

1: Performance by approach

Approach	NB	SB	NE	SW	All
Denied Del/Veh (s)	1.3	0.5	0.0	0.0	0.3
Total Del/Veh (s)	4.1	3.3	2.4	3.2	2.9
Stop Del/Veh (s)	0.8	0.0	0.0	0.8	0.1
Stop/Veh	0.29	0.00	0.00	0.33	0.02
Avg Speed (kph)	32	34	27	25	32
HC Emissions (g)	0	1	1	0	2
CO Emissions (g)	5	52	24	0	81
NOx Emissions (g)	1	5	4	0	9

2: Performance by approach

Approach	EB	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.0	0.7	0.5	0.8
Stop Del/Veh (s)	0.0	0.0	0.0	0.0
Stop/Veh	0.00	0.00	0.00	0.00
Avg Speed (kph)	36	46	20	41
HC Emissions (g)	1	6	0	7
CO Emissions (g)	23	109	3	135
NOx Emissions (g)	4	16	0	20

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	1.6	0.3	0.4	0.4
Stop Del/Veh (s)	1.4	0.0	0.0	0.0
Stop/Veh	0.50	0.00	0.00	0.00
Avg Speed (kph)	15	47	47	47
HC Emissions (g)	0	3	5	8
CO Emissions (g)	0	48	131	178
NOx Emissions (g)	0	7	15	22

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	4.0
Stop Del/Veh (s)	0.0
Stop/Veh	0.01
Avg Speed (kph)	43
HC Emissions (g)	73
CO Emissions (g)	2083
NOx Emissions (g)	230

Queuing and Blocking Report Baseline

Centura Metropolitana Cluj - Napoca
Anexa 1 - Nod 11 - an 2025

Intersection: 1:

Movement	NB	NB	SW
Directions Served	LT	>	L
Maximum Queue (m)	8.2	6.5	8.5
Average Queue (m)	1.6	1.3	1.7
95th Queue (m)	7.1	5.6	7.3
Link Distance (m)	129.5		37.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		1.0	
Storage Blk Time (%)	1		0
Queuing Penalty (veh)	0		0

Intersection: 2:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report Baseline

Centura Metropolitana Cluj - Napoca
Anexa 1 - Nod 11 - an 2025

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	7.6
Average Queue (m)	1.5
95th Queue (m)	6.5
Link Distance (m)	11.8
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Intersection								
Intersection Delay, s/veh	6.5							
Intersection LOS	A							
Approach	EB	WB	NB	SB	NE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	33	404	354			
Demand Flow Rate, veh/h	0	0	33	412	361			
Vehicles Circulating, veh/h	24	372	352	22	24			
Vehicles Exiting, veh/h	410	13	33	363	0			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	4.3	6.8	6.3			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	L	TR	L	L
Assumed Moves	LT	R	LT	R	L	TR	L	L
RT Channelized								
Lane Util	0.667	0.333	0.032	0.968	0.970	0.030	0.846	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	
Entry Flow, veh/h	22	11	13	399	350	11	11	
Cap Entry Lane, veh/h	868	883	1111	1113	1110	1111	855	
Entry HV Adj Factor	0.990	1.000	0.983	0.980	0.980	1.000	1.000	
Flow Entry, veh/h	22	11	13	391	343	11	11	
Cap Entry, veh/h	859	883	1093	1090	1088	1111	855	
V/C Ratio	0.025	0.012	0.012	0.359	0.315	0.010	0.013	
Control Delay, s/veh	4.4	4.2	3.4	6.9	6.4	3.3	4.3	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	0	2	1	0	0	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach SW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 13

Demand Flow Rate, veh/h 13

Vehicles Circulating, veh/h 372

Vehicles Exiting, veh/h 0

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 4.3

Approach LOS A

Lane Right

Designated Moves TR

Assumed Moves TR

RT Channelized

Lane Util 0.154

Critical Headway, s 4.113

Entry Flow, veh/h 2

Cap Entry Lane, veh/h 871

Entry HV Adj Factor 1.000

Flow Entry, veh/h 2

Cap Entry, veh/h 871

V/C Ratio 0.002

Control Delay, s/veh 4.2

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	NE	SW	All
Denied Del/Veh (s)	1.6	0.5	0.0	0.0	0.3
Total Del/Veh (s)	3.9	3.4	2.7	3.1	3.1
Stop Del/Veh (s)	0.4	0.0	0.3	0.6	0.1
Stop/Veh	0.50	0.00	0.13	0.50	0.10
Avg Speed (kph)	33	34	26	25	32
HC Emissions (g)	0	1	1	0	2
CO Emissions (g)	4	70	22	1	98
NOx Emissions (g)	0	6	3	0	10

2: Performance by approach

Approach	EB	WB	SW	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	1.0	0.5	0.9
Stop Del/Veh (s)	0.0	0.0	0.0	0.0
Stop/Veh	0.00	0.00	0.00	0.00
Avg Speed (kph)	38	45	20	41
HC Emissions (g)	2	8	0	10
CO Emissions (g)	40	186	4	229
NOx Emissions (g)	6	25	1	32

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.2
Total Del/Veh (s)	4.5	0.7	0.4	0.8
Stop Del/Veh (s)	5.0	0.0	0.0	0.3
Stop/Veh	0.33	0.00	0.00	0.02
Avg Speed (kph)	5	46	47	44
HC Emissions (g)	0	4	7	11
CO Emissions (g)	1	72	174	247
NOx Emissions (g)	0	12	21	33

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	4.7
Stop Del/Veh (s)	0.3
Stop/Veh	0.05
Avg Speed (kph)	43
HC Emissions (g)	99
CO Emissions (g)	2788
NOx Emissions (g)	318

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 11 - an 2045

Intersection: 1:

Movement	NB	NB	NE	NE	SW	SW
Directions Served	LT	>	L	>	L	>
Maximum Queue (m)	8.8	6.4	16.1	8.6	9.1	6.9
Average Queue (m)	1.8	2.5	6.8	3.1	1.8	2.6
95th Queue (m)	7.6	7.7	17.0	9.4	7.9	7.9
Link Distance (m)	129.5		37.8		37.4	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		1.0		1.0		1.0
Storage Blk Time (%)	0		1	0	0	
Queuing Penalty (veh)	0		0	0	0	

Intersection: 2:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 11 - an 2045

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	15.7
Average Queue (m)	10.7
95th Queue (m)	14.9
Link Distance (m)	11.8
Upstream Blk Time (%)	5
Queuing Penalty (veh)	1
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 2

Intersection								
Intersection Delay, s/veh	6.7							
Intersection LOS	A							
Approach	EB	WB	NB	SB	NE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	66	433	402			
Demand Flow Rate, veh/h	0	0	66	441	410			
Vehicles Circulating, veh/h	47	432	391	44	47			
Vehicles Exiting, veh/h	438	25	66	451	0			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	4.7	7.1	6.8			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	L	TR		L
Assumed Moves	LT	R	LT	R	L	TR		L
RT Channelized								
Lane Util	0.667	0.333	0.057	0.943	0.946	0.054		0.349
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113		4.293
Entry Flow, veh/h	44	22	25	416	388	22		22
Cap Entry Lane, veh/h	843	859	1093	1096	1091	1093		817
Entry HV Adj Factor	0.990	1.000	0.983	0.981	0.979	1.000		1.000
Flow Entry, veh/h	44	22	25	408	380	22		22
Cap Entry, veh/h	834	859	1074	1075	1068	1093		817
V/C Ratio	0.052	0.026	0.023	0.380	0.356	0.020		0.027
Control Delay, s/veh	4.8	4.4	3.5	7.3	7.0	3.5		4.7
LOS	A	A	A	A	A	A		A
95th %tile Queue, veh	0	0	0	2	2	0		0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	SW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	62
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Demand Flow Rate, veh/h	63
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Vehicles Circulating, veh/h	432
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Vehicles Exiting, veh/h	0
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	4.8
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Approach LOS	A
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Lane	Right
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Designated Moves	TR
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Assumed Moves	TR
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RT Channelized

Lane Util	0.651
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Critical Headway, s	4.113
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Entry Flow, veh/h	41
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Cap Entry Lane, veh/h	835
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Entry HV Adj Factor	0.976
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Flow Entry, veh/h	40
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Cap Entry, veh/h	815
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V/C Ratio	0.049
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Control Delay, s/veh	4.9
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LOS	A
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95th %tile Queue, veh	0
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1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	3.3	0.1	1.5
Total Del/Veh (s)	1.6	2.8	3.6	2.6	2.9
Stop Del/Veh (s)	0.0	0.1	0.1	0.3	0.1
Stop/Veh	0.00	0.75	0.71	0.11	0.49
Avg Speed (kph)	24	24	30	34	30
HC Emissions (g)	0	0	0	0	1
CO Emissions (g)	3	4	13	2	24
NOx Emissions (g)	0	1	1	0	3

2: Performance by approach

Approach	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.4	0.7	4.3	0.8
Stop Del/Veh (s)	0.0	0.0	4.3	0.3
Stop/Veh	0.00	0.00	0.57	0.04
Avg Speed (kph)	46	46	9	44
HC Emissions (g)	5	4	0	9
CO Emissions (g)	131	79	2	212
NOx Emissions (g)	14	12	0	26

12: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	1.1	0.3	0.0	0.7
Stop Del/Veh (s)	0.0	0.0	0.0	0.0
Stop/Veh	0.00	0.00	0.00	0.00
Avg Speed (kph)	47	46	52	47
HC Emissions (g)	9	3	0	13
CO Emissions (g)	172	114	0	287
NOx Emissions (g)	26	10	0	36

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	3.1
Stop Del/Veh (s)	0.3
Stop/Veh	0.10
Avg Speed (kph)	45
HC Emissions (g)	61
CO Emissions (g)	1535
NOx Emissions (g)	179

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - an 2025

Intersection: 1:

Movement	SB	SE	NW
Directions Served	>	>	LT
Maximum Queue (m)	12.1	6.6	8.1
Average Queue (m)	6.4	6.6	1.6
95th Queue (m)	12.8	6.6	6.9
Link Distance (m)			111.7
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	1.0	1.0	
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 2:

Movement	SE
Directions Served	R
Maximum Queue (m)	13.3
Average Queue (m)	9.3
95th Queue (m)	14.6
Link Distance (m)	7.6
Upstream Blk Time (%)	19
Queuing Penalty (veh)	21
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 21

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 12 - an 2025

Intersection									
Intersection Delay, s/veh	4.0								
Intersection LOS	A								
Approach	WB	NB	SB	SE	NW				
Entry Lanes	0	2	2	2	2				
Conflicting Circle Lanes	2	2	2	2	2				
Adj Approach Flow, veh/h	0	74	91	116	52				
Demand Flow Rate, veh/h	0	75	93	118	53				
Vehicles Circulating, veh/h	117	51	117	53	115				
Vehicles Exiting, veh/h	51	0	0	157	11				
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186				
Ped Vol Crossing Leg, #/h	0	0	0	0	0				
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000				
Approach Delay, s/veh	0.0	3.8	4.3	3.8	4.0				
Approach LOS	-	A	A	A	A				
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	L	TR	LT	R	LT	R	
Assumed Moves	L	TR	L	TR	LT	R	LT	R	
RT Channelized									
Lane Util	0.853	0.147	0.000	1.000	0.432	0.568	1.000	0.000	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	64	11	0	93	51	67	53	0	
Cap Entry Lane, veh/h	1088	1090	1035	1041	1086	1089	1037	1043	
Entry HV Adj Factor	0.984	1.000	1.000	0.978	0.980	0.985	0.981	1.000	
Flow Entry, veh/h	63	11	0	91	50	66	52	0	
Cap Entry, veh/h	1071	1090	1035	1019	1065	1073	1017	1043	
V/C Ratio	0.059	0.010	0.000	0.089	0.047	0.062	0.051	0.000	
Control Delay, s/veh	3.9	3.4	3.5	4.3	3.8	3.9	4.0	3.5	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	0	0	0	0	0	0	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NE
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Entry Lanes	0
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	51
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Vehicles Exiting, veh/h	120
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	0.6	0.4	0.3
Total Del/Veh (s)	1.8	2.9	4.8	5.2	3.7
Stop Del/Veh (s)	0.1	0.2	1.7	1.8	1.0
Stop/Veh	0.04	0.96	0.43	0.36	0.39
Avg Speed (kph)	23	23	27	28	26
HC Emissions (g)	1	0	0	2	4
CO Emissions (g)	18	10	20	49	96
NOx Emissions (g)	3	1	2	5	12

2: Performance by approach

Approach	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.8	0.8	13.6	2.3
Stop Del/Veh (s)	0.0	0.0	13.9	1.7
Stop/Veh	0.00	0.00	0.37	0.04
Avg Speed (kph)	41	45	4	35
HC Emissions (g)	3	3	1	6
CO Emissions (g)	104	66	12	183
NOx Emissions (g)	9	9	1	19

3: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.9	0.5	5.1	1.1
Stop Del/Veh (s)	0.0	0.0	4.6	0.5
Stop/Veh	0.00	0.00	0.58	0.06
Avg Speed (kph)	47	43	12	43
HC Emissions (g)	3	3	0	6
CO Emissions (g)	64	123	3	190
NOx Emissions (g)	10	10	0	21

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	5.8
Stop Del/Veh (s)	2.4
Stop/Veh	0.22
Avg Speed (kph)	40
HC Emissions (g)	66
CO Emissions (g)	2084
NOx Emissions (g)	208

Queuing and Blocking Report

Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 12 - an 2045

Intersection: 1:

Movement	NB	SB	SE	SE	NW
Directions Served	L	>	LT	>	LT
Maximum Queue (m)	9.0	12.3	23.4	6.6	36.3
Average Queue (m)	1.8	8.2	12.5	3.9	13.9
95th Queue (m)	7.7	11.6	25.4	9.2	34.2
Link Distance (m)	11.1		98.3		111.7
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	1				
Storage Bay Dist (m)		1.0		1.0	
Storage Blk Time (%)	0	0	5		5
Queuing Penalty (veh)	1	0	4		0

Intersection: 2:

Movement	SE	B17
Directions Served	R	T
Maximum Queue (m)	30.0	21.0
Average Queue (m)	22.4	11.8
95th Queue (m)	31.3	27.8
Link Distance (m)	9.0	88.3
Upstream Blk Time (%)	39	
Queuing Penalty (veh)	128	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 12 - an 2045

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	21.0
Average Queue (m)	14.3
95th Queue (m)	23.4
Link Distance (m)	23.5
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 135

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 12 - an 2045

Intersection									
Intersection Delay, s/veh	6.7								
Intersection LOS	A								
Approach	WB	NB	SB	SE	NW				
Entry Lanes	0	2	2	2	2				
Conflicting Circle Lanes	2	2	2	2	2				
Adj Approach Flow, veh/h	0	354	163	332	278				
Demand Flow Rate, veh/h	0	361	166	339	284				
Vehicles Circulating, veh/h	366	255	366	284	337				
Vehicles Exiting, veh/h	255	0	0	248	279				
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186				
Ped Vol Crossing Leg, #/h	0	0	0	0	0				
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000				
Approach Delay, s/veh	0.0	6.5	6.1	6.4	7.8				
Approach LOS	-	A	A	A	A				
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	L	TR	LT	R	LT	R	
Assumed Moves	L	TR	L	TR	LT	R	LT	R	
RT Channelized									
Lane Util	0.227	0.773	0.000	1.000	0.752	0.248	1.000	0.000	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	82	279	0	166	255	84	284	0	
Cap Entry Lane, veh/h	933	945	859	875	913	926	878	892	
Entry HV Adj Factor	0.976	0.982	1.000	0.982	0.980	0.976	0.979	1.000	
Flow Entry, veh/h	80	274	0	163	250	82	278	0	
Cap Entry, veh/h	910	928	859	859	895	904	859	892	
V/C Ratio	0.088	0.295	0.000	0.190	0.279	0.091	0.324	0.000	
Control Delay, s/veh	4.8	7.0	4.2	6.1	7.0	4.8	7.8	4.0	
LOS	A	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	1	0	1	1	0	1	0	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NE
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Entry Lanes	0
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	255
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Vehicles Exiting, veh/h	368
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.3	0.4	0.6
Total Del/Veh (s)	4.7	2.0	4.2	9.5	4.7
Stop Del/Veh (s)	2.8	0.3	0.2	5.1	1.5
Stop/Veh	0.55	0.17	0.23	0.51	0.32
Avg Speed (kph)	16	21	27	28	25
HC Emissions (g)	0	0	3	3	6
CO Emissions (g)	7	10	77	69	164
NOx Emissions (g)	1	2	10	8	22

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	5.1	0.9	0.9	1.1
Stop Del/Veh (s)	5.0	0.0	0.0	0.3
Stop/Veh	0.64	0.00	0.00	0.04
Avg Speed (kph)	10	43	47	44
HC Emissions (g)	0	4	6	10
CO Emissions (g)	7	144	112	264
NOx Emissions (g)	1	13	18	32

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.3	0.2
Total Del/Veh (s)	4.2	1.3	1.2	1.7
Stop Del/Veh (s)	3.8	0.0	0.1	0.6
Stop/Veh	0.42	0.00	0.03	0.07
Avg Speed (kph)	12	46	40	40
HC Emissions (g)	0	4	5	9
CO Emissions (g)	6	88	159	253
NOx Emissions (g)	1	13	15	29

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	5.6
Stop Del/Veh (s)	1.3
Stop/Veh	0.21
Avg Speed (kph)	41
HC Emissions (g)	95
CO Emissions (g)	2824
NOx Emissions (g)	304

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 13 - an 2025

Intersection: 1:

Movement	NB	NB	SB	SB	SE	SE	NW
Directions Served	L	>	L	>	LT	>	LT
Maximum Queue (m)	28.2	8.5	12.5	8.8	16.8	12.7	26.0
Average Queue (m)	13.6	7.5	5.0	6.2	3.4	9.4	14.3
95th Queue (m)	25.9	8.8	15.1	11.5	14.4	13.7	29.5
Link Distance (m)	20.4		9.5		83.2		172.2
Upstream Blk Time (%)	1		0	2			
Queuing Penalty (veh)	3		1	0			
Storage Bay Dist (m)		1.0		1.0		1.0	
Storage Blk Time (%)	9	0		1	1	0	12
Queuing Penalty (veh)	6	0		0	1	1	0

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	19.5
Average Queue (m)	12.9
95th Queue (m)	22.3
Link Distance (m)	14.3
Upstream Blk Time (%)	6
Queuing Penalty (veh)	15
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 13 - an 2025

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	26.6
Average Queue (m)	14.5
95th Queue (m)	27.3
Link Distance (m)	18.5
Upstream Blk Time (%)	7
Queuing Penalty (veh)	25
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 53

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 13 - an 2025

Intersection										
Intersection Delay, s/veh	7.8									
Intersection LOS	A									
Approach	WB		NB		SB		SE		NW	
Entry Lanes	0		2		2		2		2	
Conflicting Circle Lanes	2		2		2		2		2	
Adj Approach Flow, veh/h	0		256		314		678		197	
Demand Flow Rate, veh/h	0		261		320		692		201	
Vehicles Circulating, veh/h	390		492		390		73		588	
Vehicles Exiting, veh/h	399		0		0		637		165	
Follow-Up Headway, s	3.186		3.186		3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	0		0		0		0		0	
Ped Cap Adj	1.000		1.000		1.000		1.000		1.000	
Approach Delay, s/veh	0.0		6.9		8.6		7.6		8.3	
Approach LOS	-		A		A		A		A	
Lane	Left		Right		Left		Right		Left	Right
Designated Moves	L		TR		L		TR		LT	R
Assumed Moves	L		TR		L		TR		LT	R
RT Channelized										
Lane Util	0.724		0.276		0.003		0.997		0.710	0.290
Critical Headway, s	4.293		4.113		4.293		4.113		4.293	4.113
Entry Flow, veh/h	189		72		1		319		491	201
Cap Entry Lane, veh/h	781		801		843		860		1070	1074
Entry HV Adj Factor	0.979		0.986		1.000		0.981		0.980	0.980
Flow Entry, veh/h	185		71		1		313		481	197
Cap Entry, veh/h	765		790		843		844		1048	1052
V/C Ratio	0.242		0.090		0.001		0.371		0.459	0.187
Control Delay, s/veh	7.4		5.5		4.3		8.6		8.6	5.1
LOS	A		A		A		A		A	A
95th %tile Queue, veh	1		0		0		2		2	1

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NE
----------	----

Entry Lanes	0
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Conflicting Circle Lanes	2
--------------------------	---

Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	492
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Vehicles Exiting, veh/h	273
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.5	0.4	0.5
Total Del/Veh (s)	7.4	4.9	4.2	11.9	7.0
Stop Del/Veh (s)	5.5	3.0	0.3	7.1	4.0
Stop/Veh	0.79	0.69	0.27	0.45	0.55
Avg Speed (kph)	12	13	28	25	21
HC Emissions (g)	1	0	1	2	4
CO Emissions (g)	19	6	37	92	155
NOx Emissions (g)	2	1	5	7	15

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.2
Total Del/Veh (s)	8.6	4.1	1.1	3.3
Stop Del/Veh (s)	8.5	0.5	0.0	0.9
Stop/Veh	0.58	0.11	0.00	0.10
Avg Speed (kph)	7	33	46	36
HC Emissions (g)	0	9	8	17
CO Emissions (g)	3	249	157	409
NOx Emissions (g)	0	25	22	48

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	11.1	1.2	1.4	2.3
Stop Del/Veh (s)	11.3	0.0	0.0	1.1
Stop/Veh	0.57	0.00	0.01	0.06
Avg Speed (kph)	6	46	39	39
HC Emissions (g)	0	10	5	15
CO Emissions (g)	5	167	156	328
NOx Emissions (g)	0	27	16	44

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	10.3
Stop Del/Veh (s)	3.7
Stop/Veh	0.43
Avg Speed (kph)	38
HC Emissions (g)	129
CO Emissions (g)	3776
NOx Emissions (g)	411

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 13 - an 2045

Intersection: 1:

Movement	NB	NB	SB	SB	SE	SE	NW
Directions Served	L	>	L	>	LT	>	LT
Maximum Queue (m)	38.9	9.0	23.7	9.2	17.1	8.0	49.1
Average Queue (m)	26.8	8.2	16.9	9.1	7.0	6.9	26.7
95th Queue (m)	40.7	9.5	23.5	9.2	17.6	7.8	59.6
Link Distance (m)	20.4		9.5		90.0		172.2
Upstream Blk Time (%)	19		7	20			
Queuing Penalty (veh)	101		26	0			
Storage Bay Dist (m)		1.0		1.0		1.0	
Storage Blk Time (%)	21	1	1	12	1	0	16
Queuing Penalty (veh)	26	3	5	0	1	1	0

Intersection: 2:

Movement	SB	NE
Directions Served	R	TR
Maximum Queue (m)	19.0	44.8
Average Queue (m)	15.1	22.2
95th Queue (m)	20.2	46.5
Link Distance (m)	14.3	139.5
Upstream Blk Time (%)	12	
Queuing Penalty (veh)	23	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 13 - an 2045

Intersection: 3:

Movement	NB	B15
Directions Served	R	T
Maximum Queue (m)	27.4	26.8
Average Queue (m)	22.1	6.4
95th Queue (m)	30.9	23.5
Link Distance (m)	3.2	231.5
Upstream Blk Time (%)	39	
Queuing Penalty (veh)	121	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 307

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 13 - an 2045

Intersection									
Intersection Delay, s/veh	12.1								
Intersection LOS	B								
Approach	WB	NB	SB	SE	NW				
Entry Lanes	0	2	2	2	2				
Conflicting Circle Lanes	2	2	2	2	2				
Adj Approach Flow, veh/h	0	579	411	554	308				
Demand Flow Rate, veh/h	0	591	419	565	314				
Vehicles Circulating, veh/h	766	450	766	98	798				
Vehicles Exiting, veh/h	346	0	0	1087	243				
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186				
Ped Vol Crossing Leg, #/h	0	0	0	0	0				
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000				
Approach Delay, s/veh	0.0	11.4	17.8	7.5	14.3				
Approach LOS	-	B	C	A	B				
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	L	TR	LT	R	LT	R	
Assumed Moves	L	TR	L	TR	LT	R	LT	R	
RT Channelized									
Lane Util	0.765	0.235	0.000	1.000	0.796	0.204	1.000	0.000	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	452	139	0	419	450	115	314	0	
Cap Entry Lane, veh/h	806	825	636	661	1050	1055	621	646	
Entry HV Adj Factor	0.980	0.978	1.000	0.981	0.980	0.983	0.980	1.000	
Flow Entry, veh/h	443	136	0	411	441	113	308	0	
Cap Entry, veh/h	790	807	636	648	1029	1037	609	646	
V/C Ratio	0.561	0.169	0.000	0.634	0.429	0.109	0.506	0.000	
Control Delay, s/veh	13.0	6.2	5.7	17.8	8.2	4.4	14.3	5.6	
LOS	B	A	A	C	A	A	B	A	
95th %tile Queue, veh	4	1	0	5	2	0	3	0	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NE
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Entry Lanes	0
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	450
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Vehicles Exiting, veh/h	213
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.8	0.9	1.0
Total Del/Veh (s)	2.4	1.5	3.5	3.9	3.2
Stop Del/Veh (s)	0.4	0.0	0.1	0.2	0.2
Stop/Veh	0.39	0.00	0.36	0.19	0.27
Avg Speed (kph)	23	23	34	34	32
HC Emissions (g)	0	0	1	0	2
CO Emissions (g)	6	10	40	22	79
NOx Emissions (g)	1	1	4	2	9

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	4.4	1.1	1.8	1.6
Stop Del/Veh (s)	4.3	0.0	0.0	0.2
Stop/Veh	0.35	0.00	0.00	0.02
Avg Speed (kph)	11	46	46	45
HC Emissions (g)	0	11	12	23
CO Emissions (g)	3	275	191	469
NOx Emissions (g)	0	33	31	65

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	9.4	1.3	1.2	1.6
Stop Del/Veh (s)	9.5	0.0	0.0	0.5
Stop/Veh	0.86	0.00	0.00	0.04
Avg Speed (kph)	7	47	46	45
HC Emissions (g)	0	8	14	21
CO Emissions (g)	1	133	296	431
NOx Emissions (g)	0	23	38	61

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	5.6
Stop Del/Veh (s)	0.6
Stop/Veh	0.10
Avg Speed (kph)	45
HC Emissions (g)	129
CO Emissions (g)	2909
NOx Emissions (g)	368

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 14 - an 2025

Intersection: 1:

Movement	NB	NB	SE	SE	NW	NW
Directions Served	L	>	LT	>	LT	>
Maximum Queue (m)	9.0	6.9	9.0	12.1	8.2	6.6
Average Queue (m)	3.5	4.1	3.5	6.4	1.6	3.9
95th Queue (m)	10.6	9.7	10.7	12.7	7.1	9.2
Link Distance (m)	22.3		126.4		120.4	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		1.0		1.0		1.0
Storage Blk Time (%)	0		0		0	
Queuing Penalty (veh)	0		0		0	

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	17.0
Average Queue (m)	10.3
95th Queue (m)	20.2
Link Distance (m)	15.5
Upstream Blk Time (%)	3
Queuing Penalty (veh)	4
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 1 - Nod 14 - an 2025

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	13.7
Average Queue (m)	10.6
95th Queue (m)	16.0
Link Distance (m)	4.8
Upstream Blk Time (%)	26
Queuing Penalty (veh)	27
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 32

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 14 - an 2025

Intersection								
Intersection Delay, s/veh	4.6							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	148	88	268			
Demand Flow Rate, veh/h	0	0	151	90	273			
Vehicles Circulating, veh/h	213	200	213	200	82			
Vehicles Exiting, veh/h	142	117	0	0	208			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	4.5	4.2	4.7			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	0.530	0.470	0.444	0.556	0.634	0.366	0.916	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	
Entry Flow, veh/h	80	71	40	50	173	100	120	
Cap Entry Lane, veh/h	963	973	973	982	1063	1067	983	
Entry HV Adj Factor	0.975	0.986	0.975	0.980	0.981	0.980	0.979	
Flow Entry, veh/h	78	70	39	49	170	98	117	
Cap Entry, veh/h	939	960	948	963	1042	1046	962	
V/C Ratio	0.083	0.073	0.041	0.051	0.163	0.094	0.122	
Control Delay, s/veh	4.6	4.4	4.2	4.2	4.9	4.3	4.9	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	0	0	0	1	0	0	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 128

Demand Flow Rate, veh/h 131

Vehicles Circulating, veh/h 186

Vehicles Exiting, veh/h 178

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 4.8

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.084

Critical Headway, s 4.113

Entry Flow, veh/h 11

Cap Entry Lane, veh/h 992

Entry HV Adj Factor 1.000

Flow Entry, veh/h 11

Cap Entry, veh/h 992

V/C Ratio 0.011

Control Delay, s/veh 3.7

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.3	1.2	0.7
Total Del/Veh (s)	4.1	2.4	4.5	3.9	4.0
Stop Del/Veh (s)	1.9	0.8	0.2	0.2	0.8
Stop/Veh	0.79	0.18	0.27	0.32	0.43
Avg Speed (kph)	18	19	32	33	28
HC Emissions (g)	0	0	1	1	3
CO Emissions (g)	13	5	72	41	131
NOx Emissions (g)	2	1	6	4	13

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.4	0.0	0.2
Total Del/Veh (s)	5.4	1.8	1.3	1.8
Stop Del/Veh (s)	5.2	0.0	0.0	0.3
Stop/Veh	0.64	0.00	0.00	0.04
Avg Speed (kph)	10	44	47	44
HC Emissions (g)	0	10	7	17
CO Emissions (g)	2	255	125	382
NOx Emissions (g)	0	28	24	52

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	5.4	1.4	1.2	1.7
Stop Del/Veh (s)	5.2	0.0	0.0	0.5
Stop/Veh	0.61	0.00	0.00	0.06
Avg Speed (kph)	10	46	46	45
HC Emissions (g)	0	5	10	16
CO Emissions (g)	4	116	242	361
NOx Emissions (g)	0	17	30	47

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	6.4
Stop Del/Veh (s)	1.0
Stop/Veh	0.24
Avg Speed (kph)	43
HC Emissions (g)	106
CO Emissions (g)	3051
NOx Emissions (g)	338

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 14 - an 2045

Intersection: 1:

Movement	NB	NB	B6	SB	SB	SE	SE	NW	NW
Directions Served	L	>	T	L	>	LT	>	LT	>
Maximum Queue (m)	44.1	14.7	14.2	14.9	9.1	15.2	8.2	9.4	21.9
Average Queue (m)	13.3	10.4	2.8	6.6	3.5	4.8	6.9	5.3	8.4
95th Queue (m)	42.4	14.8	12.2	16.2	10.5	15.0	8.0	12.5	20.3
Link Distance (m)	22.3		291.3	11.0		126.4		120.4	
Upstream Blk Time (%)	2			2	1				
Queuing Penalty (veh)	11			3	0				
Storage Bay Dist (m)		1.0			1.0		1.0		1.0
Storage Blk Time (%)	1	2		1	1	1	0	0	0
Queuing Penalty (veh)	4	1		1	1	1	0	0	0

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	26.0
Average Queue (m)	12.3
95th Queue (m)	28.0
Link Distance (m)	15.5
Upstream Blk Time (%)	4
Queuing Penalty (veh)	5
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 14 - an 2045

Intersection: 3:

Movement	NB	B15
Directions Served	R	T
Maximum Queue (m)	29.0	8.7
Average Queue (m)	17.6	1.7
95th Queue (m)	27.8	7.4
Link Distance (m)	4.8	291.6
Upstream Blk Time (%)	24	
Queuing Penalty (veh)	47	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 74

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 14 - an 2045

Intersection								
Intersection Delay, s/veh	7.3							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	474	199	420			
Demand Flow Rate, veh/h	0	0	483	203	429			
Vehicles Circulating, veh/h	411	234	411	234	111			
Vehicles Exiting, veh/h	129	220	0	0	326			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	10.2	4.9	6.3			
Approach LOS	-	-	B	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	0.133	0.867	0.355	0.645	0.790	0.210	0.705	0.705
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	64	419	72	131	339	90	170	170
Cap Entry Lane, veh/h	830	847	948	959	1040	1045	963	963
Entry HV Adj Factor	0.984	0.981	0.986	0.977	0.980	0.978	0.979	0.979
Flow Entry, veh/h	63	411	71	128	332	88	166	166
Cap Entry, veh/h	817	831	935	937	1019	1022	943	943
V/C Ratio	0.077	0.494	0.076	0.137	0.326	0.086	0.177	0.177
Control Delay, s/veh	5.2	11.0	4.5	5.1	6.9	4.3	5.5	5.5
LOS	A	B	A	A	A	A	A	A
95th %tile Queue, veh	0	3	0	0	1	0	1	1

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 236

Demand Flow Rate, veh/h 241

Vehicles Circulating, veh/h 213

Vehicles Exiting, veh/h 681

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 5.2

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.295

Critical Headway, s 4.113

Entry Flow, veh/h 71

Cap Entry Lane, veh/h 973

Entry HV Adj Factor 0.986

Flow Entry, veh/h 70

Cap Entry, veh/h 960

V/C Ratio 0.073

Control Delay, s/veh 4.4

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	2.7	2.0	1.5
Total Del/Veh (s)	2.7	2.8	5.0	3.8	3.9
Stop Del/Veh (s)	1.2	0.8	0.2	0.5	0.6
Stop/Veh	0.34	0.59	0.63	0.57	0.54
Avg Speed (kph)	17	20	30	36	29
HC Emissions (g)	1	0	2	2	5
CO Emissions (g)	15	6	89	47	157
NOx Emissions (g)	2	1	8	5	17

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	1.4	1.1	9.9	2.7
Stop Del/Veh (s)	0.0	0.0	9.7	1.6
Stop/Veh	0.00	0.00	0.61	0.10
Avg Speed (kph)	43	47	7	39
HC Emissions (g)	12	4	0	16
CO Emissions (g)	287	77	8	372
NOx Emissions (g)	32	12	1	44

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	1.2	1.0	6.8	1.6
Stop Del/Veh (s)	0.0	0.0	6.0	0.5
Stop/Veh	0.00	0.00	0.50	0.05
Avg Speed (kph)	46	45	12	43
HC Emissions (g)	7	5	0	12
CO Emissions (g)	132	166	7	304
NOx Emissions (g)	21	15	1	37

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	6.8
Stop Del/Veh (s)	1.9
Stop/Veh	0.34
Avg Speed (kph)	41
HC Emissions (g)	114
CO Emissions (g)	3210
NOx Emissions (g)	350

Queuing and Blocking Report

Baseline

Centura metropolitana Cluj - Napoca

Anexa 1 - Nod 15 - an 2025

Intersection: 1:

Movement	NB	SB	SB	SE	SE	NW	NW
Directions Served	L	L	>	LT	>	LT	>
Maximum Queue (m)	16.3	11.1	8.7	8.8	22.2	16.2	12.7
Average Queue (m)	12.6	8.3	8.3	1.8	13.3	5.0	7.9
95th Queue (m)	18.8	15.2	8.8	7.6	22.2	15.8	11.8
Link Distance (m)	14.9	22.8		129.0		174.3	
Upstream Blk Time (%)	2						
Queuing Penalty (veh)	8						
Storage Bay Dist (m)			1.0		1.0		1.0
Storage Blk Time (%)	4	1	1	0	1	1	
Queuing Penalty (veh)	0	2	0	1	1	1	

Intersection: 2:

Movement	SB	B16
Directions Served	R	T
Maximum Queue (m)	31.4	23.2
Average Queue (m)	28.0	7.7
95th Queue (m)	35.4	22.1
Link Distance (m)	7.0	213.8
Upstream Blk Time (%)	40	
Queuing Penalty (veh)	154	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 1 - Nod 15 - an 2025

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	34.5
Average Queue (m)	16.7
95th Queue (m)	32.1
Link Distance (m)	22.8
Upstream Blk Time (%)	3
Queuing Penalty (veh)	6
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 172

Intersection								
Intersection Delay, s/veh	7.1							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	368	202	638			
Demand Flow Rate, veh/h	0	0	375	206	650			
Vehicles Circulating, veh/h	302	465	302	465	73			
Vehicles Exiting, veh/h	421	193	0	0	598			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	9.0	6.0	6.8			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	1.000	0.000	0.354	0.646	0.352	0.648	0.508	0.508
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	375	0	73	133	229	421	90	90
Cap Entry Lane, veh/h	901	915	797	816	1070	1074	788	788
Entry HV Adj Factor	0.981	1.000	0.986	0.977	0.981	0.981	0.980	0.980
Flow Entry, veh/h	368	0	72	130	225	413	88	88
Cap Entry, veh/h	884	915	786	798	1049	1053	772	772
V/C Ratio	0.416	0.000	0.092	0.163	0.214	0.392	0.114	0.114
Control Delay, s/veh	9.0	3.9	5.5	6.2	5.4	7.6	5.8	5.8
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	2	0	0	1	1	2	0	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	173
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Demand Flow Rate, veh/h	177
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Vehicles Circulating, veh/h	481
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Vehicles Exiting, veh/h	196
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	5.7
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Approach LOS	A
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Lane	Right
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Designated Moves	R
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Assumed Moves	R
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RT Channelized

Lane Util	0.492
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Critical Headway, s	4.113
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Entry Flow, veh/h	87
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Cap Entry Lane, veh/h	807
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Entry HV Adj Factor	0.977
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Flow Entry, veh/h	85
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Cap Entry, veh/h	788
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V/C Ratio	0.108
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Control Delay, s/veh	5.7
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LOS	A
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95th %tile Queue, veh	0
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1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.1	1.6	0.9	0.9
Total Del/Veh (s)	3.0	6.0	5.6	8.9	6.2
Stop Del/Veh (s)	1.6	4.4	0.9	4.1	2.7
Stop/Veh	0.32	0.79	0.44	0.59	0.55
Avg Speed (kph)	16	13	30	29	26
HC Emissions (g)	1	0	1	1	4
CO Emissions (g)	14	10	79	84	186
NOx Emissions (g)	2	1	7	6	16

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.2
Total Del/Veh (s)	1.2	1.0	5.0	1.4
Stop Del/Veh (s)	0.0	0.0	4.9	0.4
Stop/Veh	0.00	0.00	0.45	0.04
Avg Speed (kph)	45	46	11	44
HC Emissions (g)	10	12	0	22
CO Emissions (g)	248	195	2	446
NOx Emissions (g)	30	33	0	63

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	1.4	2.1	9.6	2.6
Stop Del/Veh (s)	0.0	0.0	8.8	0.9
Stop/Veh	0.00	0.00	0.61	0.06
Avg Speed (kph)	46	42	10	41
HC Emissions (g)	7	17	0	24
CO Emissions (g)	151	380	5	535
NOx Emissions (g)	22	45	0	67

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	7.6
Stop Del/Veh (s)	2.2
Stop/Veh	0.32
Avg Speed (kph)	41
HC Emissions (g)	146
CO Emissions (g)	3862
NOx Emissions (g)	442

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 15 - an 2045

Intersection: 1:

Movement	NB	SB	SB	B5	SE	SE	NW	NW
Directions Served	L	L	>	T	LT	>	LT	>
Maximum Queue (m)	15.6	37.8	19.3	14.0	29.4	14.4	34.9	9.1
Average Queue (m)	10.9	15.5	10.9	2.8	12.7	8.8	19.6	6.4
95th Queue (m)	20.7	36.0	17.9	12.1	28.9	13.7	33.3	11.7
Link Distance (m)	14.9	22.8		196.7	129.0		174.3	
Upstream Blk Time (%)	2	7	0					
Queuing Penalty (veh)	5	22	0					
Storage Bay Dist (m)			1.0			1.0		1.0
Storage Blk Time (%)	5	8	2		2	0	13	1
Queuing Penalty (veh)	0	18	2		6	1	13	2

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	19.2
Average Queue (m)	9.4
95th Queue (m)	17.5
Link Distance (m)	7.0
Upstream Blk Time (%)	19
Queuing Penalty (veh)	51
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 15 - an 2045

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	40.3
Average Queue (m)	20.3
95th Queue (m)	36.8
Link Distance (m)	22.8
Upstream Blk Time (%)	8
Queuing Penalty (veh)	22
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 141

Intersection								
Intersection Delay, s/veh	7.8							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	211	354	722			
Demand Flow Rate, veh/h	0	0	215	361	737			
Vehicles Circulating, veh/h	553	526	553	526	114			
Vehicles Exiting, veh/h	298	297	0	0	773			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	8.3	7.8	7.5			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	1.000	0.000	0.316	0.684	0.596	0.404	0.733	0.733
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	215	0	114	247	439	298	311	311
Cap Entry Lane, veh/h	746	767	762	782	1037	1043	838	838
Entry HV Adj Factor	0.981	1.000	0.982	0.980	0.979	0.980	0.980	0.980
Flow Entry, veh/h	211	0	112	242	430	292	305	305
Cap Entry, veh/h	732	767	748	766	1016	1022	821	821
V/C Ratio	0.288	0.000	0.150	0.316	0.423	0.286	0.371	0.371
Control Delay, s/veh	8.3	4.7	6.4	8.4	8.2	6.4	8.8	8.8
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	1	0	1	1	2	1	2	2

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 416

Demand Flow Rate, veh/h 424

Vehicles Circulating, veh/h 399

Vehicles Exiting, veh/h 369

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 7.9

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.267

Critical Headway, s 4.113

Entry Flow, veh/h 113

Cap Entry Lane, veh/h 855

Entry HV Adj Factor 0.982

Flow Entry, veh/h 111

Cap Entry, veh/h 839

V/C Ratio 0.132

Control Delay, s/veh 5.6

LOS A

95th %tile Queue, veh 0