



Appendix G1. Analysis of Capacity on the Metra Electric District to Serve Metra and Northern Indiana Commuter Transportation District Growth with West Lake Corridor Service



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**Analysis of Capacity on the MED to
Serve Metra and NICTD Growth
with West Lake Corridor Service**

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Prepared for:

Federal Transit Administration and Northern Indiana Commuter Transportation District

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Acronyms

DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
FTA	Federal Transit Administration
IHB	Indiana Harbor Belt
NEPA	National Environmental Policy Act
NICTD	Northern Indiana Commuter Transportation District
SSL	South Shore Line
MED	Metra Electric District
RTC	Rail Traffic Controller

1. INTRODUCTION

1.1 Project Overview

The Federal Transit Administration (FTA) and Northern Indiana Commuter Transportation District (NICTD) have initiated the environmental review process for the West Lake Corridor Project in Lake County, Indiana and Cook County, Illinois in accordance with the National Environmental Policy Act (NEPA) and other regulatory requirements. A Draft Environmental Impact Statement (DEIS) is being prepared as part of this process with the FTA as the Federal Lead Agency and NICTD as the Local Project Sponsor, responsible for implementing the Project under NEPA.

The project team is studying a Commuter Rail Alternative, which would involve an approximately 9-mile southern extension of NICTD's existing South Shore Line (SSL) between Dyer and Hammond, Indiana. The Project would include new track adjacent to the existing CSX Monon Subdivision from Munster to Dyer and use of the former Monon railroad corridor from Hammond to Munster with a flyover to the existing SSL in Hammond. Four stations are being considered at Munster/Dyer Main Street, Munster Fisher/45th Streets, South Hammond, and Downtown Hammond. A maintenance facility and storage yard would also be needed to store and maintain the vehicles. Trains on the proposed West Lake Corridor line would connect with the existing SSL and ultimately Metra Electric District's (MED) line to the north, providing new transit service between Munster/Dyer and Metra's Millennium Station in Downtown Chicago.

The proposed West Lake service would traverse the MED from the Kensington Interlocking to Millennium Station. Currently, Metra and NICTD operate 199 trains per day along the MED corridor. Due to this large volume of traffic, West Lake service must be planned to avoid conflicts with existing revenue train service. Should West Lake trains be unable to operate without interfering with the existing traffic, additional infrastructure would be required to accommodate the proposed service.

1.2 Purpose of Study

This study is intended to evaluate the capacity of the MED corridor and determine the effects of introducing new West Lake Corridor service on Metra and NICTD SSL service. In order to accomplish these objectives, the study simulates operations of trains over the network under existing and future conditions, enabling the team to evaluate the performance of the scheduled trains and the effects of infrastructure improvement measures.

2. RTC BACKGROUND AND ASSUMPTIONS

Rail Traffic Controller (RTC) is a computer program, developed by Berkeley Simulation Software, LLC, used to simulate train operations within a railroad network. RTC is broadly used by most North American Class 1 railroads to evaluate capacity and the effectiveness of infrastructure improvements. RTC simplifies modeling by using links and nodes to construct a network representing track and signal features. Trains are programmed by defining characteristics, such as locomotive type and horsepower, total train length, and trailing car

tonnage. Routes are defined for each train by identifying nodes along the train's path. RTC uses the data entered to conduct a Virtual Dispatch that simulates train operations and calculates statistical data, enabling the user to evaluate capacity and quantify the benefits of infrastructure improvements.

RTC models in this report assume an ideal day of operations with error-free dispatch and train operation. The following assumptions have also been made to assure consistency in modeling:

- Existing revenue and non-revenue train routes replicate dispatch recordings made by Metra on Wednesday, October 15, 2014 (the operational impacts associated with the introduction of the two NICTD SSL Sunrise Express trains on March 16, 2015 were reviewed, which concluded that the comparison to the October 15, 2014 dispatch records remain valid)
- NICTD trains are linked to evaluate midday storage needs of the network
- Existing operations on the MED are maintained by scheduling proposed trains to avoid conflicts with existing schedules
- The Base Case RTC network represents the tracks, signals, and speeds in the July 15th, 2009 Metra Operations Profile
- The MED Kensington Interlocking has no freight traffic programmed
- All flag stops are programmed for a minimum of 1 second
- All station stops are programmed for a minimum of 10 seconds
- Trains are not randomized; operations are based on 2015 Metra and NICTD train schedules
- All nonrevenue train movements are included in the models, to the extent they have been described by Metra and NICTD
- All Metra and NICTD revenue and non-revenue schedules have been validated by Metra
- All statistics are a result of one day's dispatch with 1 hour each of warm up and cool down

3. METHODOLOGY

To measure the effect of the proposed West Lake Corridor service on the MED, a "Base Case" model replicating existing operations was constructed to provide a baseline of statistics. The Base Case model was calibrated using actual dispatch data and was reviewed and approved by Metra. Critical statistics gathered from the model's virtual dispatch provided a baseline of network performance. This study used "Average Speed with Dwell" and "True Delay" as measures of network performance. True Delay represents a train's run time (gathered by RTC's virtual dispatch) from its Ideal, unopposed run time (gathered by RTC's Train Performance Calculator tool). Together these statistics provided a snap shot of the network's performance.

By comparing statistics from modeled scenarios with and without the proposed West Lake Corridor service, the potential degradation caused by additional service was quantified, providing a guide for evaluating the capacity of the MED in present and future service scenarios.

3.1 Future Scenarios

The West Lake Corridor service could be in operation by the year 2023. To predict the effect that the West Lake Corridor service would have on Metra and NICTD SSL service, RTC models were constructed to represent several possible 2023 conditions. All 2023 RTC models contain network infrastructure improvements planned by Metra and NICTD for completion by 2023, including those elements listed below. These improvements are associated with expanded Metra and NICTD service, and would not be required for the proposed West Lake Corridor service on its own.

- Bi-directional signals from Millennium to 67th Street
- Left hand crossover at 47th Street
- Remote operation of 11th Street Interlocking
- Reconfiguration of and addition of tracks from Millennium to Museum Campus with Track 7 extension, new Track 6, extension and connection of Track 5
- Build out of Millennium terminal Tracks 15, 16 and 17
- Connection of Track 7 from Museum Campus to Millennium Station, bypassing Van Buren Station and 11th Place Interlocking

Listed below are the possible 2023 traffic scenarios defined by NICTD and Metra:

- No added Metra service
- 10% additional Metra traffic
- 20% additional Metra traffic
- 10 additional NICTD SSL peak hour trains per day

4. DESCRIPTION OF BASE MODEL AND STATISTICS

The Base Case RTC model replicated 2015 MED operations as closely as possible. The Base Case was accepted by Metra as an accurate representation of 2015 MED operations. The resulting statistics from the Base Case model are listed in **Table 4-1**. String line graphs displaying the time and position of rush hour trains are available in **Appendix A**.

Table 4-1 Base Case Statistics

Train Group	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec)
<i>METRA Revenue</i>	161	25.84	14
<i>NICTD Revenue</i>	38	35.50	21
<i>All Revenue Trains</i>	199	27.69	16

*True delay = average delay per revenue train

All statistics in **Table 4-1** are representative of average Metra and NICTD revenue train service. These numbers do not include non-revenue train moves.

Table 4-2 displays statistics describing the effect West Lake service would have on today's MED traffic, assuming no MED infrastructure improvements. String line graphs for this scenario are found in **Appendix A**. **Appendix B** contains the proposed West Lake Corridor train schedule used for RTC model analysis.

Table 4-2 Base Case Plus West Lake Service Statistics

Train Group	Train Count	Change in Average Speed	Change in True Delay*
	Revenue Trips	(MPH)	(Sec/Train)
<i>METRA Revenue</i>	161	-0.03	+4
<i>NICTD Revenue</i>	38	-0.34	+11
<i>West Lake Revenue</i>	+12	---	---
<i>All Revenue Trains</i>	211	+0.27	+6

*True delay = average delay per revenue train

The models' results showed a small degradation of network performance. NICTD trains experienced most of the degradation because they are not permitted to pick up passengers at their MED station stops. NICTD trains routinely leave their MED station stops directly after discharging passengers, as no passengers rely on them to depart at their scheduled time. By adding the proposed West Lake Corridor service to NICTD's existing MED route, trains are kept from running ahead of schedule, which the RTC program identifies as a reduction in speed and an increase in delay. Bar graphs displaying True Delay by train number are available in **Appendix D**.

5. FUTURE SCENARIOS MODELED

West Lake service would begin in the year 2023. Eleven future scenarios, described below, were modeled to represent possible 2023 service scenarios. The schedules for proposed NICTD and Metra growth scenarios are shown in **Appendix C**.

Metra 0% Growth:

Scenario 1

- NICTD – Existing 2015 service
- Metra – Existing 2015 service
- MED Network – 2023 infrastructure

Scenario 2

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – Existing 2015 service
- MED Network – 2023 infrastructure

Scenario 3

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – Existing 2015 service

- West Lake Corridor – 5 rush hour trains and 1 reverse commute (12 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Metra 10% Growth:

Scenario 4

- NICTD – Existing 2015 service
- Metra – 10% service increase (10 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Scenario 5

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – 10% service increase (10 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Scenario 6

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – 10% service increase (10 additional revenue trains per weekday)
- West Lake Corridor – 5 rush hour trains and 1 reverse commute (12 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Scenario 7

- NICTD – Existing 2015 service
- Metra – 10% service increase (10 additional revenue trains per weekday)
- West Lake Corridor – 5 rush hour trains and 1 reverse commute (12 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Metra 20% Growth:

Scenario 8

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – 20% service increase (23 additional revenue trains per weekday)
- West Lake Corridor – 5 rush hour trains and 1 reverse commute (12 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Scenario 9

- NICTD – 5 additional rush hour trains with 3 additional reverse commutes (16 additional revenue trains per weekday)
- Metra – 20% service increase (23 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

Scenario 10

- NICTD – Existing 2015 service
- Metra – 20% service increase (23 additional revenue trains per weekday)

- MED Network – 2023 infrastructure

Scenario 11

- NICTD – Existing 2015 service
- Metra – 20% service increase (23 additional revenue trains per weekday)
- West Lake Corridor – 5 rush hour trains and 1 reverse commute (12 additional revenue trains per weekday)
- MED Network – 2023 infrastructure

6. RESULTS AND STATISTICS

6.1 Metra 0% Growth Scenarios

Metra’s 0% growth scenarios replicated possible 2023 MED service scenarios with no addition to existing Metra revenue service. For all Metra 0% growth scenarios dispatch methods were identical to the Base Case; therefore, statistics for Scenario 1 were similar to the Base Case. **Table 6-1** displays critical statistics for revenue trains in three 0% Metra growth scenarios. String Line Graphs for all Metra 0% growth scenarios can be found in **Appendix A**.

Table 6-1 Scenario 1-3 Statistics

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 1			Scenario 2			Scenario 3		
<i>METRA Revenue</i>	161	25.80	22	161	26.03	13	161	25.95	25
<i>NICTD Revenue</i>	38	35.66	22	54	34.87	65	54	34.69	73
<i>West Lake Service</i>	---	---	---	---	---	---	12	34.21	60
<i>All Revenue Trains</i>	199	27.68	22	215	28.25	25	227	28.465	39

*True Delay = average delay per revenue train

Table 6-2 compares the above cases to the Base Case, quantifying the MED’s capacity to accommodate the following future scenarios:

- 2015 Service with 2023 MED improvements (Scenario 1)
- NICTD 2023 service (Scenario 2)
- NICTD 2023 proposed service with West Lake service (Scenario 3)

Table 6-2 Scenario 1-3 Statistics Compared to Base Case

Train Group	Train Count Increase	Average Speed	True Delay*	Train Count Increase	Average Speed	True Delay*	Train Count Increase	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 1			Scenario 2			Scenario 3		
<i>METRA Revenue</i>	---	-0.04	+8	---	+0.19	-1	---	+0.11	+11

Train Group	Train Count Increase	Average Speed	True Delay*	Train Count Increase	Average Speed	True Delay*	Train Count Increase	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 1			Scenario 2			Scenario 3		
NICTD Revenue	---	+0.16	+1	+16	-0.63	+44	+16	-0.81	+52

*True Delay = average delay per revenue train

Metra revenue trains experienced a minor increase in True Delay from the addition of West Lake service. NICTD trains experienced more delay, as they did when West Lake was added to the Base Case. Bar charts showing True Delay by train number are available in **Appendix D**.

6.2 Metra 10% Growth Scenarios

Metra’s 10% growth scenarios replicated possible 2023 MED service scenarios with 10 additional Metra revenue trains per weekday. All additional Metra trains operate during rush periods. The increase in Metra revenue traffic would require platform reassignments at Millennium Station. Additional nonrevenue train moves must be included to account for the increased revenue traffic entering and exiting the Station to/from storage tracks. **Table 6-3** displays critical statistics for revenue trains in the four 10% Metra growth scenarios. String Line Graphs for all Metra 10% growth scenarios can be found in **Appendix A**.

Table 6-3 Scenario 4-7 Statistics

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 4			Scenario 5		
METRA Revenue	171	26.11	20	171	26.08	23
NICTD Revenue	38	35.24	29	54	34.82	65
West Lake Service	---	---	---	---	---	---
All Revenue Trains	209	27.77	22	225	28.18	33
	Scenario 6			Scenario 7		
METRA Revenue	171	26.06	24	171	26.10	21
NICTD Revenue	54	34.68	73	38	35.17	32
West Lake Service	12	34.37	46	12	34.38	46
All Revenue Trains	237	28.45	36	221	28.11	24

*True delay = average delay per revenue train

Table 6-4 compares the above scenarios to the Base Case, quantifying the MED’s capacity to accommodate the following future scenarios:

- Metra 10% Traffic Increase (Scenario 4)
- Metra 10% Traffic Increase and NICTD 2023 proposed service (Scenario 5)

- Metra 10% Traffic Increase and NICTD 2023 proposed service with West Lake service (Scenario 6)
- Metra 10% Traffic Increase with West Lake service (Scenario 7)

Table 6-4 Scenario 4-7 Statistics Compared to Base Case

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 4			Scenario 5		
<i>METRA Revenue</i>	+10	+0.27	+6	+10	+0.24	+9
<i>NICTD Revenue</i>	---	-0.26	+8	+16	-0.68	+44
	Scenario 6			Scenario 7		
<i>METRA Revenue</i>	+10	+0.22	+10	+10	-0.26	+7
<i>NICTD Revenue</i>	+16	-0.82	+52	---	-0.33	+11

*True delay = average delay per revenue train

Table 6-4 shows that solely adding 10 Metra trains to the MED increased True Delay an average of 6 seconds per Metra revenue train. Scenarios 5, 6, and 7 results were similar to the 0% growth scenarios. The addition of the West Lake Corridor trains caused a very modest decrease in Average Speed and increase in True Delay compared to those incurred in Scenario 5 with 10% Metra growth and the planned NICTD 2023 service. Bar charts showing True Delay by train number are available in **Appendix D**.

6.3 Metra 20% Growth Scenarios

Metra’s 20% growth scenarios replicated possible 2023 MED service scenarios with 23 additional Metra revenue trips per weekday (all additional Metra trains operate during rush periods). Like the 10% growth scenarios, Millennium Station required platform reassignments and the addition of nonrevenue trains to accommodate additional Metra traffic. **Table 6-5** displays critical statistics for revenue trains in the four 20% Metra growth scenarios. String Line Graphs for all Metra 20% growth scenarios can be found in **Appendix A**.

Table 6-5 Scenario 8-11 Statistics

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 8			Scenario 9		
<i>METRA Revenue</i>	184	24.02	226	184	24.32	178
<i>NICTD Revenue</i>	54	30.59	415	54	31.56	377
<i>West Lake Service</i>	12	31.01	337	---	---	---
<i>All Revenue Trains</i>	250	25.77	272	238	25.96	223
	Scenario 10			Scenario 11		
<i>METRA Revenue</i>	184	24.52	142	184	24.56	134
<i>NICTD Revenue</i>	38	32.85	211	38	32.34	245
<i>West Lake Service</i>	---	---	---	12	31.40	297

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 8			Scenario 9		
All Revenue Trains	222	25.94	154	234	26.18	160

*True delay = average delay per revenue train

Table 6-6 compares the above scenarios to the Base Case; quantifying the MED’s capacity to accommodate the following future scenarios:

- Metra 20% Traffic Increase (Scenario 10)
- Metra 20% Traffic Increase and NICTD 2023 proposed service (Scenario 9)
- Metra 20% Traffic Increase and NICTD 2023 proposed service with West Lake service (Scenario 8)
- Metra 20% Traffic Increase with West Lake service (Scenario 11)

Table 6-6 Scenario 8-11 Statistics Compared to Base Case

Train Group	Train Count	Average Speed	True Delay*	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)	Revenue Trips	(MPH)	(Sec/Train)
	Scenario 8			Scenario 9		
METRA Revenue	+23	-1.82	+211	+23	-1.52	+164
NICTD Revenue	+16	-4.91	+394	+16	-3.94	+356
	Scenario 10			Scenario 11		
METRA Revenue	+23	-1.32	+128	+23	-1.28	+119
NICTD Revenue	0	-2.65	+190	0	-3.16	+225

*True delay = average delay per revenue train

Table 6-6 shows an average increase in True Delay of 2-3 minutes per revenue train from the Base Case caused by the addition of 23 Metra revenue trains. The results indicate that the MED is unable to accommodate this service increase with the planned 2023 infrastructure. Bar charts showing True Delay by train number are available in **Appendix D**.

A comparison of scenarios 8 and 9 is instructive; these cases represent the maximum expansion of Metra and NICTD SSL service. **Table 6-7** shows that the addition of the proposed West Lake Corridor service would have a comparatively small effect on this MED network operation. This is because the West Lake Corridor service would use future Track 7 to bypass 11th Place and Van Buren Station, allowing separation from other NICTD and Metra traffic in the congested corridor close to Millennium Station.

Table 6-7 Scenario 8 & 9 Compared

Train Group	Train Count	Average Speed	True Delay*
	Revenue Trips	(MPH)	(Sec/Train)
<i>METRA Revenue</i>	---	-0.30	+48
<i>NICTD Revenue</i>	---	-0.97	+38

7. SUMMARY AND RECOMMENDATIONS

Subject to Metra and NICTD approval of the modeling results, this analysis would appear to prove that the MED has sufficient capacity to accommodate the proposed West Lake Corridor service. West Lake Corridor trains can be added to today’s operation and infrastructure with relatively little disruption to schedules and on-time performance.

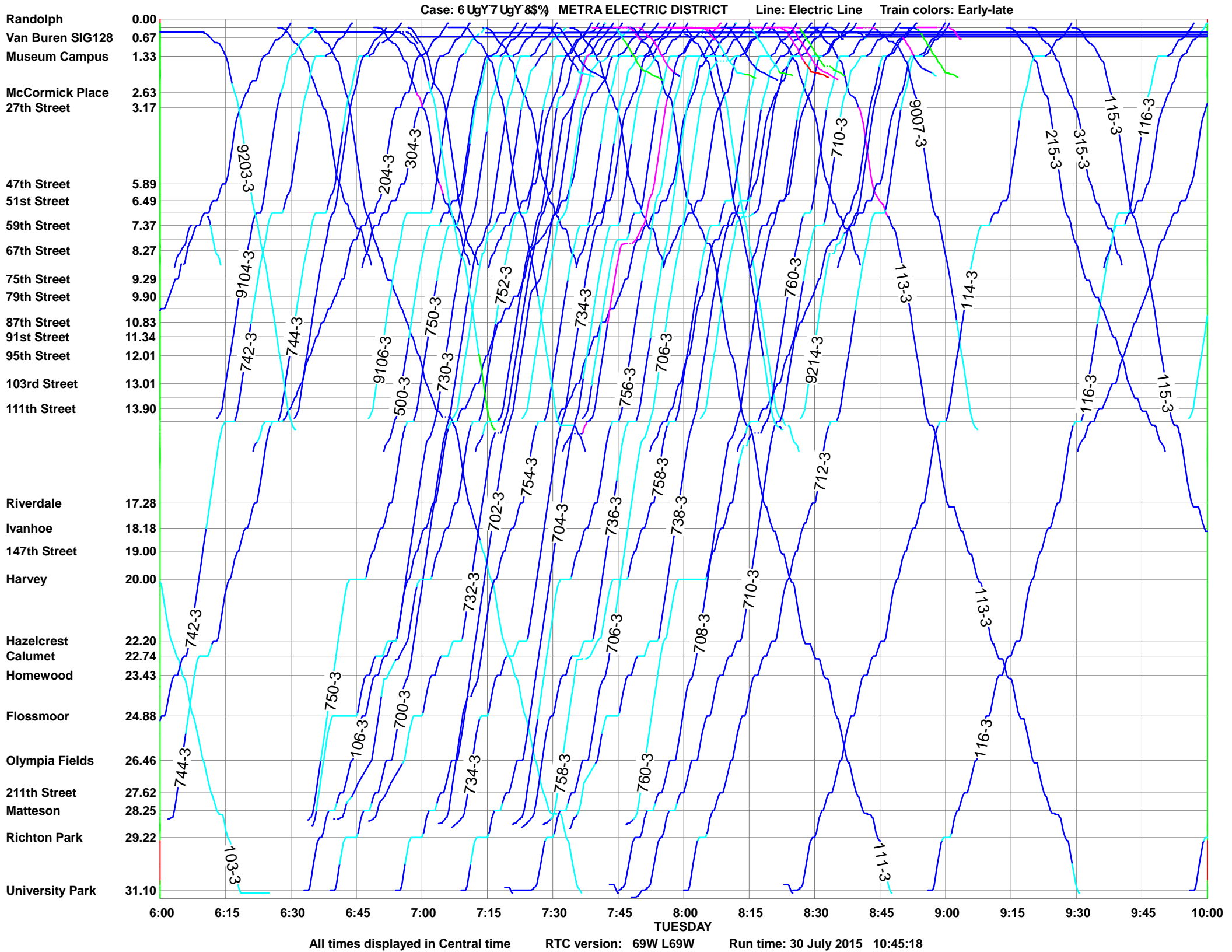
The 10% Metra growth and NICTD’s proposed 2023 growth with the programmed 2023 infrastructure scenarios showed modest degradation to the network’s performance. Adding the West Lake Corridor service would have virtually no impact in these scenarios.

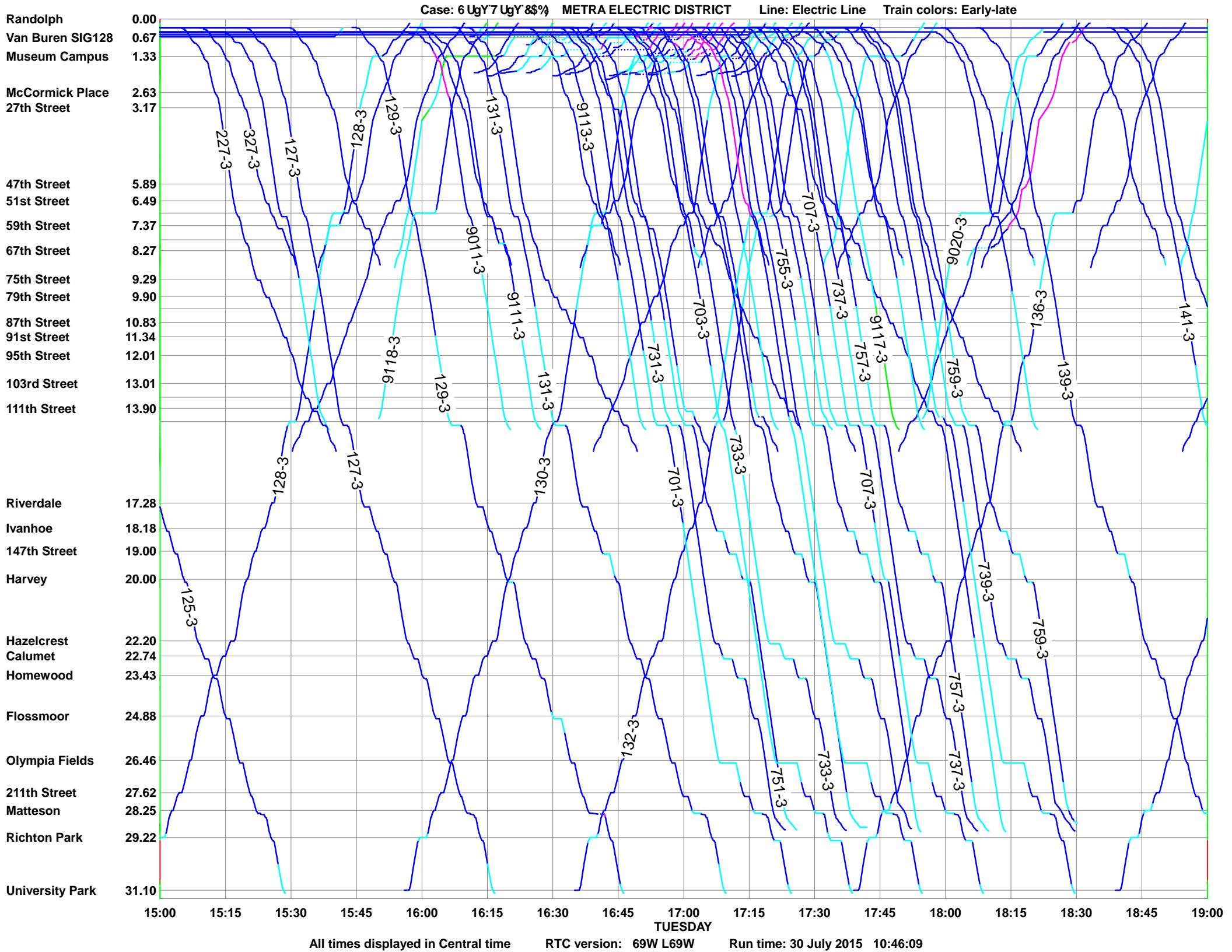
Scenarios containing Metra’s anticipated 20% growth yielded significant delays, suggesting that further network infrastructure and operating modifications would be needed to accommodate such growth. Adding the West Lake Corridor service under these conditions would cause relatively little further deterioration in performance beyond that caused by the assumed Metra and NICTD expansions.

The primary reasons the West Lake Corridor would not contribute to degradation in MED performance is the proposed use of the isolated east side Millennium Station terminal track platforms and the new Track 7, bypassing Van Buren Station. In addition, the West Lake Corridor service would be scheduled to operate in available slots.

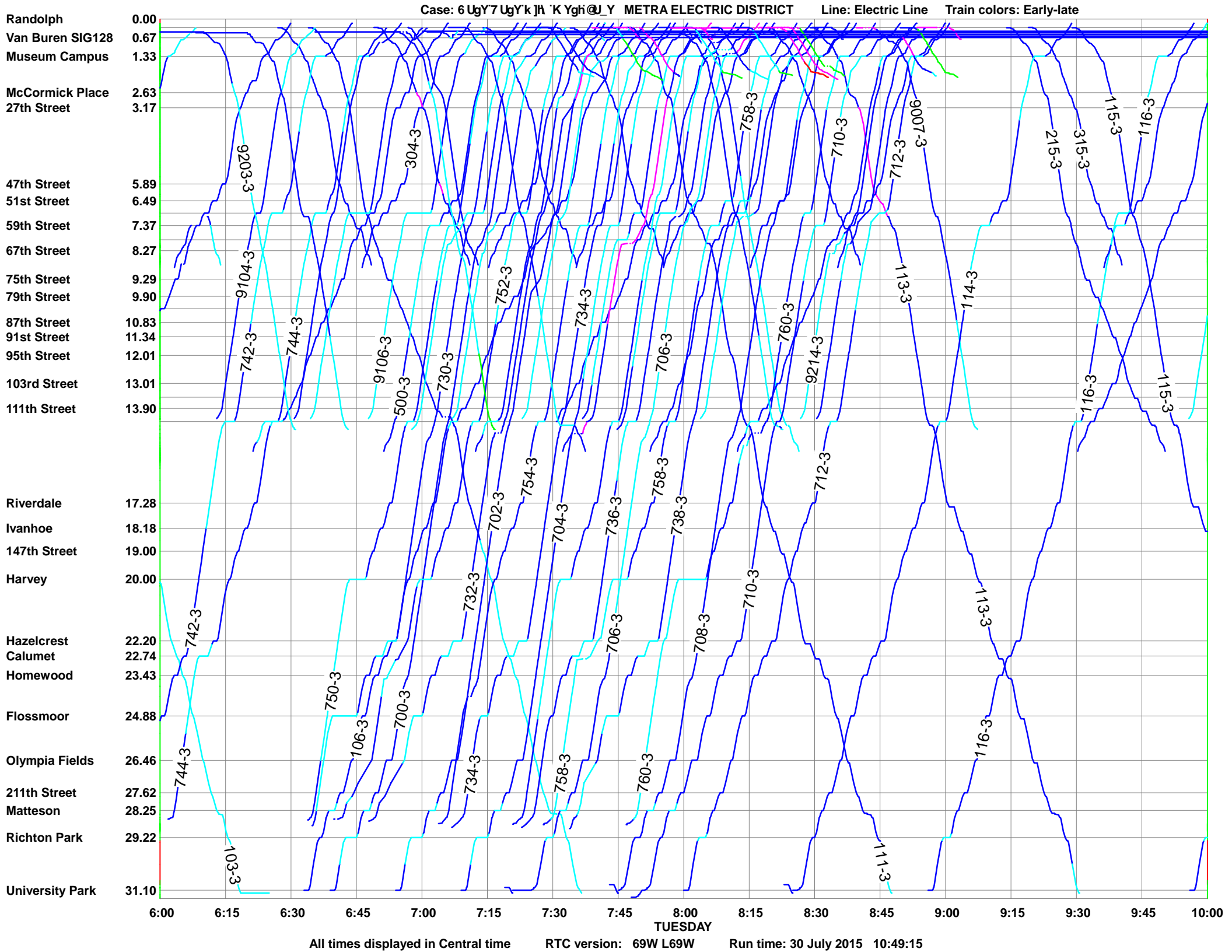
APPENDIX A
RTC String Line Graphs

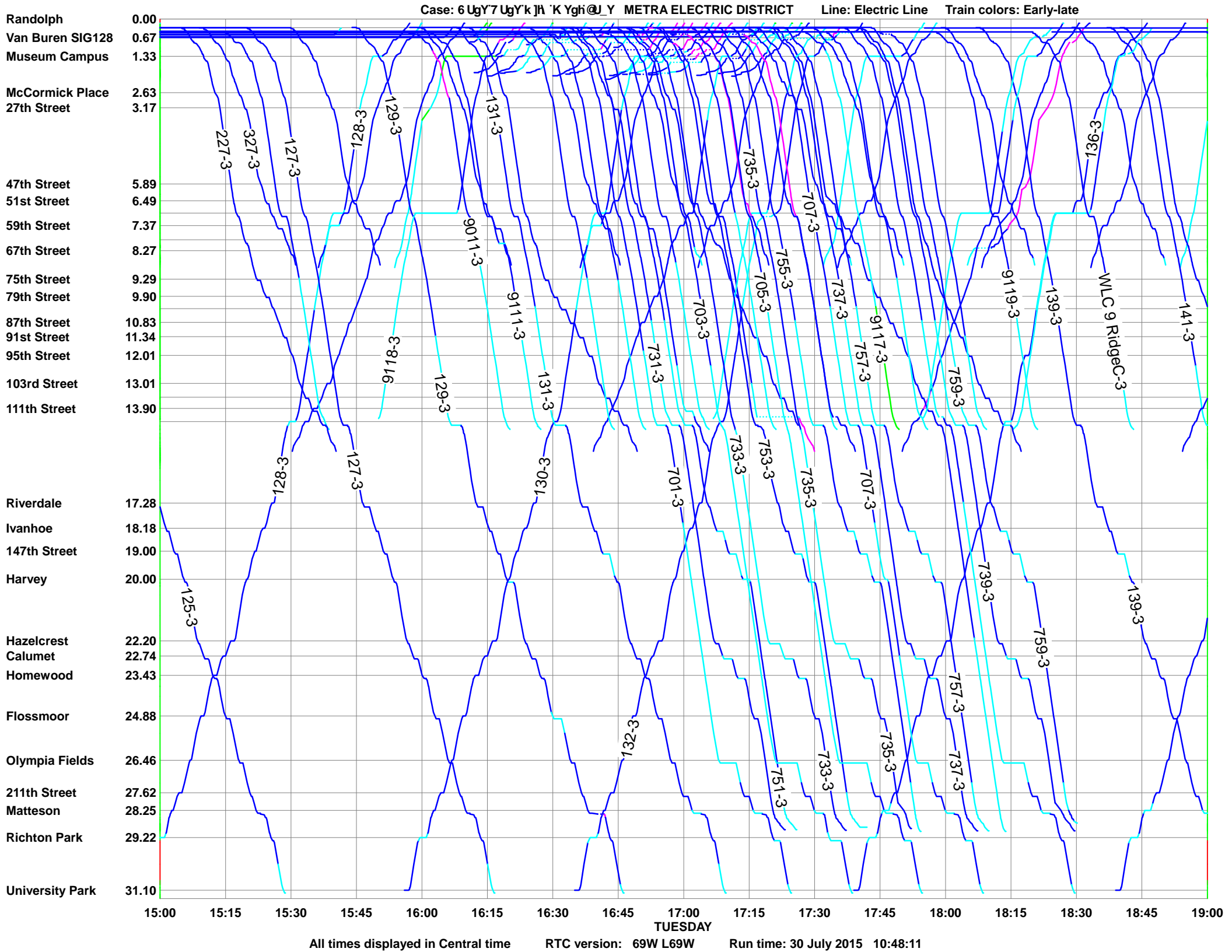
Base Case String Line Graphs



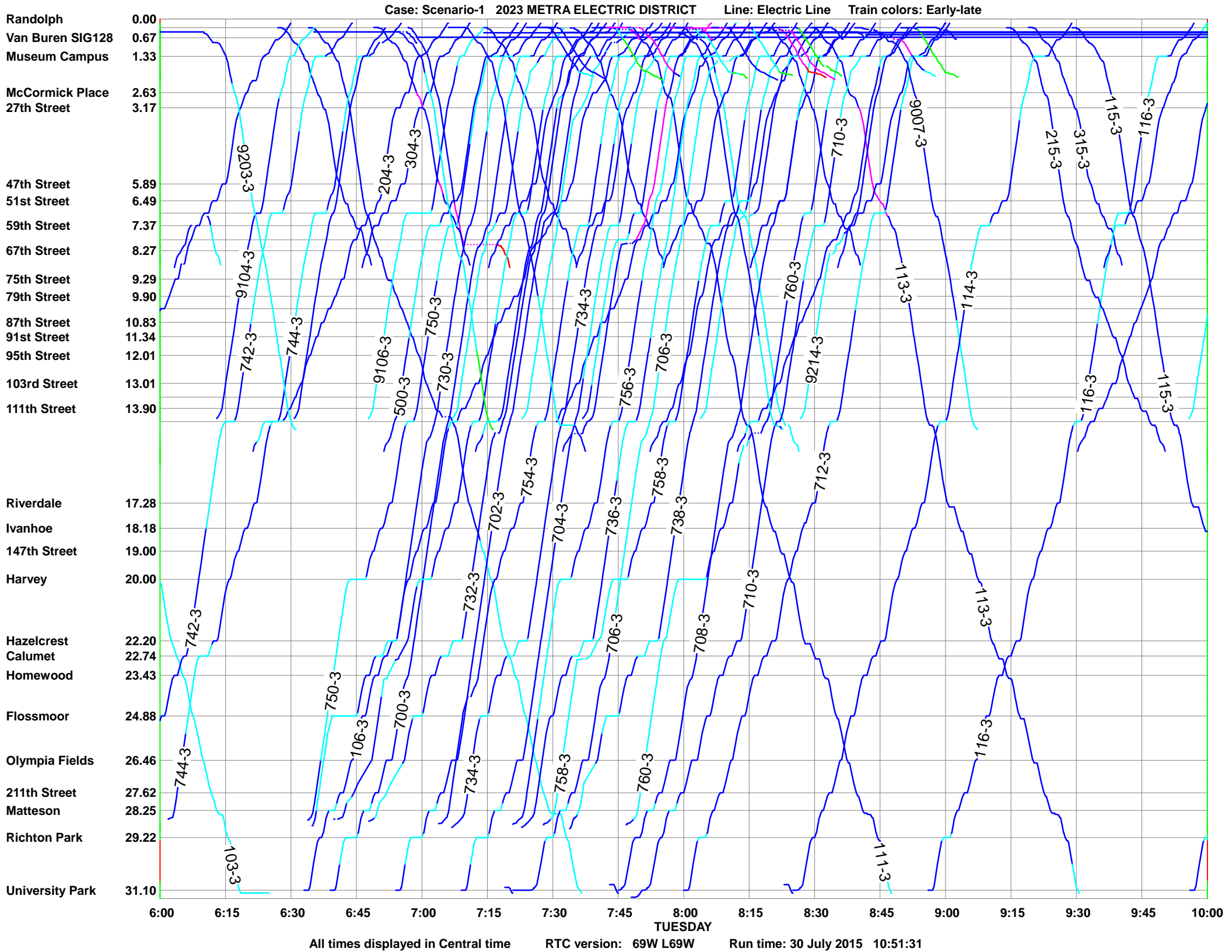


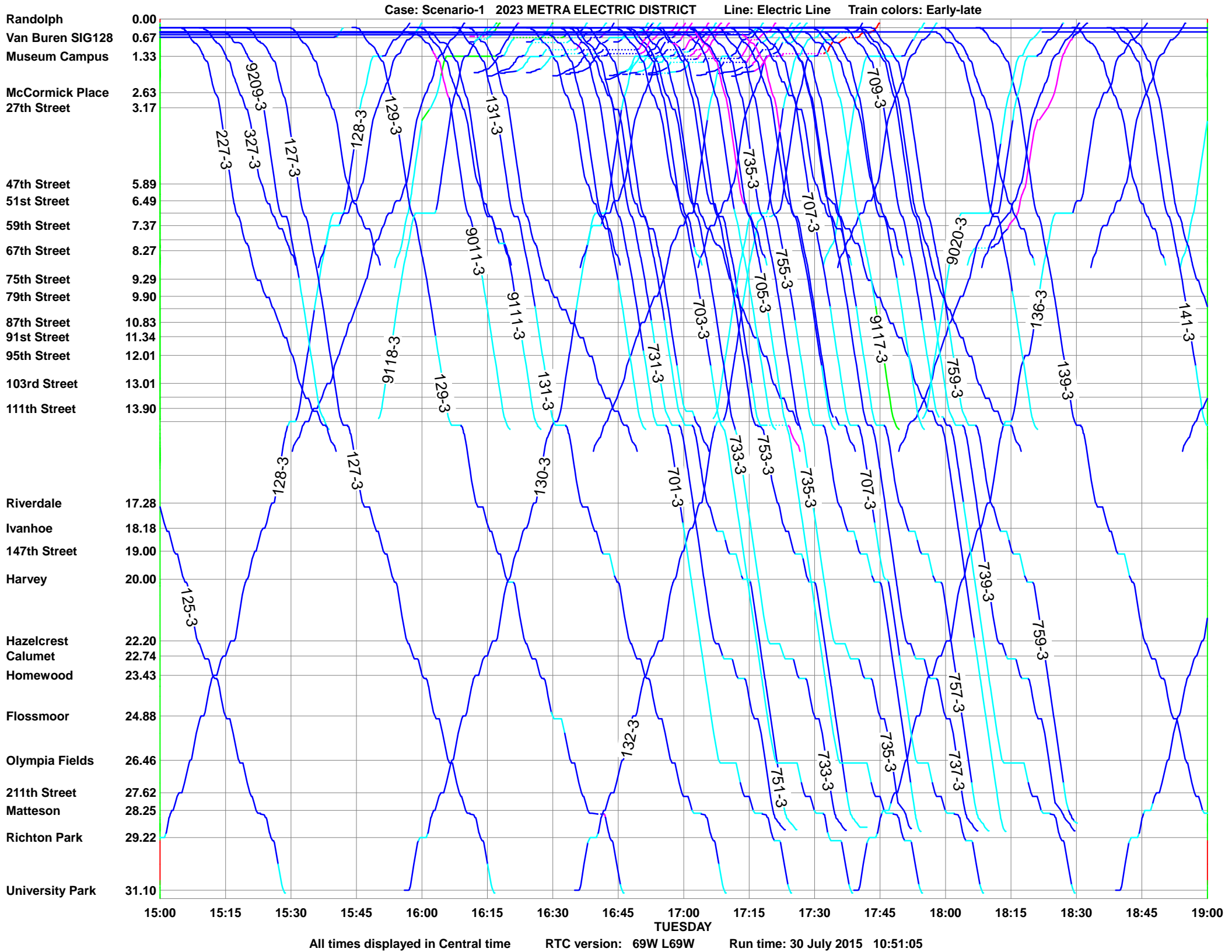
Base Case with West Lake Corridor Service String Line Graphs



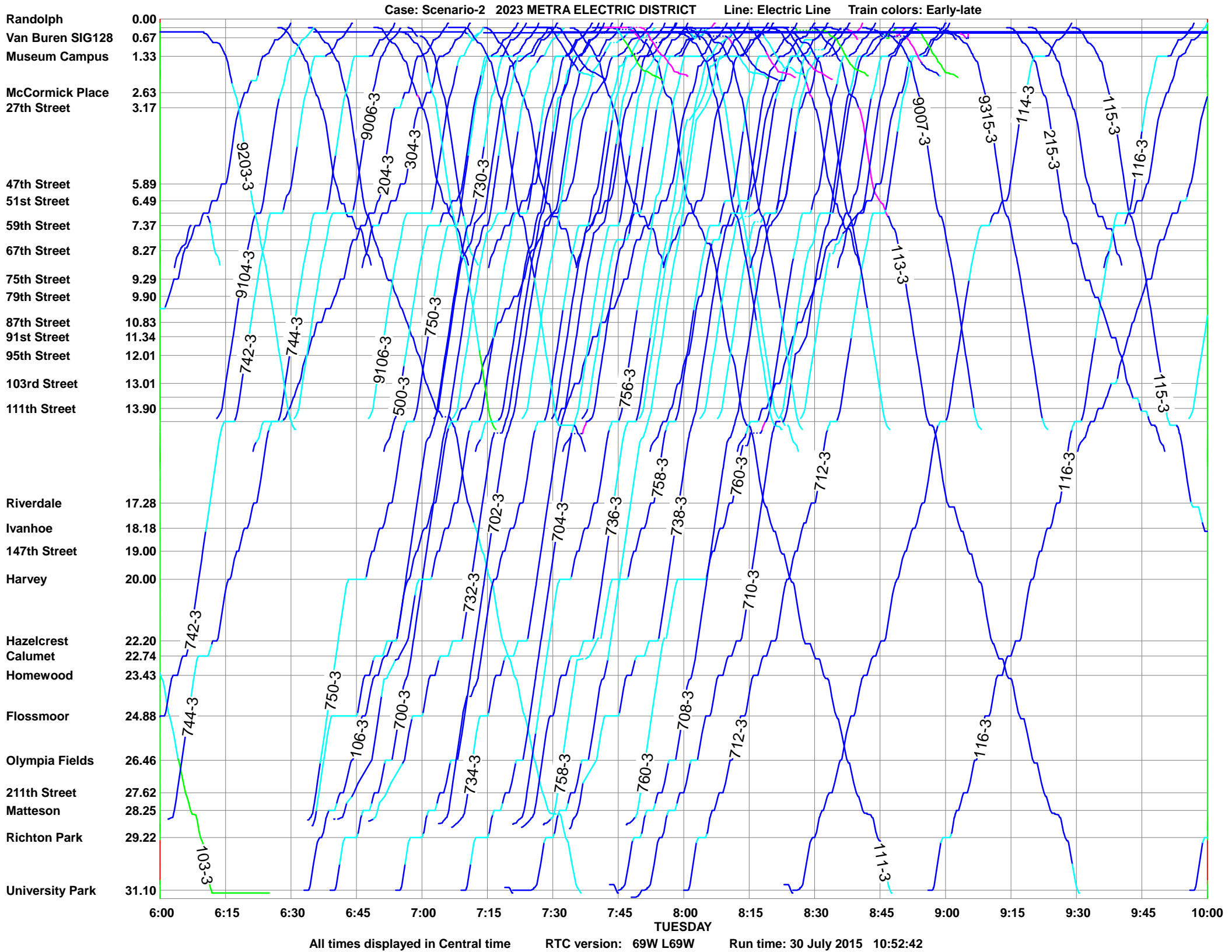


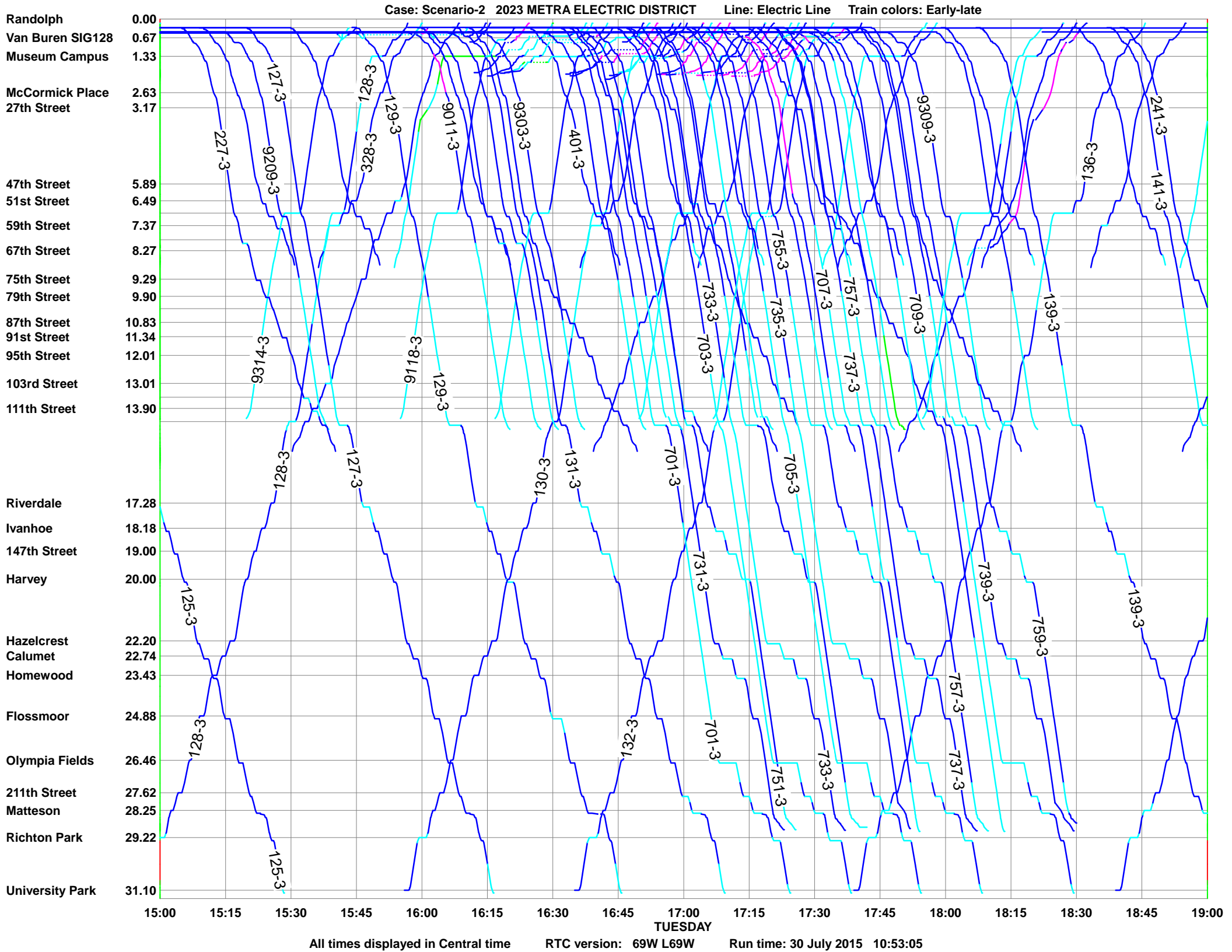
Scenario 1 String Line Graphs



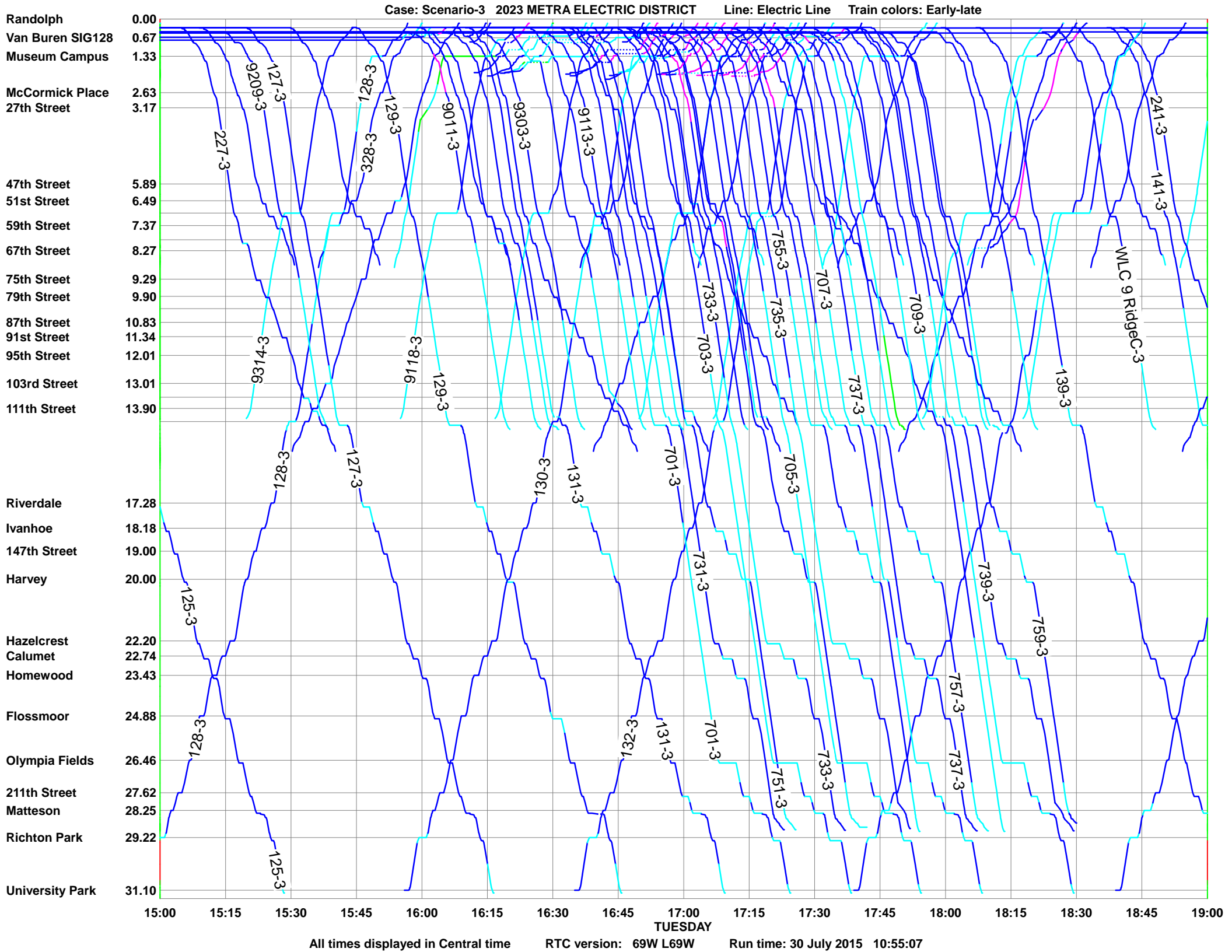


Scenario 2 String Line Graphs

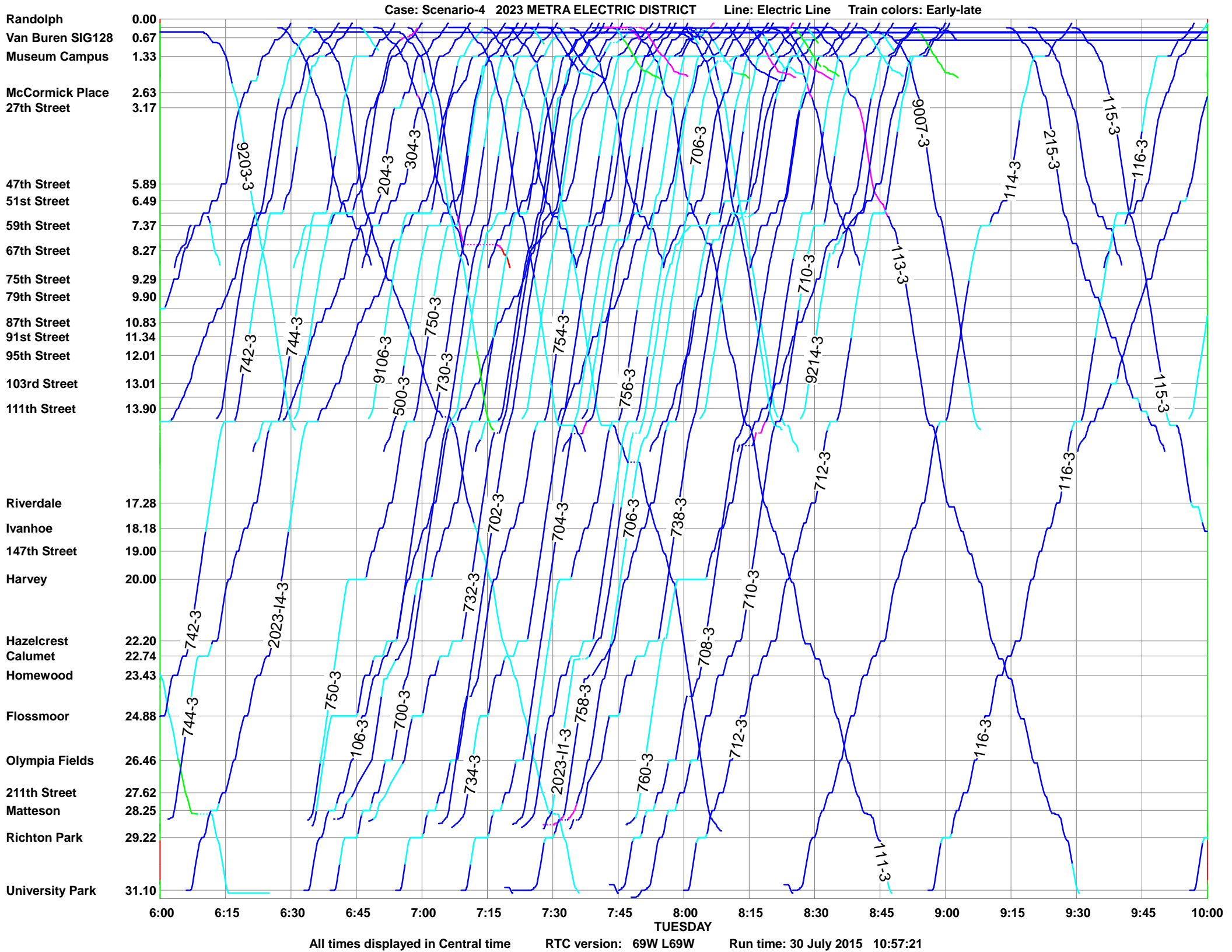




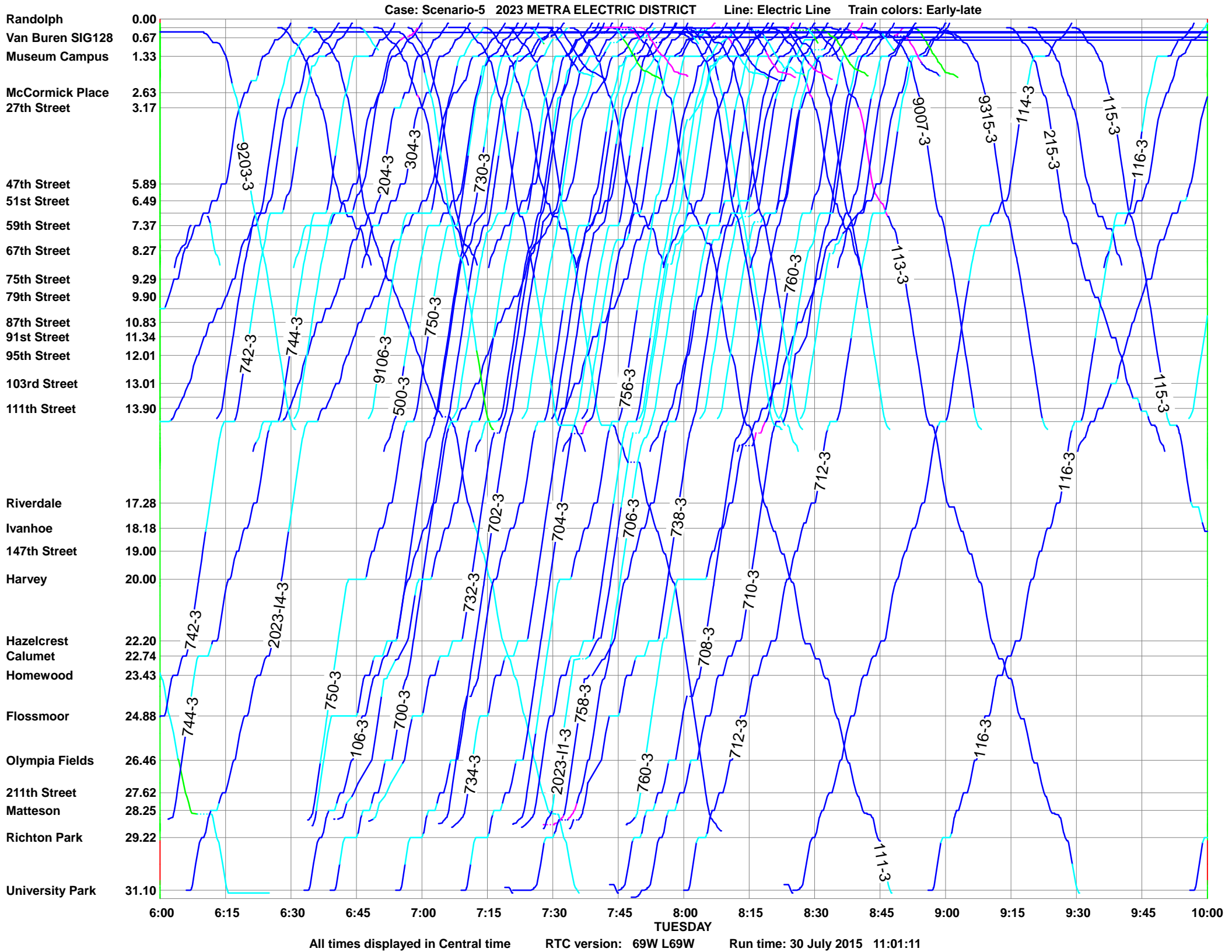
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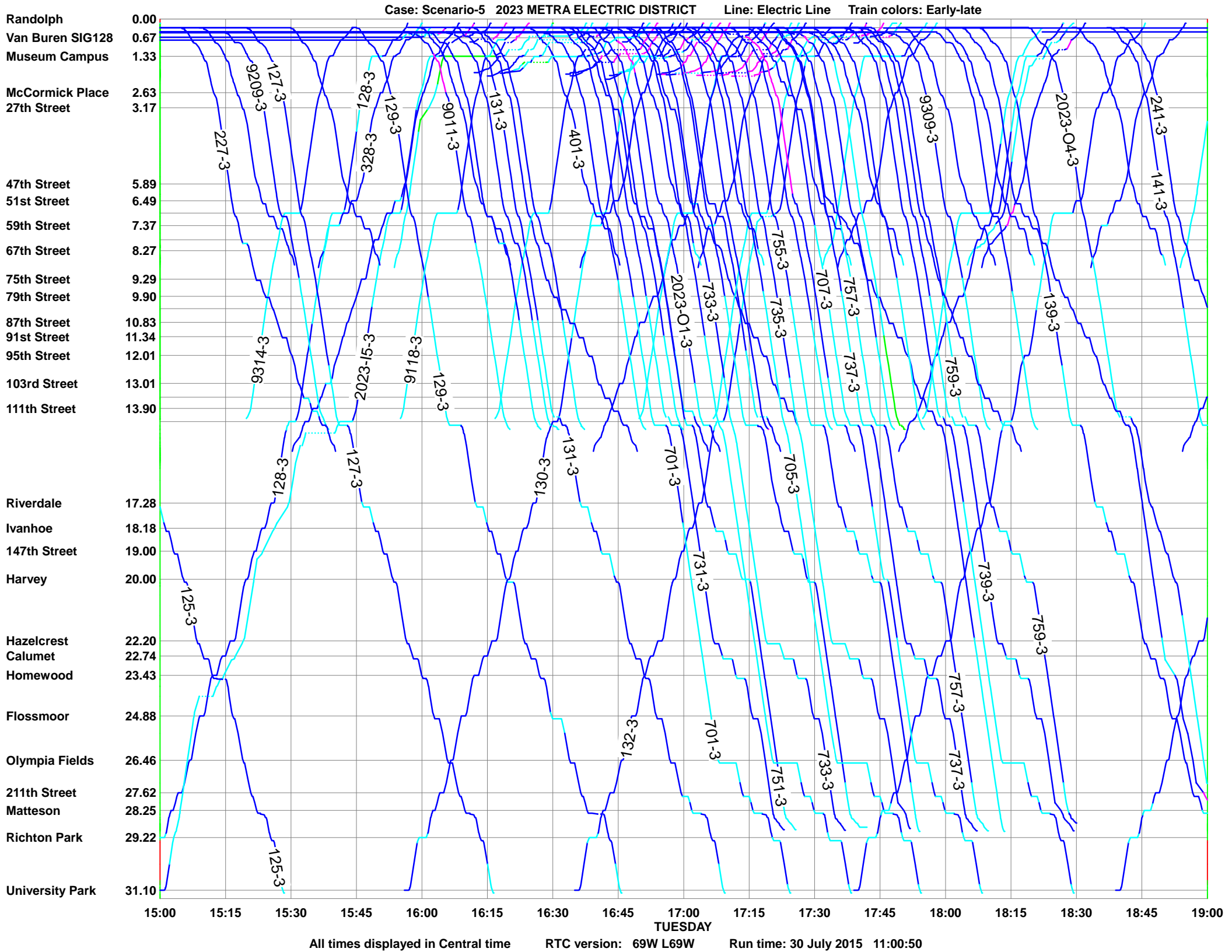


Scenario 4 String Line Graphs

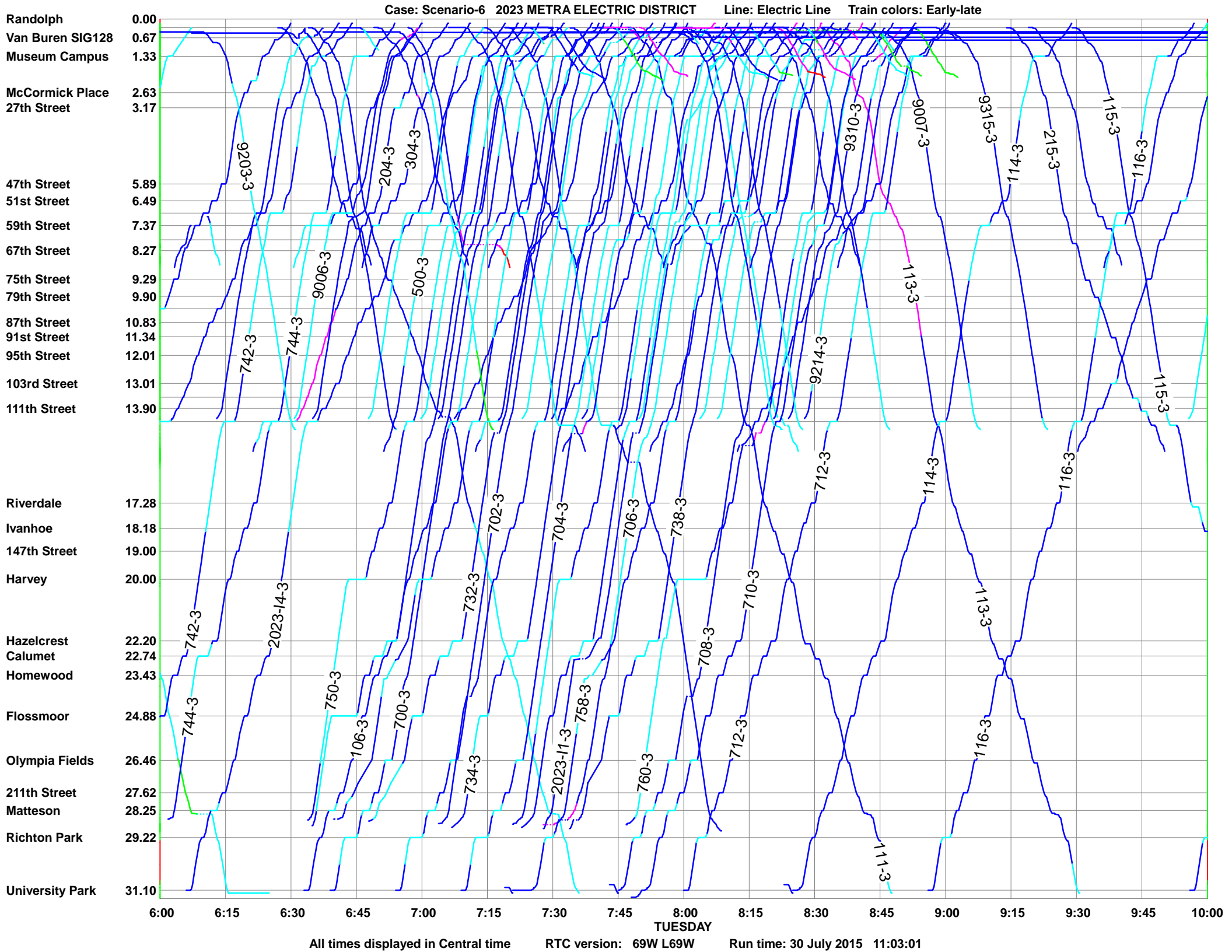


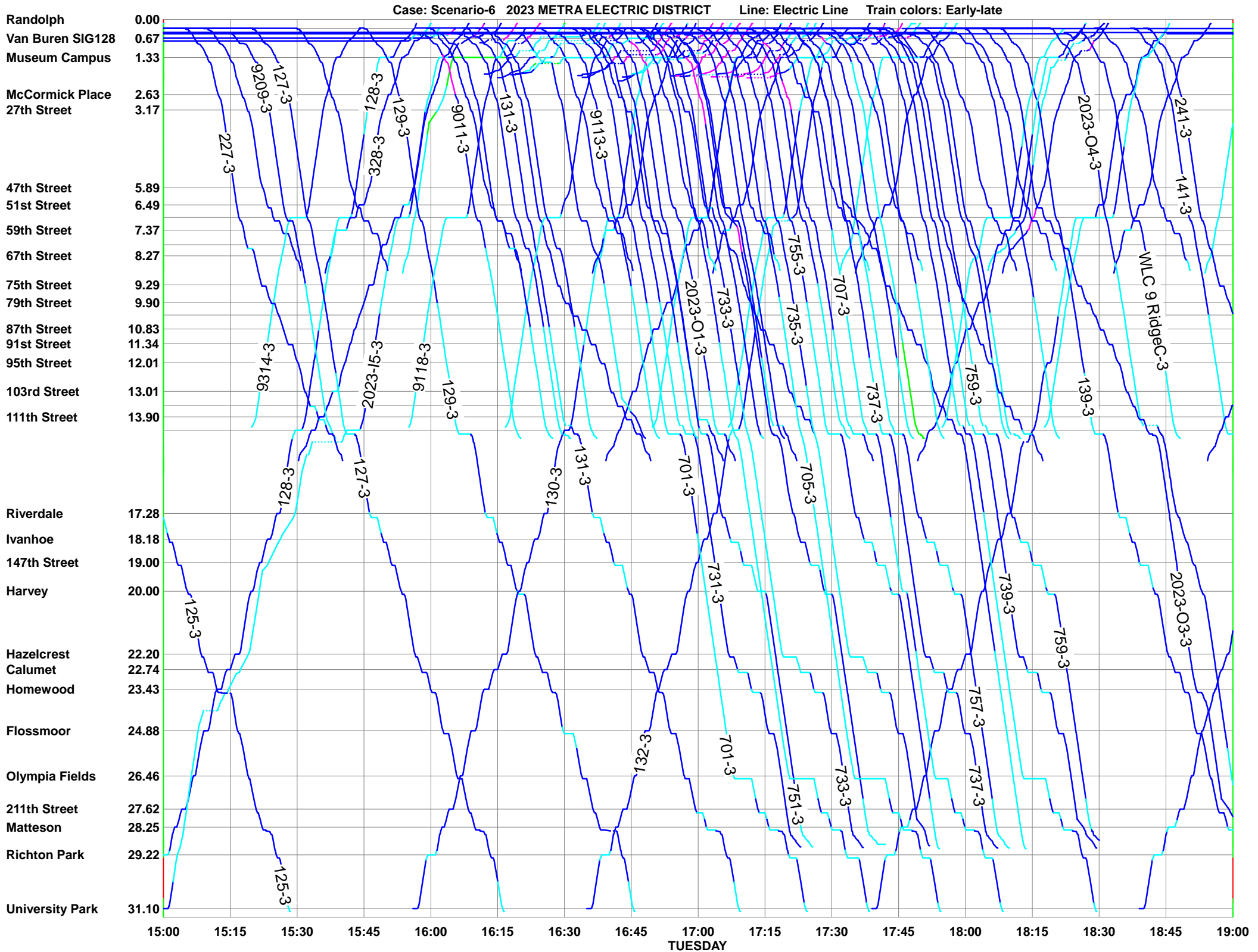
Scenario 5 String Line Graphs



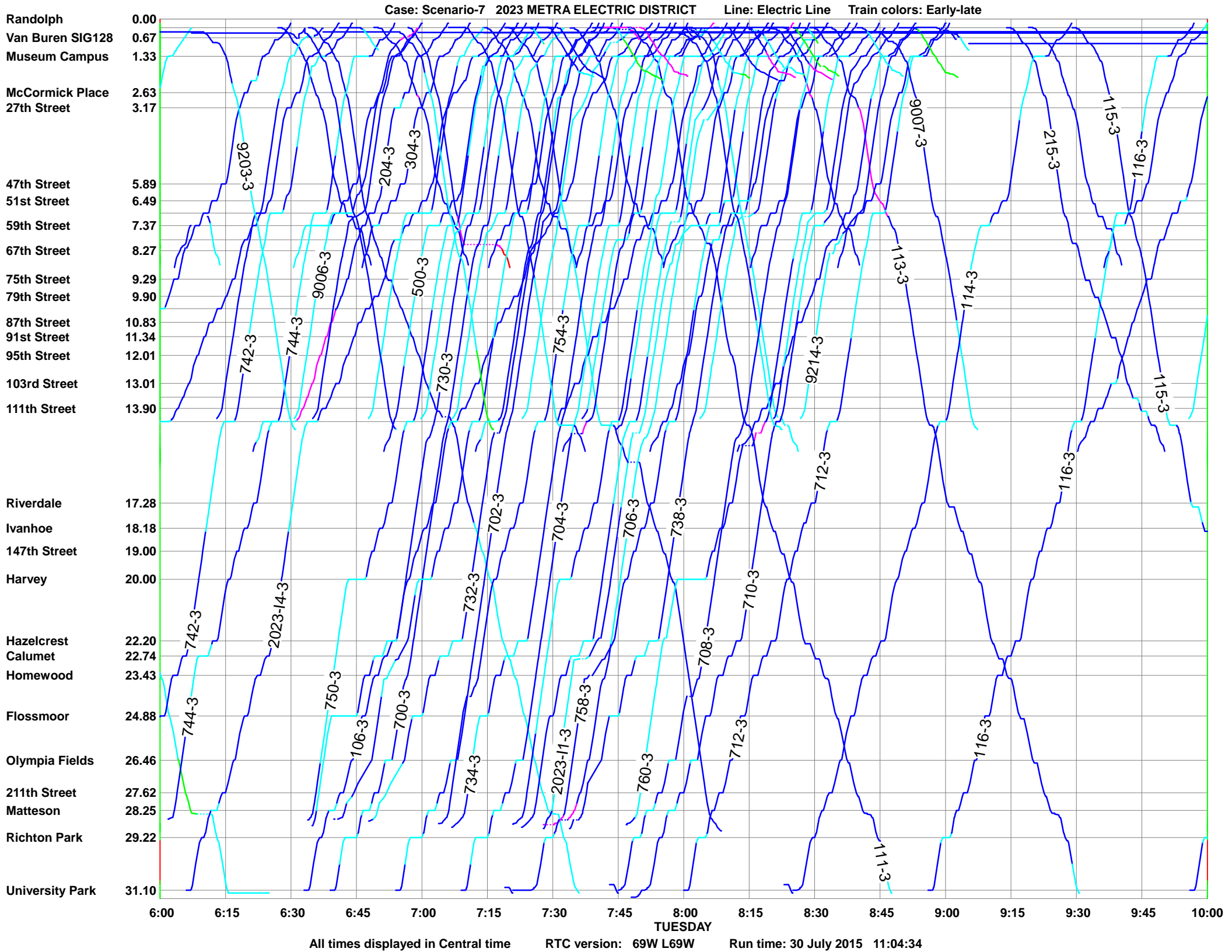


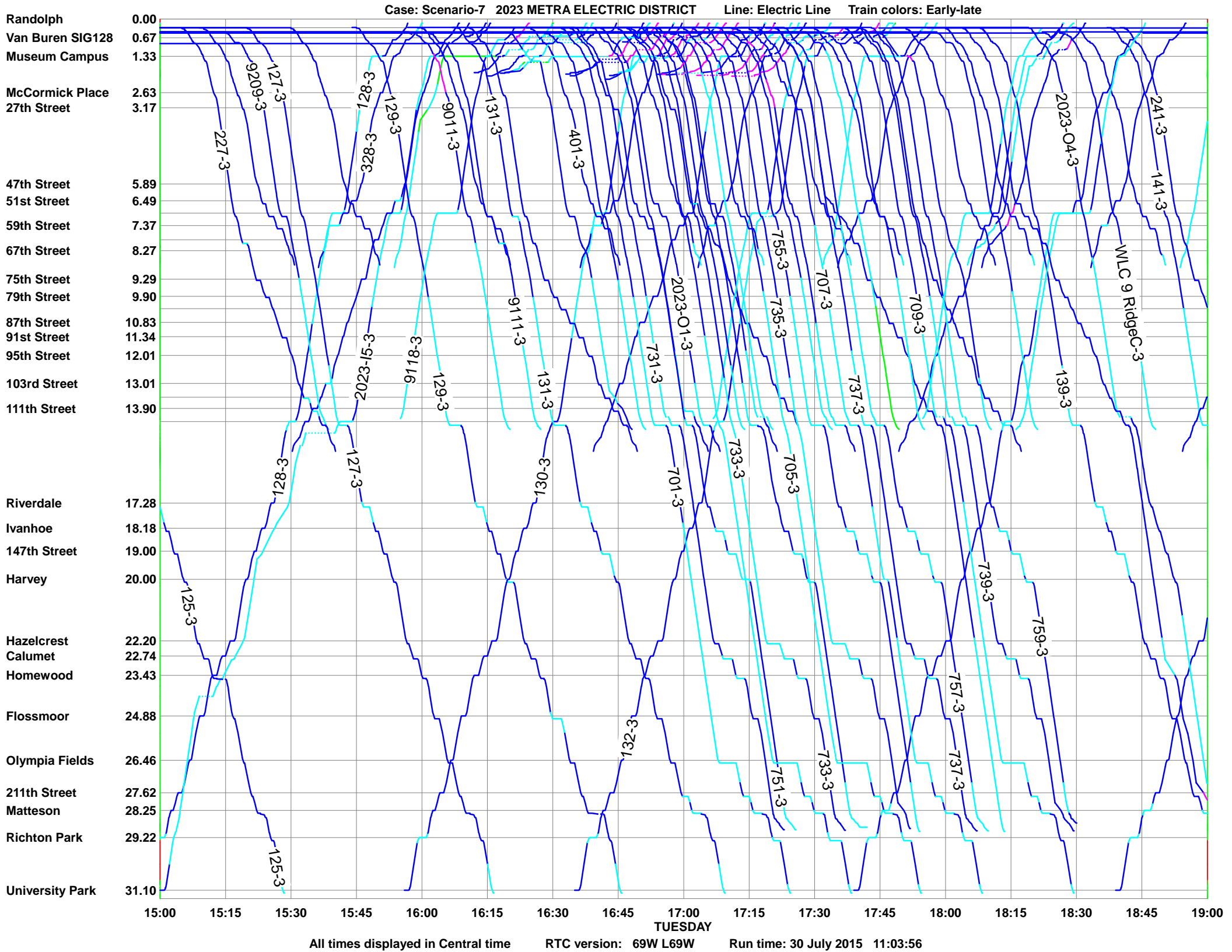
Scenario 6 String Line Graphs



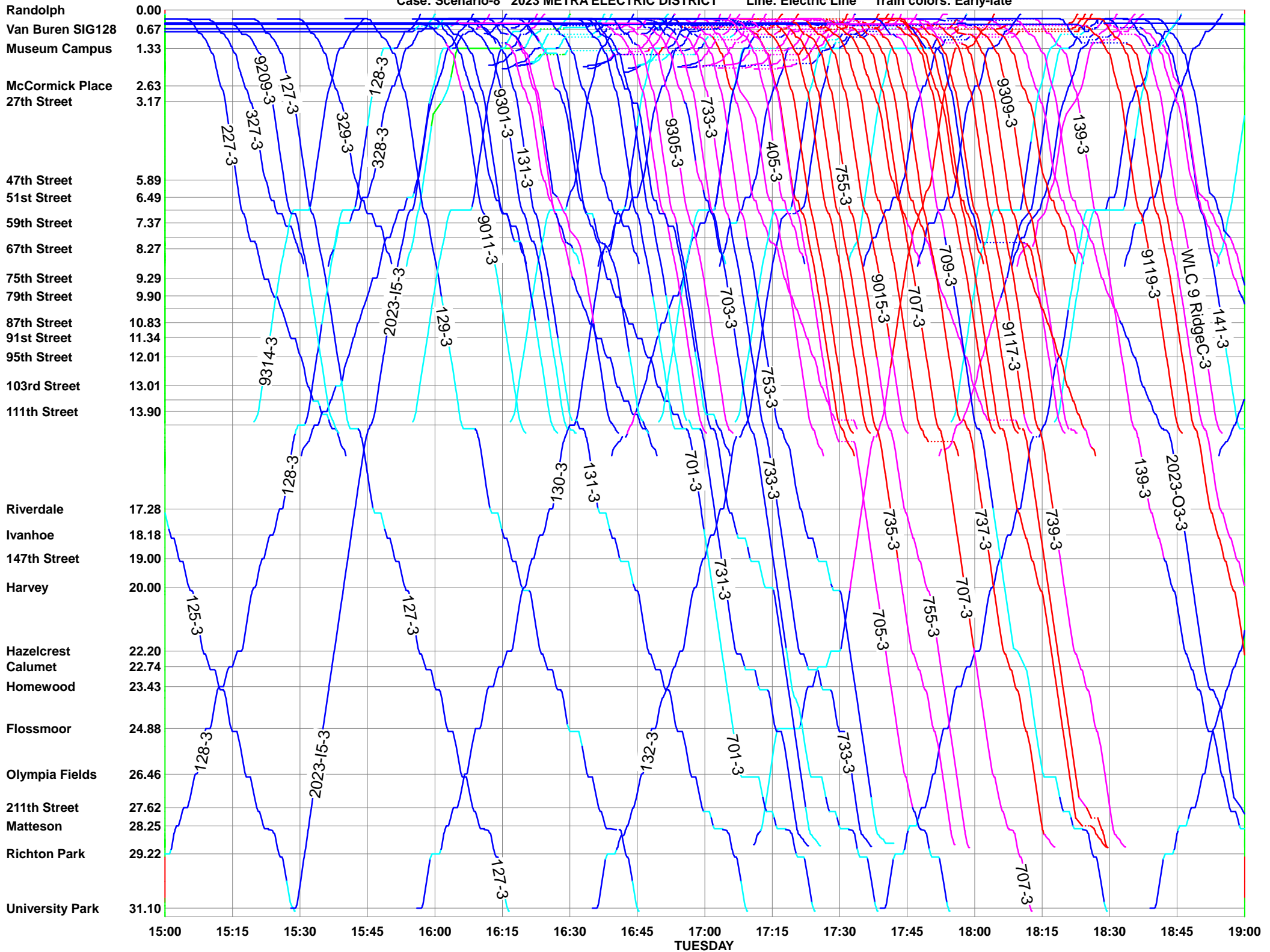
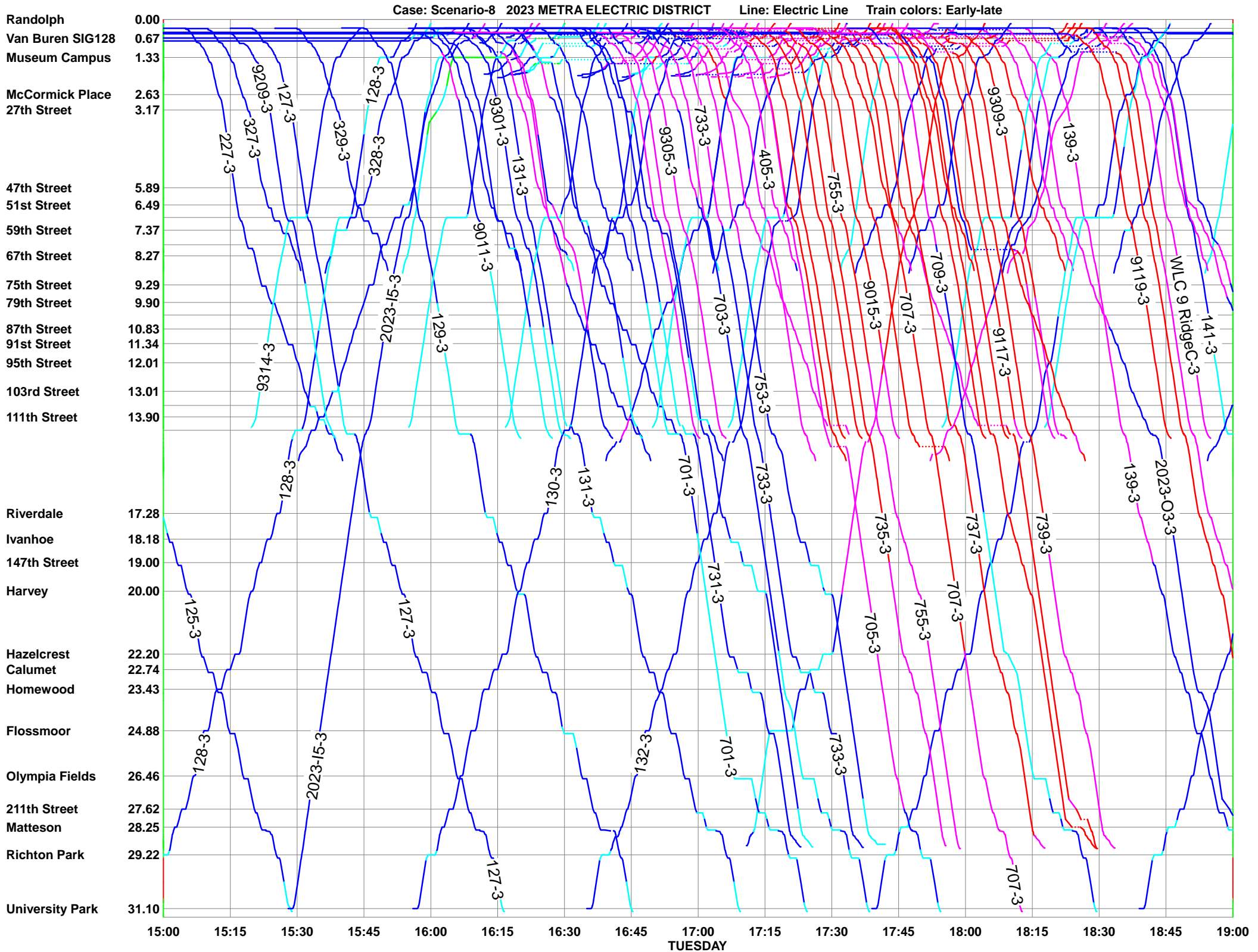


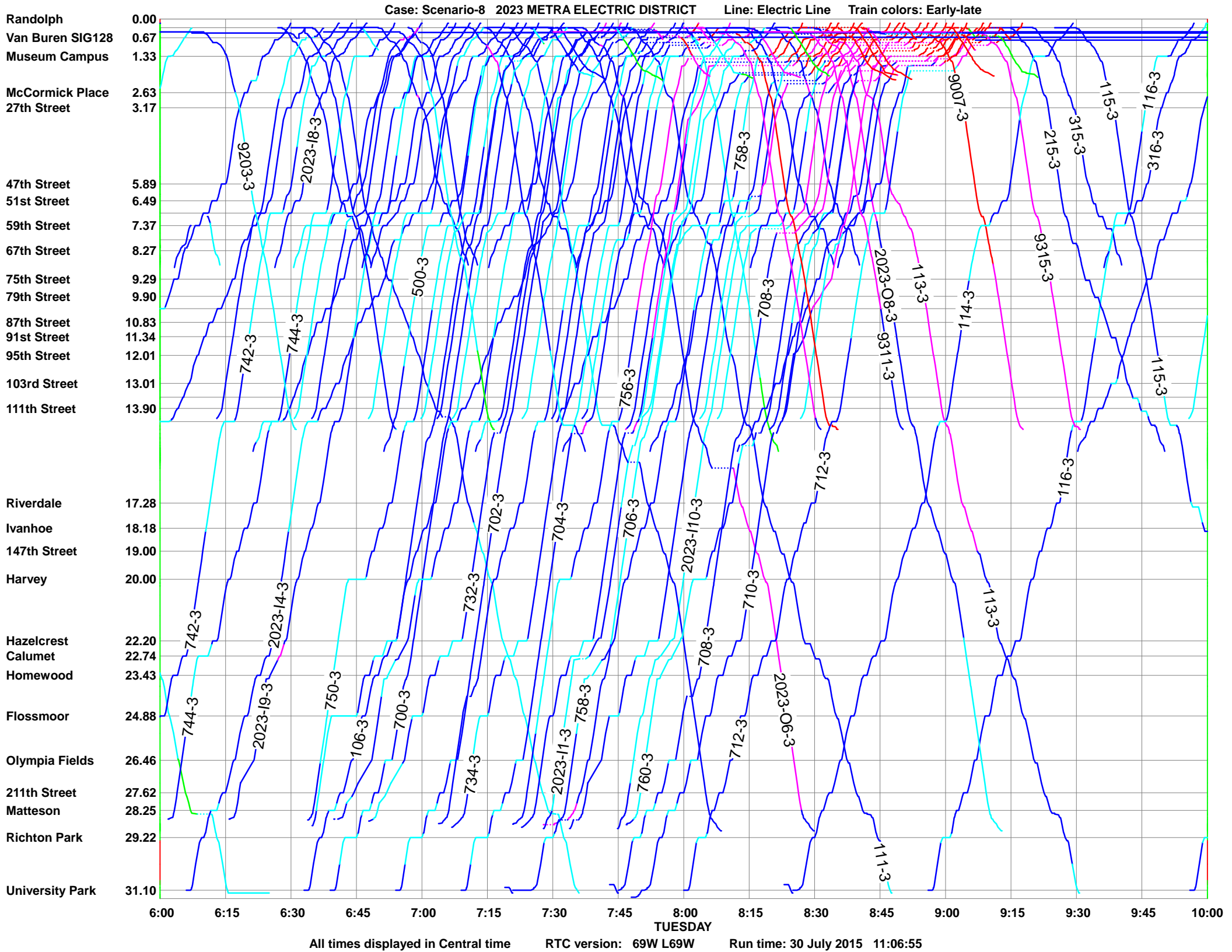
Scenario 7 String Line Graphs



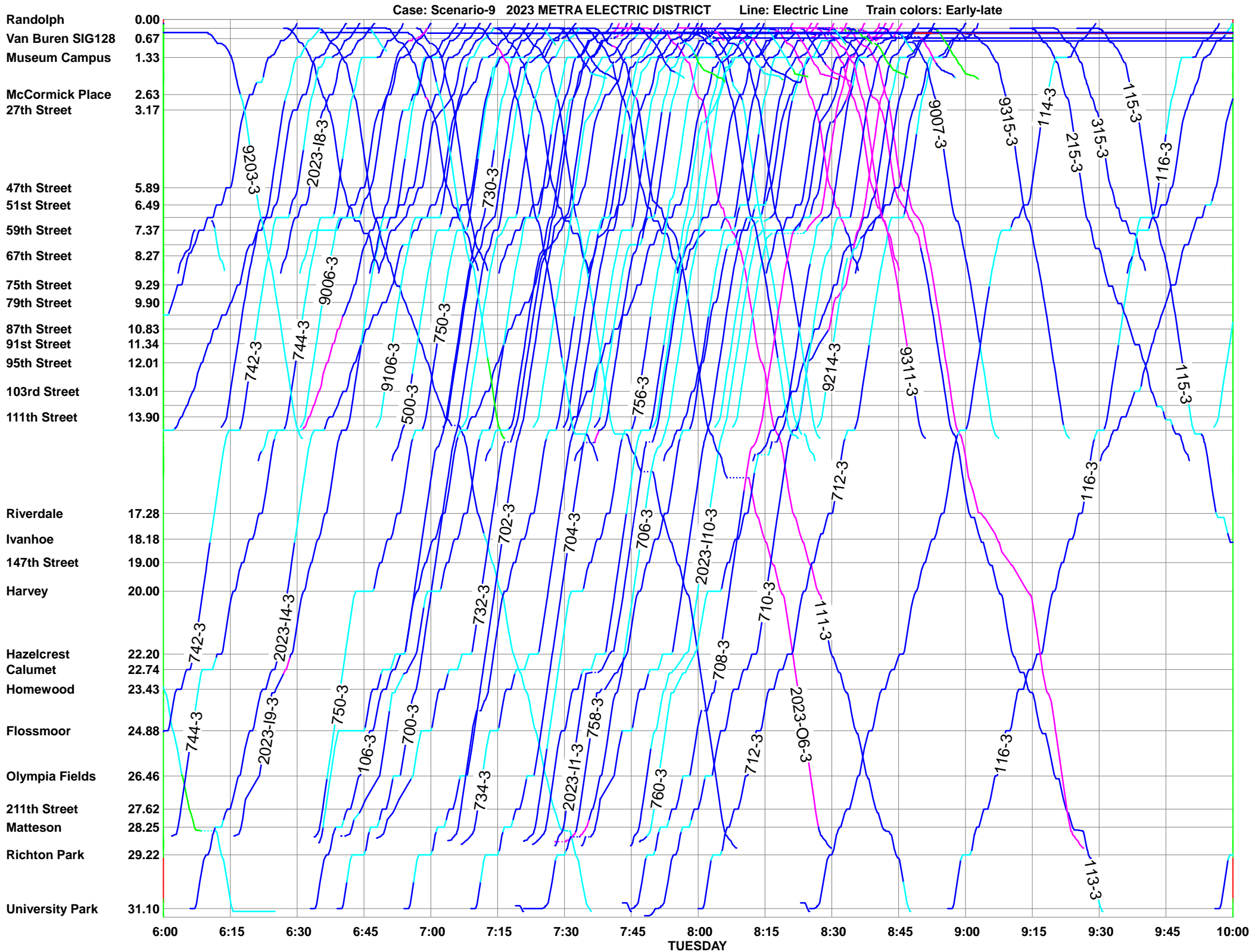


Scenario 8 String Line Graphs

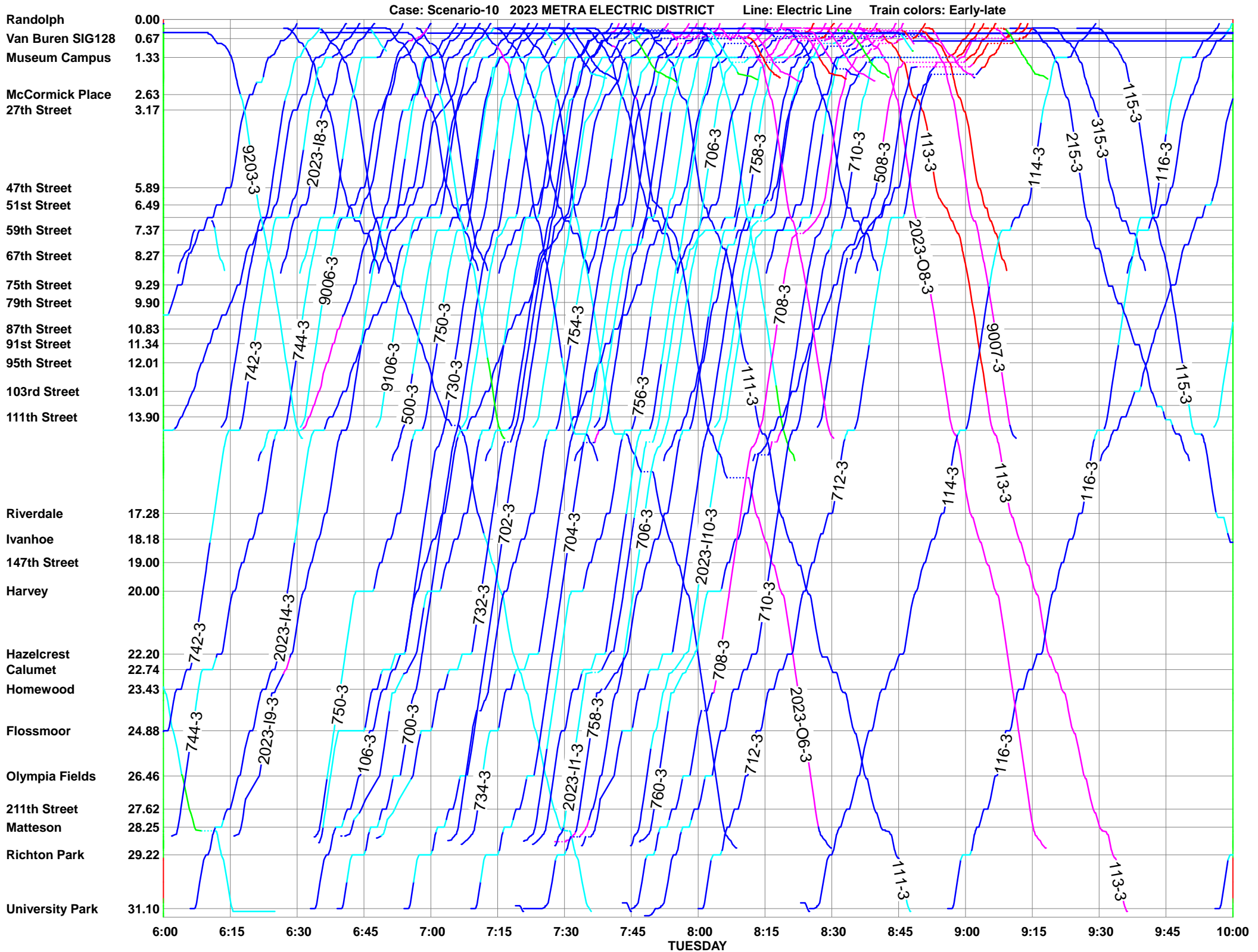




Scenario 9 String Line Graphs



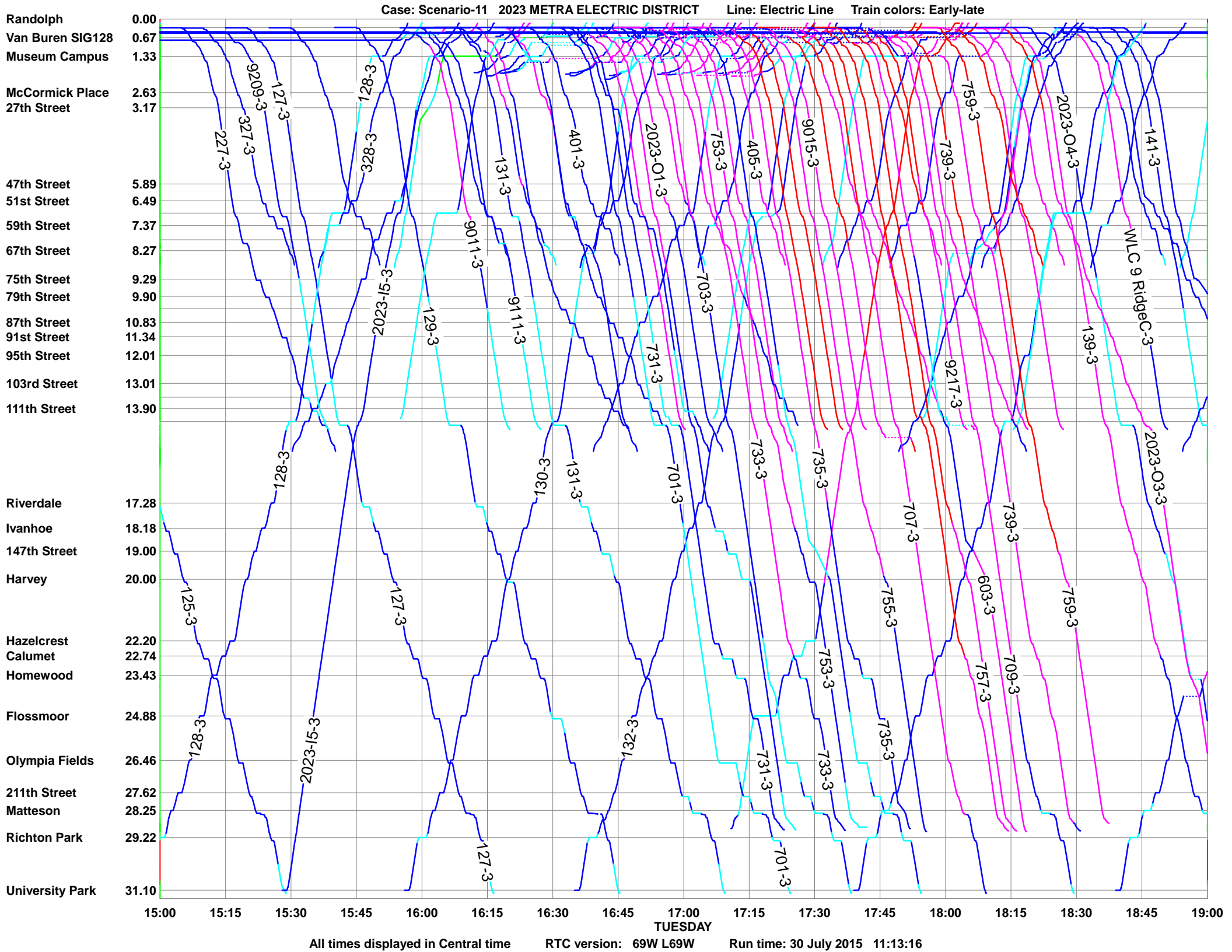
Scenario 10 String Line Graphs

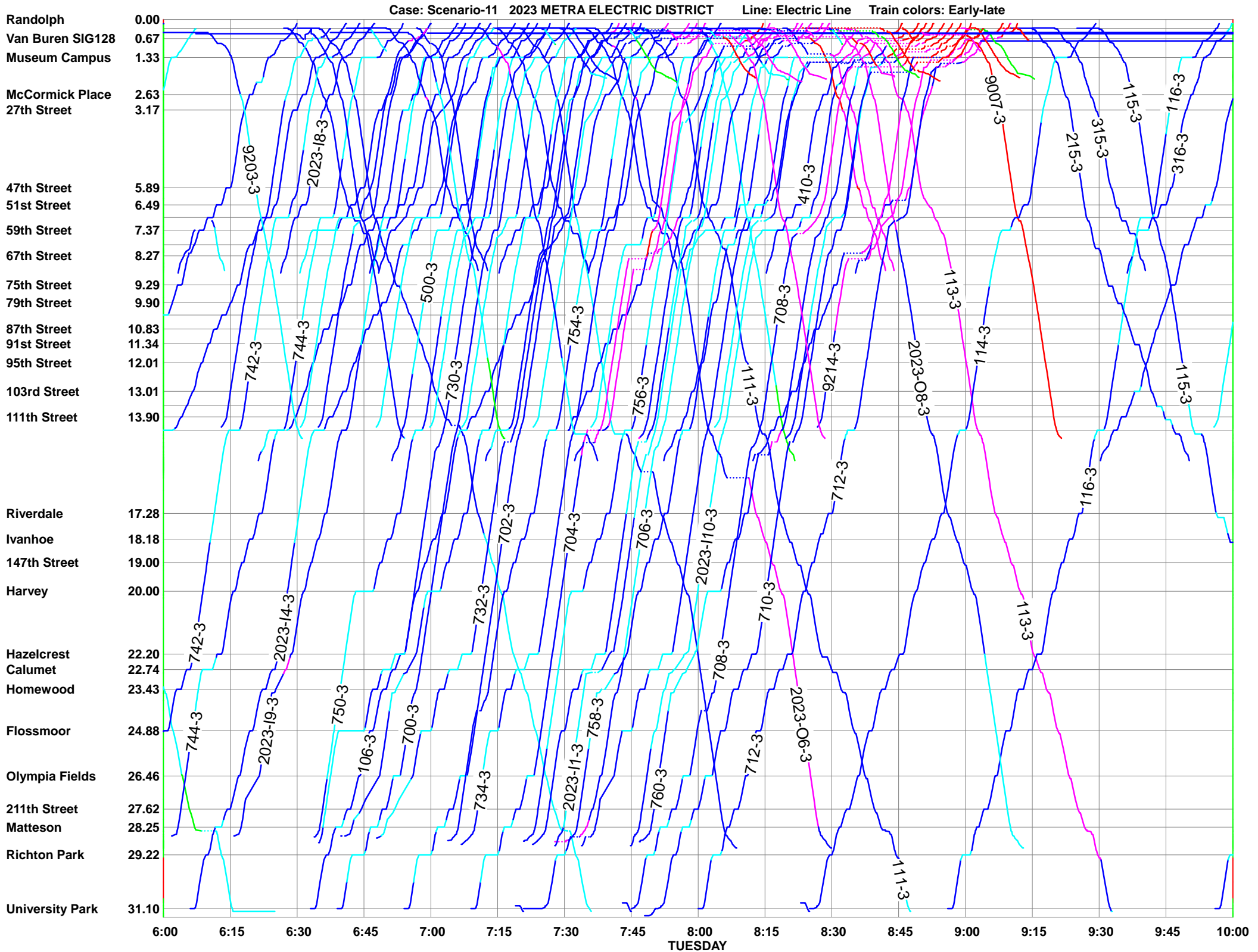


Case: Scenario-10 2023 METRA ELECTRIC DISTRICT Line: Electric Line Train colors: Early-late

Station	Time	Train ID
Randolph	6:00	
Van Buren SIG128	6:00	
Museum Campus	6:00	
McCormick Place	6:00	
27th Street	6:00	
47th Street	6:00	
51st Street	6:00	
59th Street	6:00	
67th Street	6:00	
75th Street	6:00	
79th Street	6:00	
87th Street	6:00	
91st Street	6:00	
95th Street	6:00	
103rd Street	6:00	
111th Street	6:00	
Riverdale	6:00	
Ivanhoe	6:00	
147th Street	6:00	
Harvey	6:00	
Hazelcrest	6:00	
Calumet	6:00	
Homewood	6:00	
Flossmoor	6:00	
Olympia Fields	6:00	
211th Street	6:00	
Matteson	6:00	
Richton Park	6:00	
University Park	6:00	

Scenario 11 String Line Graphs





APPENDIX B

West Lake Corridor Revenue Train Schedule

Proposed West Lake Corridor Service Schedule

Outbound		WLC1	WLC3	WLC5	WLC7	WLC9	WLC11
	MP	WL	WL	WL	WL	WL	WL
Millennium Station at Randolph	0.0	6:30	16:20	16:48	17:45	18:23	19:00
Museum Campus/11th St.	1.4	6:36	16:27	16:56	17:51	18:31	19:06
57th St. (Hyde Park)	7.0	6:44	16:35	17:04	17:59	18:39	19:14
Hegewisch	19.5	7:04	16:58	17:26	18:21	19:01	19:36
Inbound		WLC2	WLC4	WLC6	WLC8	WLC10	WLC12
	MP	WL	WL	WL	WL	WL	WL
Hegewisch	19.5	5:34	6:26	6:50	7:36	8:11	18:09
57th St. (Hyde Park)	7.0	5:55	6:45	7:13	7:58	8:32	18:33
Museum Campus/11th St.	1.4	6:05	6:55	7:21	8:10	8:40	18:42
Millennium Station at Randolph	0.0	6:10	7:00	7:27	8:15	8:45	18:50

APPENDIX C

NICTD Planned Service Expansion, Metra 10% and Metra 20% Schedules

Probable NICTD Service Expansion Schedule

Outbound

		9313	9311	9315	9301	9303	9305	9307	9309
MP		SS	SS	SS	SS	SS	SS	SS	SS
Millennium Station at Randolph	0.0	8:05	8:25	9:00	16:05	16:13	16:37	17:24	17:47
Van Buren St.	0.8	8:08	8:28	9:03	16:08	16:16	16:40	17:27	17:50
Museum Campus/11th St.	1.4	8:11	8:31	9:06	16:11	16:18	16:43	17:30	17:53
57th St. (Hyde Park)	7.0	8:18	8:38	9:13	16:19	16:26	16:50	17:38	18:01
Hegewisch	19.5	8:39	8:59	9:34	16:43	16:50	17:14	18:02	18:25

Inbound

		9302	9304	9306	9308	9310	9314	9316	9312
MP		SS	SS	SS	SS	SS	SS	SS	SS
Hegewisch	19.5	6:54	7:21	7:41	7:59	8:13	15:11	16:08	16:41
57th St. (Hyde Park)	7.0	7:13	7:40	8:03	8:21	8:34	15:32	16:29	17:02
Museum Campus/11th St.	1.4	7:23	7:50	8:12	8:30	8:42	15:40	16:37	17:09
Van Buren St.	0.8	7:26	7:53	8:15	8:33	8:45	15:43	16:40	17:13
Millennium Station at Randolph	0.0	7:29	7:56	8:21	8:36	8:47	15:45	16:42	17:15

Probable METRA 10% Service Expansion Schedule

	MP	2023-12	2023-13	2023-14	2023-05	2023-11	2023-15	2023-01	2023-02	2023-03	2023-04
		BI	SC	ML	ML	ML	ML	BI	SC	ML	ML
Millennium Station at Randolph	0.0	6:41	7:00	7:19	7:20	8:23	16:10	16:41	17:51	18:04	18:19
Van Buren St.	0.8	6:38	6:57	7:16	7:23	8:20	16:06	16:43	17:53	18:06	18:21
Museum Campus/11th St.	1.4	6:35	6:54	7:13	7:26	8:17	16:04	16:46	17:56	18:09	18:24
18th St.	2.2	0:00	0:00	7:10							
McCormick Place	2.7	6:32	6:51	7:08					17:58		
27th St.	3.2	6:30	6:49	7:06					18:00		
47th St.	5.9	0:00	6:45	7:02					18:03		
51st St./53rd St.	6.5	6:25	6:43	7:01		8:08		16:54	18:05	18:17	
57th St. (Hyde Park)	7.0	6:24	6:41	6:59			15:55	16:56	18:07	18:19	
59th St.	7.4	6:22	6:39	6:57		8:05			18:09	18:21	
63rd St.	7.9	6:20		6:55						18:23	
75th St.	9.5	6:17		6:51						18:26	
79th St.	10.0	6:15		6:50						18:28	
83rd St.	10.4	6:14		6:48						18:29	
87th St.	10.9	6:12		6:46						18:31	
91st	11.4	6:10		6:44						18:33	
95th St.	12.0	6:08		6:43						18:34	
103rd St.	13.1	6:06		6:41						18:36	
107th St.	13.5	6:05		6:39						18:38	
111th St.	14.0	6:04		6:38						18:40	
Kensington	14.5	6:02		6:36	7:44	7:28	15:44	17:06		18:42	18:43
Hegewisch	19.5										

Probable METRA 20% Service Expansion Schedule

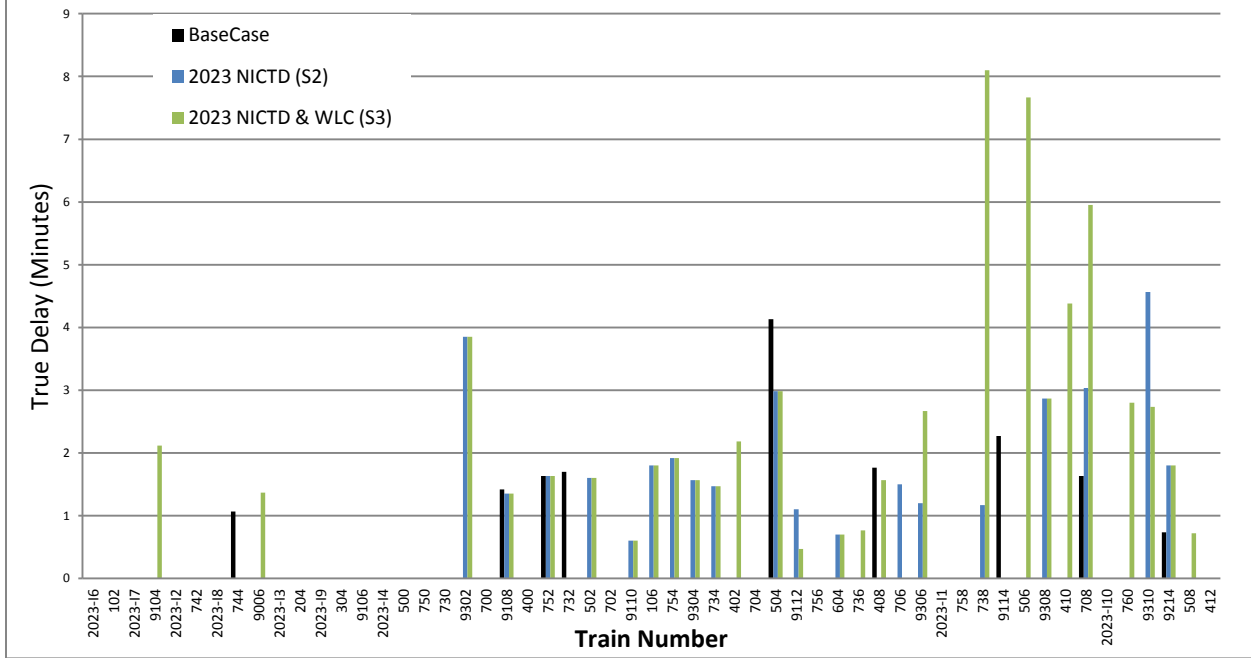
		Outbound										
		2023-05	2023-06	2023-07	2023-08	2023-09	2023-10	2023-01	2023-02	2023-03	2023-04	2023-011
		ML	BI	SC	ML	SC	ML	BI	SC	ML	ML	ML
Millennium Station at Randolph	0.0	7:20	7:38	8:14	8:28	16:09	16:17	16:41	17:51	18:04	18:19	18:34
Van Buren St.	0.8	7:23	7:40	8:16	8:30	16:11	16:20	16:43	17:53	18:06	18:21	18:36
Museum Campus/11th St.	1.4	7:26	7:43	8:19	8:33	16:14	16:22	16:46	17:56	18:09	18:24	18:39
18th St.	2.2		7:44									
McCormick Place	2.7		7:45	8:21		16:16	16:25		17:58			
27th St.	3.2			8:23		16:18	16:27		18:00			
47th St.	5.9			8:26		16:21			18:03			
51st St./53rd St.	6.5		7:51	8:28		16:23	16:32	16:54	18:05	18:17		18:47
57th St. (Hyde Park)	7.0		7:53	8:30	8:40	16:25	16:33	16:56	18:07	18:19		18:49
59th St.	7.4			8:32		16:27	16:35		18:09	18:21		18:51
63rd St.	7.9						16:36			18:23		18:53
75th St.	9.5						16:39			18:26		18:56
79th St.	10.0						16:41			18:28		18:58
83rd St.	10.4						16:42			18:29		18:59
87th St.	10.9						16:44			18:31		19:01
91st	11.4						16:46			18:33		19:03
95th St.	12.0						16:48			18:34		19:04
103rd St.	13.1						16:50			18:36		19:06
107th St.	13.5						16:52			18:38		19:08
111th St.	14.0						16:54			18:40		19:10
Kensington	14.5	7:44	8:04		8:51		16:56	17:06		18:42	18:43	19:12
Hegewisch	19.5											

		Inbound											
		2023-16	2023-17	2023-12	2023-18	2023-13	2023-19	2023-14	2023-11	2023-10	2023-15	2023-111	2023-112
		BI	SC	BI	SC	SC	ML	ML	ML	ML	ML	ML	SC
Hegewisch	19.5								7:28				
Kensington	14.5			6:02			6:41	6:36		8:12	15:44	17:22	
111th St.	14.0			6:04				6:38					
107th St.	13.5			6:05				6:39					
103rd St.	13.1			6:06				6:41					
95th St.	12.0			6:08				6:43					
91st	11.4			6:10				6:44					
87th St.	10.9			6:12				6:46					
83rd St.	10.4			6:14				6:48					
79th St.	10.0			6:15				6:50					
75th St.	9.5			6:17				6:51					
63rd St.	7.9			6:20				6:55					
59th St.	7.4	5:42	6:13	6:22	6:28	6:39	6:57	8:05	8:22		17:32	17:51	
57th St. (Hyde Park)	7.0	5:44	6:15	6:24	6:30	6:41	6:59			15:55		17:53	
51st St./53rd St.	6.5	5:46	6:17	6:25	6:32	6:43	7:01	8:08	8:25		17:35	17:55	
47th St.	5.9		6:19			6:45	7:02						
27th St.	3.2		6:23	6:30	6:36	6:49	7:06					17:59	
McCormick Place	2.7		6:25	6:32	6:38	6:51	7:08					18:01	
18th St.	2.2						7:10						
Museum Campus/11th St.	1.4	5:54	6:28	6:35	6:41	6:54	7:02	7:13	8:17	8:34	16:04	17:44	18:04
Van Buren St.	0.8	5:57	6:31	6:38	6:44	6:57	7:05	7:16	8:20	8:37	16:06	17:47	18:07
Millennium Station at Randolph	0.0	6:00	6:34	6:41	6:47	7:00	7:08	7:19	8:23	8:40	16:10	17:50	18:10

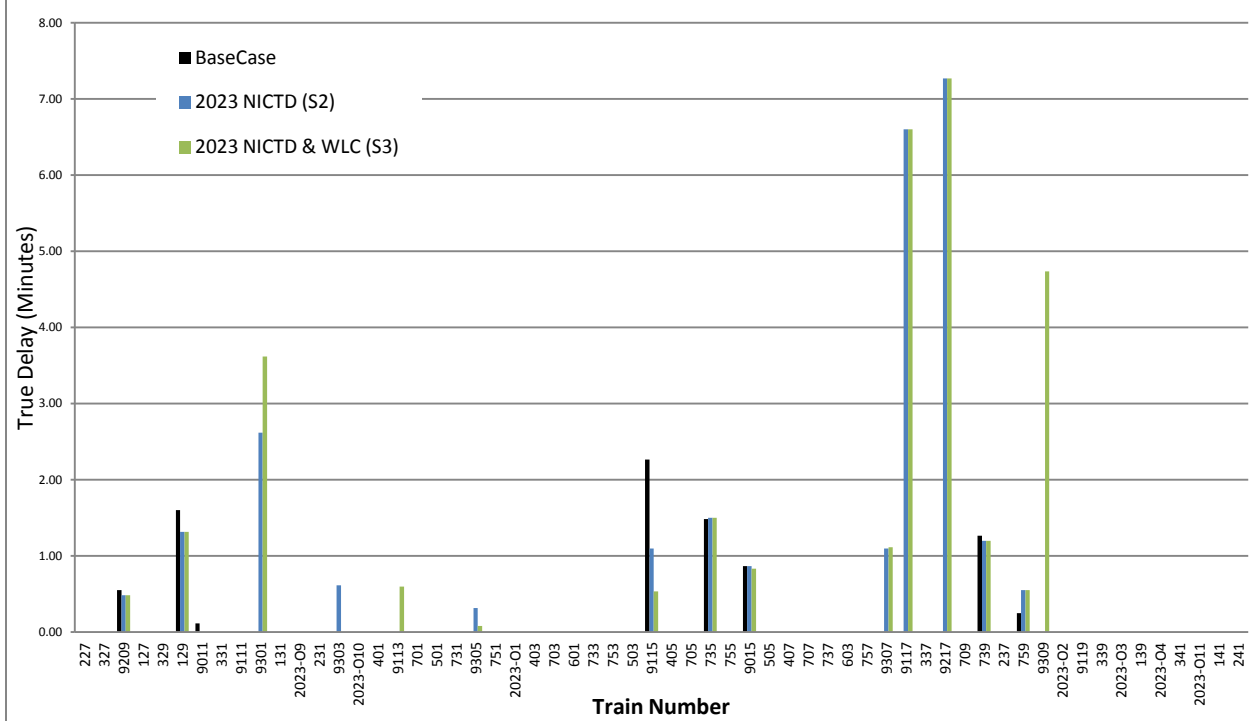
APPENDIX D

True Delay by Train Number Bar Charts

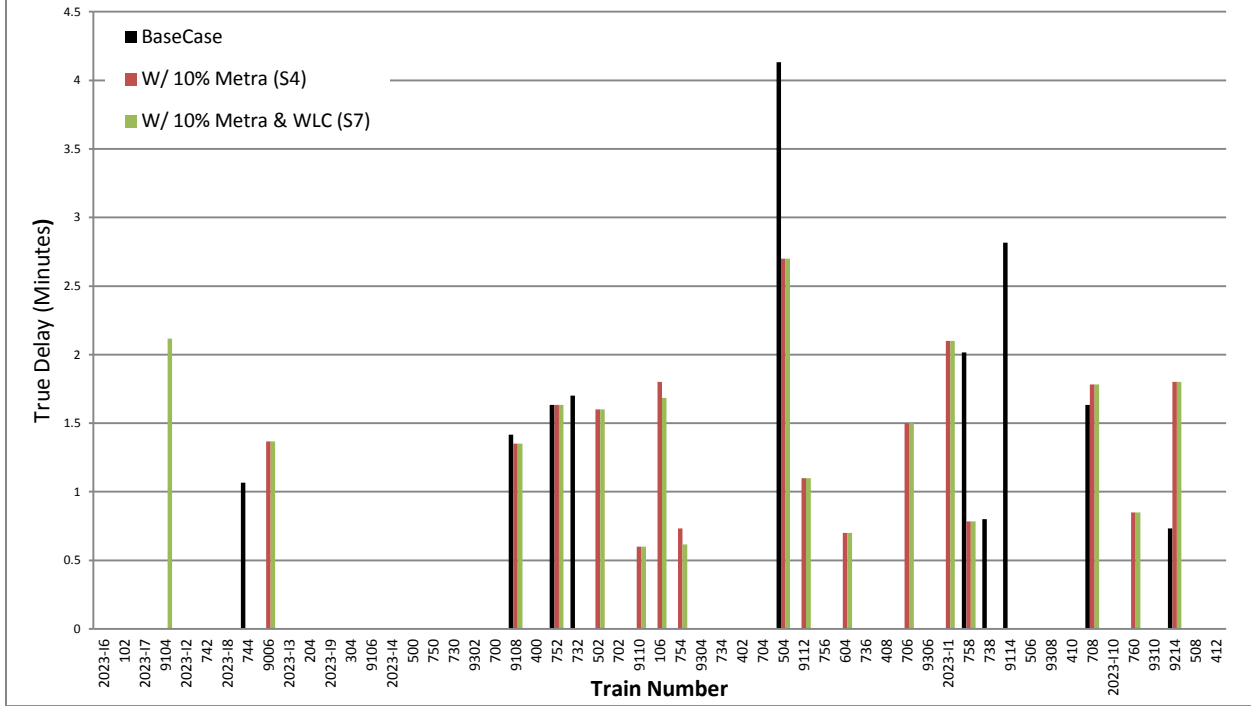
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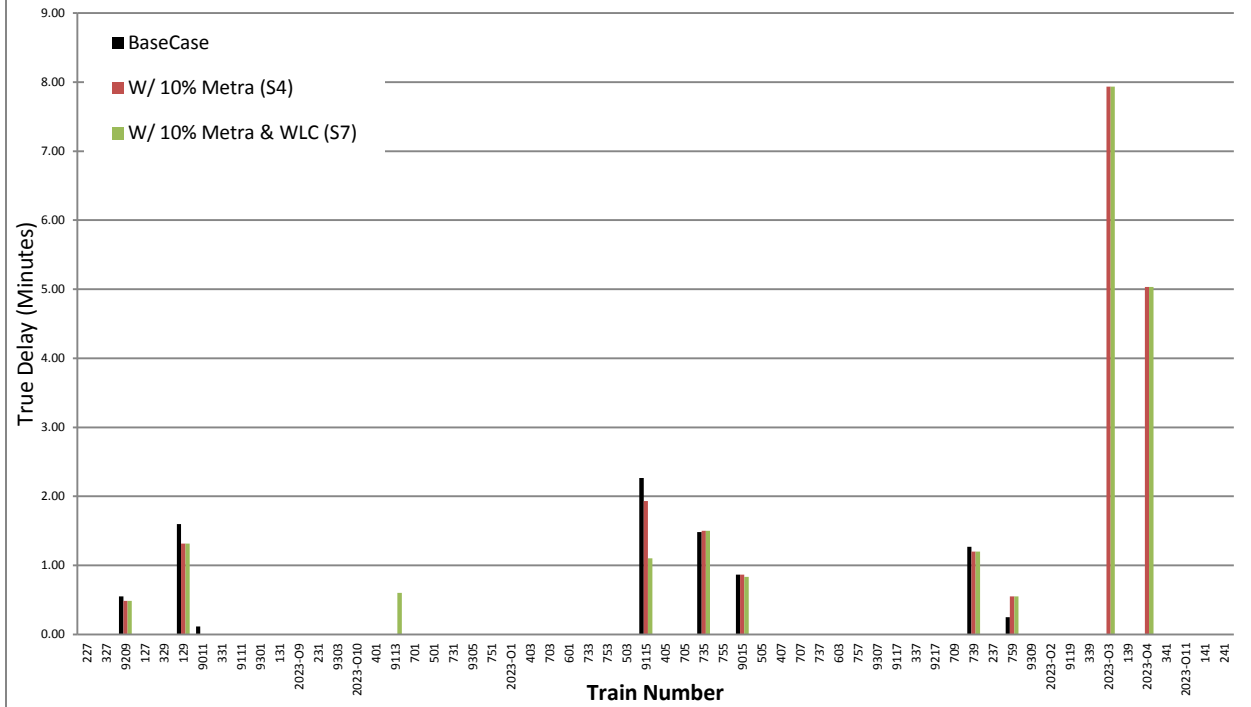
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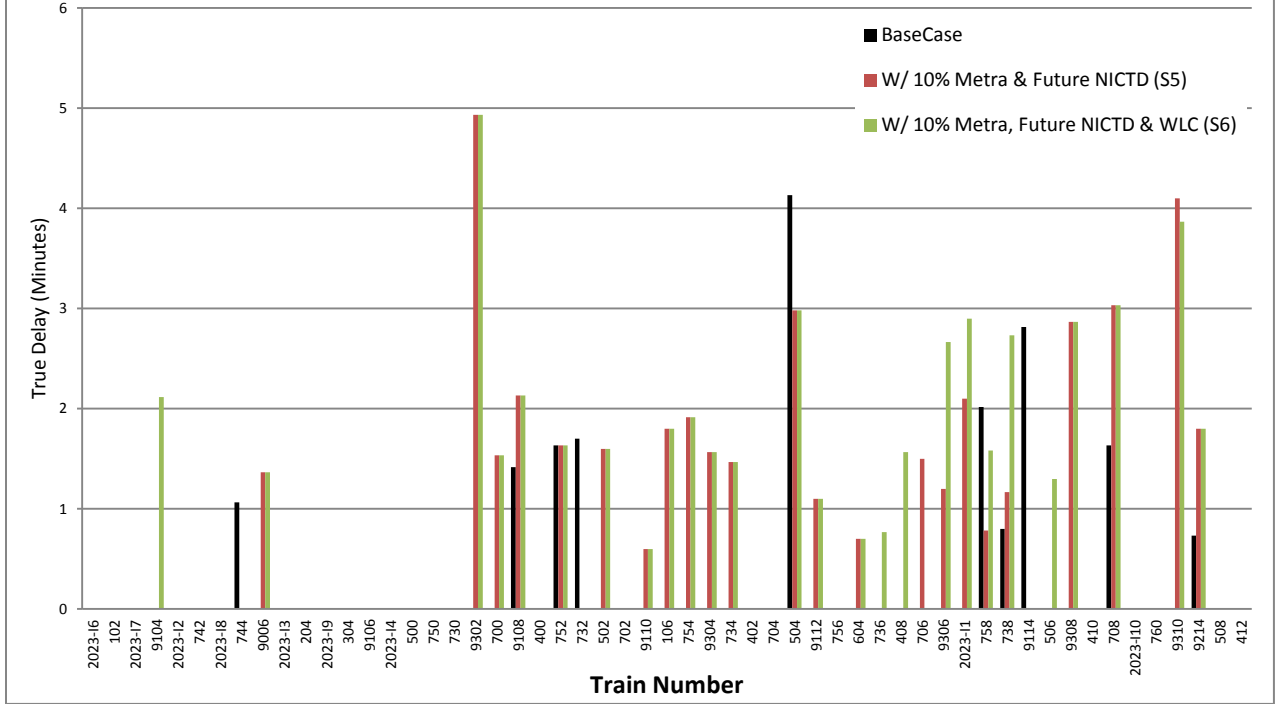
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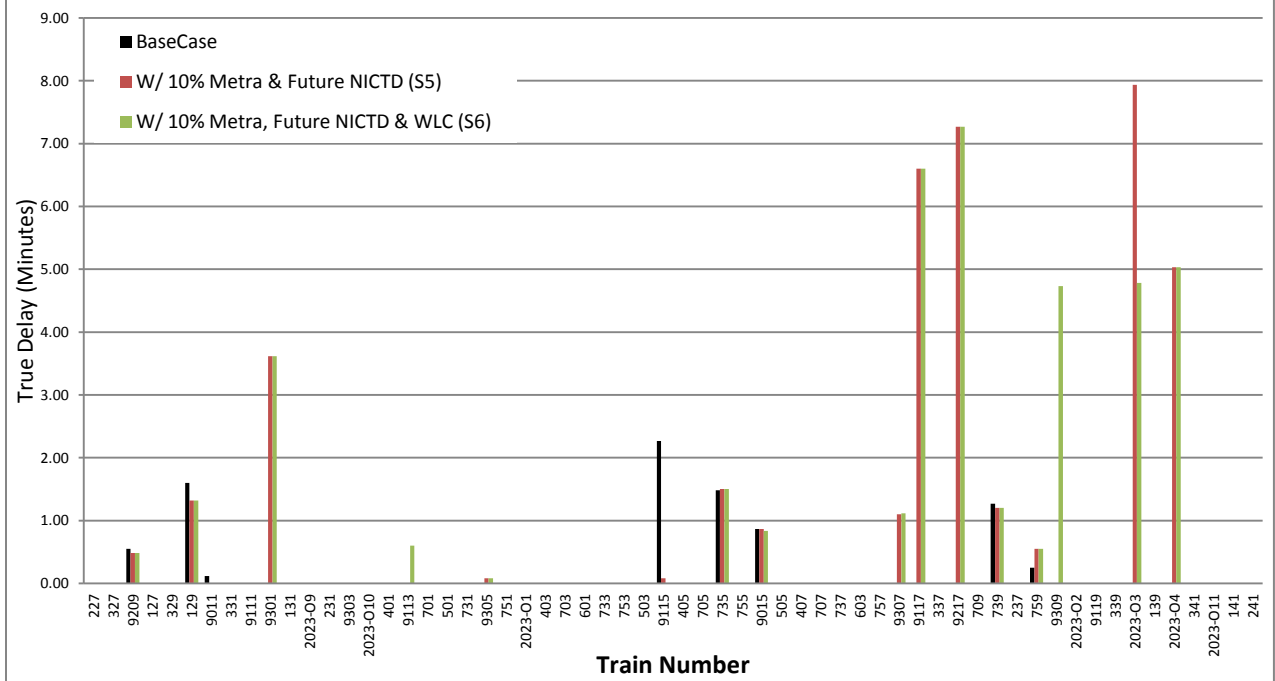
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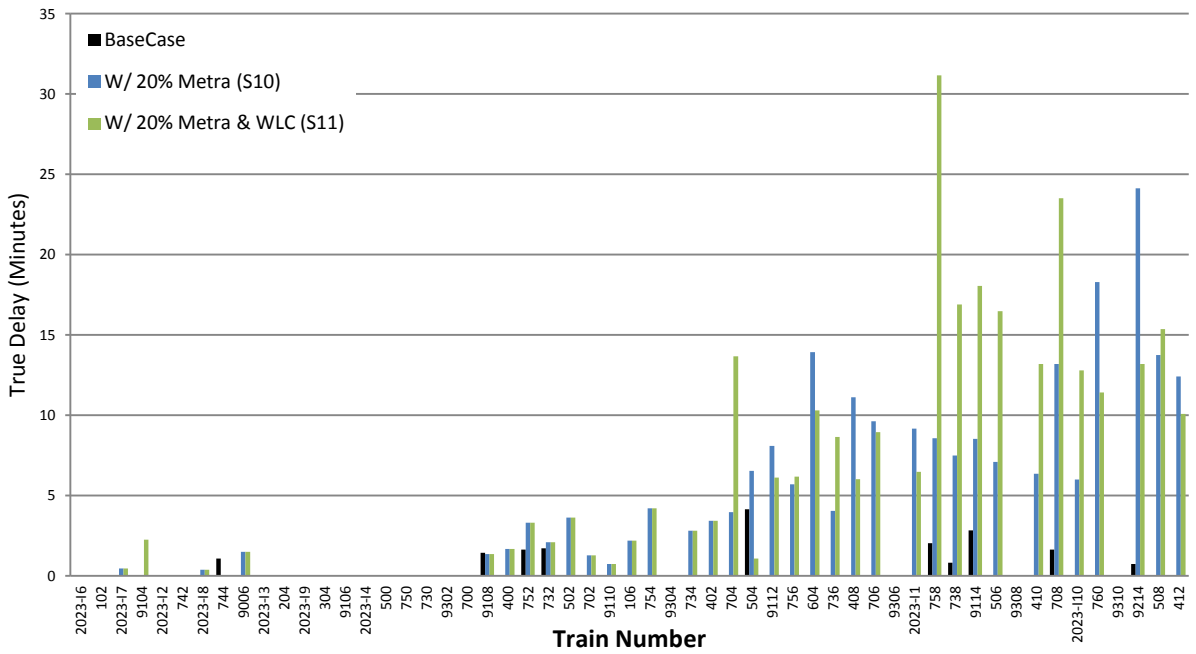
METRA 10% & NICTD INCREASE AM INBOUND RUSH



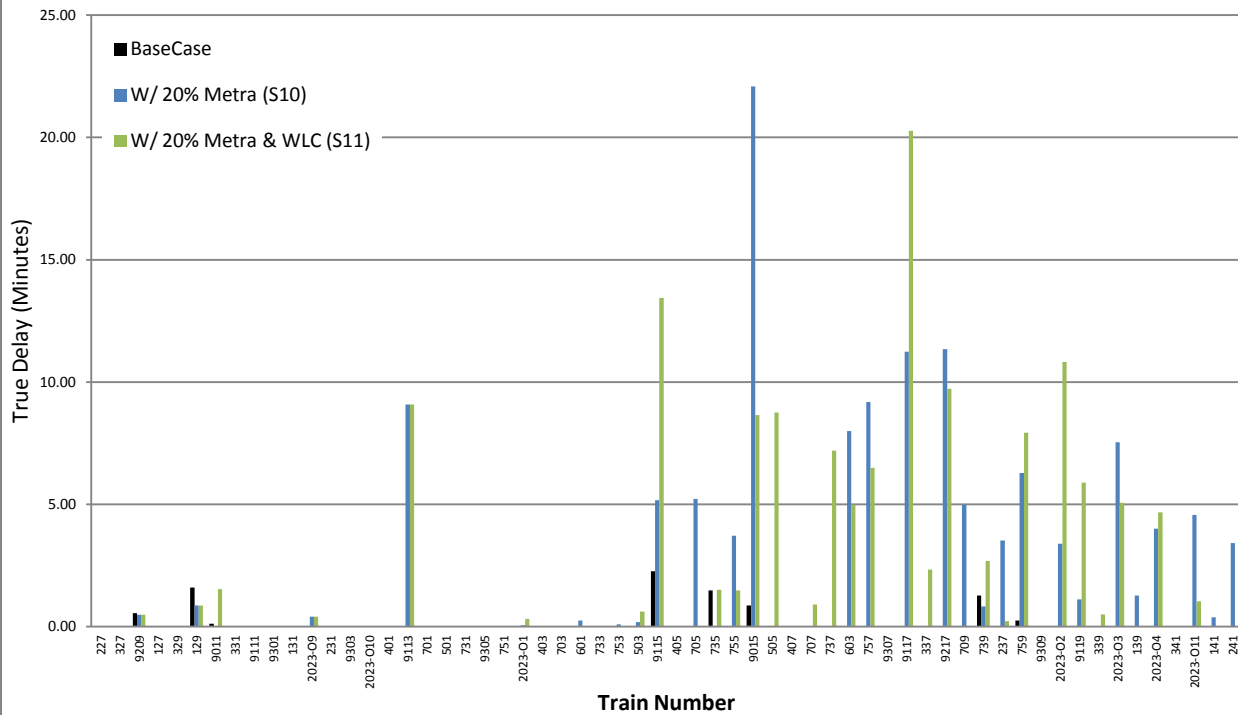
METRA 10% & NICTD INCREASE PM RUSH OUTBOUND



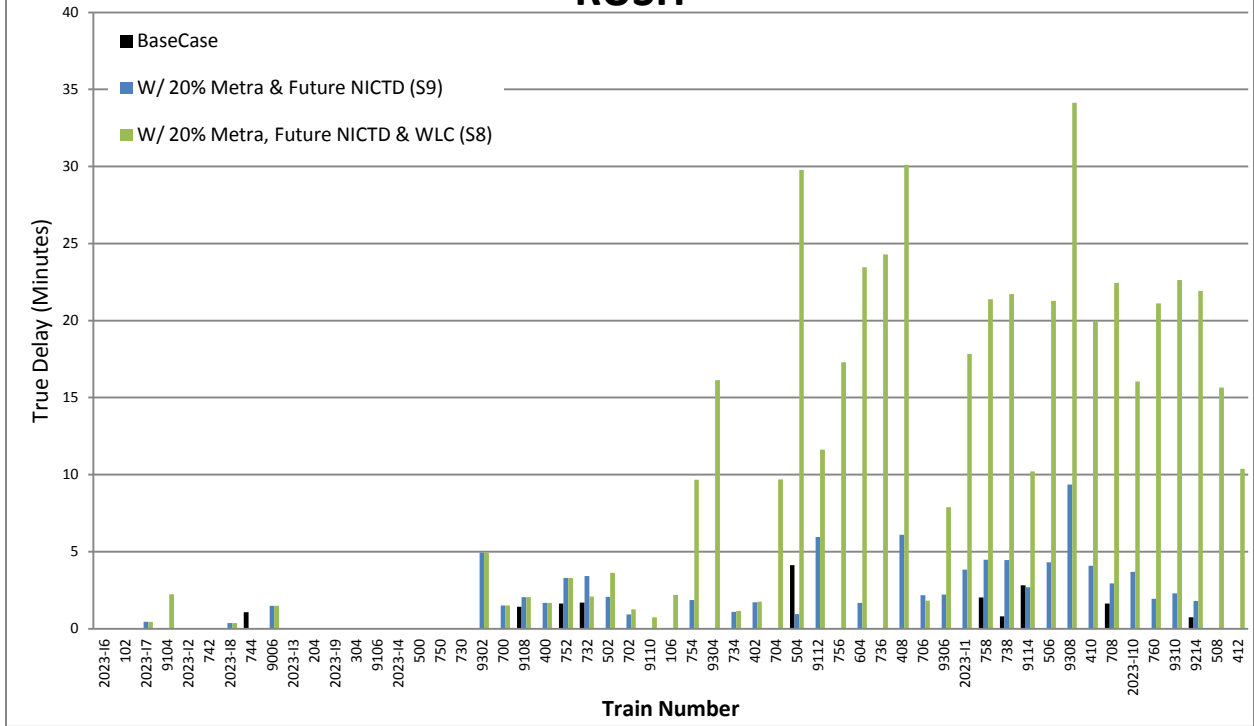
METRA 20% INCREASE AM INBOUND RUSH



METRA 20% INCREASE PM OUTBOUND RUSH



METRA 20% & NICTD INCREASE AM INBOUND RUSH



METRA 20% & NICTD INCREASE PM OUTBOUND RUSH

