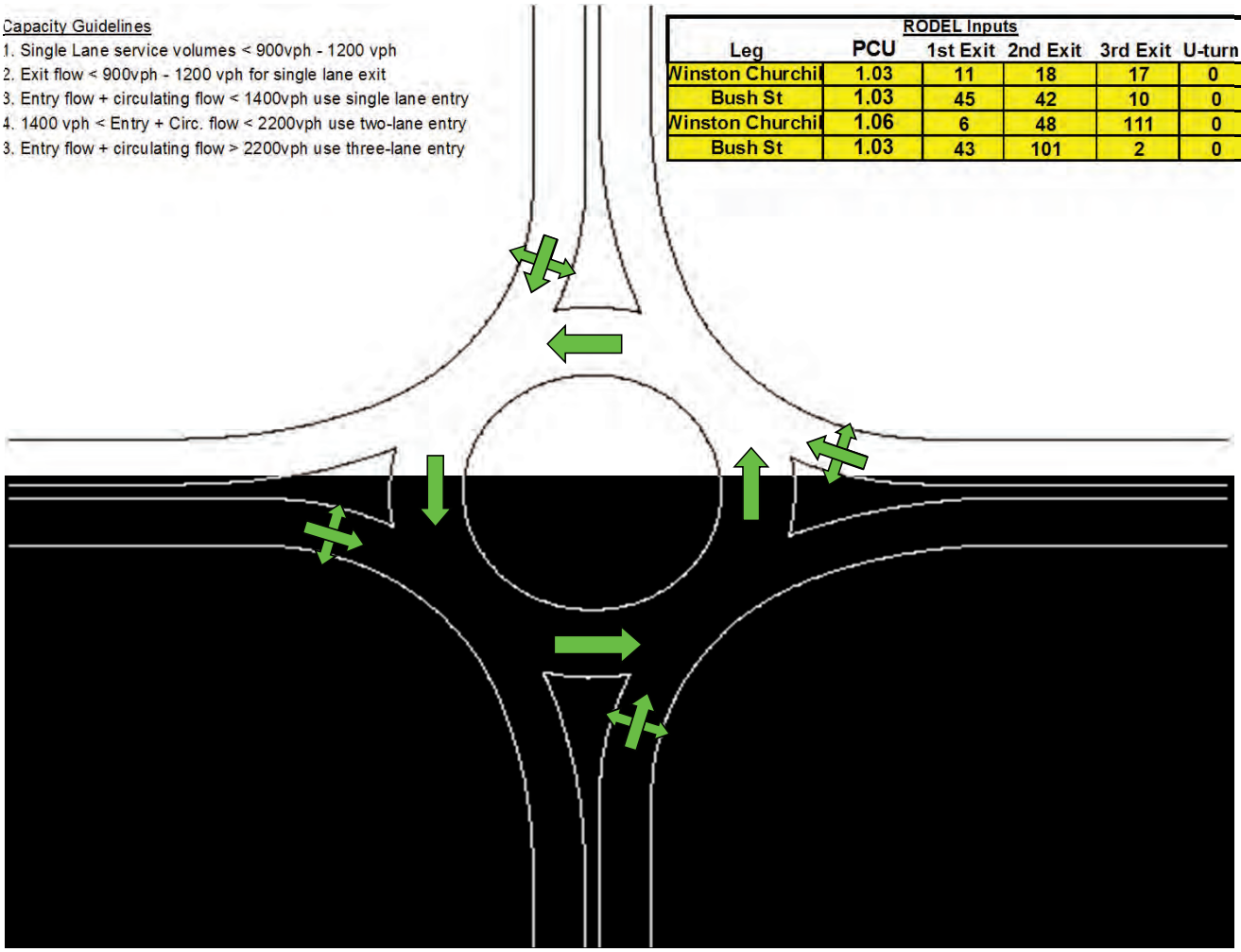


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

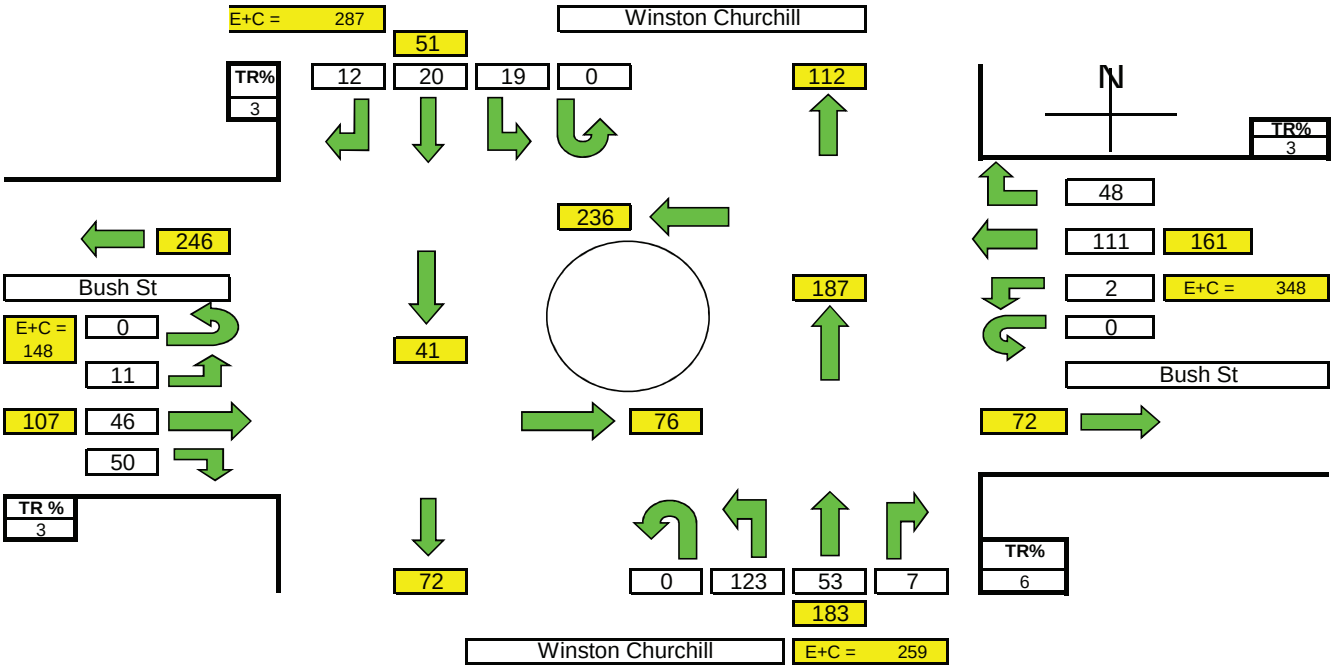
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.03	11	18	17	0
Bush St	1.03	45	42	10	0
Winston Churchil	1.06	6	48	111	0
Bush St	1.03	43	101	2	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 6 **of** 6
Intersection: Realigned Winston Churchill Blvd at Bush St
Time Period: 2031 PM

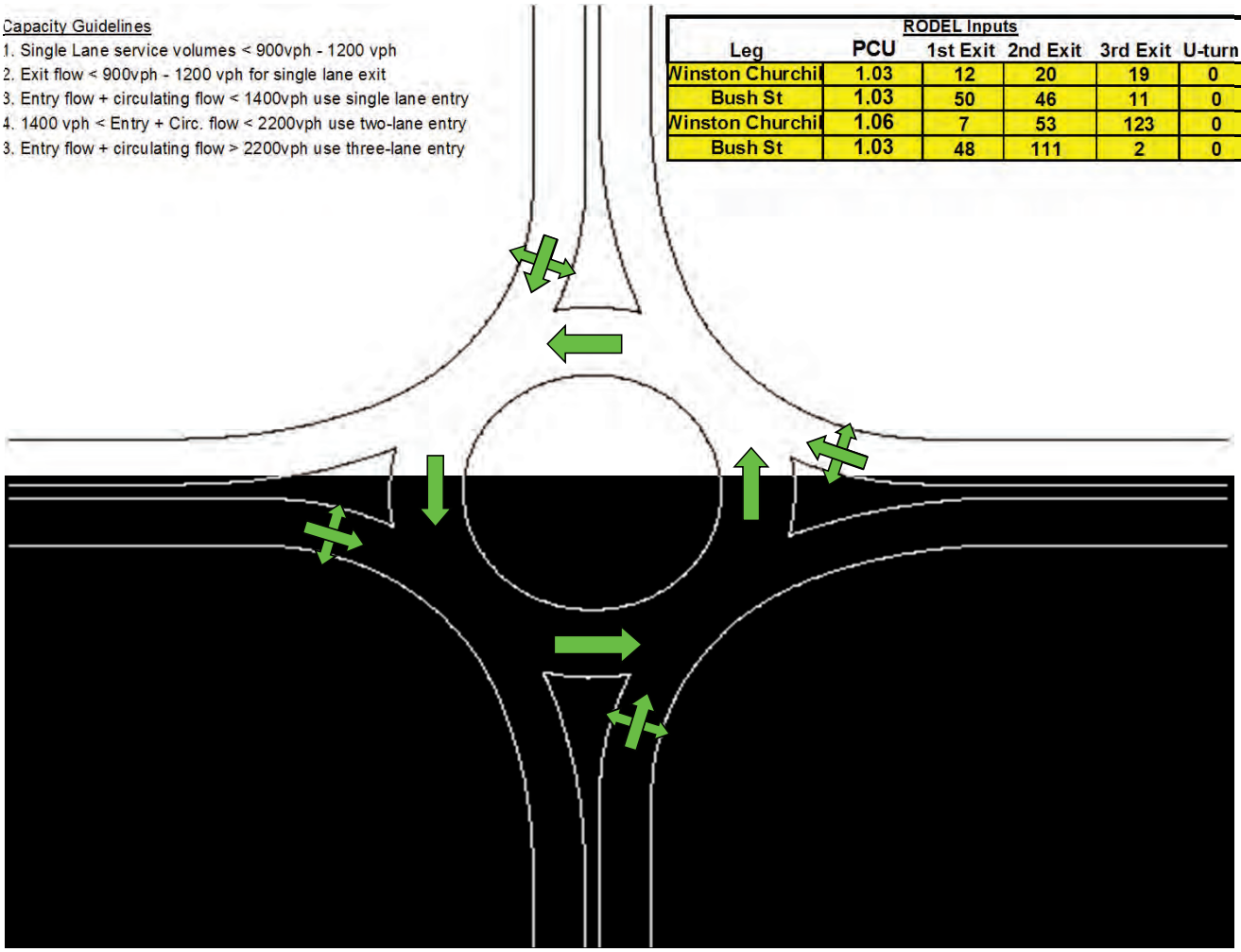


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.03	12	20	19	0
Bush St	1.03	50	46	11	0
Winston Churchil	1.06	7	53	123	0
Bush St	1.03	48	111	2	0



BUSH STREET (TRAVELLED ROAD)

ICD-45m

WINSTON CHURCHILL BOULEVARD

711570003

142720022

142

BUSH STREET
AT WINSTON CHURCHILL BLVD.
PRELIMINARY
ROUNDABOUT LAYOUT (ALTERNATIVE 1)

SCALE: 1:1000

WINSTON CHURCHILL BOULEVARD

711560019

BUSH STREET (TRAVELLED ROAD)

ICD=45m

ICD=45m

142720022

WINSTON CHURCHILL BOULEVARD

711570003

BUSH STREET
AT WINSTON CHURCHILL BLVD.
PRELIMINARY
ROUNDABOUT LAYOUT (ALTERNATIVE 2)
SCALE: 1:1000

BUSH STREET

AT WINSTON CHURCHILL BLVD.

PRELIMINARY

ROUNDABOUT LAYOUT (ALTERNATIVE 3)

SCALE: 1:1000

N

BUSH STREET (TRAVELLED ROAD)

WINSTON CHURCHILL BOULEVARD

ICD-45m

711560019

711570003

142720022

20 year Present Value Injury Collision Costs - Existing unsignalized or future intersections

Winston Churchill Blvd at Bush St

Alternative 1

AADT	3860
Injury Collision Rate	0.71
ACIF	1.000319
ICC	30000
i	0.06
Pvsig	$3,540,420
PVrd	$1,770,210

Implementation Costs

Signal	$100,000
Roundabout	$750,000

Total Life Cycle Costs

Signals	$3,640,420
Roundabout	$2,520,210
Diff	-$1,120,210

Alternative 2

AADT	3860
Injury Collision Rate	0.71
ACIF	1.000319
ICC	30000
i	0.06
Pvsig	$3,540,420
PVrd	$1,770,210

Implementation Costs

Signal	$200,000
Roundabout	$1,500,000

Total Life Cycle Costs

Signals	$3,740,420
Roundabout	$3,270,210
Diff	-$470,210

Alternative 3

AADT	3860
Injury Collision Rate	0.71
ACIF	1.000319
ICC	30000
i	0.06
Pvsig	$3,540,420
PVrd	$1,770,210

Implementation Costs

Signal	$1,100,000
Roundabout	$2,000,000

Total Life Cycle Costs

Signals	$4,640,420
Roundabout	$3,770,210
Diff	-$870,210

ARCADY 8

Version: 8.0.0.296 [27 Feb 2012]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 E-mail: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: WCB at Bush Alternative 1.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool\WCB at Bush
Report generation date: 3/21/2013 4:05:29 PM

Summary of intersection performance

	AM							PM					
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersecti Delay (s)
A1 - 2021													
Bush St.	0.28	?	3.42	0.22	A	3.29	A	0.11	?	3.03	0.10	A	3.27
Winston Churchill South	0.07	?	3.05	0.06	A			0.17	?	3.35	0.14	A	
Bush St	0.05	?	2.98	0.05	A			0.15	?	3.38	0.13	A	
A1 - 2031													
Bush St.	0.30	?	3.49	0.23	A	3.34	A	0.12	?	3.06	0.11	A	3.32
Winston Churchill South	0.07	?	3.08	0.06	A			0.18	?	3.39	0.15	A	
Bush St	0.05	?	2.97	0.05	A			0.17	?	3.45	0.14	A	
A1 - Existing													
Bush St.	0.25	?	3.35	0.20	A	3.23	A	0.10	?	3.01	0.09	A	3.23
Winston Churchill South	0.06	?	3.02	0.06	A			0.16	?	3.31	0.13	A	
Bush St	0.05	?	2.96	0.04	A			0.14	?	3.32	0.12	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - 2021, AM" model duration: 8:00 AM - 9:30 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:30 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:30 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:30 PM
"D6 - 2031, PM " model duration: 5:00 PM - 6:30 PM

Run using ARCADY 8.0.0.296 at 3/21/2013 4:05:26 PM

File summary

File Description

Title	(untitled)
Location	
Site Number	
Date	3/21/2013
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, PM	2031	PM		Varies by Leg	17:00	18:30	90	15				✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
WCB South at BUSH	Roundabout	1,2,3				3.32	A

Intersection Network Options

Driving Side	Lighting	Road Surface

Right	Normal/unknown	(Mini-roundabouts only)

Legs

Legs

Name	Name	Description
Bush St.	Bush St.	
Winston Churchill South	Winston Churchill South	
Bush St	Bush St	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush St.	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00
Bush St	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush St.	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	
Bush St	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush St.	None
Winston Churchill South	None
Bush St	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush St.		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445
Bush St		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
Bush St.	ONE HOUR	✓	130.00	100.000
Winston Churchill South	ONE HOUR	✓	174.00	100.000
Bush St	ONE HOUR	✓	161.00	100.000

Turning Proportions

Turning Counts or Proportions (PCE/hr) - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	0.000	65.000	65.000
	2	167.000	0.000	7.000
	3	159.000	2.000	0.000

Turning Proportions (PCE) - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	0.00	0.50	0.50
	2	0.96	0.00	0.04
	3	0.99	0.01	0.00

Vehicle Mix

Average PCE Per Vehicle - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	1.000	1.030	1.030
	2	1.060	1.000	1.060
	3	1.030	1.030	1.000

Truck Percentages - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	0.000	3.000	3.000
	2	6.000	0.000	6.000
	3	3.000	3.000	0.000

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
Bush St.	0.11	3.06	0.12	?	A	119.29	178.94	8.93	2.99	0.10	8.93	2.99

Winston Churchill South	0.15	3.39	0.18	?	A	159.67	239.50	13.09	3.28	0.15	13.10	3.28
Bush St	0.14	3.45	0.17	?	A	147.74	221.60	12.23	3.31	0.14	12.23	3.31

Main Results for each time segment

Main results: (17:00-17:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	97.87	24.47	97.55	244.56	1.50	0.00	1356.58	1351.55	0.072	0.00	0.08	2.945	A
Winston Churchill South	131.00	32.75	130.53	50.28	48.78	0.00	1329.22	966.34	0.099	0.00	0.12	3.183	A
Bush St	121.21	30.30	120.78	54.03	125.28	0.00	1284.94	820.67	0.094	0.00	0.11	3.185	A

Main results: (17:15-17:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	116.87	29.22	116.80	292.87	1.80	0.00	1356.41	1351.55	0.086	0.08	0.10	2.990	A
Winston Churchill South	156.42	39.11	156.32	60.20	58.40	0.00	1323.65	966.34	0.118	0.12	0.14	3.268	A
Bush St	144.74	36.18	144.64	64.69	150.03	0.00	1270.61	820.67	0.114	0.11	0.13	3.292	A

Main results: (17:30-17:45)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	143.13	35.78	143.04	358.64	2.20	0.00	1356.17	1351.55	0.106	0.10	0.12	3.056	A
Winston Churchill South	191.58	47.89	191.42	73.72	71.52	0.00	1316.05	966.34	0.146	0.14	0.18	3.392	A
Bush St	177.26	44.32	177.11	79.22	183.72	0.00	1251.11	820.67	0.142	0.13	0.17	3.452	A

Main results: (17:45-18:00)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	143.13	35.78	143.13	358.93	2.20	0.00	1356.17	1351.55	0.106	0.12	0.12	3.056	A
Winston Churchill South	191.58	47.89	191.58	73.77	71.57	0.00	1316.03	966.34	0.146	0.18	0.18	3.392	A
Bush St	177.26	44.32	177.26	79.27	183.87	0.00	1251.03	820.67	0.142	0.17	0.17	3.452	A

Main results: (18:00-18:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	116.87	29.22	116.96	293.36	1.80	0.00	1356.40	1351.55	0.086	0.12	0.10	2.993	A
Winston Churchill South	156.42	39.11	156.57	60.28	58.48	0.00	1323.60	966.34	0.118	0.18	0.14	3.269	A
Bush St	144.74	36.18	144.88	64.78	150.27	0.00	1270.47	820.67	0.114	0.17	0.13	3.296	A

Main results: (18:15-18:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St.	97.87	24.47	97.94	245.63	1.51	0.00	1356.57	1351.55	0.072	0.10	0.08	2.947	A
Winston Churchill South	131.00	32.75	131.10	50.48	48.97	0.00	1329.10	966.34	0.099	0.14	0.12	3.187	A
Bush St	121.21	30.30	121.31	54.24	125.83	0.00	1284.62	820.67	0.094	0.13	0.11	3.189	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.18	0.08	2.945	A	A
Winston Churchill South	1.70	0.11	3.183	A	A
Bush St	1.57	0.10	3.185	A	A

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.44	0.10	2.990	A	A
Winston Churchill South	2.10	0.14	3.268	A	A
Bush St	1.95	0.13	3.292	A	A

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.80	0.12	3.056	A	A
Winston Churchill South	2.66	0.18	3.392	A	A
Bush St	2.51	0.17	3.452	A	A

Queueing Delay results: (17:45-18:00)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.82	0.12	3.056	A	A
Winston Churchill South	2.70	0.18	3.392	A	A
Bush St	2.54	0.17	3.452	A	A

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.48	0.10	2.993	A	A
Winston Churchill South	2.17	0.14	3.269	A	A
Bush St	2.02	0.13	3.296	A	A

Queueing Delay results: (18:15-18:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St.	1.22	0.08	2.947	A	A
Winston Churchill South	1.77	0.12	3.187	A	A

Bush St	1.64	0.11	3.189	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-17:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St.	0.08	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.11	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St.	0.10	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.14	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St.	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.18	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.17	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St.	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.18	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.17	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (18:00-18:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

Bush St.	0.10	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.14	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (18:15-18:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St.	0.08	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill South	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Bush St	0.11	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

ARCADY 8

Filename: WCB at Bush Alternative 2.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool\WCB at Bush
Report generation date: 3/21/2013 3:45:36 PM

Summary of intersection performance

	AM							PM					
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersecti Delay (s)
	A1 - 2021												
WCB South at BUSH - Bush St.	0.28	?	3.43	0.22	A			0.11	?	3.03	0.10	A	
WCB South at BUSH - Winston Churchill South	0.07	?	3.05	0.06	A	3.29	A	0.17	?	3.35	0.14	A	3.27
WCB South at BUSH - Bush St	0.05	?	2.98	0.05	A			0.15	?	3.38	0.13	A	
WCB North at BUSH - Winston Churchill North	0.11	?	3.20	0.10	A			0.04	?	3.16	0.04	A	
WCB North at BUSH - Bush St	0.18	?	3.31	0.15	A	3.21	A	0.09	?	3.02	0.08	A	3.46
WCB North at BUSH - Bush St.	0.11	?	3.06	0.09	A			0.34	?	3.64	0.25	A	
	A1 - 2031												
WCB South at BUSH - Bush St.	0.31	?	3.51	0.24	A			0.12	?	3.06	0.11	A	
WCB South at													

BUSH - Winston Churchill South	0.07	?	3.08	0.06	A	3.36	A	0.18	?	3.40	0.15	A	3.32
WCB South at BUSH - Bush St	0.05	?	2.97	0.05	A			0.17	?	3.45	0.14	A	
WCB North at BUSH - Winston Churchill North	0.12	?	3.22	0.10	A	3.25	A	0.05	?	3.20	0.04	A	3.53
WCB North at BUSH - Bush St	0.20	?	3.38	0.17	A			0.10	?	3.05	0.09	A	
WCB North at BUSH - Bush St.	0.11	?	3.05	0.09	A			0.37	?	3.74	0.27	A	
	A1 - Existing												
WCB South at BUSH - Bush St.	0.25	?	3.35	0.20	A	3.23	A	0.10	?	3.01	0.09	A	3.23
WCB South at BUSH - Winston Churchill South	0.06	?	3.02	0.06	A			0.16	?	3.31	0.13	A	
WCB South at BUSH - Bush St	0.05	?	2.96	0.04	A			0.14	?	3.32	0.12	A	
WCB North at BUSH - Winston Churchill North	0.10	?	3.16	0.09	A	3.16	A	0.04	?	3.12	0.04	A	3.39
WCB North at BUSH - Bush St	0.16	?	3.25	0.14	A			0.08	?	2.99	0.07	A	
WCB North at BUSH - Bush St.	0.10	?	3.03	0.09	A			0.30	?	3.55	0.23	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - 2021, AM" model duration: 8:00 AM - 9:30 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:30 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:30 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:30 PM
"D6 - 2031, PM " model duration: 5:00 PM - 6:30 PM

Run using ARCADY 8.0.0.296 at 3/21/2013 3:45:29 PM

File summary

File Description

Title	(untitled)
Location	

Site Number	
Date	3/21/2013
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Linked Roundabout	WCB South at BUSH - Bush St.	If the distance between linked intersections is small, results should be treated with caution. The linked intersections will be modelled as separate intersections, but the real behaviour may be that of a complex system with interactions that cannot be modelled.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Linked Roundabout	WCB North at BUSH - Bush St.	If the distance between linked intersections is small, results should be treated with caution. The linked intersections will be modelled as separate intersections, but the real behaviour may be that of a complex system with interactions that cannot be modelled.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, PM	2031	PM		Varies by Leg	17:00	18:30	90	15				✓		

Intersection Network

Intersections

Junction	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS

1	WCB South at BUSH	Roundabout	1,2,3				3.32	A
2	WCB North at BUSH	Roundabout	1,2,3				3.53	A

Intersection Network Options

Driving Side	Lighting	Road Surface
Right	Normal/unknown	(Mini-roundabouts only)

Legs

Legs

Name	Name	Name	Description
WCB South at BUSH	**Bush St.**	Bush St.	
WCB South at BUSH	**Winston Churchill South**	Winston Churchill South	
WCB South at BUSH	**Bush St**	Bush St	
WCB North at BUSH	**Winston Churchill North**	Winston Churchill North	
WCB North at BUSH	**Bush St**	Bush St	
WCB North at BUSH	**Bush St.**	Bush St.	

Capacity Options

Name	Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
WCB South at BUSH	**Bush St.**	0.00	99999.00		0.00
WCB South at BUSH	**Winston Churchill South**	0.00	99999.00		0.00
WCB South at BUSH	**Bush St**	0.00	99999.00		0.00
WCB North at BUSH	**Winston Churchill North**	0.00	99999.00		0.00
WCB North at BUSH	**Bush St**	0.00	99999.00		0.00
WCB North at BUSH	**Bush St.**	0.00	99999.00		0.00

Roundabout Geometry

Name	Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
WCB South at BUSH	**Bush St.**	3.50	4.50	30.00	20.00	40.00	25.00	
WCB South at BUSH	**Winston Churchill South**	3.50	4.50	30.00	20.00	40.00	25.00	
WCB South at BUSH	**Bush St**	3.50	4.50	30.00	20.00	40.00	25.00	
WCB North at BUSH	**Winston Churchill North**	3.50	4.50	30.00	20.00	40.00	25.00	
WCB North at BUSH	**Bush St**	3.50	4.50	30.00	20.00	40.00	25.00	
WCB North at BUSH	**Bush St.**	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Name	Crossing Type
WCB South at BUSH	**Bush St.**	None
WCB South at BUSH	**Winston Churchill South**	None
WCB South at BUSH	**Bush St**	None
WCB North at BUSH	**Winston Churchill North**	None
WCB North at BUSH	**Bush St**	None
WCB North at BUSH	**Bush St.**	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
WCB South at BUSH	Bush St.		(calculated)	(calculated)	0.579	1357.445
WCB South at BUSH	Winston Churchill South		(calculated)	(calculated)	0.579	1357.445
WCB South at BUSH	Bush St		(calculated)	(calculated)	0.579	1357.445
WCB North at BUSH	Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
WCB North at BUSH	Bush St		(calculated)	(calculated)	0.579	1357.445
WCB North at BUSH	Bush St.		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Name	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
WCB South at BUSH	Bush St.	Linked Leg		N/A	N/A
WCB South at BUSH	Winston Churchill South	ONE HOUR	✓	174.00	100.000
WCB South at BUSH	Bush St	ONE HOUR	✓	161.00	100.000
WCB North at BUSH	Winston Churchill North	ONE HOUR	✓	47.00	100.000
WCB North at BUSH	Bush St	ONE HOUR	✓	107.00	100.000
WCB North at BUSH	Bush St.	Linked Leg		N/A	N/A

Linked Leg Data

Name	Name	From Intersection ID	From Leg ID	Link Type	Flow Source	Uniform Flow (PCE/hr)	Flow Multiplier (%)	Internal Storage Space (PCE)
WCB South at BUSH	Bush St.	2	3	Simple (vertical queueing)	Normal	0.00	100.00	N/A
WCB North at BUSH	Bush St.	1	1	Simple (vertical queueing)	Normal	0.00	100.00	N/A

Turning Proportions

Turning Counts or Proportions (PCE/hr) - WCB South at BUSH (for whole period)

	To

		To		
		1	2	3
From	1	0.000	65.000	65.000
	2	167.000	0.000	7.000
	3	159.000	2.000	0.000

Turning Proportions (PCE) - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	0.00	0.50	0.50
	2	0.96	0.00	0.04
	3	0.99	0.01	0.00

Turning Counts or Proportions (PCE/hr) - WCB North at BUSH (for whole period)

		To		
		1	2	3
From	1	0.000	11.000	36.000
	2	10.000	0.000	97.000
	3	96.000	236.000	0.000

Turning Proportions (PCE) - WCB North at BUSH (for whole period)

		To		
		1	2	3
From	1	0.00	0.23	0.77
	2	0.09	0.00	0.91
	3	0.29	0.71	0.00

Vehicle Mix

Average PCE Per Vehicle - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	1.000	1.030	1.030
	2	1.060	1.000	1.060
	3	1.030	1.030	1.000

Truck Percentages - WCB South at BUSH (for whole period)

		To		
		1	2	3
From	1	0.000	3.000	3.000
	2	6.000	0.000	6.000
	3	3.000	3.000	0.000

Average PCE Per Vehicle - WCB North at BUSH (for whole period)

		To		
		1	2	3
From	1	1.000	1.030	1.030
	2	1.030	1.000	1.030
	3	1.030	1.030	1.000

Truck Percentages - WCB North at BUSH (for whole period)

	To

From		1	2	3
	1	0.000	3.000	3.000
	2	3.000	0.000	3.000
	3	3.000	3.000	0.000

Results

Results Summary for whole modelled period

Name	Name	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
WCB South at BUSH	Bush St.	0.11	3.06	0.12	?	A	121.99	182.98	9.15	3.00	0.10	9.15	3.00
WCB South at BUSH	Winston Churchill South	0.15	3.40	0.18	?	A	159.67	239.50	13.10	3.28	0.15	13.10	3.28
WCB South at BUSH	Bush St	0.14	3.45	0.17	?	A	147.74	221.60	12.23	3.31	0.14	12.23	3.31
WCB North at BUSH	Winston Churchill North	0.04	3.20	0.05	?	A	43.13	64.69	3.35	3.11	0.04	3.35	3.11
WCB North at BUSH	Bush St	0.09	3.05	0.10	?	A	98.19	147.28	7.33	2.99	0.08	7.33	2.99
WCB North at BUSH	Bush St.	0.27	3.74	0.37	?	A	299.00	448.50	26.41	3.53	0.29	26.41	3.53

Main Results for each time segment

Main results: (17:00-17:15)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	99.80	24.95	99.47	244.56	1.50	0.00	1356.58	1351.55	0.074	0.00	0.08	2.949	A
WCB South at BUSH	Winston Churchill South	131.00	32.75	130.53	51.24	49.74	0.00	1328.66	966.34	0.099	0.00	0.12	3.185	A
WCB South at BUSH	Bush St	121.21	30.30	120.78	54.99	125.28	0.00	1284.94	820.67	0.094	0.00	0.11	3.185	A

WCB North at BUSH	Winston Churchill North	35.38	8.85	35.27	77.96	173.20	0.00	1257.20	821.09	0.028	0.00	0.03	3.034	A
WCB North at BUSH	Bush St	80.56	20.14	80.29	181.46	27.01	0.00	1341.81	993.45	0.060	0.00	0.07	2.939	A
WCB North at BUSH	Bush St.	244.56	61.14	243.66	99.80	7.50	0.00	1353.10	1303.71	0.181	0.00	0.23	3.338	A

Main results: (17:15-17:30)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	119.49	29.87	119.42	292.87	1.80	0.00	1356.41	1351.55	0.088	0.08	0.10	2.997	A
WCB South at BUSH	Winston Churchill South	156.42	39.11	156.32	61.51	59.71	0.00	1322.89	966.34	0.118	0.12	0.14	3.270	A
WCB South at BUSH	Bush St	144.74	36.18	144.64	66.00	150.03	0.00	1270.61	820.67	0.114	0.11	0.13	3.292	A
WCB North at BUSH	Winston Churchill North	42.25	10.56	42.23	93.60	208.02	0.00	1237.05	821.09	0.034	0.03	0.04	3.102	A
WCB North at BUSH	Bush St	96.19	24.05	96.14	217.90	32.34	0.00	1338.73	993.45	0.072	0.07	0.08	2.983	A
WCB North at BUSH	Bush St.	292.87	73.22	292.64	119.49	8.98	0.00	1352.25	1303.71	0.217	0.23	0.28	3.499	A

Main results: (17:30-17:45)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	146.33	36.58	146.23	358.64	2.20	0.00	1356.17	1351.55	0.108	0.10	0.12	3.064	A
WCB South at BUSH	Winston Churchill South	191.58	47.89	191.42	75.32	73.12	0.00	1315.13	966.34	0.146	0.14	0.18	3.395	A
WCB South at BUSH	Bush St	177.26	44.32	177.11	80.82	183.72	0.00	1251.11	820.67	0.142	0.13	0.17	3.452	A
WCB North at BUSH	Winston Churchill North	51.75	12.94	51.71	114.60	254.69	0.00	1210.04	821.09	0.043	0.04	0.05	3.200	A
WCB North at BUSH	Bush St	117.81	29.45	117.73	266.79	39.61	0.00	1334.52	993.45	0.088	0.08	0.10	3.046	A

WCB North at BUSH	Bush St.	358.64	89.66	358.29	146.33	11.00	0.00	1351.08	1303.71	0.265	0.28	0.37	3.735	A

Main results: (17:45-18:00)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	146.43	36.61	146.43	358.93	2.20	0.00	1356.17	1351.55	0.108	0.12	0.12	3.064	A
WCB South at BUSH	Winston Churchill South	191.58	47.89	191.58	75.42	73.22	0.00	1315.07	966.34	0.146	0.18	0.18	3.395	A
WCB South at BUSH	Bush St	177.26	44.32	177.26	80.92	183.87	0.00	1251.03	820.67	0.142	0.17	0.17	3.452	A
WCB North at BUSH	Winston Churchill North	51.75	12.94	51.75	114.80	255.14	0.00	1209.78	821.09	0.043	0.05	0.05	3.201	A
WCB North at BUSH	Bush St	117.81	29.45	117.81	267.25	39.64	0.00	1334.51	993.45	0.088	0.10	0.10	3.046	A
WCB North at BUSH	Bush St.	358.93	89.73	358.92	146.43	11.01	0.00	1351.07	1303.71	0.266	0.37	0.37	3.736	A

Main results: (18:00-18:15)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	119.66	29.92	119.76	293.36	1.80	0.00	1356.40	1351.55	0.088	0.12	0.10	2.998	A
WCB South at BUSH	Winston Churchill South	156.42	39.11	156.57	61.68	59.88	0.00	1322.79	966.34	0.118	0.18	0.14	3.274	A
WCB South at BUSH	Bush St	144.74	36.18	144.88	66.18	150.27	0.00	1270.47	820.67	0.114	0.17	0.13	3.296	A
WCB North at BUSH	Winston Churchill North	42.25	10.56	42.29	93.92	208.77	0.00	1236.62	821.09	0.034	0.05	0.04	3.104	A
WCB North at BUSH	Bush St	96.19	24.05	96.27	218.67	32.39	0.00	1338.70	993.45	0.072	0.10	0.08	2.986	A
WCB North at BUSH	Bush St.	293.36	73.34	293.70	119.66	9.00	0.00	1352.24	1303.71	0.217	0.37	0.29	3.505	A

Main results: (18:15-18:30)

Name	Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
WCB South at BUSH	Bush St.	100.20	25.05	100.27	245.63	1.51	0.00	1356.57	1351.55	0.074	0.10	0.08	2.951	A
WCB South at BUSH	Winston Churchill South	131.00	32.75	131.10	51.64	50.14	0.00	1328.43	966.34	0.099	0.14	0.12	3.189	A
WCB South at BUSH	Bush St	121.21	30.30	121.31	55.41	125.83	0.00	1284.62	820.67	0.094	0.13	0.11	3.186	A
WCB North at BUSH	Winston Churchill North	35.38	8.85	35.41	78.63	174.77	0.00	1256.30	821.09	0.028	0.04	0.03	3.036	A
WCB North at BUSH	Bush St	80.56	20.14	80.61	183.06	27.12	0.00	1341.75	993.45	0.060	0.08	0.07	2.941	A
WCB North at BUSH	Bush St.	245.63	61.41	245.86	100.20	7.53	0.00	1353.08	1303.71	0.182	0.29	0.23	3.351	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.20	0.08	2.949	A	A
WCB South at BUSH	Winston Churchill South	1.70	0.11	3.185	A	A
WCB South at BUSH	Bush St	1.57	0.10	3.185	A	A
WCB North at BUSH	Winston Churchill North	0.44	0.03	3.034	A	A
WCB North at BUSH	Bush St	0.97	0.06	2.939	A	A
WCB North at BUSH	Bush St.	3.33	0.22	3.338	A	A

Queueing Delay results: (17:15-17:30)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.47	0.10	2.997	A	A
WCB South at BUSH	Winston Churchill South	2.10	0.14	3.270	A	A
WCB South at BUSH	Bush St	1.95	0.13	3.292	A	A
WCB North at BUSH	Winston Churchill North	0.54	0.04	3.102	A	A
WCB North at BUSH	Bush St	1.18	0.08	2.983	A	A
WCB North at BUSH	Bush St.	4.19	0.28	3.499	A	A

Queueing Delay results: (17:30-17:45)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.84	0.12	3.064	A	A
WCB South at BUSH	Winston Churchill South	2.66	0.18	3.395	A	A
WCB South at BUSH	Bush St	2.51	0.17	3.452	A	A
WCB North at BUSH	Winston Churchill North	0.68	0.05	3.200	A	A
WCB North at BUSH	Bush St	1.47	0.10	3.046	A	A
WCB North at BUSH	Bush St.	5.46	0.36	3.735	A	A

Queueing Delay results: (17:45-18:00)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.86	0.12	3.064	A	A
WCB South at BUSH	Winston Churchill South	2.70	0.18	3.395	A	A
WCB South at BUSH	Bush St	2.54	0.17	3.452	A	A
WCB North at BUSH	Winston Churchill North	0.69	0.05	3.201	A	A
WCB North at BUSH	Bush St	1.49	0.10	3.046	A	A
WCB North at BUSH	Bush St.	5.56	0.37	3.736	A	A

Queueing Delay results: (18:00-18:15)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.52	0.10	2.998	A	A
WCB South at BUSH	Winston Churchill South	2.17	0.14	3.274	A	A
WCB South at BUSH	Bush St	2.02	0.13	3.296	A	A
WCB North at BUSH	Winston Churchill North	0.55	0.04	3.104	A	A
WCB North at BUSH	Bush St	1.21	0.08	2.986	A	A
WCB North at BUSH	Bush St.	4.37	0.29	3.505	A	A

Queueing Delay results: (18:15-18:30)

Name	Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
WCB South at BUSH	Bush St.	1.25	0.08	2.951	A	A
WCB South at BUSH	Winston Churchill South	1.77	0.12	3.189	A	A
WCB South at BUSH	Bush St	1.64	0.11	3.186	A	A
WCB North at BUSH	Winston Churchill North	0.45	0.03	3.036	A	A
WCB North at BUSH	Bush St	1.00	0.07	2.941	A	A

WCB North at BUSH	Bush St.	3.49	0.23	3.351	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-17:15)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at BUSH	Bush St.	0.08	N/A	N/A	N/A	N/A			N/A	N/A
WCB South at BUSH	Winston Churchill South	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	Bush St	0.11	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Winston Churchill North	0.03	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St.	0.23	N/A	N/A	N/A	N/A			N/A	N/A

Queue Variation results: (17:15-17:30)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at BUSH	Bush St.	0.10	N/A	N/A	N/A	N/A			N/A	N/A
WCB South at BUSH	Winston Churchill South	0.14	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	Bush St	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Winston Churchill North	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St	0.08	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St.	0.28	N/A	N/A	N/A	N/A			N/A	N/A

Queue Variation results: (17:30-17:45)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at	Bush St.	0.12	N/A	N/A	N/A	N/A			N/A	N/A

BUSH										
WCB South at BUSH	Winston Churchill South	0.18	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	Bush St	0.17	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Winston Churchill North	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St	0.10	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St.	0.37	N/A	N/A	N/A	N/A			N/A	N/A

Queue Variation results: (17:45-18:00)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at BUSH	Bush St.	0.12	N/A	N/A	N/A	N/A			N/A	N/A
WCB South at BUSH	Winston Churchill South	0.18	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	Bush St	0.17	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Winston Churchill North	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St	0.10	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	Bush St.	0.37	N/A	N/A	N/A	N/A			N/A	N/A

Queue Variation results: (18:00-18:15)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at BUSH	Bush St.	0.10	N/A	N/A	N/A	N/A			N/A	N/A
WCB South at BUSH	Winston Churchill South	0.14	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	Bush St	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

WCB North at BUSH	**Winston Churchill North**	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	**Bush St**	0.08	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	**Bush St.**	0.29	N/A	N/A	N/A	N/A			N/A	N/A

Queue Variation results: (18:15-18:30)

Name	Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
WCB South at BUSH	**Bush St.**	0.08	N/A	N/A	N/A	N/A			N/A	N/A
WCB South at BUSH	**Winston Churchill South**	0.12	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB South at BUSH	**Bush St**	0.11	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	**Winston Churchill North**	0.03	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	**Bush St**	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
WCB North at BUSH	**Bush St.**	0.23	N/A	N/A	N/A	N/A			N/A	N/A

ARCADY 8

Version: 8.0.0.296 [27 Feb 2012]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 E-mail: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: WCB at Bush Alternative 3.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool\WCB at Bush
Report generation date: 3/21/2013 3:59:17 PM

Summary of intersection performance

	AM												
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS
	A1 - 2021												
Bush East	0.05	?	2.89	0.05	A	3.20	A	413% [Bush West]	0.14	?	3.36	0.12	A
Winston Churchill North	0.10	?	3.17	0.09	A				0.04	?	3.14	0.04	A
Bush West	0.17	?	3.37	0.14	A				0.08	?	3.00	0.07	A
Winston Churchill South	0.06	?	3.04	0.06	A				0.15	?	3.34	0.13	A
	A1 - 2031												
Bush East	0.05	?	2.91	0.05	A	3.25	A	364% [Bush West]	0.15	?	3.44	0.13	A
Winston Churchill North	0.11	?	3.22	0.10	A				0.05	?	3.19	0.04	A
Bush West	0.19	?	3.45	0.16	A				0.09	?	3.03	0.08	A
Winston Churchill South	0.07	?	3.07	0.06	A				0.17	?	3.41	0.15	A
	A1 - Existing												
Bush East	0.04	?	2.87	0.04	A	3.15	A	460% [Bush West]	0.12	?	3.30	0.11	A
Winston Churchill North	0.09	?	3.14	0.08	A				0.04	?	3.11	0.04	A
Bush West	0.15	?	3.31	0.13	A				0.07	?	2.97	0.07	A
Winston Churchill South	0.06	?	3.01	0.05	A				0.14	?	3.30	0.12	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

"D1 - Existing, AM" model duration: 8:00 AM - 9:00 AM
"D2 - 2021, AM" model duration: 8:00 AM - 9:00 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:00 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:00 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:00 PM
"D6 - 2031, PM " model duration: 5:00 PM - 6:00 PM

Run using ARCADY 8.0.0.296 at 3/21/2013 3:58:58 PM

File summary

File Description

Title	Belfountain EA Roundabout Analysis
Location	Region of Peel
Site Number	
Date	11/13/2012
Version	
Status	(new file)
Identifier	
Client	Region of Peel
Jobnumber	6776
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓	✓	Delay	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		DIRECT	08:00	09:00	60	60				✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.15	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	460	Bush West

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None
Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	Bush East	54.00	54.54	N/A	N/A
08:00-09:00	Winston Churchill North	106.00	111.30	N/A	N/A
08:00-09:00	Bush West	164.00	170.56	N/A	N/A
08:00-09:00	Winston Churchill South	66.00	67.32	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.04	2.87	0.04	?	A	54.00	54.00	2.57	2.86	0.04	2.57	2.86
Winston												

Churchill North	0.08	3.14	0.09	?	A	106.00	106.00	5.52	3.12	0.09	5.52	3.12
Bush West	0.13	3.31	0.15	?	A	164.00	164.00	8.99	3.29	0.15	8.99	3.29
Winston Churchill South	0.05	3.01	0.06	?	A	66.00	66.00	3.29	2.99	0.05	3.29	2.99

Main Results for each time segment

Main results: (08:00-09:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	54.00	54.00	53.96	118.89	62.95	0.00	1307.11	872.70	0.041	0.00	0.04	2.872	A
Winston Churchill North	106.00	106.00	105.91	42.96	73.94	0.00	1251.44	669.80	0.085	0.00	0.09	3.142	A
Bush West	164.00	164.00	163.85	86.93	92.92	0.00	1250.99	951.06	0.131	0.00	0.15	3.311	A
Winston Churchill South	66.00	66.00	65.94	140.87	115.90	0.00	1262.22	920.50	0.052	0.00	0.06	3.008	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-09:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	2.57	0.04	2.872	A	A
Winston Churchill North	5.52	0.09	3.142	A	A
Bush West	8.99	0.15	3.311	A	A
Winston Churchill South	3.29	0.05	3.008	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-09:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.04	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill North	0.09	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.15	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.06	N/A	N/A	N/A	N/A			N/A	N/A

(Default Analysis Set) - 2021, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2021, AM	2021	AM		DIRECT	08:00	09:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.20	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	413	Bush West

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	

Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None
Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	**Bush East**	59.00	59.59	N/A	N/A
08:00-09:00	**Winston Churchill North**	114.00	119.70	N/A	N/A
08:00-09:00	**Bush West**	180.00	187.20	N/A	N/A

08:00-09:00	Winston Churchill South	71.00	72.42	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.05	2.89	0.05	?	A	59.00	59.00	2.83	2.87	0.05	2.83	2.87
Winston Churchill North	0.09	3.17	0.10	?	A	114.00	114.00	5.99	3.15	0.10	5.99	3.15
Bush West	0.14	3.37	0.17	?	A	180.00	180.00	10.05	3.35	0.17	10.05	3.35
Winston Churchill South	0.06	3.04	0.06	?	A	71.00	71.00	3.57	3.02	0.06	3.57	3.02

Main Results for each time segment

Main results: (08:00-09:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	59.00	59.00	58.95	128.88	67.94	0.00	1304.18	872.49	0.045	0.00	0.05	2.890	A
Winston Churchill North	114.00	114.00	113.90	46.96	79.93	0.00	1248.09	670.69	0.091	0.00	0.10	3.173	A
Bush West	180.00	180.00	179.83	93.92	99.91	0.00	1246.90	951.71	0.144	0.00	0.17	3.373	A
Winston Churchill South	71.00	71.00	70.94	153.86	125.88	0.00	1256.31	921.52	0.057	0.00	0.06	3.036	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-09:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	2.83	0.05	2.890	A	A
Winston Churchill North	5.99	0.10	3.173	A	A
Bush West	10.05	0.17	3.373	A	A
Winston Churchill South	3.57	0.06	3.036	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-09:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.05	N/A	N/A	N/A	N/A			N/A	N/A

Winston Churchill North	0.10	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.17	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.06	N/A	N/A	N/A	N/A			N/A	N/A

(Default Analysis Set) - 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, AM	2031	AM		DIRECT	08:00	09:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.25	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	364	Bush West

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None
Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
08:00-09:00	Bush East	65.00	65.65	N/A	N/A
08:00-09:00	Winston Churchill North	126.00	132.30	N/A	N/A
08:00-09:00	Bush West	199.00	206.96	N/A	N/A
08:00-09:00	Winston Churchill South	78.00	79.56	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.05	2.91	0.05	?	A	65.00	65.00	3.14	2.90	0.05	3.14	2.90
Winston Churchill North	0.10	3.22	0.11	?	A	126.00	126.00	6.72	3.20	0.11	6.72	3.20
Bush West	0.16	3.45	0.19	?	A	199.00	199.00	11.37	3.43	0.19	11.37	3.43
Winston Churchill South	0.06	3.07	0.07	?	A	78.00	78.00	3.97	3.06	0.07	3.97	3.06

Main Results for each time segment

Main results: (08:00-09:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	65.00	65.00	64.95	141.87	74.94	0.00	1300.08	870.19	0.050	0.00	0.05	2.914	A
Winston Churchill North	126.00	126.00	125.89	50.96	88.93	0.00	1243.06	664.95	0.101	0.00	0.11	3.222	A
Bush West	199.00	199.00	198.81	104.91	109.90	0.00	1241.06	957.14	0.160	0.00	0.19	3.453	A
Winston Churchill South	78.00	78.00	77.93	169.84	138.87	0.00	1248.62	922.23	0.062	0.00	0.07	3.074	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-09:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	3.14	0.05	2.914	A	A

Winston Churchill North	6.72	0.11	3.222	A	A
Bush West	11.37	0.19	3.453	A	A
Winston Churchill South	3.97	0.07	3.074	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-09:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.05	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill North	0.11	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.19	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.07	N/A	N/A	N/A	N/A			N/A	N/A

(Default Analysis Set) - Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.21	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	442	Bush East

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None
Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	Bush East	134.00	138.02	N/A	N/A
17:00-18:00	Winston Churchill North	43.00	44.29	N/A	N/A
17:00-18:00	Bush West	88.00	90.64	N/A	N/A
17:00-18:00	Winston Churchill South	154.00	163.24	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.11	3.30	0.12	?	A	134.00	134.00	7.32	3.28	0.12	7.32	3.28
Winston Churchill North	0.04	3.11	0.04	?	A	43.00	43.00	2.21	3.09	0.04	2.21	3.09
Bush West	0.07	2.97	0.07	?	A	88.00	88.00	4.34	2.96	0.07	4.34	2.96
Winston Churchill South	0.12	3.30	0.14	?	A	154.00	154.00	8.41	3.28	0.14	8.41	3.28

Main Results for each time segment

Main results: (17:00-18:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	134.00	134.00	133.88	59.95	156.86	0.00	1224.63	779.07	0.109	0.00	0.12	3.300	A
Winston Churchill	43.00	43.00	42.96	92.92	197.82	0.00	1201.67	665.21	0.036	0.00	0.04	3.106	A

North													
Bush West	88.00	88.00	87.93	205.81	34.97	0.00	1297.67	1015.69	0.068	0.00	0.07	2.975	A
Winston Churchill South	154.00	154.00	153.86	59.95	62.95	0.00	1245.21	836.33	0.124	0.00	0.14	3.298	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-18:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	7.32	0.12	3.300	A	A
Winston Churchill North	2.21	0.04	3.106	A	A
Bush West	4.34	0.07	2.975	A	A
Winston Churchill South	8.41	0.14	3.298	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-18:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.12	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill North	0.04	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.07	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.14	N/A	N/A	N/A	N/A			N/A	N/A

(Default Analysis Set) - 2021, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2021, PM	2021	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.25	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	400	Bush East

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None
Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445

Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	**Bush East**	146.00	150.38	N/A	N/A
17:00-18:00	**Winston Churchill North**	46.00	47.38	N/A	N/A
17:00-18:00	**Bush West**	97.00	99.91	N/A	N/A
17:00-18:00	**Winston Churchill South**	165.00	174.90	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.12	3.36	0.14	?	A	146.00	146.00	8.12	3.34	0.14	8.12	3.34
Winston Churchill North	0.04	3.14	0.04	?	A	46.00	46.00	2.39	3.12	0.04	2.39	3.12
Bush West	0.07	3.00	0.08	?	A	97.00	97.00	4.82	2.98	0.08	4.82	2.98
Winston Churchill South	0.13	3.34	0.15	?	A	165.00	165.00	9.13	3.32	0.15	9.13	3.32

Main Results for each time segment

Main results: (17:00-18:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	146.00	146.00	145.86	64.94	168.84	0.00	1217.51	777.79	0.120	0.00	0.14	3.358	A
Winston Churchill North	46.00	46.00	45.96	100.91	213.80	0.00	1192.30	665.69	0.039	0.00	0.04	3.139	A
Bush West	97.00	97.00	96.92	222.79	36.97	0.00	1296.51	1018.57	0.075	0.00	0.08	3.000	A
Winston Churchill South	165.00	165.00	164.85	64.94	68.94	0.00	1241.84	835.17	0.133	0.00	0.15	3.342	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-18:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	8.12	0.14	3.358	A	A
Winston Churchill North	2.39	0.04	3.139	A	A
Bush West	4.82	0.08	3.000	A	A
Winston Churchill South	9.13	0.15	3.342	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-18:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.14	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill North	0.04	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.08	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.15	N/A	N/A	N/A	N/A			N/A	N/A

(Default Analysis Set) - 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Flow Leg 1	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 2	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 3	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.
Warning	Flow Leg 4	Analysis Options	Queue Variations cannot be calculated for the selected traffic profile type.

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors

(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, PM	2031	PM		DIRECT	17:00	18:00	60	60		✓		✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill at Bush	Roundabout	1,2,3,4				3.32	A

Intersection Network Options

Driving Side	Lighting	Road Surface	Network Residual Capacity (%)	First Leg Reaching Threshold
Right	Normal/unknown	(Mini-roundabouts only)	353	Bush East

Legs

Legs

Name	Name	Description
Bush East	Bush East	
Winston Churchill North	Winston Churchill North	
Bush West	Bush West	
Winston Churchill South	Winston Churchill South	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush East	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00
Bush West	0.00	99999.00		0.00
Winston Churchill South	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Bush East	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	
Bush West	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush East	None
Winston Churchill North	None

Bush West	None
Winston Churchill South	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush East		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445
Bush West		(calculated)	(calculated)	0.579	1357.445
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
Bush East	DIRECT	✓	N/A	100.000
Winston Churchill North	DIRECT	✓	N/A	100.000
Bush West	DIRECT	✓	N/A	100.000
Winston Churchill South	DIRECT	✓	N/A	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Name	Direct Demand Entry Flow (Veh/hr)	DirectDemandEntryFlowInPCE (PCE/hr)	Direct Demand Exit Flow (Veh/hr)	Direct Demand Pedestrian Flow (Ped/hr)
17:00-18:00	**Bush East**	161.00	165.83	N/A	N/A
17:00-18:00	**Winston Churchill North**	51.00	52.53	N/A	N/A
17:00-18:00	**Bush West**	107.00	110.21	N/A	N/A
17:00-18:00	**Winston Churchill South**	183.00	193.98	N/A	N/A

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
Bush East	0.13	3.44	0.15	?	A	161.00	161.00	9.17	3.42	0.15	9.17	3.42
Winston Churchill North	0.04	3.19	0.05	?	A	51.00	51.00	2.69	3.17	0.04	2.69	3.17
Bush West	0.08	3.03	0.09	?	A	107.00	107.00	5.37	3.01	0.09	5.37	3.01
Winston Churchill South	0.15	3.41	0.17	?	A	183.00	183.00	10.33	3.39	0.17	10.33	3.39

Main Results for each time segment

Main results: (17:00-18:00)

Name	Total Demand (Veh/hr)	Intersection Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	V/C Ratio	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
Bush East	161.00	161.00	160.85	71.94	186.82	0.00	1206.82	778.42	0.133	0.00	0.15	3.441	A
Winston Churchill North	51.00	51.00	50.95	111.89	235.77	0.00	1179.38	666.97	0.043	0.00	0.05	3.189	A
Bush West	107.00	107.00	106.91	245.77	40.96	0.00	1294.20	1017.10	0.083	0.00	0.09	3.031	A
Winston Churchill South	183.00	183.00	182.83	71.94	75.94	0.00	1237.90	836.15	0.148	0.00	0.17	3.411	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-18:00)

Name	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush East	9.17	0.15	3.441	A	A
Winston Churchill North	2.69	0.04	3.189	A	A
Bush West	5.37	0.09	3.031	A	A
Winston Churchill South	10.33	0.17	3.411	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-18:00)

Name	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush East	0.15	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill North	0.05	N/A	N/A	N/A	N/A			N/A	N/A
Bush West	0.09	N/A	N/A	N/A	N/A			N/A	N/A
Winston Churchill South	0.17	N/A	N/A	N/A	N/A			N/A	N/A

Region of Peel
Roundabout Feasibility Screening Tool for
Winston Churchill Boulevard at Old Base Line Road

		Roundabout Supportive?
1)	Project name, File #, Intersection Location (B/C/M, Street name, distance from major intersections, etc.): Belfountain EA (6776) – Intersection of Winston Churchill Boulevard (Regional Road 19) at Old Base Line Road (Regional Road 12), in the Municipality of Caledon.	
2)	Brief description of Intersection (No. of legs, Lanes on each leg, Total AADT, ADDT on each road). Attach or sketch a diagram of existing and horizon year TMCs: 3 legs (Winston Churchill Blvd runs north/south, Old Base Line Rd intersects with WCB from the east). Total AADT: 2920; Winston Churchill Blvd AADT: 2147; Old Base Line Rd AADT: 2230. Attached is a diagram containing Existing, 2021, and 2031 weekday AM and PM peak hour volumes.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
3)	What operational problems are being experienced at this location? Existing and future traffic operations are acceptable. Possible sight line issues from Old Base Line Road. The south leg of Winston Churchill Blvd is currently gravel.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
4)	Is it a new intersection or a retrofit of an existing intersection? If existing, what is the existing type of traffic control? Existing intersection – Stop Controlled for Old Base Line Road.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

5)	Is the intersection near a major intersection or a railroad crossing? If so, how close and what type of traffic control exists at the adjacent intersection(s)? Will queues be a problem? Describe the corridor (eg.: average intersection spacing). No. Nearest major intersection is >1km away. Private Driveway in close proximity to the north and south of intersection. Queues are not expected to be a problem.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
6)	Would the intersection be located within a coordinated signal network? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
7)	Would the intersection be located on a preferred roundabout corridor? If yes why? No.	**YES** ☐ **NO** ☐ **NEUTRAL** ☒
8)	What is the collision history of the intersection over the past five years? Is there a collision problem that needs to be addressed? There have been 4 reported collisions at this intersection over the past five years (3 Property Damage Only and 1 Non-Fatal Injury).	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
9)	Is the intersection scheduled for improvements or is it located within a corridor that is scheduled for improvements in the next 10 years? What is the ultimate cross-section of the approaching legs? Intersection currently under review as part of the Belfountain EA. Ultimate cross-section for approaching legs to remain at two lanes (one lane per direction).	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

10)	Are there expected to be special users at this intersection in the near future (ie. a person with disability, pedestrians, cyclists, large agricultural machinery, horses, etc.)? If yes, what special considerations would be required? Potential for cyclists, large agricultural machinery, and horses. Special considerations such as pave shoulders may be implemented.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
11)	What traditional improvements are proposed for this intersection (traffic signals, all-way stop, auxiliary lanes, off-set re-alignment, etc)? No traditional improvements are proposed for this intersection.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
12)	If traffic signals are considered, does it meet the warrant for the horizon year? Signal warrant analysis shows that traffic signals are not warranted at this intersection under Existing, 2021, and 2031 traffic conditions.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐
13)	What size of roundabout is being considered for this intersection (ie. single, two, three lane entry)? Please attach a Traffic Flow Worksheet, a lane configuration diagram and a sketch of how a roundabout would fit into the ROW. Single lane (45m ICD) roundabout with single lane entries and exits. Traffic flow worksheets (for Existing, 2021, and 2031 AM and PM peak hours) and a sketch of roundabout are attached.	**YES** ☒ **NO** ☐ **NEUTRAL** ☐
14)	Are there property constraints at/near the intersection or is it restricted by a watercourse/parks/cemeteries/etc? If yes, what are they? Potential property constraint along west side and north-east quadrant.	**YES** ☐ **NO** ☒ **NEUTRAL** ☐

15) Terrain – Is the area on a grade/flat/rolling?

Rural – grade. South leg of Winston Churchill Blvd below intersection – undesirable at roundabouts

YES ☐
NO ☒
NEUTRAL ☐

16) 20 Year Life Cycle Cost Estimate

Injury Collision Cost (ICC): $30,000
Discount Rate (i): 6%

YES ☒
NO ☐
NEUTRAL ☐

20 YEAR LIFE- CYCLE COST COMPARISON		
Cost Item	Other Traffic Control	Roundabout
Implementation Cost	$100,000	$1,000,000
Injury Collision Cost (Present Value)	$2,829,132	$1,414,566
Total Life Cycle Cost	$2,929,132	$2,414,566

Notes:

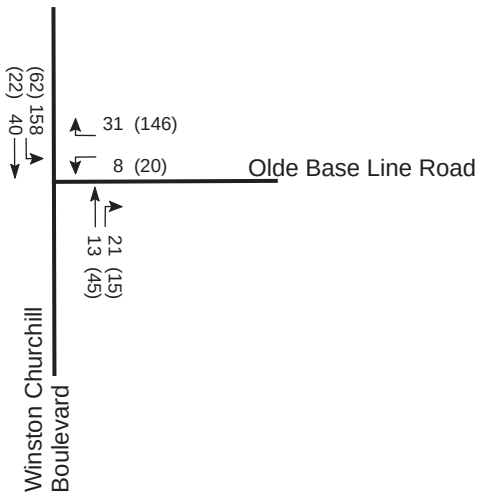
- Implementation Cost
  = sum of costs for construction, property, utility relocation, illumination, engineering (20%), contingency (20%) and maintenance (5%)
- Present Value of 20 Year Injury Collision Cost
  = expected annual collision frequency x ICC $((1+i)^{20}-1)/i(1+i)^{20}$
- Monte Carlo Analysis may be required. If so, a range for the implementation cost (i.e. 10%, 50%, 90% probability) is required

17) Conclusions and Recommendations:

Due to minor traffic volumes, the topography at and surrounding the intersection, property constraints, and the costs to construct a roundabout, a roundabout would not be feasible at this intersection.

YES ☐
NO ☒

EXISTING



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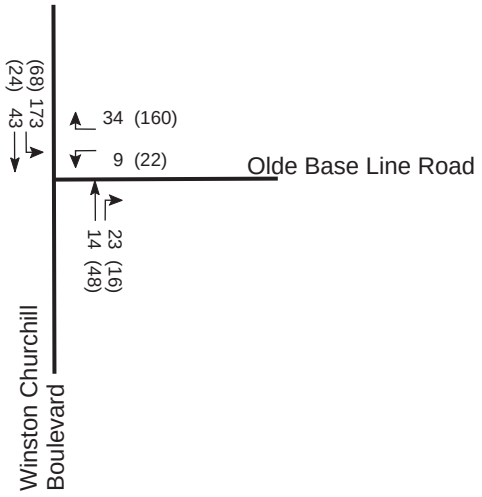

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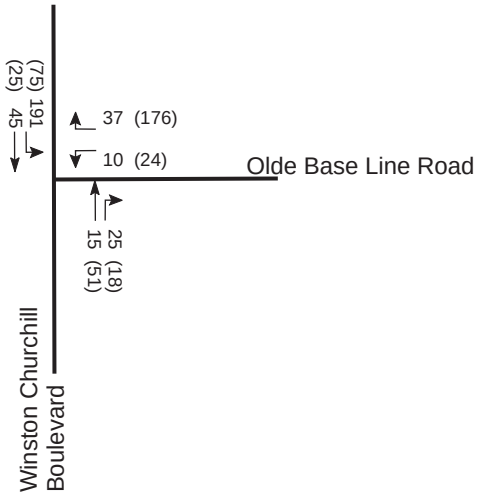
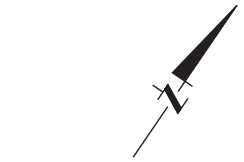
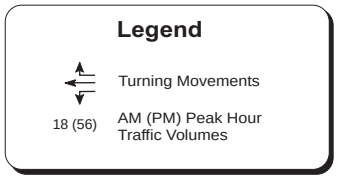






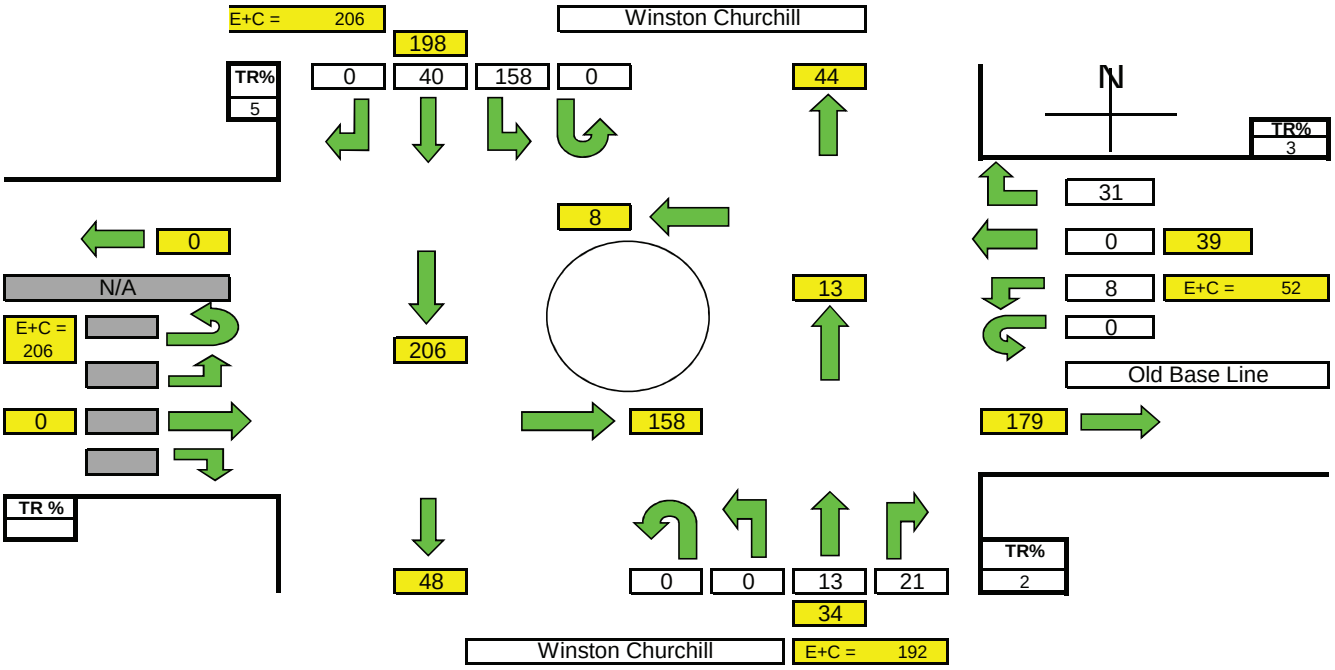
Winston Churchill Boulevard at Old Base Line Road
Existing and Future Turning Movements

Not To Scale
March 2013

REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 1 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: Existing AM

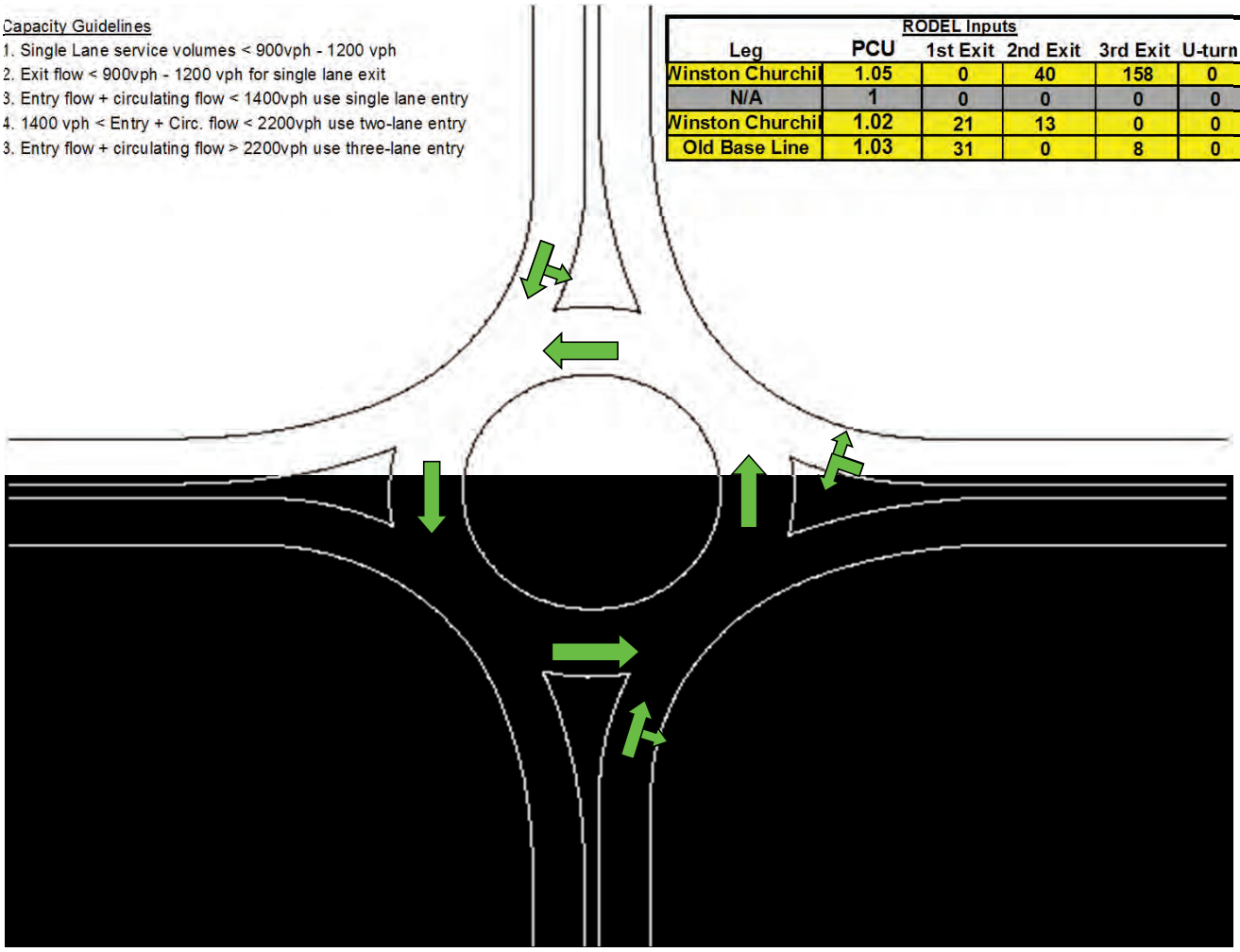


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

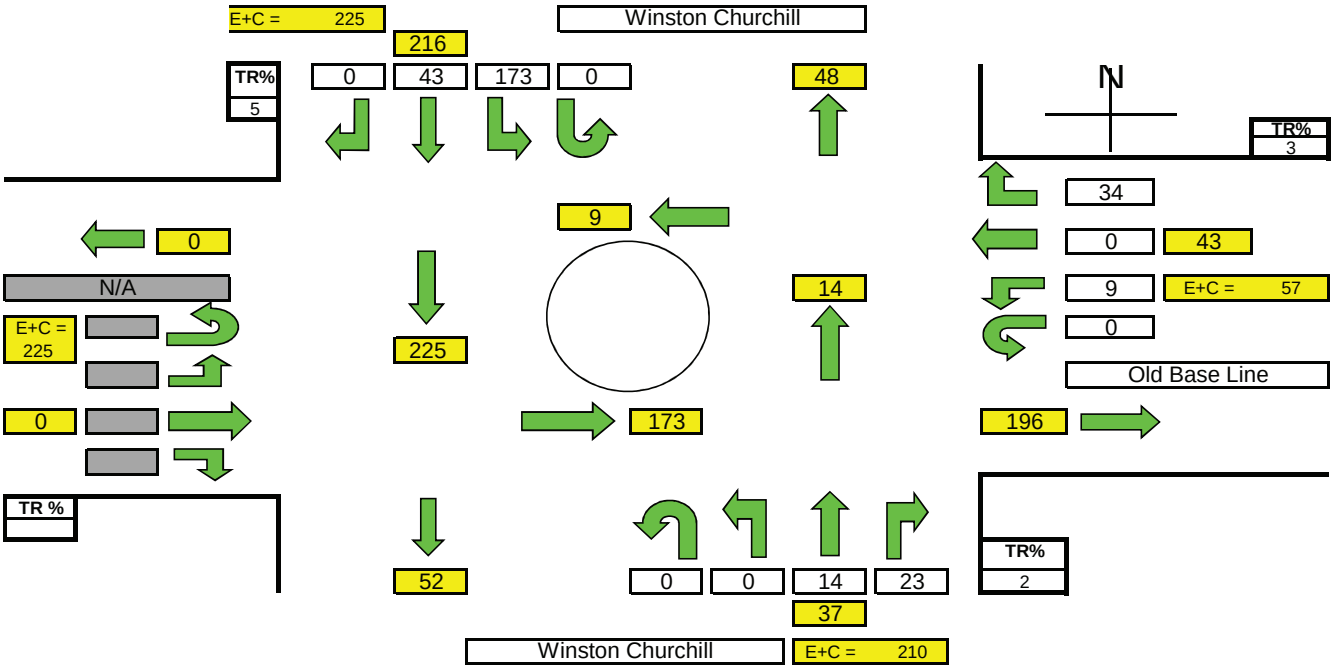
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	0	40	158	0
N/A	1	0	0	0	0
Winston Churchil	1.02	21	13	0	0
Old Base Line	1.03	31	0	8	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 2 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: 2021 AM

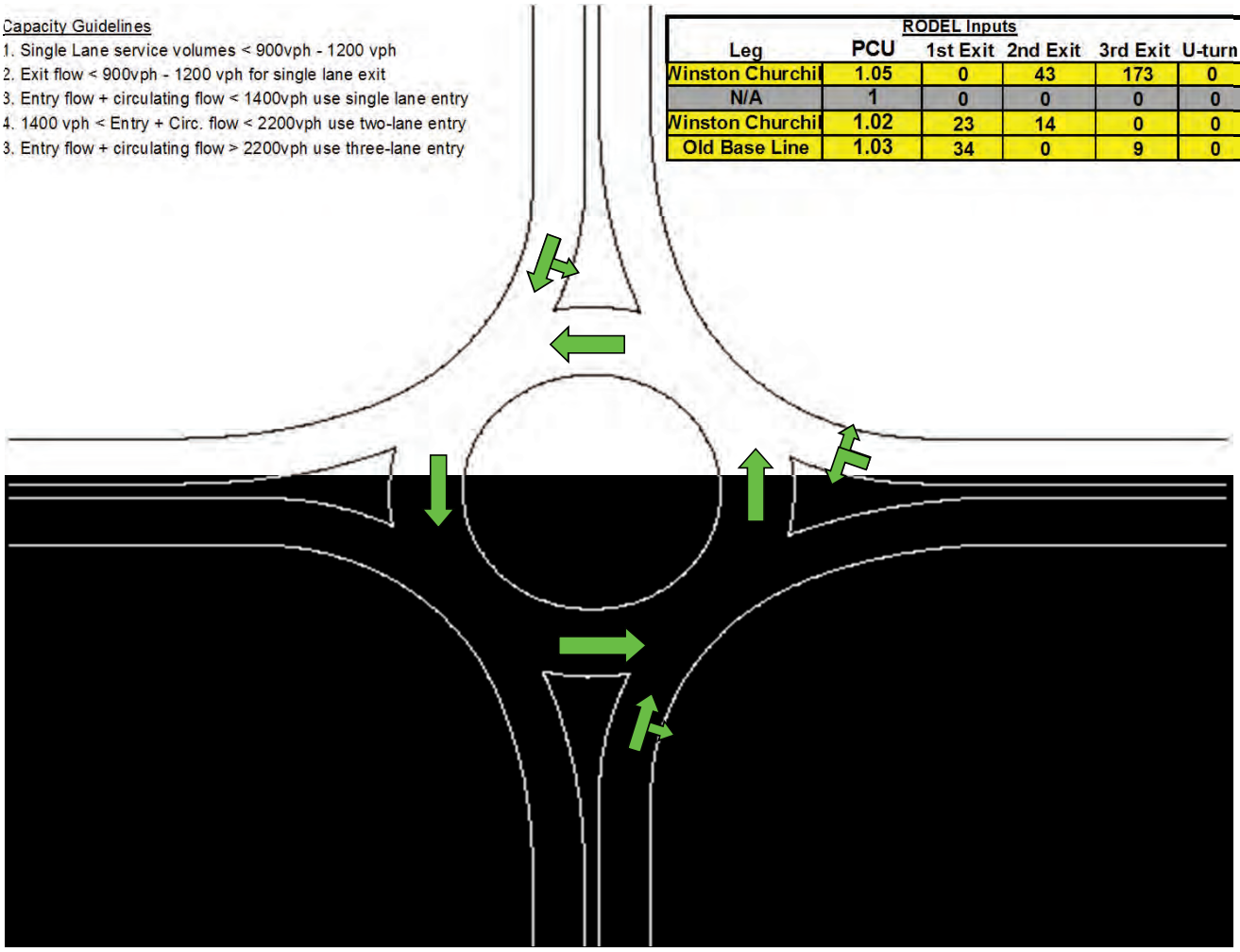


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

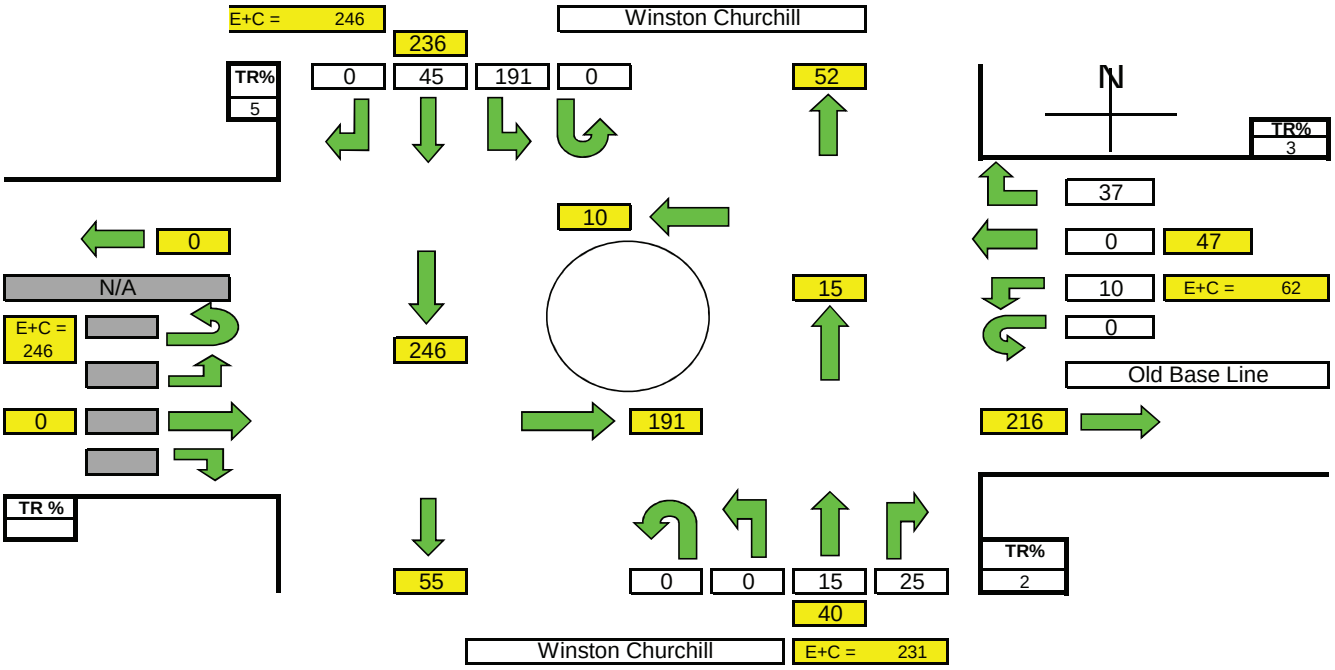
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	0	43	173	0
N/A	1	0	0	0	0
Winston Churchil	1.02	23	14	0	0
Old Base Line	1.03	34	0	9	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 3 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: 2031 AM

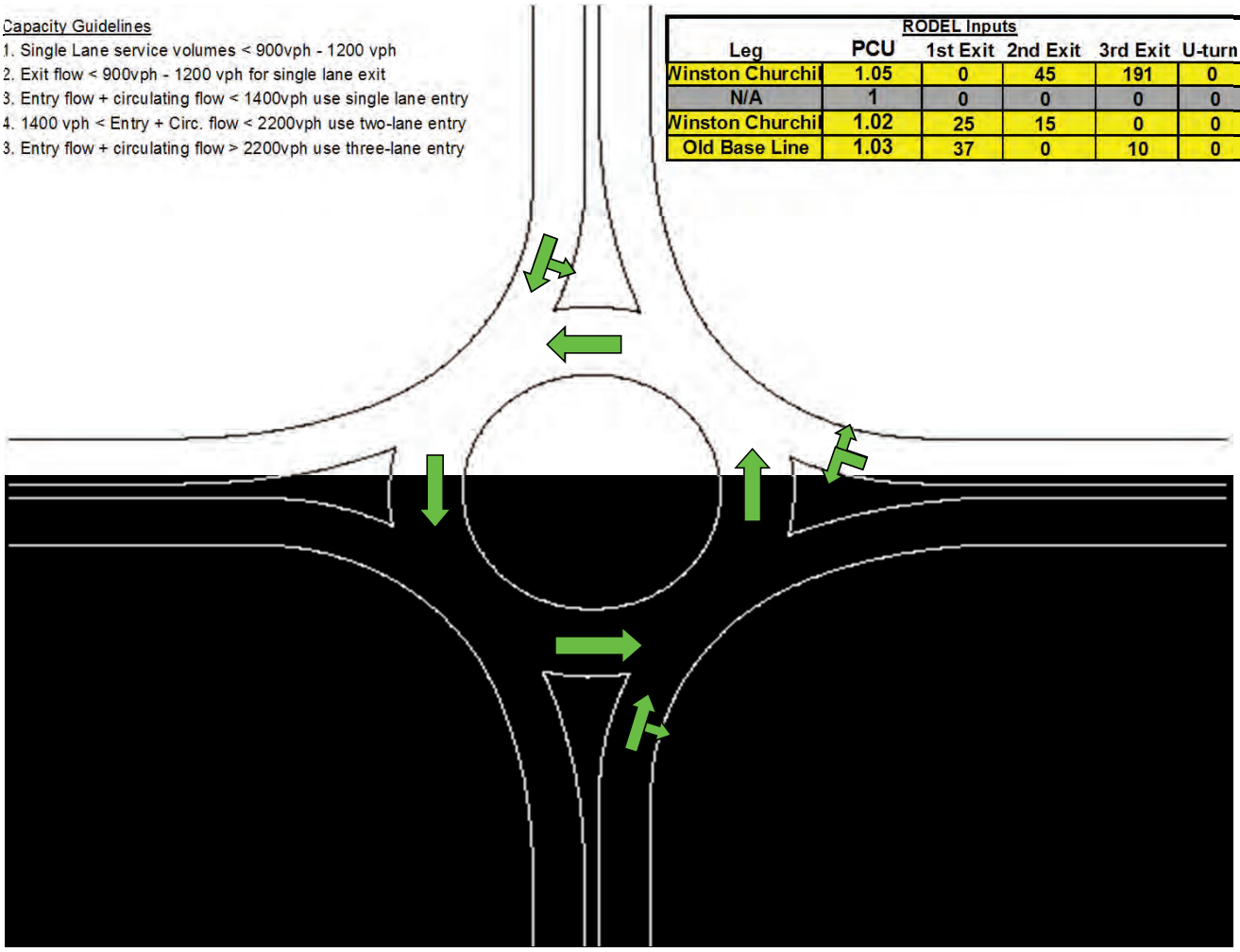


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

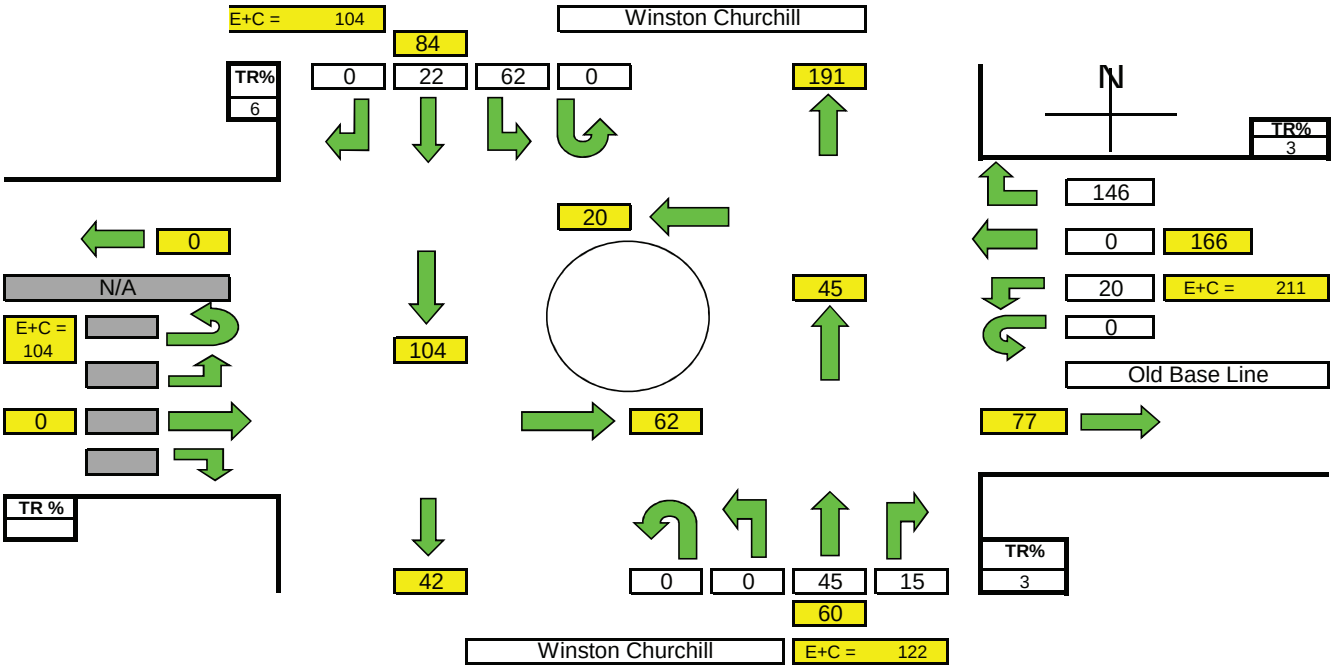
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.05	0	45	191	0
N/A	1	0	0	0	0
Winston Churchil	1.02	25	15	0	0
Old Base Line	1.03	37	0	10	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA
Drawn By: HDR
Project No.: 6776
Sheet 4 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: Existing PM

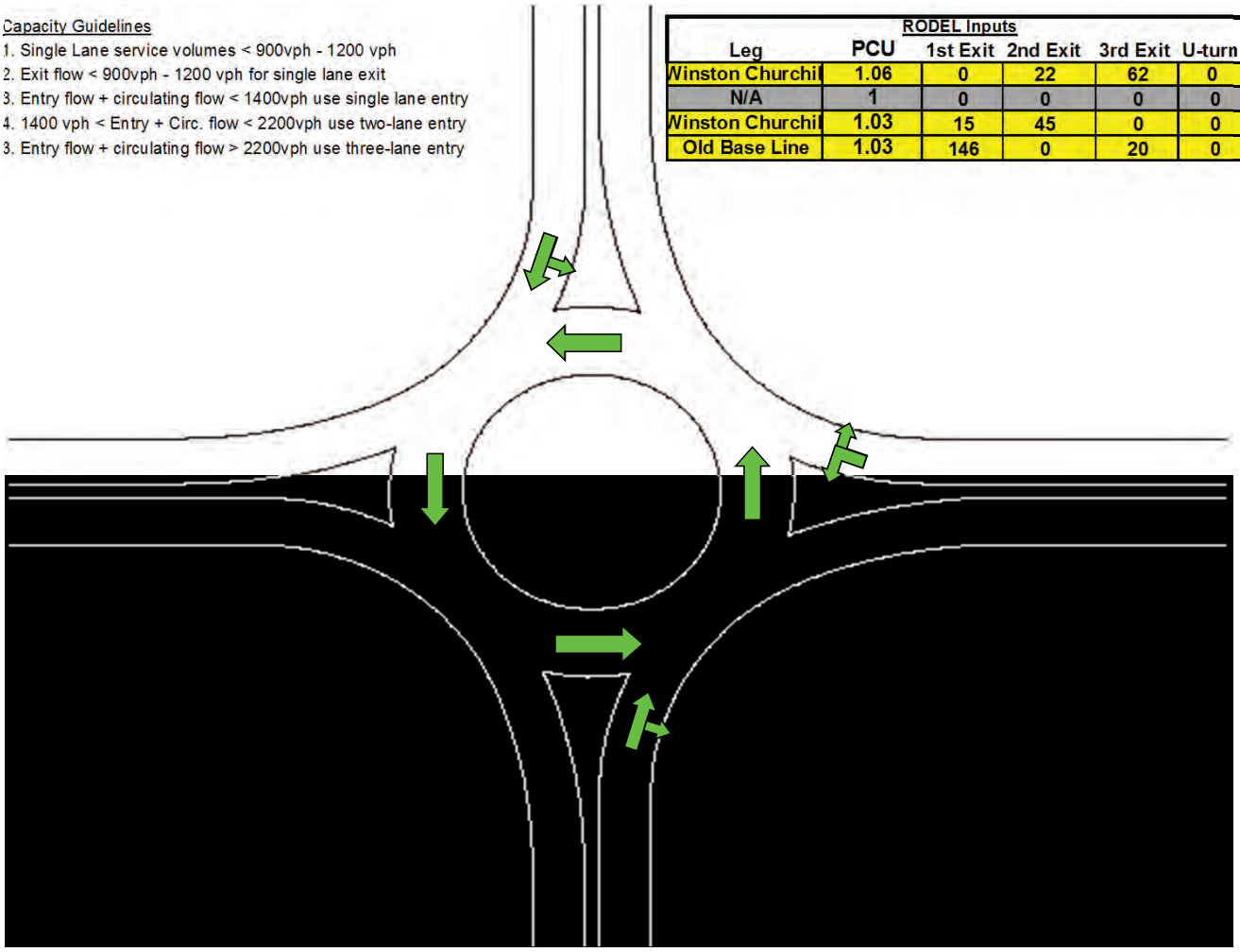


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

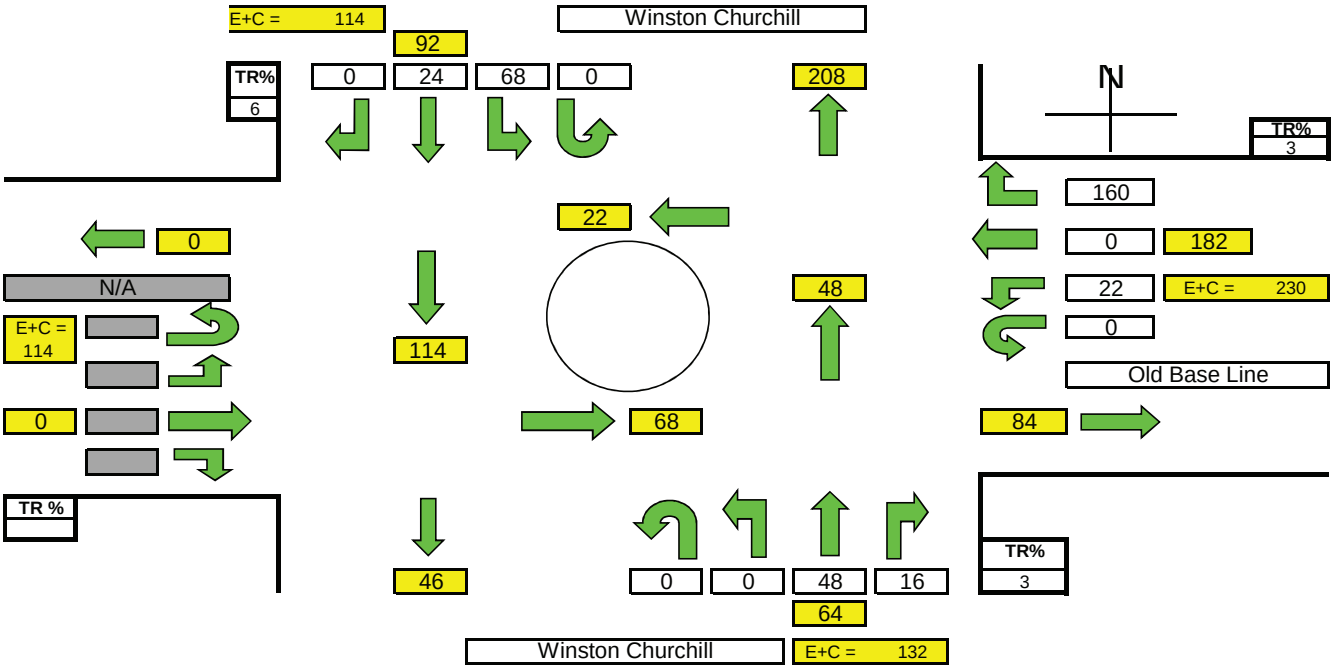
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.06	0	22	62	0
N/A	1	0	0	0	0
Winston Churchil	1.03	15	45	0	0
Old Base Line	1.03	146	0	20	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 5 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: 2021 PM

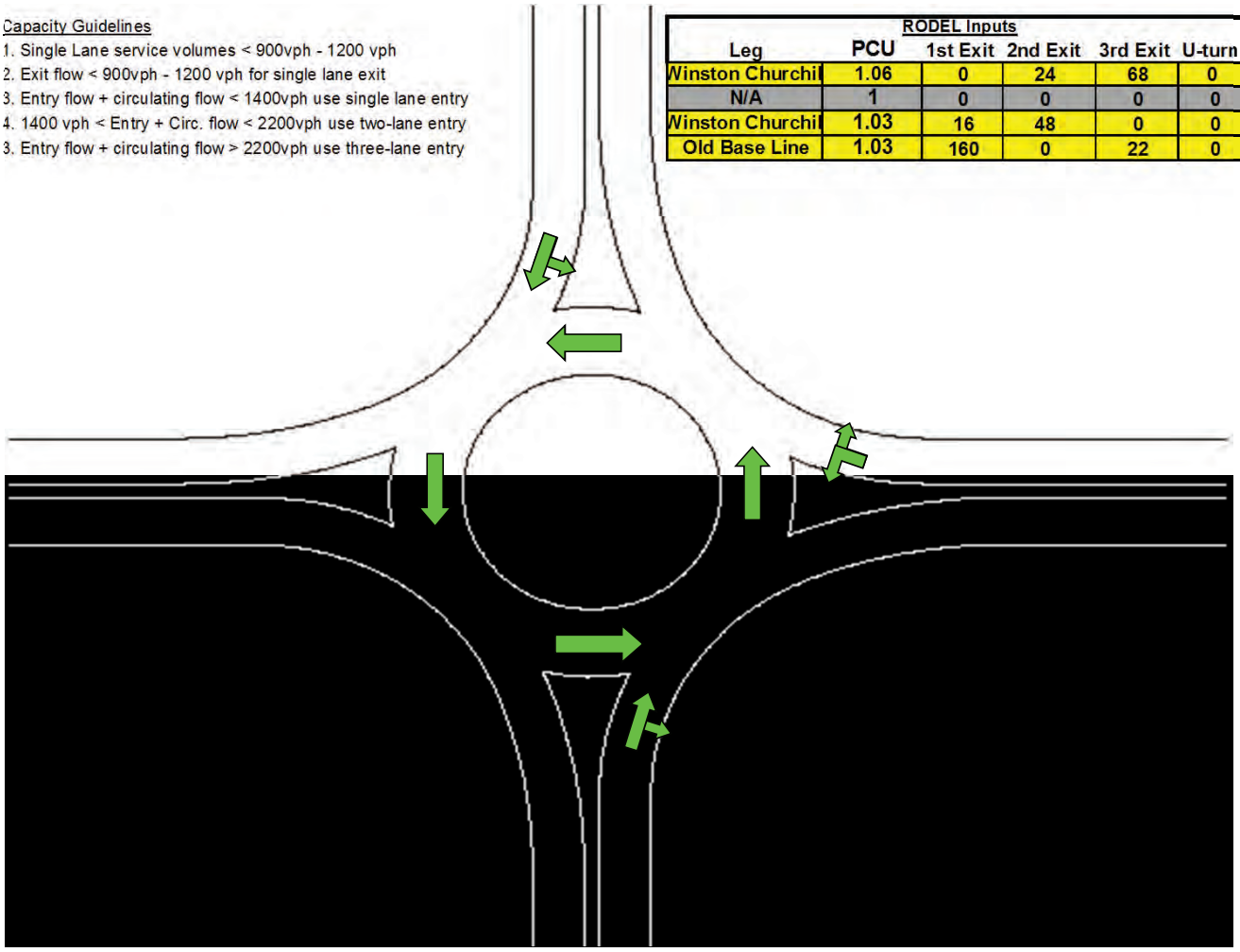


Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

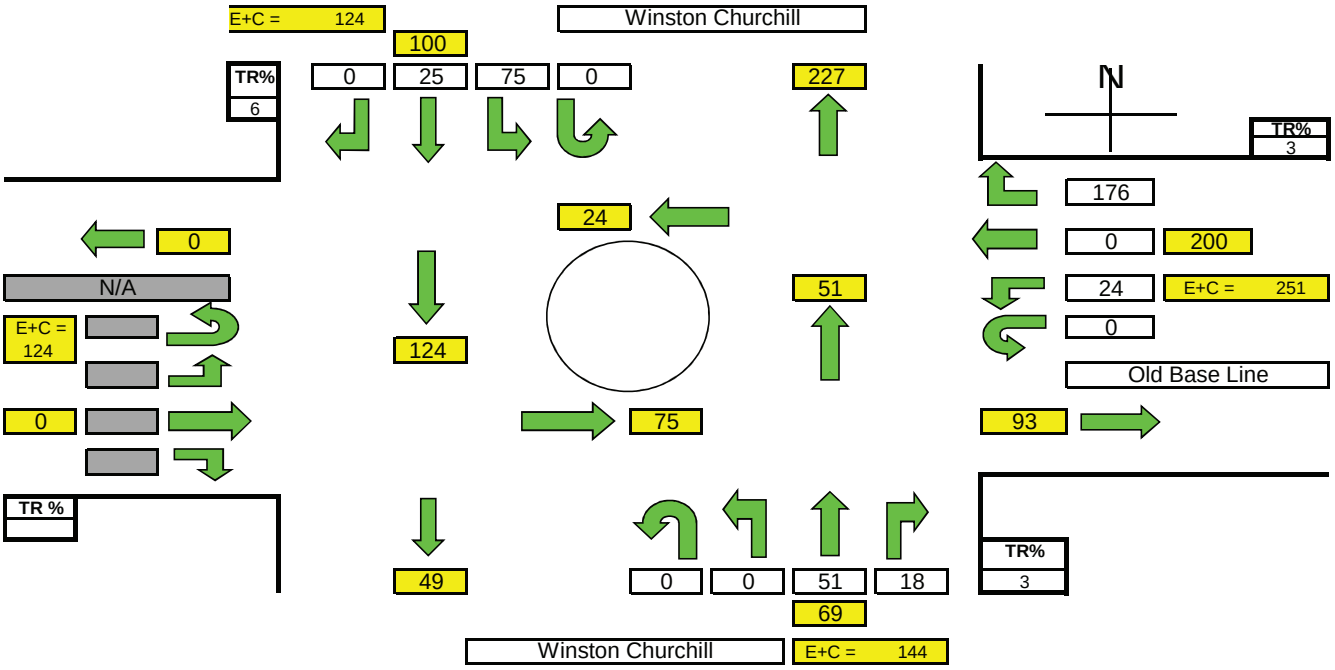
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.06	0	24	68	0
N/A	1	0	0	0	0
Winston Churchil	1.03	16	48	0	0
Old Base Line	1.03	160	0	22	0



REGION OF PEEL
ROUNDABOUT TRAFFIC FLOW SHEET

VERSION 1.0

Project: Belfountain EA **Drawn By:** HDR
Project No.: 6776 **Sheet** 6 **of** 6
Intersection: Winston Churchill Blvd at Old Base Line Rd
Time Period: 2031 PM

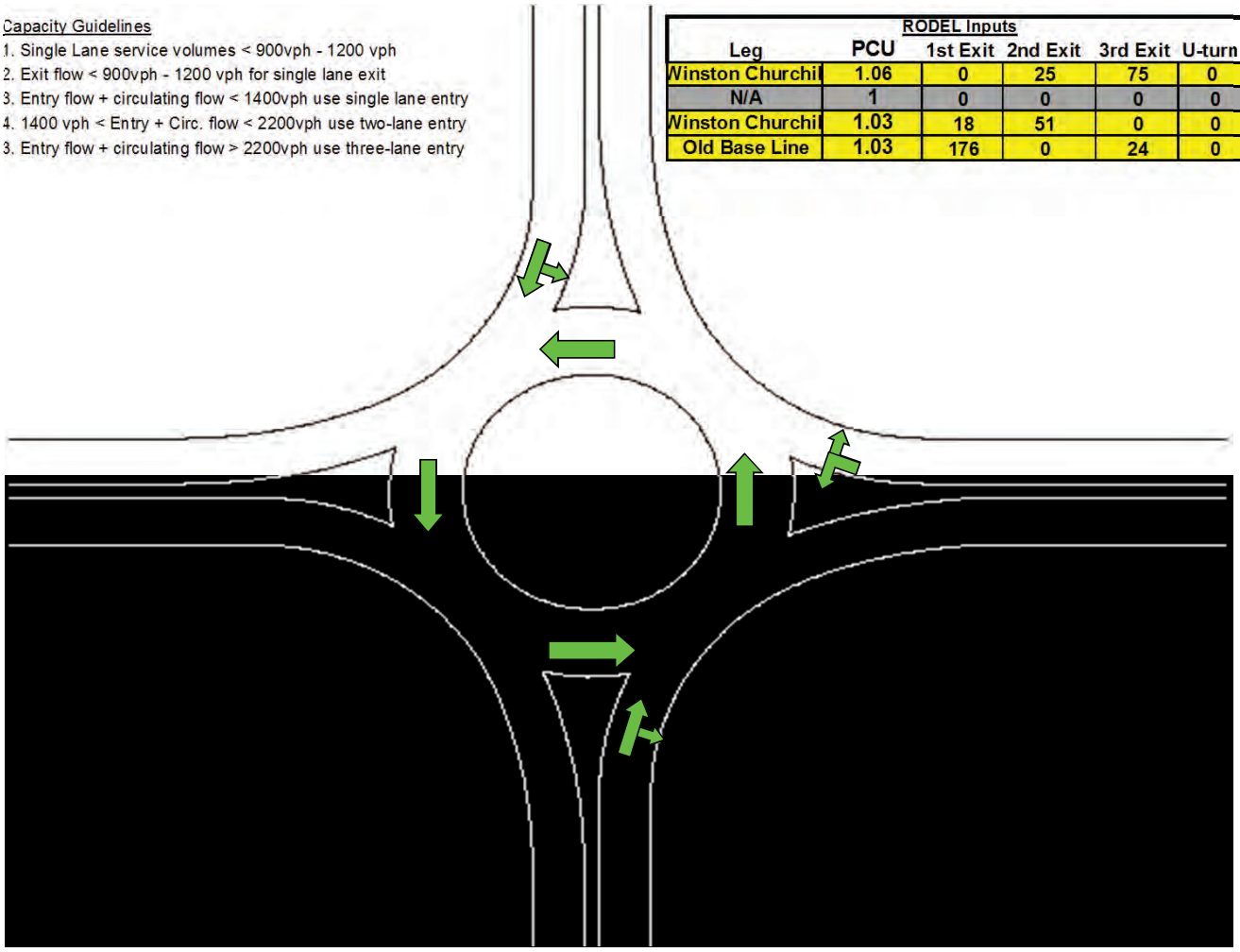


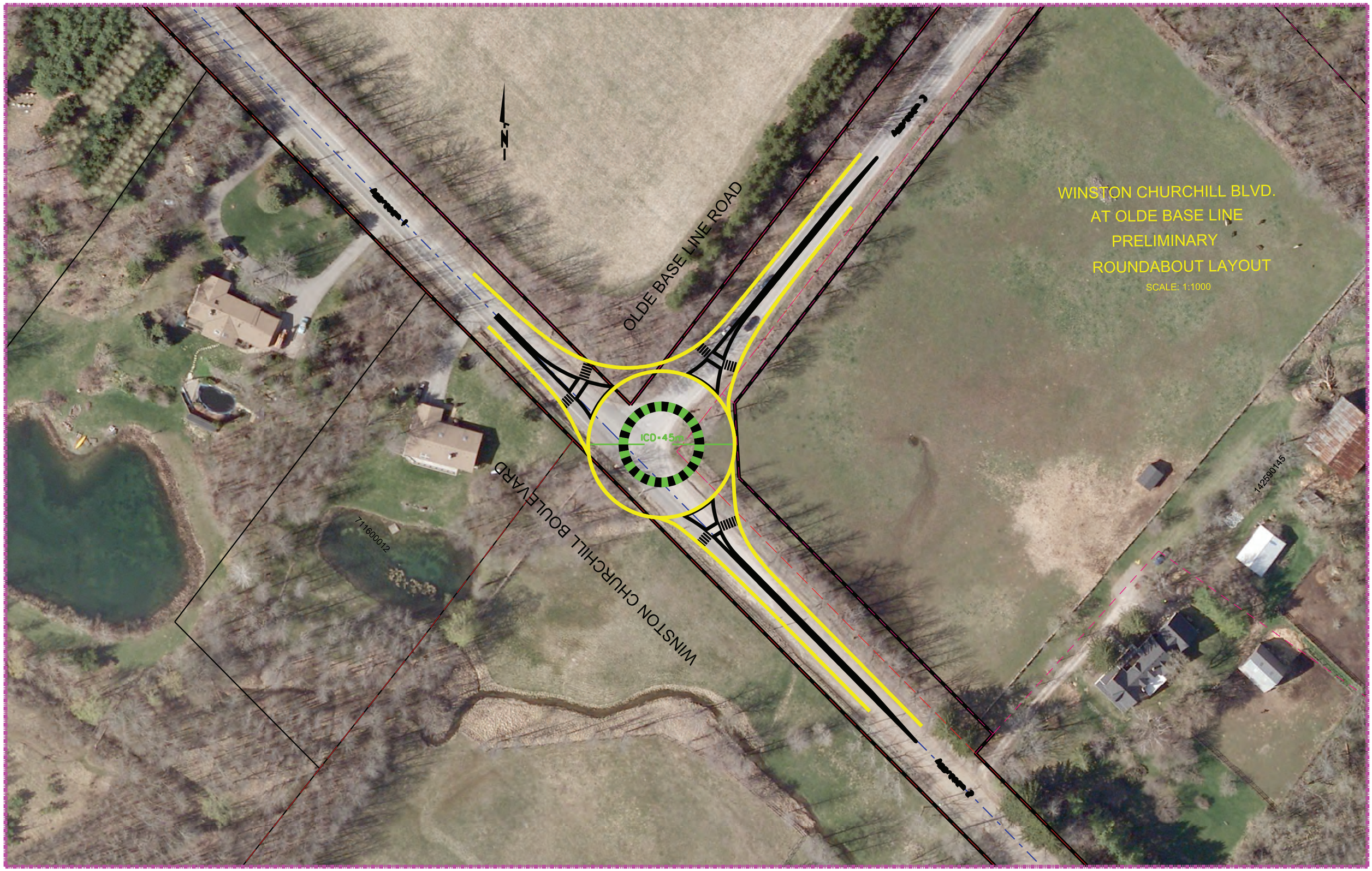
Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

RODEL Inputs

Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
Winston Churchil	1.06	0	25	75	0
N/A	1	0	0	0	0
Winston Churchil	1.03	18	51	0	0
Old Base Line	1.03	176	0	24	0




N
OLDE BASE LINE ROAD
WINSTON CHURCHILL BOULEVARD
ICD=45m
711600012
142590145
WINSTON CHURCHILL BLVD.
AT OLDE BASE LINE
PRELIMINARY
ROUNDABOUT LAYOUT
SCALE: 1:1000

20 year Present Value Injury Collision Costs - Existing unsignalized or future intersections

Winston Churchill Blvd at Old Base Line Road

AADT	2920
Injury Collision Rate	0.75
ACIF	0.79935
ICC	30000
i	0.06
Pvsig	$2,829,132
PVrd	$1,414,566

Implementation Costs

Signal	$100,000
Roundabout	$1,000,000

Total Life Cycle Costs

Signals	$2,929,132
Roundabout	$2,414,566
Diff	-$514,566

ARCADY 8

Filename: WCB at OBL.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool\WCB at OBL
Report generation date: 3/21/2013 3:15:06 PM

Summary of intersection performance

	AM							PM					
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersecti Delay (s)
A1 - 2021													
Winston Churchill South	0.03	?	3.04	0.03	A	3.27	A	0.06	?	3.07	0.05	A	3.16
Old Base Line Road	0.04	?	2.85	0.04	A			0.18	?	3.29	0.15	A	
Winston Churchill North	0.22	?	3.39	0.18	A			0.08	?	2.98	0.08	A	
A1 - 2031													
Winston Churchill South	0.04	?	3.08	0.04	A	3.33	A	0.07	?	3.09	0.06	A	3.21
Old Base Line Road	0.04	?	2.86	0.04	A			0.20	?	3.36	0.17	A	
Winston Churchill North	0.25	?	3.46	0.19	A			0.09	?	3.01	0.08	A	
A1 - Existing													
Winston Churchill South	0.03	?	3.01	0.03	A	3.22	A	0.06	?	3.05	0.05	A	3.12
Old Base Line Road	0.03	?	2.84	0.03	A			0.16	?	3.23	0.14	A	
Winston Churchill North	0.20	?	3.33	0.16	A			0.08	?	2.96	0.07	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - 2021, AM" model duration: 8:00 AM - 9:30 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:30 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:30 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:30 PM
"D6 - 2031, PM " model duration: 5:00 PM - 6:30 PM

Run using ARCADY 8.0.0.296 at 3/21/2013 3:15:03 PM

File summary

File Description

Title	(untitled)
Location	
Site Number	
Date	3/21/2013
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2031, PM	2031	PM		ONE HOUR	17:00	18:30	90	15				✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
Winston Churchill Blvd at Old Base Line Rd	Roundabout	1,2,3				3.21	A

Intersection Network Options

Driving Side	Lighting	Road Surface
Right	Normal/unknown	(Mini-roundabouts only)

Legs

Legs

Name	Name	Description
Winston Churchill South	Winston Churchill South	
Old Base Line Road	Old Base Line Road	
Winston Churchill North	Winston Churchill North	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Winston Churchill South	0.00	99999.00		0.00
Old Base Line Road	0.00	99999.00		0.00
Winston Churchill North	0.00	99999.00		0.00

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
Winston Churchill South	3.50	4.50	30.00	20.00	40.00	25.00	
Old Base Line Road	3.50	4.50	30.00	20.00	40.00	25.00	
Winston Churchill North	3.50	4.50	30.00	20.00	40.00	25.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Winston Churchill South	None
Old Base Line Road	None
Winston Churchill North	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Winston Churchill South		(calculated)	(calculated)	0.579	1357.445
Old Base Line Road		(calculated)	(calculated)	0.579	1357.445
Winston Churchill North		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
Winston Churchill South	ONE HOUR	✓	69.00	100.000
Old Base Line Road	ONE HOUR	✓	200.00	100.000
Winston Churchill North	ONE HOUR	✓	100.00	100.000

Turning Proportions

Turning Counts or Proportions (PCE/hr) - Winston Churchill Blvd at Old Base Line Rd (for whole period)

		To		
		1	2	3
From	1	0.000	18.000	51.000
	2	24.000	0.000	176.000
	3	25.000	75.000	0.000

Turning Proportions (PCE) - Winston Churchill Blvd at Old Base Line Rd (for whole period)

		To		
		1	2	3
From	1	0.00	0.26	0.74
	2	0.12	0.00	0.88
	3	0.25	0.75	0.00

Vehicle Mix

Average PCE Per Vehicle - Winston Churchill Blvd at Old Base Line Rd (for whole period)

		To		
		1	2	3
From	1	1.000	1.060	1.060
	2	1.030	1.000	1.030
	3	1.030	1.030	1.000

Truck Percentages - Winston Churchill Blvd at Old Base Line Rd (for whole period)

		To		
		1	2	3
From	1	0.000	6.000	6.000
	2	3.000	0.000	3.000
	3	3.000	3.000	0.000

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
Winston Churchill South	0.06	3.09	0.07	?	A	63.32	94.97	4.81	3.04	0.05	4.81	3.04
Old Base Line Road	0.17	3.36	0.20	?	A	183.52	275.29	14.84	3.23	0.16	14.84	3.24
Winston Churchill North	0.08	3.01	0.09	?	A	91.76	137.64	6.78	2.95	0.08	6.78	2.95

Main Results for each time segment

Main results: (17:00-17:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	51.95	12.99	51.77	36.77	56.28	0.00	1324.87	798.83	0.039	0.00	0.04	2.997	A
Old Base Line Road	150.57	37.64	150.05	69.79	38.27	0.00	1335.30	1015.72	0.113	0.00	0.13	3.126	A
Winston Churchill North	75.29	18.82	75.04	170.31	18.01	0.00	1347.02	1286.91	0.056	0.00	0.06	2.915	A

Main results: (17:15-17:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	62.03	15.51	61.99	44.02	67.39	0.00	1318.45	798.83	0.047	0.04	0.05	3.036	A
Old Base Line Road	179.80	44.95	179.68	83.56	45.82	0.00	1330.93	1015.72	0.135	0.13	0.16	3.220	A
Winston Churchill North	89.90	22.47	89.85	203.94	21.56	0.00	1344.97	1286.91	0.067	0.06	0.07	2.953	A

Main results: (17:30-17:45)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	75.97	18.99	75.92	53.91	82.52	0.00	1309.68	798.83	0.058	0.05	0.07	3.092	A
Old Base Line Road	220.20	55.05	220.03	102.33	56.11	0.00	1324.97	1015.72	0.166	0.16	0.20	3.355	A
Winston Churchill North	110.10	27.53	110.03	249.74	26.40	0.00	1342.16	1286.91	0.082	0.07	0.09	3.008	A

Main results: (17:45-18:00)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	75.97	18.99	75.97	53.95	82.58	0.00	1309.65	798.83	0.058	0.07	0.07	3.092	A
Old Base Line Road	220.20	55.05	220.20	102.39	56.15	0.00	1324.95	1015.72	0.166	0.20	0.20	3.355	A
Winston Churchill North	110.10	27.53	110.10	249.93	26.42	0.00	1342.15	1286.91	0.082	0.09	0.09	3.008	A

Main results: (18:00-18:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	62.03	15.51	62.08	44.09	67.48	0.00	1318.39	798.83	0.047	0.07	0.05	3.036	A
Old Base Line Road	179.80	44.95	179.97	83.67	45.89	0.00	1330.89	1015.72	0.135	0.20	0.16	3.221	A
Winston Churchill North	89.90	22.47	89.97	204.26	21.60	0.00	1344.95	1286.91	0.067	0.09	0.07	2.956	A

Main results: (18:15-18:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Winston Churchill South	51.95	12.99	51.98	36.92	56.50	0.00	1324.74	798.83	0.039	0.05	0.04	2.997	A
Old Base Line Road	150.57	37.64	150.69	70.06	38.42	0.00	1335.21	1015.72	0.113	0.16	0.13	3.129	A
Winston Churchill North	75.29	18.82	75.34	171.03	18.08	0.00	1346.98	1286.91	0.056	0.07	0.06	2.917	A

Queueing Delay Results for each time segment

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Winston Churchill South	0.64	0.04	2.997	A	A
Old Base Line Road	1.92	0.13	3.126	A	A
Winston Churchill North	0.90	0.06	2.915	A	A

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Winston Churchill South	0.77	0.05	3.036	A	A
Old Base Line Road	2.37	0.16	3.220	A	A
Winston Churchill North	1.09	0.07	2.953	A	A

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

Winston Churchill South	0.96	0.06	3.092	A	A
Old Base Line Road	3.03	0.20	3.355	A	A
Winston Churchill North	1.36	0.09	3.008	A	A

Queueing Delay results: (17:45-18:00)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Winston Churchill South	0.98	0.07	3.092	A	A
Old Base Line Road	3.07	0.20	3.355	A	A
Winston Churchill North	1.38	0.09	3.008	A	A

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Winston Churchill South	0.80	0.05	3.036	A	A
Old Base Line Road	2.46	0.16	3.221	A	A
Winston Churchill North	1.12	0.07	2.956	A	A

Queueing Delay results: (18:15-18:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Winston Churchill South	0.66	0.04	2.997	A	A
Old Base Line Road	2.00	0.13	3.129	A	A
Winston Churchill North	0.93	0.06	2.917	A	A

Queue Variation Results for each time segment

Queue Variation results: (17:00-17:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill North	0.06	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.16	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue		N/A	N/A

North						is very small or very big.			

Queue Variation results: (17:30-17:45)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.20	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill North	0.09	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.20	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill North	0.09	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (18:00-18:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.16	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill North	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (18:15-18:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Winston Churchill South	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Base Line Road	0.13	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Winston Churchill North	0.06	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

ARCADY 8

Filename: Old Main at Bush Mini.arc8
Path: C:\Users\anevans\Desktop\6776 Belfountain\Roundabout Screening Tool
Report generation date: 3/28/2013 1:01:24 PM

Summary of intersection performance

	AM							PM					
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersectio Delay (s)
A1 - 2021													
Bush St	0.26	?	5.59	0.21	A	5.19	A	0.10	?	4.77	0.09	A	5.72
Old Main South	0.05	?	4.50	0.05	A			0.43	1.01	6.15	0.30	A	
Comm. Dwy,	0.01	?	4.39	0.01	A			0.00	?	0.00	0.00	A	
Old Main North	0.09	?	4.76	0.09	A			0.07	?	5.09	0.07	A	
A1 - 2031													
Bush St	0.28	?	5.68	0.22	A	5.24	A	0.11	?	4.80	0.10	A	5.84
Old Main South	0.06	?	4.53	0.05	A			0.47	1.01	6.30	0.32	A	
Comm. Dwy,	0.02	?	4.41	0.02	A			0.00	?	0.00	0.00	A	
Old Main North	0.10	?	4.80	0.09	A			0.08	?	5.15	0.07	A	
A1 - Existing													
Bush St	0.24	?	5.47	0.19	A	5.10	A	0.10	?	4.73	0.09	A	5.59
Old Main South	0.05	?	4.49	0.05	A			0.39	?	5.97	0.28	A	
Comm. Dwy,	0.01	?	4.38	0.01	A			0.00	?	0.00	0.00	A	
Old Main North	0.09	?	4.72	0.08	A			0.07	?	5.03	0.06	A	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - 2021, AM" model duration: 8:00 AM - 9:30 AM
"D3 - 2031, AM" model duration: 8:00 AM - 9:30 AM
"D4 - Existing, PM" model duration: 5:00 PM - 6:30 PM
"D5 - 2021, PM" model duration: 5:00 PM - 6:30 PM
"D6 - 2031, PM" model duration: 5:00 PM - 6:30 PM

Run using ARCADY 8.0.0.296 at 3/28/2013 1:01:20 PM

File summary

File Description

Title	(untitled)
Location	
Site Number	
Date	3/28/2013
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	INTRANET\AnEvans
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
5.75	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Name	Intersection Type	Leg Order	Intersection Delay (s)	Intersection LOS
Old Main at Bush	Mini-roundabout	1,2,3,4	5.10	A

Intersection Network Options

Driving Side	Lighting	Road Surface	In London
Right	Normal/unknown	Normal/unknown	

Legs

Legs

Name	Name	Description
Bush St	Bush St	
Old Main South	Old Main South	
Comm. Dwy,	Comm. Dwy,	
Old Main North	Old Main North	

Capacity Options

Name	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
Bush St	0.00	99999.00		0.00
Old Main South	0.00	99999.00		0.00
Comm. Dwy,	0.00	99999.00		0.00
Old Main North	0.00	99999.00		0.00

Mini Roundabout Geometry

Name	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next leg (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
Bush St	3.00	3.00	3.00	0.00	5.00	2.00	0.00	
Old Main South	3.00	3.00	3.00	0.00	5.00	2.00	0.00	
Comm. Dwy,	3.00	3.00	3.00	0.00	5.00	2.00	0.00	
Old Main North	3.00	3.00	3.00	0.00	5.00	2.00	0.00	

Geometries for Leg C are measured opposite Leg B. Geometries for Leg A (if relevant) are measured opposite Leg D.

Pedestrian Crossings

Name	Crossing Type
Bush St	None
Old Main South	None
Comm. Dwy,	None
Old Main North	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
Bush St		(calculated)	(calculated)	0.504	855.776
Old Main South		(calculated)	(calculated)	0.504	855.776

Comm. Dwy,		(calculated)	(calculated)	0.504	855.776
Old Main North		(calculated)	(calculated)	0.504	855.776

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
Bush St	ONE HOUR	✓	143.00	100.000
Old Main South	ONE HOUR	✓	36.00	100.000
Comm. Dwy,	ONE HOUR	✓	11.00	100.000
Old Main North	ONE HOUR	✓	61.00	100.000

Turning Proportions

Turning Counts or Proportions (PCE/hr) - Old Main at Bush (for whole period)

		To			
		1	**2**	**3**	**4**
From	**1**	0.000	135.000	1.000	7.000
	2	28.000	0.000	3.000	5.000
	3	2.000	5.000	0.000	4.000
	4	5.000	52.000	4.000	0.000

Turning Proportions (PCE) - Old Main at Bush (for whole period)

		To			
		1	**2**	**3**	**4**
From	**1**	0.00	0.94	0.01	0.05
	2	0.78	0.00	0.08	0.14
	3	0.18	0.45	0.00	0.36
	4	0.08	0.85	0.07	0.00

Vehicle Mix

Average PCE Per Vehicle - Old Main at Bush (for whole period)

		To			
		1	**2**	**3**	**4**
From	**1**	1.000	1.010	1.000	1.010
	2	1.010	1.000	1.000	1.010

	3	1.000	1.000	1.000	1.000
	4	1.010	1.010	1.000	1.000

Truck Percentages - Old Main at Bush (for whole period)

		To			
		1	2	3	4
From	1	0.000	1.000	0.000	1.000
	2	1.000	0.000	0.000	1.000
	3	0.000	0.000	0.000	0.000
	4	1.000	1.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
Bush St	0.19	5.47	0.24	?	A	131.22	196.83	17.12	5.22	0.19	17.12	5.22
Old Main South	0.05	4.49	0.05	?	A	33.03	49.55	3.66	4.43	0.04	3.66	4.43
Comm. Dwy,	0.01	4.38	0.01	?	A	10.09	15.14	1.09	4.34	0.01	1.09	4.34
Old Main North	0.08	4.72	0.09	?	A	55.97	83.96	6.47	4.62	0.07	6.47	4.62

Main Results for each time segment

Main results: (08:00-08:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	107.66	26.91	107.06	26.22	45.69	0.00	832.74	572.72	0.129	0.00	0.15	5.005	A
Old Main South	27.10	6.78	26.97	143.77	8.99	0.00	851.25	826.93	0.032	0.00	0.03	4.407	A
Comm. Dwy,	8.28	2.07	8.24	5.99	29.96	0.00	840.67	459.55	0.010	0.00	0.01	4.324	A
Old Main North	45.92	11.48	45.69	11.98	26.22	0.00	842.56	384.16	0.055	0.00	0.06	4.559	A

Main results: (08:15-08:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	128.55	32.14	128.41	31.44	54.79	0.00	828.16	572.72	0.155	0.15	0.18	5.194	A
Old Main South	32.36	8.09	32.34	172.43	10.78	0.00	850.34	826.93	0.038	0.03	0.04	4.441	A
Comm. Dwy,	9.89	2.47	9.88	7.19	35.93	0.00	837.67	459.55	0.012	0.01	0.01	4.348	A
Old Main North	54.84	13.71	54.79	14.37	31.44	0.00	839.93	384.16	0.065	0.06	0.07	4.627	A

Main results: (08:30-08:45)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	157.45	39.36	157.23	38.50	67.09	0.00	821.96	572.72	0.192	0.18	0.24	5.468	A
Old Main South	39.64	9.91	39.60	211.13	13.20	0.00	849.12	826.93	0.047	0.04	0.05	4.487	A
Comm. Dwy,	12.11	3.03	12.10	8.80	44.00	0.00	833.60	459.55	0.015	0.01	0.01	4.381	A
Old Main North	67.16	16.79	67.09	17.60	38.50	0.00	836.37	384.16	0.080	0.07	0.09	4.723	A

Main results: (08:45-09:00)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	157.45	39.36	157.44	38.54	67.16	0.00	821.92	572.72	0.192	0.24	0.24	5.471	A
Old Main South	39.64	9.91	39.64	211.39	13.21	0.00	849.12	826.93	0.047	0.05	0.05	4.487	A
Comm. Dwy,	12.11	3.03	12.11	8.81	44.04	0.00	833.58	459.55	0.015	0.01	0.01	4.382	A
Old Main North	67.16	16.79	67.16	17.62	38.54	0.00	836.35	384.16	0.080	0.09	0.09	4.723	A

Main results: (09:00-09:15)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	128.55	32.14	128.76	31.50	54.91	0.00	828.10	572.72	0.155	0.24	0.19	5.199	A
Old Main South	32.36	8.09	32.40	172.86	10.80	0.00	850.33	826.93	0.038	0.05	0.04	4.443	A
Comm. Dwy,	9.89	2.47	9.90	7.20	36.00	0.00	837.63	459.55	0.012	0.01	0.01	4.348	A
Old Main North	54.84	13.71	54.91	14.40	31.50	0.00	839.90	384.16	0.065	0.09	0.07	4.630	A

Main results: (09:15-09:30)

Name	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
Bush St	107.66	26.91	107.80	26.38	45.97	0.00	832.60	572.72	0.129	0.19	0.15	5.016	A
Old Main South	27.10	6.78	27.13	144.73	9.05	0.00	851.22	826.93	0.032	0.04	0.03	4.409	A
Comm. Dwy,	8.28	2.07	8.29	6.03	30.15	0.00	840.58	459.55	0.010	0.01	0.01	4.326	A
Old Main North	45.92	11.48	45.97	12.06	26.38	0.00	842.48	384.16	0.055	0.07	0.06	4.561	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	2.18	0.15	5.005	A	A
Old Main South	0.48	0.03	4.407	A	A
Comm. Dwy,	0.15	0.01	4.324	A	A
Old Main North	0.85	0.06	4.559	A	A

Queueing Delay results: (08:15-08:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	2.72	0.18	5.194	A	A
Old Main South	0.59	0.04	4.441	A	A
Comm. Dwy,	0.18	0.01	4.348	A	A
Old Main North	1.04	0.07	4.627	A	A

Queueing Delay results: (08:30-08:45)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	3.50	0.23	5.468	A	A
Old Main South	0.73	0.05	4.487	A	A
Comm. Dwy,	0.22	0.01	4.381	A	A
Old Main North	1.29	0.09	4.723	A	A

Queueing Delay results: (08:45-09:00)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	3.57	0.24	5.471	A	A
Old Main South	0.74	0.05	4.487	A	A
Comm. Dwy,	0.22	0.01	4.382	A	A
Old Main North	1.32	0.09	4.723	A	A

Queueing Delay results: (09:00-09:15)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	2.86	0.19	5.199	A	A
Old Main South	0.61	0.04	4.443	A	A
Comm. Dwy,	0.18	0.01	4.348	A	A
Old Main North	1.08	0.07	4.630	A	A

Queueing Delay results: (09:15-09:30)

Name	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
Bush St	2.30	0.15	5.016	A	A
Old Main South	0.51	0.03	4.409	A	A
Comm. Dwy,	0.15	0.01	4.326	A	A
Old Main North	0.89	0.06	4.561	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St	0.15	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Old Main South	0.03	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.06	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St	0.18	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main South	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St	0.24	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main South	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.09	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St	0.24	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main South	0.05	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.09	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

Bush St	0.19	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main South	0.04	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.07	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Name	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
Bush St	0.15	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main South	0.03	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Comm. Dwy,	0.01	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
Old Main North	0.06	N/A	N/A	N/A	N/A	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A