Appendix D:

Traffic Impact Study

Generic Draft Environmental Impact Statement

Hampton Ridge Center Rezoning

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
REGION FOUR
1530 JEFFERSON ROAD
ROCHESTER, NEW YORK 14623
www.nysdot.gov

KEVIN B. O'BUCKLEY, P.E.
REGIONAL DIRECTOR

ASTRID C. GLYNN
COMMISSIONER

September 19, 2007

Mr. James Elmer, P.E.
Bergmann Associates
200 First Federal Plaza
28 East Main Street
Rochester, NY 14614

Proj. No. 6698.00
Org. ~~Contda~~ mPetroski
Encl.
For Copy
Copies to J. Elmer

Re: Hampton Ridge Center
Route 104, Town of Greece
Monroe County

Dear Mr. Elmer:

We have received your request for information on whether five locations adjacent to the subject project are on the New York State Priority Investigation Location (PIL) list.

The following intersections are on our PIL list.

Route 104 and Manitou Road
Route 104 and Elmgrove Road/North Greece Road
Route 104 and Elmridge Plaza

These locations are not on our PIL list.

Route 104 and Kohl's driveway
Route 104 between Manitou Road and the Kohl's driveway

If there are any questions please contact Mr. Robert Duennebacke at 272-3475.

Sincerely,

David C. Goehring

David C. Goehring, P.E.,
Regional Transportation Operations Engineer
DCG/RLD/

Mark Petroski

RECEIVED
SEP 14 2007
BY:----------

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
REGION FOUR
1530 JEFFERSON ROAD
ROCHESTER, NEW YORK 14623
www.nysdot.gov

KEVIN B. O'BUCKLEY, P.E.
REGIONAL DIRECTOR

ASTRID C. GLYNN
COMMISSIONER

September 11, 2007

Mr. Frank Dolan
Bergmann Associates
28 East Main Street
200 First Federal Plaza
Rochester, NY 14614-1909

Proj. No.
Org. F. Dolan
Enc. " "
Full Copy
Copies to CAV

Re: Hampton Ridge Center
Route 104, between Route 261 & Route 286
Town of Greece, Monroe County

Dear Mr. ~~Dolan~~ Frank,

We have completed our review of your July 18, 2007 letter responding to our previous comments and have the following comments.

In regards to the Route 104 and Manitou Road intersection, it is our policy that when a lowering in the level of service (LOS) during a peak hour occurs, traffic mitigation is required to offset this impact. The LOS is expected to be lowered significantly during peak hours. Contrary to your statement, there is no indication that this would be limited to one peak hour. It is more reasonable to assume that there will be significant impacts during afternoon and weekend periods when commercial activity is high. In this case improvements at the intersection appear impractical due to right-of-way and physical constraints. It was suggested that these improvements could be done when the New York State Department of Transportation reconstructs Route 104 in this area and can obtain right-of-way. Presently we do not have a project planned in this area and thus do not foresee the necessary traffic improvements occurring for at least ten years. If traffic mitigation is not feasible with full development of Hampton Ridge Center, consideration needs to be given to the scope of this project in relation to the transportation infrastructure available.

We have reviewed the proposed modifications at the Route 104 and Elmgrove Road/North Greece Road intersection. The installation of dual left turn lanes on Elmgrove Road and North Greece Road has inherent drawbacks but appears feasible. As stated in our previous comments, the proposed layout may require a higher cycle length and may negatively impact the progression of traffic on Route 104. We also have concerns with the inefficiency of split phasing the northbound and southbound directions during off peak hours. Before split-phasing Elmgrove Road and North Greece Road an updated intersection analysis with actual traffic volumes as Hampton Ridge approaches full development will be necessary. A comparison of existing and proposed geometry is necessary to determine which alternative is better. This analysis should compare impacts to capacity, safety and the progression of Route 104 traffic.

Another drawback is the unconventional way that large vehicles (buses and trucks) needing to turn onto North Greece Road must be accommodated. Permanently detouring large vehicles to use the Old North Greece Road truck U-turn does not fully mitigate for the impact the dual left counter-measure will have on large vehicles. The impact that remains is an unquantifiable operational deficiency. Detailed design will reveal additional modifications to striping and lane tapers that may be necessary to eliminate trap lanes and provide for better lane alignment.

As stated in your letter, we are in agreement with traffic mitigation at the site driveway on Route 104. The location of this driveway and all traffic mitigation must be coordinated with the future development of property on the south side of Route 104. Efforts to minimize signalized intersections are critical to maintain good traffic flow.

A Highway Work Permit is required for all work within State right-of-way. However significant issues still exist that require further conceptual work. We look forward to the results of your continued planning efforts for this commercial development.

If there are any questions regarding our review please contact Mr. Robert Duennebacke at 272-3475.

Sincerely,

David C. Goehring, P.E.,
Regional Transportation Operations Engineer

DCG/RLD/
c: G. Tajkowski, Town of Greece
D. Jindra, Assistant Resident Engineer, Monroe West
J. Frank, Permit Review

Department of **Transportation**
Monroe County, New York

Maggie Brooks
County Executive

Terrence J. Rice, P.E.
Director

July 31, 2007

Mr. Frank L. Dolan, P.E., PTOE
Bergmann Associates
200 First Federal Plaza
28 E. Main St.
Rochester, NY 14614

RE: HAMPTON RIDGE CENTER – TRAFFIC IMPACT STUDY

Dear Mr. ~~Dolan,~~ FRANK

We have completed our review of the traffic impact study for the above referenced project and offer the following comments:

1. Figures 9 & 10 identify that additional intersections should be studied beyond that performed. Any intersections that have 100 or more trips added as a result of this development should at least be reviewed to determine if the additional traffic will have an impact. This means the Mill Rd. & N. Greece Rd intersection, as well as east of Elmridge Plaza on Route 104 and west of Manitou on Route 104 as well should be studied.
2. Table 6 shows that the mitigation proposed appears to be inadequate @ Route 104 & Manitou Road, as well as at Route 104/N. Greece Rd./Elmgrove Rd. We concur with NYSDOT's comments dated 3.28.2005 regarding these intersections, which are under their jurisdiction.
3. Pg 22; ¶ 3 indicates that pedestrian phases were removed from the Synchro model at the Route 104/Elmgrove/N. Greece Rd. intersection, however, the infrequent pushes of the button is an input that can be accounted for, and modeled. Please modify and re-run the analysis.
4. Please identify any impacts to N. Greece Road and to nearby accesses, as a result of any mitigation (widening for left turn lane) etc. that may be required.
5. Pg 24 – The statement that the changes at Route 104/Elmgrove/N. Greece Rd. can be made w/pavement markings & signal modifications is incorrect – this intersection has already been reconstructed differently.
6. Traffic signal conduit should be installed from the site driveway to both Manitou Rd. and Elmgrove Road.
7. Recommendations: #2 – The new signal at the site driveway must be coordinated with the adjacent signals to the east at Elmgrove and beyond.

8. Recommendations: #6 - The signal at Route 104/Elmgrove/N. Greece Rd. must be coordinated with the adjacent signals. It is coordinated now, and runs well @ 120 second cycle length.
9. Recommendations: #7 - Continue to operate the signal @ Route 104 & Elmridge Plaza in coordination with those to the east *and* west.

We would like to review a revised traffic impact study. If you have any questions, or wish to meet to discuss, please call me at (585) 753-7733.

Sincerely,

Brent H. Penwarden III, P.E.
Associate Engineer

cc: T. Rice
G. Tajkowski, Town of Greece
L. Sherman, NYSDOT, Region 4
File
H:\PERMITS\hank\TIR\Hampton Ridge Center.doc

Bergmann associates

July 18, 2007

Mr. David Goehring, P.E.
New York State Department of Transportation
Traffic Operations Section
1530 Jefferson Road
Rochester, New York 14623-3161

Re : Hampton Ridge Center
Route 104, Between Route 261 and
N. Greece Road, Town of Greece
Monroe County

Dave

Dear ~~Mr. Goehring~~:

We are following up on your March 28,2005 letter and our subsequent meetings and e-mails concerning the referenced project.

Regarding the intersection of Rt.104 and Manitou Road, we offer the following: As we have the discussed the existing No- Build Levels of service for the Northbound and Southbound left turn and through lanes show E and F respectively for the PM peak period. In our report pages 22 and 23 we indicated that in order to mitigate this existing condition construction of dedicated left turn lanes would be necessary. However, as you have indicated in your March 28, 2005 letter, given the ROW and grade issues these improvements appear impractical without the purchase of ROW. Given that this is only a short existing Friday PM peak period problem, we suggest that these improvements be held until NYSDOT does reconstruction of Rt.104 in this area and can obtain the necessary ROW.

Regarding the intersection of Rt.104 and Elmgrove Road/ N. Greece Road, attached is a drawing showing our proposed modifications to this intersection. We have extended the lane tapers on Elmgrove Road to avoid creating a "trap lane". Attached are the Sim Traffic queue results for this intersection. These results show that the proposed improvements can improve the levels of service on Elmgrove Road and North Greece Road. We believe our proposed improvements can accommodate the increase in traffic with out significantly disrupting traffic on Rt.104.

585.232.5135
28 East Main Street • 200 First Federal Plaza • Rochester, New York 14614-1909
www.bergmannpc.com

Relative to your comments regarding the westbound Rt.104 design vehicle being able to negotiate the right turn into North Greece Road, the newly constructed truck turn around just west of this intersection can be signed and used for large vehicles wanting to travel north on North Greece Road.

We will comply with your requirements regarding the proposed site driveway

We trust that this addresses your concerns and look forward to your approval.

Very truly yours,

Bergmann Associates

Frank L. Dolan, P.E.,PTOE
Principal Transportation Systems

Xc M. Petroski
J. Di Marco II

499: NYS Route 104 & N Greece Performance by movement

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	6.0	12.0	1.8	5.6	17.4	0.6	6.9	9.8	1.8	3.8	4.7	2.5
Delay / Veh (s)	64.9	42.2	27.8	92.4	55.8	10.4	58.0	70.8	31.5	56.3	49.2	26.7
Stop Delay (hr)	5.1	9.1	1.5	4.7	12.9	0.1	6.1	8.2	1.4	3.5	4.0	1.9
St Del/Veh (s)	55.3	32.0	22.4	78.7	41.5	1.8	50.7	59.1	24.5	51.9	42.1	20.4
Total Stops	338	815	210	268	993	123	461	564	159	231	300	234
Stop/Veh	1.02	0.79	0.88	1.24	0.89	0.62	1.07	1.13	0.76	0.96	0.88	0.69
Travel Dist (mi)	75.5	227.9	54.0	55.0	284.6	50.8	50.1	57.6	24.1	18.7	26.5	25.9
Travel Time (hr)	8.2	17.9	3.7	7.2	24.7	2.2	8.7	11.5	2.7	4.5	5.5	3.6
Avg Speed (mph)	9	13	15	8	12	23	6	5	9	4	5	7
Vehicles Entered	336	1019	239	219	1125	198	433	500	211	238	343	337
Vehicles Exited	330	1032	239	215	1113	198	430	497	206	241	341	340
Hourly Exit Rate	330	1032	239	215	1113	198	430	497	206	241	341	340
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

499: NYS Route 104 & N Greece Intersection Performance

	EB	WB	NB	SB	Total
Total Delay (hr)	19.9	23.5	18.6	10.9	72.9
Delay / Veh (s)	44.8	55.1	58.7	42.8	50.5
Stop Delay (hr)	15.7	17.7	15.7	9.4	58.5
St Del/Veh (s)	35.4	41.6	49.6	36.7	40.6
Total Stops	1363	1384	1184	765	4696
Stop/Veh	0.85	0.90	1.04	0.83	0.90
Travel Dist (mi)	357.4	390.5	131.9	71.1	950.8
Travel Time (hr)	29.8	34.2	22.9	13.6	100.4
Avg Speed (mph)	12	11	6	5	9
Vehicles Entered	1594	1542	1144	918	5198
Vehicles Exited	1601	1526	1133	922	5182
Hourly Exit Rate	1601	1526	1133	922	5182
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Intersection: 499: NYS Route 104 & N Greece

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	T	R	L	L	T
Maximum Queue (ft)	320	407	290	303	320	475	458	475	48	232	476	620
Average Queue (ft)	217	209	194	200	197	232	235	212	15	144	209	424
95th Queue (ft)	311	318	269	281	325	387	362	338	35	206	433	703
Link Distance (ft)		1192	1192	1192		1263	1263	1263				548
Upstream Blk Time (%)												0.09
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	295				295				295	440	440	
Storage Blk Time (%)	0.03	0.00			0.06	0.01		0.01				0.15
Queuing Penalty (veh)	10	0			23	2		1				91

Intersection: 499: NYS Route 104 & N Greece

Movement	NB	B4	SB	SB	SB	SB	B2
Directions Served	R	T	L	L	T	R	T
Maximum Queue (ft)	426	865	135	338	418	245	386
Average Queue (ft)	149	159	66	97	247	174	48
95th Queue (ft)	360	616	119	212	419	268	227
Link Distance (ft)		851			346		371
Upstream Blk Time (%)		0.01		0.00	0.07		0.00
Queuing Penalty (veh)		0		0	0		0
Storage Bay Dist (ft)	400		340	340		200	
Storage Blk Time (%)	0.00			0.00	0.15	0.01	
Queuing Penalty (veh)	0			1	89	4	

Intersection: 1056: NYS Route 104 & NYS Route 261

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	182	236	246	195	674	742	1325	176	1354	145
Average Queue (ft)	92	171	165	140	273	365	925	126	1129	107
95th Queue (ft)	154	240	240	227	461	593	1498	225	1726	179
Link Distance (ft)		1166	1166		2193	2193	1310		1320	
Upstream Blk Time (%)							0.16		0.57	
Queuing Penalty (veh)							0		0	
Storage Bay Dist (ft)	245			170				150		100
Storage Blk Time (%)		0.00		0.10	0.15		0.57	0.00	0.86	0.00
Queuing Penalty (veh)		0		50	34		147	2	108	0

499: NYS Route 104 & N Greece Performance by movement

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	6.5	13.1	2.9	3.4	25.5	1.9	4.7	6.0	2.8	4.6	4.8	2.9
Delay / Veh (s)	60.3	36.4	29.4	58.3	68.4	33.5	61.8	61.6	33.2	71.7	57.0	26.2
Stop Delay (hr)	5.4	9.2	2.1	2.5	19.2	1.3	4.4	5.3	2.3	4.3	4.1	2.1
St Del/Veh (s)	49.8	25.5	21.2	44.0	51.6	22.9	57.5	54.0	27.4	66.6	48.6	18.5
Total Stops	394	935	295	223	1374	165	276	366	244	253	303	278
Stop/Veh	1.01	0.72	0.84	1.08	1.02	0.79	1.01	1.04	0.79	1.10	1.00	0.69
Travel Dist (mi)	88.9	301.0	84.0	53.3	345.6	53.8	32.0	41.1	35.2	24.0	31.5	40.7
Travel Time (hr)	9.2	20.9	5.7	4.9	34.4	3.7	5.9	7.4	4.3	5.5	5.8	4.5
Avg Speed (mph)	10	14	15	11	10	15	5	6	8	4	5	9
Vehicles Entered	386	1295	355	208	1359	209	275	360	307	233	308	401
Vehicles Exited	391	1296	351	207	1324	208	272	347	307	228	301	401
Hourly Exit Rate	391	1296	351	207	1324	208	272	347	307	228	301	401
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

499: NYS Route 104 & N Greece Intersection Performance

	EB	WB	NB	SB	Total
Total Delay (hr)	22.5	30.8	13.6	12.3	79.2
Delay / Veh (s)	39.8	63.0	52.3	47.4	50.3
Stop Delay (hr)	16.6	23.1	12.0	10.4	62.1
St Del/Veh (s)	29.4	47.2	46.2	40.1	39.5
Total Stops	1624	1762	886	834	5106
Stop/Veh	0.80	1.00	0.95	0.89	0.90
Travel Dist (mi)	474.0	452.7	108.3	96.2	1131.1
Travel Time (hr)	35.7	43.0	17.6	15.8	112.1
Avg Speed (mph)	13	11	6	6	10
Vehicles Entered	2036	1776	942	942	5696
Vehicles Exited	2038	1739	926	930	5633
Hourly Exit Rate	2038	1739	926	930	5633
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

Intersection: 499: NYS Route 104 & N Greece

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	T	R	L	L	T
Maximum Queue (ft)	321	632	370	385	321	483	503	467	340	216	239	454
Average Queue (ft)	232	242	223	263	176	335	351	303	129	96	101	249
95th Queue (ft)	349	406	331	383	338	493	504	453	323	169	169	421
Link Distance (ft)		1192	1192	1192		1263	1263	1263				548
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	295				295				295	440	440	
Storage Blk Time (%)	0.04	0.01			0.00	0.12		0.09	0.00			0.01
Queuing Penalty (veh)	17	3			0	25		17	0			5

Intersection: 499: NYS Route 104 & N Greece

Movement	NB	SB	SB	SB	SB	B2
Directions Served	R	L	L	T	R	T
Maximum Queue (ft)	426	152	373	552	226	187
Average Queue (ft)	174	82	117	248	174	6
95th Queue (ft)	310	143	242	441	264	62
Link Distance (ft)				480		236
Upstream Blk Time (%)				0.02		
Queuing Penalty (veh)				0		
Storage Bay Dist (ft)	400	340	340		200	
Storage Blk Time (%)	0.00			0.11	0.02	
Queuing Penalty (veh)	0			75	11	

Intersection: 1056: NYS Route 104 & NYS Route 261

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	271	470	454	195	464	428	184	176	619	145
Average Queue (ft)	75	264	255	120	214	252	86	77	395	101
95th Queue (ft)	199	401	395	199	373	408	152	161	570	175
Link Distance (ft)		1166	1166		2192	2192	1310		1320	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	245			170				150		100
Storage Blk Time (%)	0.00	0.11		0.01	0.19		0.02	0.00	0.64	0.00
Queuing Penalty (veh)	0	9		6	42		5	0	78	0

Bergmann associates

May 30, 2007

Mr. Henry Herdzik
Monroe County Department of Transportation
6100 City Place
50 West Main Street
Rochester, NY 14614

RE: **Proposed Hampton Ridge Center, Town of Greece**

Dear Henry,

Please find attached for your records one (1) copy of the December 2004 Traffic Impact Study for the proposed Hampton Ridge Center on NYS Route 104 (West Ridge Road) in the Town of Greece. This report was submitted to the New York State Department of Transportation (NYSDOT) for review at the close of 2004 prior to the genesis of the Southwestern Commons project. We received comments from the NYSDOT dated March 28, 2005 (copy also attached for your records). The project team next met with the NYSDOT and presented a concept plan in response. We are in the process of obtaining a NYSDOT response to that concept plan.

As the traffic impact study for the Hampton Ridge Center was formally submitted prior to that of Southwestern Commons, we cordially ask that the MCDOT provide us with any comments specifically related the proposed Hampton Ridge Center separate from its neighboring development.

Please feel free to contact me at (585) 232-5137 extension 490 should you have any questions on the traffic impact study or our request. I look forward to hearing from you in the near future.

Sincerely,
BERGMANN ASSOCIATES

FOR

Frank L. Dolan, P.E., PTOE
Principal, Transportation Systems

Cc. Mark Petroski, Bergmann Associates

MONROE COUNTY
DEPARTMENT OF TRANSPORTATION

DEVELOPMENT REVIEW COMMITTEE REPORT

PROJECT: Hampton Ridge Center	**ATTENTION: Renee Casler**
LOCATION: 4320 West Ridge Road	**DATE TO PLANNING: May 16, 2007**
TOWN: Greece	**DRC #: GR07-27Z**
ENGINEER: Bergmann Asociates	**LOG IN DATE: 5/8/07**
OWNER: John L. DiMarco, II	**ENGINEER FAX #: 232-4652-Mark Petroski**
MCDOT CONTACT: Henry Herdzik	**# OF PAGES IN THIS FAX: 1**

GENERAL COMMENTS:

1. The Traffic Impact Report will need to be scoped and developed for this project for our review. Since the Southwestern Commons proposed development (south side of West Ridge Road) will need to analyze many of the same intersections, and since each of these two proposed projects will need to consider impacts from the other, we recommend that both parties work together to create one traffic impact report for both projects. (B)

DEPARTMENT OF

TRANSPORTATION

FAX

Telephone: (585) 753-7720 Fax: (585) 753-7730

TO: Frank Dolan @ Bergmann Associates

FAX #: 232-4652

SUBJECT: Hampton Ridge Center – Traffic Impact Report

DATE: 5/4/07 Pages: (Including cover sheet) 1

FROM: Henry Herdzik

OF: MCDOT Permits PHONE #: 753-7711

COMMENTS:

Hello Frank,

We have received the Traffic Impact Report for the above mentioned project and are currently reviewing it. Before the County can comment on this report, we must receive a $800 traffic report review fee.

Please note that checks must be made payable to:
Director of Finance, County of Monroe.

P97-010

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
REGION FOUR
1530 JEFFERSON ROAD
ROCHESTER, NEW YORK 14623
www.nysdot.gov

KEVIN B. O'BUCKLEY, P.E.
REGIONAL DIRECTOR

ASTRID C. GLYNN
ACTING COMMISSIONER

May 11, 2007

Ms. Meaghan Partelow
FRA Engineering
530 Summit Point Drive
Henrietta, NY 14467

Re: Southwestern Commons and
Wal-Mart Plaza
Route 104 and Manitou Road
Town of Greece, Monroe County

Dear Ms. ~~Partelow~~: Meaghan —

We have completed our review of the Traffic Impact Study for the proposed Southwestern Commons and Wal-Mart Plaza on the southeast quadrant of Route 104 and Manitou Road. Before we can comment on the traffic impacts of this development and mitigation necessary, the scope of this study needs to be expanded.

Due to the significant number of trips generated by Southwestern Commons and Wal-Mart Plaza the following signalized intersections should also included in this study.

Route 104 and Route 259
Route 261 and Route 18
Route 261 and Route 31

To capture the full development traffic impacts of this development and on the adjacent roadway system, this study should take into account all planned development in the area which is approved and unapproved. Specifically the full development of Hampton Ridge Center and the adjacent Shops at Hampton Ridge(Kohls) which are on the north side of Route 104 across from this project. The proposed Hampton Ridge Center proposes a signalized driveway on Route 104 east of the proposed Southwestern Boulevard traffic signal. Each of these driveway locations and projects should be coordinated so that impacts to Route 104 are minimized.

We also have concerns regarding the existing traffic volumes used. These were taken in March, 2002. New traffic counts should be taken at the Route 104 and Route 261 intersection and compared with the 2002 counts. We realize that newer traffic counts on Route 104 may be impacted by the current Route 104 construction project, however if traffic counts are taken before the construction significantly ramps up this Spring, these traffic counts could assist in simulating existing conditions.

As with the proposed Hampton Ridge Center we have concerns with the significant number of trips generated by Southwestern Commons and the Wal-Mart Plaza, and the resulting traffic impacts on Route 104 and Route 261. Much of the traffic mitigation proposed will require the acquisition and transfer of right-of-way on Route 104 and Route 261. Without this right-of-way in our possession, traffic mitigation such as the addition of lanes is not possible. We also question whether some of the traffic mitigation is feasible, due to physical constraints, particularly the areas in the vicinity of Larkin Creek and the cemetery on the southwest corner of Route 104 and Route 261 raised concerns. Subsequent to determining traffic mitigation, a concept plan is required to determine what right-of-way is necessary, impacts on utilities, and what physical constraints need to be addressed.

With full development of this project and all proposed traffic mitigation in place we have concerns that Route 104 and its approaches will be near or exceed its capacity. This will create operational and safety problems on Route 104 and its approaches. Since additional traffic mitigation may not be feasible, a reduction in the intensity of development and the number of trips generated in the peak hours may be the only alternative to mitigate the impacts on the highway system.

If there are any questions regarding our review please contact Mr. Robert Duennebacke at 272-3475.

Very truly yours,

David C. Goehring

David C. Goehring, P.E.
Regional Transportation Operations Engineer

DCG/RLD/

c: G. Taikowski, Director of Development Services, Town of Greece
T. Rice, Director, Monroe County Department of Transportation
D. Jindra, Assistant Resident Engineer, Monroe West
J. Frank, Permit Review

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STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
1530 JEFFERSON ROAD
ROCHESTER, N.Y. 14623-3161

CHARLES E. MOYNIHAN, P.E.
REGIONAL DIRECTOR

JOSEPH H. BOARDMAN
COMMISSIONER

May 25, 2005

MAY 27 2005

Mr. Frank Dolan
Bergmann Associates
200 First Federal Plaza
28 East Main Street
Rochester, NY 14614-1909

RE: TRAFFIC SIGNAL WARRANT STUDY
ROUTE 104 AT KOHL'S PLAZA
TOWN OF GREECE, MONROE COUNTY

Dear Mr. ~~Dolan~~ Frank,

We have completed our review of the Traffic Signal Analysis for the above referenced location.

Our review included an assessment of the methodology followed, a spot-check of traffic volume data collected and an assessment of conclusions made. We also took into account anticipated traffic volumes from additional retail and office space which is now before the Greece Planning Board for approval.

The analysis reviewed the capacity of the intersection with and without a traffic signal, a comparison of traffic volumes with warrant thresholds identified in the New York State Manual of Uniform Traffic Control Devices and a delay study. These are comments on methodology used.

1. Warrant 8 is to be used only in exceptional cases as it calls for a lower threshold than Warrants 1 and 2. As this intersection exhibits no characteristics that would classify it as exceptional in the context that is intended here, this warrant is not applicable here. Warrants 9 and 10 are used in conjunction with excessive delays. Meeting the volume thresholds for these warrants is only meaningful in combination with observed and measurable delays that are well beyond what is considered acceptable. Warrant 2 is also intended to be used in combination with some measurable delays though not as excessive as that of Warrants 9 or 10.

2. The delay study data was collected properly however the results were not provided in such a way that gives us a meaningful sense of the delays experienced. The percentage of vehicles delayed less than 60 seconds, 90 seconds and 120 seconds are relevant thresholds in a location such as this. We then can draw comparisons to how vehicles would be delayed if signalized.

The traffic volume data was spot-checked with a comparable timeframe in May. Traffic volumes appear reasonable for a weekday on a day with no special sales going on. We believe the non-sale days would represent a more typical day at the store.

We have concluded that though the volumes thresholds are met for Warrants 2, 9 and 11, the delays are not of the magnitude that would indicate that a signal is warranted. Traffic signals that are installed without careful consideration of all these factors can often work to the disadvantage of the traveling public. Besides increasing delays for motorists a traffic signal can increase the frequency of accidents especially rear-end type accidents.

We also looked at the need for a signal once the additional retail is opened. We first compared the volume data collected in this analysis to the anticipated trips identified in the original Traffic Impact Analysis. Since the existing volumes are lower than the original projections, we reduced the projected volumes for the additional retail by the same factor and added it to the existing Kohl's traffic volumes. These volumes meet the threshold for Warrant 1 four out of seven days a week.

Based on this analysis we have concluded that a traffic signal will be warranted upon completion of the additional retail currently proposed. A traffic signal should be installed no sooner than two weeks prior to opening day of the first retail but no later than the opening day of the last retail space. The proposed office space should have minimal impact on the need for the traffic signal and is therefore not considered a trigger for the timeframe for installing the traffic signal.

A Highway Work Permit will be required for this work. Detailed plans, prepared in accordance with the Region 4 Checklist for Major Highway Work Permits (found at www.dot.state.ny.us/reg/r4/ref_links.html) should be submitted for review to Mr. Ken Bittner, Assistant Resident Engineer at the following address:

New York State Department of Transportation
2441 S. Union Street
Spencerport, NY 14559

If you have any questions regarding this review, please contact Dave Goehring at (585) 272-3460, ext. 3481.

Very truly yours,

Larry R. Sherman
Regional Traffic Engineer

LRS/DCG/cg
c: G. Tajkowski, Town of Greece
D. Hofmeister, Di Marco Group
K. Bittner, Asst. Resident Engineer, Monroe West
J. Frank, Traffic & Safety Permit Review

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
1530 JEFFERSON ROAD
ROCHESTER, N.Y. 14623-3161

CHARLES E. MOYNIHAN, P.E.
REGIONAL DIRECTOR

JOSEPH H. BOARDMAN
COMMISSIONER

March 28, 2005

Mr. Frank Dolan
Bergmann Associates
200 First Federal Plaza
Rochester, New York 14614

Re: Hampton Ridge Center
Route 104, Between Route 261 &
N. Greece Road, Town of Greece
Monroe County

Dear Mr. Dolan: Frank,

We have completed our review of a Traffic Impact Study for the proposed 390,000 square feet of building space to include a multiplex movie theater, various retail stores, 4 sit-down restaurants, a pharmacy, and a drive-thru bank. Through our review we noted that Hampton Ridge Center and the adjacent Shops at Hampton Ridge will generate 2167 and 3836 trips in the weekday PM and Saturday mid-day peak hours respectively. Of the total trips generated, 1430 and 2839 will be new trips on Route 104 in the weekday PM and Saturday mid-day peak hour respectively.

These new trips will significantly impact the adjacent signalized intersection at Manitou Road and at Elmgrove Road/North Greece Road. Traffic impacts will significantly reduce the capacity of each of these intersections and at some approaches exceed their capacity during peak hours. With the proposed traffic mitigation we have serious concerns about the safety and operation of the signalized intersections as they approach capacity. Therefore, we recommend a reduction in the intensity of development and the number of trips generated in the peak hours. In regards to our specific concerns we have the following comments:

At the Route 104 and Manitou Road intersection, Table 7 shows the overall Level of Service (LOS) in the PM peak to be 'D' (37 sec/veh) with full development and with geometric improvements. However, the geometric improvements assumed in the analysis (a 100 foot southbound right turn lane and a 150 foot northbound right turn lane) are not identified as recommended mitigation measures. Reasons cited include the real possibility that additional lanes would not fit within the existing right-of-way. We believe that right turn lanes would need to be significantly longer than proposed and improvements to the through lanes on both approaches would be necessary to accommodate the anticipated queue.

We estimate that with 2 or 3 through vehicles in the northbound lane a right turn vehicle would not be able to reach the short right turn lane, greatly reducing their effectiveness. If these mitigation measures are found to be impractical, as expected, the appropriate level of service for the intersection is summarized in Table 6 instead. This shows an overall LOS 'E' (73 sec/veh) with LOS 'F' for the northbound and southbound lefts. The intersection can expect to operate at 11.8% beyond full capacity with full development in the weekday PM peak hour.

At the Route 104 and Elmgrove Road/North Greece Road intersection we have concerns with the proposal to revise our upcoming capital improvements at this intersection with striping changes to allow dual left turns northbound and southbound. This proposal will create a trap lane for northbound through vehicles approaching Route 104. The proposed geometry would lead a vehicle intending to continue north on North Greece Road into a lane designated for left turns. Also, will the design vehicle be able to make a westbound right turn on Route 104 without traversing into a southbound left turn lane? A conceptual design plan needs to be included to determine if this proposal is physically feasible.

In the SYNCHRO analysis queue lengths were not included. We have concerns that queue lengths for through vehicles may block turning lanes or vice-versa. Also of concern is the inefficiency of split phasing the northbound and southbound approaches (which becomes necessary when introducing dual left turn lanes) during off-peak hours which is a great majority of the normal week. Also, the relatively high cycle length (125 seconds) which requires this intersection to run out of coordination during peak hours will negatively impact corridor progression. Even with the proposed mitigation it is expected that this intersection will be at approximately 92% of its capacity with full development in the weekday PM and Saturday mid-day peak hours. Full development of the subject project will consume a majority of excess capacity built into our capital project. Instead of this intersection approaching its capacity for 20 more years which is the intent of our project, this intersection will exceed its capacity within 5 years of its completion.

At the proposed site driveway on Route 104, three lanes exiting (two 12 foot wide left turn lanes and a 12 foot wide right turn lane) and two 12 foot lanes entering are warranted. The storage lengths for exiting lanes should be a minimum of 200 feet and provide sufficient storage based on queue lengths. Until a traffic signal is warranted, the third exiting lane should be cross-hatched to provide two lanes exiting. Driveway radii should be based on the design vehicle, which should be identified prior to starting design. We agree that an eastbound left turn lane and a westbound right turn lane on Route 104 is warranted. We also agree that the eastbound left turn lane should provide a storage length of 500 feet and be 12 feet side. Taper lengths should conform to Table 262-2 of the New York State Manual of Uniform Traffic Control Devices. Due to the taper lengths for the eastbound left turn lane at the site driveway and the existing eastbound left turn lane at the adjacent Shops at Hampton Ridge, a 12 foot left turn lane is required on Route 104 between the site driveway and the Shops at Hampton Ridge driveway. This will eliminate safety and operational concerns of tapering through traffic on Route 104 around each left turn within a very short distance. The free flow westbound right turn lane should provide a storage length of 325 feet and be 12 feet in width. Existing shoulder widths should be maintained. Clear zones should be identified and should be attainable with gentle slopes that do not require guiderail.

We agree that a three color traffic signal is warranted on Route 104 at the site driveway with full development of the project. Include the installation of traffic signal conduit and pull boxes at the site driveway to facilitate a traffic signal when traffic signal warrants are met. Also include traffic signal conduit and pull boxes from the site driveway to Manitou Road and the adjacent Shops at Hampton Ridge driveway to facilitate the future coordination of theses traffic signals. As the development progresses a traffic signal warrant analysis will be required. The analysis should be performed with approximately 100,000 square feet of building space open. The traffic signal warrant analysis should include twenty-four hour machine counts of an average day, an accident analysis, and a delay study.

In regard to the proposed cross access roadway between Hampton Ridge Center and the adjacent Shops at Hampton Ridge, we strongly support this and any other proposal to provide cross access to adjacent development.

We look forward to your response to the issues that we have identified. If you have any questions regarding our review, please contact Mr. Robert Duennebacke at 272-3475 ext. 3475.

Very truly yours,

Larry R. Sherman
Regional Traffic Engineer

LRS/RLD/
c: D. Hofmeister, The DiMarco Group
G. Tajkowski, Town of Greece
K. Bittner, Asst. Resident Engineer, Monroe West

N.Y.S.D.O.T. REGION 4
TRAFFIC IMPACT STUDY CHECKLIST

Project Name: Hampton Ridge Center

Address or Location: Rt 104 - Ridge Rd. T/o Greece

Owner/Contact: DiMarco Group - Dave Hofmeister

Address: 1950 Brighton-Henrietta T.L. Rd
Rochester, NY 14623

Engineer/Contact: Bergmann Assoc. Mike Crocé

Address: 28 E. Main St. Rochester NY 14614

Phone No.: 585-232-5135

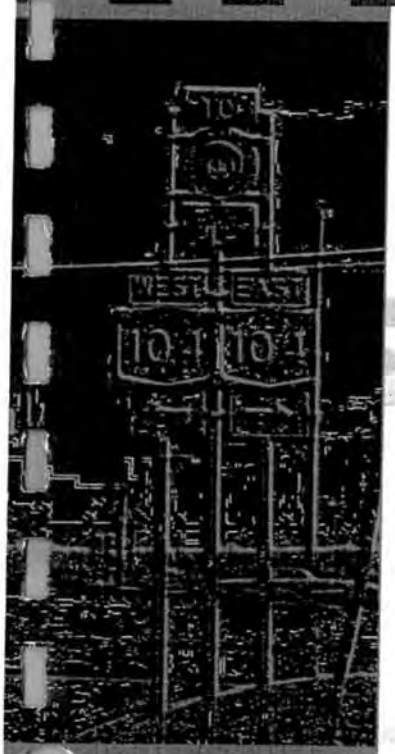
Fax No.: 585-325-8446

SEQRA Determination:

Sub. No.	Date Sub.	Date returned to Consultant	Resub. Reqd.?	Accept or Reject	Comments

N.Y.S.D.O.T. REGION 4
TRAFFIC IMPACT STUDY CHECKLIST

Inc.	Not App.	Traffic Impact Study Submission Description (2 copies)	Comments
✓		1. Perm 51 Payment Agreement for Highway Work Permit and fee for > 100,000 SF	
✓		2. Site Plan (showing lot lines, proposed entrances, adj./opposite properties & driveways)	
✓		3. Location Map (study area)	
✓		4. Project description (land use, sq. footage/no. units)	
✓		5. ITE Land Use Code, Trip Generation Edition, calculations	
	✓	6. Other sources for determining projected trips (comparable uses)	
✓		7. Identify roadways & intersections affected, describe roadways (include diagrams), jurisdiction, AADT's, posted speeds.	
✓		8. Phasing schedule & year of full buildout	Full Bu. Idout 2006
✓		9. Traffic counts (incl. dates, sources and diagrams), rationale for analysis peak hours	See text. GRC traffic used
✓		10. Rationale for analysis of peak hours	
✓		11. Identify other proposed development in area, planned improvements by others	
✓		12. Background growth rate & source	
✓		13. Transit availability, pedestrian facilities	
✓		14. Trip distribution pattern (incl. rationale for & source each turning movement, diagram)	
✓		15. Pass-by trips/shopper credit (incl. rationale), multi-use, seasonal adjustments	
✓		16. Sight distance at proposed access	
✓		17. Signal warrant check, delay or gap studies	
	✓	18. Left or right turn lane warrant check	Signal Warrant met
✓		19. L.O.S. table for key roadways & intersections for: (specify analysis method & version)	Synchro 5
✓		a) Present year	
✓		b) Year of full buildout w/o development	
		c) Year of full buildout w/development w/o mitigation	Described in text
✓		d) Year of full buildout w/development w/mitigation	
	✓	e) Phased construction w/development w/corresponding phased mitigation	Construction Not phased
✓		20. Detailed description of proposed mitigation (include phased mitigation as applicable.	
	✓	21. Schematic plan of mitigation with dimensions	to be completed during design phase
	✓	22. Indicate if "break in access" is required & explain	
	✓	23. Include count data sheets, projected traffic sheets	Count Data obtained from GRC TIS
✓		24. Include L.O.S. computer analysis sheets	
✓		25. Include warrant analysis, sight distance, left turn lane warrants and delay or gap studies/calculations	warrant analysis in appendix C
✓		26. Reference of other studies in area & sources	referenced in text.



Hampton Ridge Center
Traffic Impact Study

December 2004

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

Prepared For:
Di Marco Group
1950 Brighton-Henrietta Rd.
Rochester, NY 14623

Town of Greece
Monroe County

New York State

TABLE OF CONTENTS

LIST OF TABLES

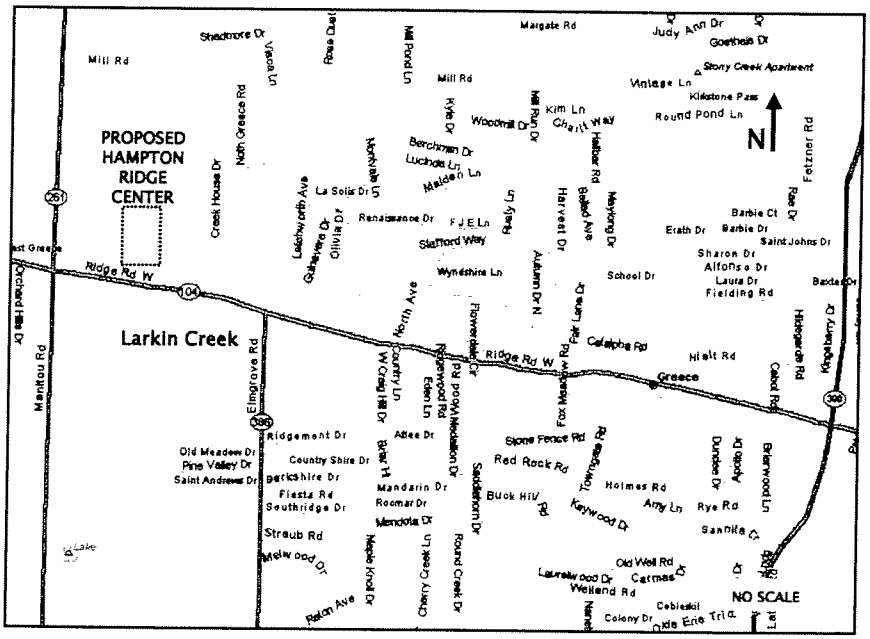
LIST OF FIGURES

I. INTRODUCTION

The subject of this study is the proposed multi-use development to be named Hampton Ridge Center. The DiMarco Group is proposing to construct this new development in the Town of Greece, Monroe County, New York. The proposed site is located north of NYS Route 104 (West Ridge Road) between North Greece Road and Manitou Road (NYS Route 261). A project location map is shown in Figure 1.

The proposed multi-use development would include 390,000 square feet of total building space comprised of several land uses including a multiplex movie theater, various retail establishments, 4 sit down restaurants, a pharmacy and a drive-in bank. Access to the site would be provided by a driveway intersecting NYS Route 104. This study will focus on traffic impacts along NYS Route 104 (West Ridge Road). The intent of this traffic impact study is to document the existing traffic conditions and evaluate any potential transportation impacts of the proposed development on the surrounding transportation system.

Figure 1: Proposed Project Location



The following methodology was used to conduct this study:

1. Conduct site visits to verify roadway geometry and observe traffic operations.

2. Using previously obtained manual turning movement counts for 3 study area intersections, summarize the existing (2004) weekday evening and Saturday mid-day peak hour traffic volumes.

3. Investigate and calculate additional traffic on NYS Route 104 due to proposed and approved surrounding development(s). Include this traffic in the 2006 background traffic estimate for the proposed development.

4. Estimate the number of new trips generated by the proposed development, distribute the trips on the surrounding roadways, and add the projected trips to the background traffic volumes at the estimated time of completion of the project, 2006.

5. Evaluate the capacity of study area intersections under existing traffic conditions as well as future conditions with and without the proposed Hampton Ridge Center development.

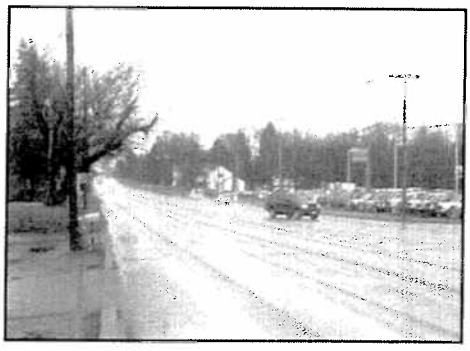
6. Summarize potential impacts of the proposed Hampton Ridge Center development on the roadway system and identify mitigation measures, if any.

II. EXISTING CONDITIONS

A. STUDY AREA ROADWAYS

1. NYS Route 104 (West Ridge Road)

NYS Route 104 is classified as an Urban Principal Arterial. The roadway has two 11 foot (ft) wide travel lanes in each direction and a 12 ft center two-way left-turn lane (TWLTL) from the eastern study limits to approximately 1/2 mile (mi) east of Manitou Road. At this point, NYS Route 104 transitions to a four-lane roadway (11 ft lanes) with a 4 ft striped median. Paved shoulder widths range from 0 ft to 3 ft throughout this section.



NYS Route 104 Eastbound at Western Study Limits

The roadway's asphalt pavement is listed in fair condition in the 2003 New York State Department of Transportation (NYSDOT) Highway Sufficiency

Ratings. NYS Route 104 has a posted speed limit of 40 mph between Elmgrove Road and Manitou Road. Land use in the area is primarily commercial and residential.

Traffic counts by NYSDOT indicate that NYS Route 104 carries an estimated Average Annual Daily Traffic (AADT) of 22,400 vehicles per day (vpd). Much of this volume consists of commuter travel between the City of Rochester and its western suburbs.

NYS Route 104 Westbound at Eastern Study Limits

According to NYSDOT Region 4, the proposed West Ridge Road Improvement Project (PIN 4045.51) would reconstruct NYS Route 104 from east of the study area to Larkin Creek. The reconstruction would widen NYS Route 104 to a 7-lane section with three 12 ft through lanes in each direction, a 4 ft curb offset, and a 16 ft median. No median barrier would be installed in the study area. Additional improvements (lane additions) would be made at the North Greece Road and Elmgrove Road intersection. Roadway construction is set to begin in 2005. No improvements other than routine maintenance are planned for the section of NYS Route 104 west of Larkin Creek.

2. Elmgrove Road (NYS Route 386)

Elmgrove Road connects NYS Route 531 to the south with NYS Route 104, east of the proposed Hampton Ridge Center. In the project area, Elmgrove Road is a classified as an Urban Collector. It has one 12 ft travel lane in each direction and 6 ft shoulders. The posted speed limit is 40 mph. In 2003, the asphalt pavement surface was listed in poor condition according to the NYSDOT Highway Sufficiency Ratings (2003). The current AADT on this section of the highway is approximately 19,000 vpd.

3. North Greece Road

North Greece Road is a north-south arterial that meets Elmgrove Road at its intersection with NYS Route 104. It has one 12 ft travel lane in each direction. The roadway is curbed through the study area. The posted speed limit is 35 mph. The estimated AADT on North Greece Road is 18,500 vpd. This is based upon historic traffic count information presented in the Monroe County Department of Transportation (MCDOT) Traffic Summary Report (2002). Sidewalks are provided along each side of the road from NYS Route 104 to Bramhall Road.

4. Manitou Road (NYS Route 261)

Manitou Road crosses NYS Route 104 at the western project limit. North of NYS Route 104, Manitou Road is an Urban Minor Arterial and is signed as NYS Route 261. The roadway has one 12 ft travel lane in each direction and 8 ft shoulders. The posted speed limit is 40 mph.

The pavement north of NYS Route 104 was listed in good condition according to the NYSDOT Highway Sufficiency Ratings (2003). Based upon the same reference, the AADT on NYS Route 261 is approximately 11,000 vpd.

Manitou Road Northbound at NYS Route 104

MCDOT owns and maintains the highway south of NYS Route 104. The posted speed limit is 40 mph. The AADT on this section of Manitou Road was 8,600 vpd in 2001 according to the 2002 MCDOT Traffic Summary Report.

5. Elmridge Plaza Drive

The main entrance to Elmridge Plaza is located off NYS Route 104 just east of North Greece Road and Elmgrove Road. The asphalt roadway has multiple travel lanes in each direction separated by a narrow planted median. The roadway is curbed. There is no posted speed limit.

Elmridge Plaza

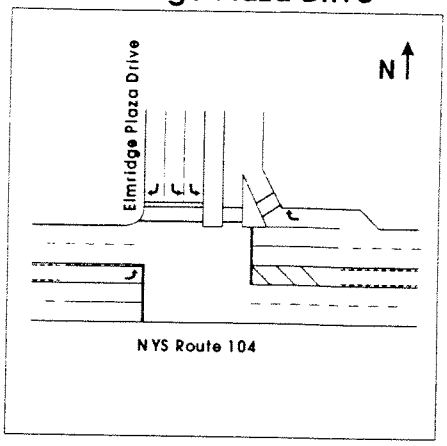
Plaza Drive at NYS Route 104

B. STUDY AREA INTERSECTIONS

All traffic signals at intersections within the study area are owned and operated by NYSDOT.

1. NYS Route 104 and Elmridge Plaza Drive

Figure 2: NYS Route 104 and Elmridge Plaza Drive

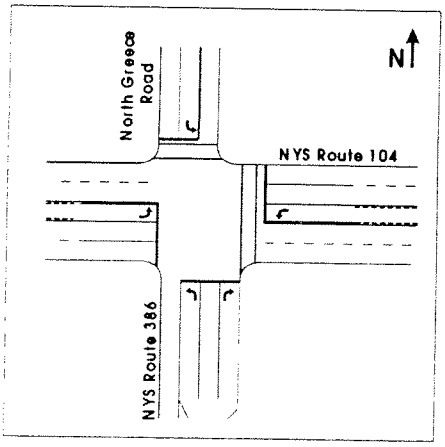


The Elmridge Plaza drive meets NYS Route 104 at a signalized intersection. The signal operates as part of an actuated-coordinated system along NYS Route 104. The eastbound approach consists of an exclusive left-turn lane and two through lanes. Two through travel lanes along with an exclusive, free-flow right-turn lane comprise the westbound approach. A raised splitter island separates the free-flow right-turn lane from opposing traffic. The southbound approach consists of dual exclusive left-turn lanes and an exclusive right-turn lane. All lane widths are 12 ft. All approaches are controlled by the signal with the exception of the exclusive right-turn lane in the westbound direction. There is one marked pedestrian crossing on the north approach.

As part of the West Ridge Road improvement project, NYS Route 104 would be widened to include three 12 ft through lanes in each direction with a 4 ft curb offset. No significant changes would be made to the Elmridge Plaza Drive approach.

2. NYS Route 104, Elmgrove Road, and North Greece Road

Figure 3: NYS Route 104, NYS Route 386 (Elmgrove Road), and North Greece Road



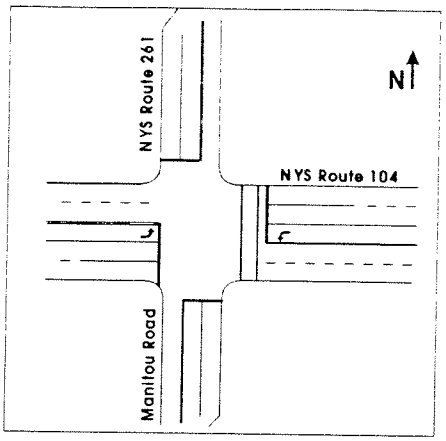
Elmgrove Road and North Greece Road meet NYS Route 104 at a four-way signalized intersection. This signal is coordinated with those to the east. The Elmgrove Road (northbound) approach presently consists of an exclusive left-turn lane, a through lane, and an exclusive right-turn lane. All lane widths on this approach are 11 ft. The North Greece Road (southbound) approach consists of a 16 ft shared through and right-turn lane with a 12-foot exclusive left-turn lane. Both the eastbound and westbound approaches consist of two 12 ft through lanes with an exclusive left-turn lane. Marked pedestrian crossings are located on the north and east approaches.

As part of the West Ridge Road Improvement Project, NYS Route 104 would be widened to include three 12 ft through lanes in each direction and a new westbound right-turn lane. An exclusive southbound right-turn lane would be added to the North Greece Road approach. Finally, a second northbound through lane would be added to the Elmgrove Road (NYS Route 386) approach.

3. NYS Route 104 and Manitou Road

Manitou Road crosses NYS Route 104 at a four-legged signalized intersection. The signal at this intersection is not presently coordinated with any others on NYS Route 104. Both the northbound and southbound (Manitou Road) approaches consist of two lanes. No pavement markings or signage is present to designate lane usage. Field observations showed that generally the inside lanes on both approaches are utilized as shared through and left-turn lanes while the outside lanes are used as exclusive right-turn lanes. The eastbound and westbound approaches each consist of an exclusive left-turn lane, a through lane, and a shared through and right-turn lane. The only marked pedestrian crossing is located on the east approach.

Figure 4: NYS Route 104 and NYS Route 261 (Manitou Rd.)



III. TRAFFIC VOLUMES

A. EXISTING TRAFFIC VOLUMES

Manual turning movement counts were performed at 3 study area intersections in March of 2002 for the Shops at Hampton Ridge (SHR) project. This count data will be used as a base for Hampton Ridge Center Traffic Impact Study.

1. NYS Route 104 (West Ridge Road) and Manitou Road (NYS Route 261)

2. NYS Route 104, Elmgrove Road (NYS Route 386), and North Greece Road

3. NYS Route 104 and the Elmridge Plaza Entrance

The counts were recorded in 15-minute intervals to enable the identification of the peak hour and traffic peaking characteristics within that hour. Data regarding the percent of truck traffic and right turns on red were also collected.

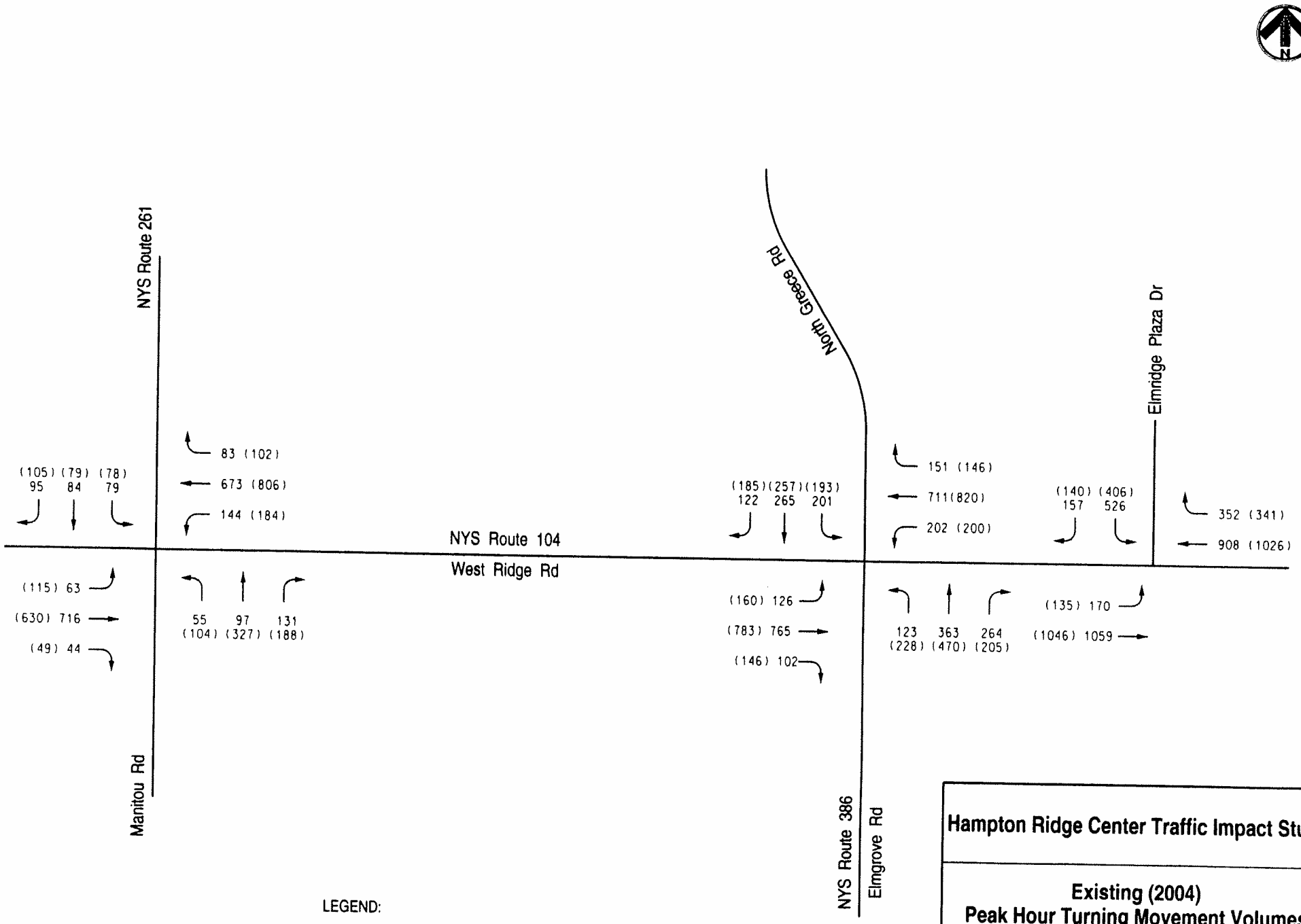
Weekday evening counts were taken on Friday, March 15, 2002 from 3:30 PM to 6:30 PM. The counts were taken on a Friday to evaluate what is typically the highest period of combined commuter and retail traffic. The weekday evening peak hour was determined to occur from 4:30 PM to 5:30 PM.

Saturday mid-day peak period counts were performed on March 16, 2002 between 11:00 AM and 3:00 PM. Counts were taken at this time because retail traffic generally peaks during the Saturday mid-day period. The mid-day peak period occurred from 11:30 AM to 12:30 PM.

An annually compounded growth rate of 1.5% per year was applied to the 2002 turning movements to estimate existing traffic volumes in 2004. This rate is based upon historic growth trends and forecasts for the area. This growth rate is also referenced in the NYSDOT Design Report and Environmental Assessment for Ridge Road, Part 1, (Rochester to West Greece, PIN 4045.51). The existing 2004 weekday evening and Saturday mid-day peak hour traffic volumes are shown in Figure 5.

B. BACKGROUND TRAFFIC VOLUMES

As with the existing traffic volumes, the annually compounded growth rate of 1.5% per year was applied to estimate background traffic volumes. The projected study area 2006 background traffic volumes are shown in Figure 6. Expected traffic generated by the following approved developments was also included in the 2006 background traffic: Bramhall Office Park, Creek House Commons, Fairfield Place and the Shops at Hampton Ridge (SHR). Estimated traffic to be generated by each development was obtained using their respective traffic impact studies.



Hampton Ridge Center Traffic Impact Study

Existing (2004) Peak Hour Turning Movement Volumes

FIGURE NO.	SCALE	DATE
5	No Scale	12 / 04

BERGMANN associates
Engineers / Architects / Surveyors

Conversations with the Town of Greece indicate that there are two currently approved developments due for completion in the area by 2006. They are the Bramhall Office Park to be located off of Bramhall Road and Creek House Commons to be located on Creek House Drive. In addition, a residential development is slated for construction in the Town of Parma. Fairfield Place is a 550+/- mixed residential development (single family homes, apartments and townhouses) that will be built about 700 ft north of West Ridge Road. It will have two access drives to Manitou Road. The entire development may not be complete by 2006, but in an effort to be conservative, this study assumes the development will be completely finished at this time.

Also included in the 2006 background traffic estimate for the Hampton Ridge Center are peak hour trips generated by the SHR found immediately to the east. The proposed SHR development includes a 108,248 square foot Kohl's (allowing for a 20,000 square foot expansion), 64,700 square feet of retail space, a 10,800 square foot office building, a 2,200 square foot bank and a 2,800 square foot fast food restaurant with drive through window. A list of proposed land uses within the SHR and size of each are shown in Table 1. The SHR will have one driveway accessing NYS Route 104 for all land uses except the office building, which will have one access driveway to Creek House Drive.

Table 1: Assumed Land Uses for the SHR

Building(s)	Size (gsf)	Description	ITE Land Use Code
Retail	64,700	Specialty Retail Center	814
Kohl's	108,248	Free Standing Discount Store	815
Office	10,800	Single Tenant Office Building	715
Bank	2,200	Drive-In Bank	912
Fast Food	2,800	Fast Food Restaurant with Drive Through Window	834

Where applicable, trip rates for each land use were taken from the SHR traffic impact study used for project approval. Otherwise, the trip generation rates are based on the 7th edition Trip Generation (Institute of Transportation Engineers (ITE), Washington, D.C., 2003). Trip Generation documents traffic counts collected throughout the country for different land uses.

Based upon the ITE Trip Generation the proposed development would generate 948 and 1788 total trip ends during the weekday evening and Saturday mid-day peak hours, respectively. A trip end is equal to one entering trip or one exiting trip.

It was assumed that during each peak period, 15% of the total trips would be shared among the various components of the development. The number of shared trips is based upon past experience and professional

judgment. The number of trips assumed to be shared by the SHR and the Hampton Ridge Center via the cross-access roadway shown on the concept site plan are 90 and 179 (10% of the total trips generated by the SHR minus the SHR office building) during the weekday evening and Saturday mid-day peak hours, respectively.

The remaining trips (external trips) are comprised of pass-by and primary trips. Pass-by trips are intermediate stops on the way to another destination. These trips are diverted from the traffic passing on an adjacent street. As is typical of a retail development, a portion of the customers will be already passing by the stores or restaurants, stop in, and then continue on to their original destination.

Based upon data for each proposed land use contained in the Trip Generation Handbook (ITE, Washington, D.C., 2001), a 34% and 26% pass-by credit was assumed for the SHR during the weekday evening and Saturday mid-day peak periods, respectively. Table 2 summarizes the total trips by land use, shared trips, pass-by trips and primary trips during the peak hours.

Table 2: SHR Trip Generation Summary

Building/Parcel	**Trips Generated**					
	Weekday Evening			**Saturday Mid-day**		
	Enter	Exit	Total	Enter	Exit	Total
Specialty Retail Center	107	136	243	370	342	712
Free Standing Discount Store	230	229	459	423	406	829
Single Tenant Office Building	8	43	51	0	0	0
Drive-In Bank	51	50	101	42	40	82
Fast Food Restaurant w/ Drive-Thru	47	47	94	84	81	165
Total Trips	443	505	948	919	869	1788
Total Trips at NYS Route 104	**435**	**462**	**897**	**919**	**869**	**1788**
Total Trips Shared Internally (15%)	65	69	134	138	130	268
Total Trips Shared with HRC (10%)	44	46	90	92	87	179
Total Net Site Trips at NYS Route 104	**326**	**347**	**673**	**689**	**652**	**1341**
Total Pass-by Trips at NYS Route 104	111	118	229	179	170	349
Total New (Primary) Trips at NYS Route 104	**215**	**229**	**444**	**510**	**482**	**992**

The office building outparcel of the SHR was treated as a separate site development during the trip analysis as it will have an independent access driveway to Creek House Drive.

C. TRIP GENERATION

The trip generation estimate for the proposed Hampton Ridge Center is based on the 7th edition Trip Generation (Institute of Transportation Engineers (ITE), Washington, D.C., 2003).

The site would include 390,000 square feet of multi-use building space. While the exact tenant of each building and outparcel is unknown at this time, likely uses were assumed. The gross floor space and assumed use of each parcel are summarized in Table 3.

Table 3: Assumed Land Uses for the Hampton Ridge Center

Building(s)	Size (gsf)	Description	ITE Land Use Code
Movie Theater	50,000	Multiplex Movie Theater	445
Retail, Bank & Pharmacy	316,000	Shopping Center	820
Four (4) Sit Down Restaurants	24,000	High Turnover Sit Down Restaurant	932

The proposed development is projected to generate approximately 1863 and 3146 total trip ends during the weekday evening and Saturday mid-day peak hours, respectively. The trip generation estimate for each land use is summarized in Table 4.

Table 4: Hampton Ridge Center Trip Generation Summary

Building/Parcel	Trips Generated					
	Weekday Evening			Saturday Mid-day		
	Enter	Exit	Total	Enter	Exit	Total
Multiplex Movie Theater	167	94	261	436	402	838
Shopping Center	642	696	1338	951	877	1828
High-Turnover (Sit Down) Restaurant	40	26	66	76	44	120
High-Turnover (Sit Down) Restaurant	40	26	66	76	44	120
High-Turnover (Sit Down) Restaurant	40	26	66	76	44	120
High-Turnover (Sit Down) Restaurant	40	26	66	76	44	120
Total Trips	969	894	1863	1691	1455	3146
Total Trips Shared Internally (15%)	145	134	279	254	218	472
Total Trips Shared with SHR	46	44	90	87	92	179
Total Net Site Trips	**778**	**716**	**1494**	**1350**	**1145**	**2495**
Total Pass-by Trips	265	243	508	351	298	649
Total New (Primary) Trips	**513**	**473**	**986**	**999**	**847**	**1846**

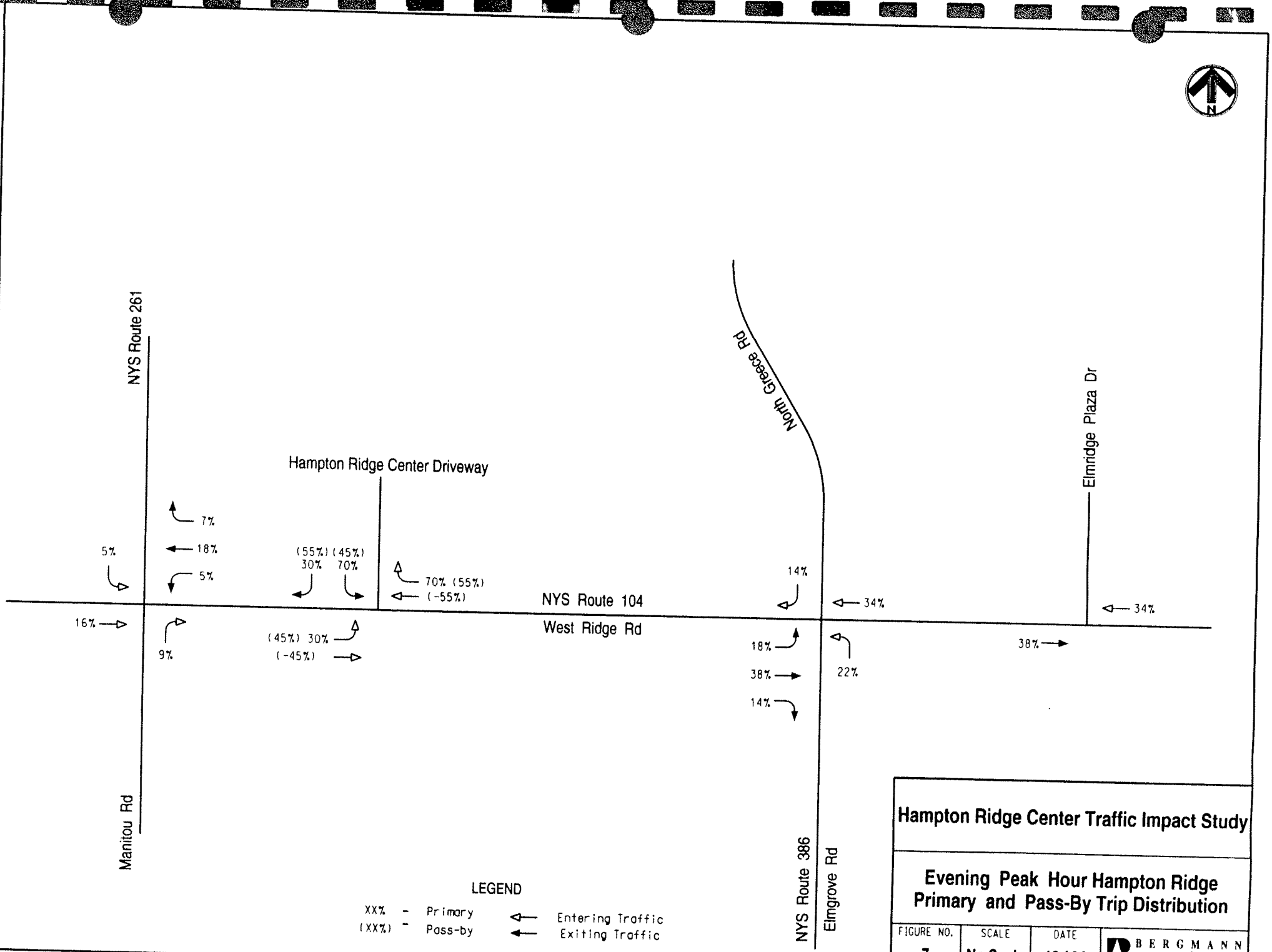
It was assumed that during each peak period, 15% of the total trips would be shared among the various components of the development. The number of shared trips is based upon past experience and professional judgment. The number of trips assumed to be shared by the SHR and the Hampton Ridge Center via the cross-access roadway shown on the concept site plan are 90 and 179 (10% of the total trips generated by the SHR minus the SHR office building) during the weekday evening and Saturday mid-day peak hours, respectively.

D. TRIP DISTRIBUTION AND ASSIGNMENT

The projected trips generated by the proposed development were assigned to the transportation system based on existing traffic patterns, locations of population centers, the local roadway network, proposed access points, and professional judgment. In addition, the trip distribution is influenced by the existing pattern found at the Elmridge Plaza driveway to NYS Route 104. Figures 7 and 8 contain the trip distribution for the weekday evening and Saturday mid-day peak periods, respectively. This is the trip distribution used for the Hampton Ridge Center and the SHR. The estimated pass-by and primary trips generated by the Hampton Ridge Center are shown in Figures 9 (weekday evening peak hour) and Figure 10 (Saturday mid-day peak hour).

E. BUILD TRAFFIC VOLUMES

The full build traffic volumes are the sum of the 2006 background traffic volumes and the estimated new site-generated trips shown in Figures 9 and 10. The Hampton Ridge Center is expected to be complete in 2006. Projected turning movement volumes during the weekday evening and Saturday mid-day peak hours upon completion of the project are shown in Figure 11.

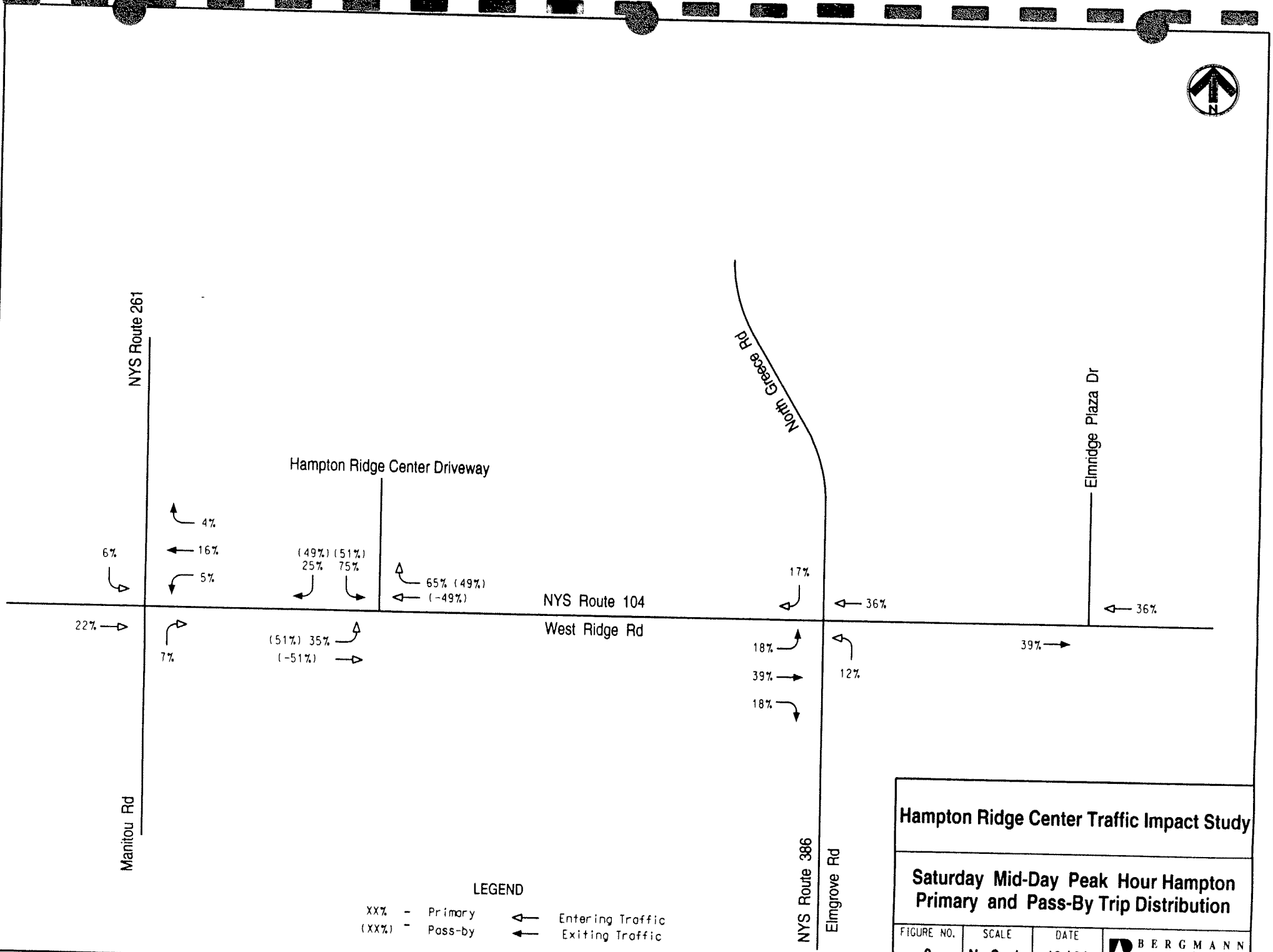


Hampton Ridge Center Traffic Impact Study

Evening Peak Hour Hampton Ridge Primary and Pass-By Trip Distribution

FIGURE NO.	SCALE	DATE
7	No Scale	12 / 04

BERGMANN associates
Engineers / Architects / Surveyors

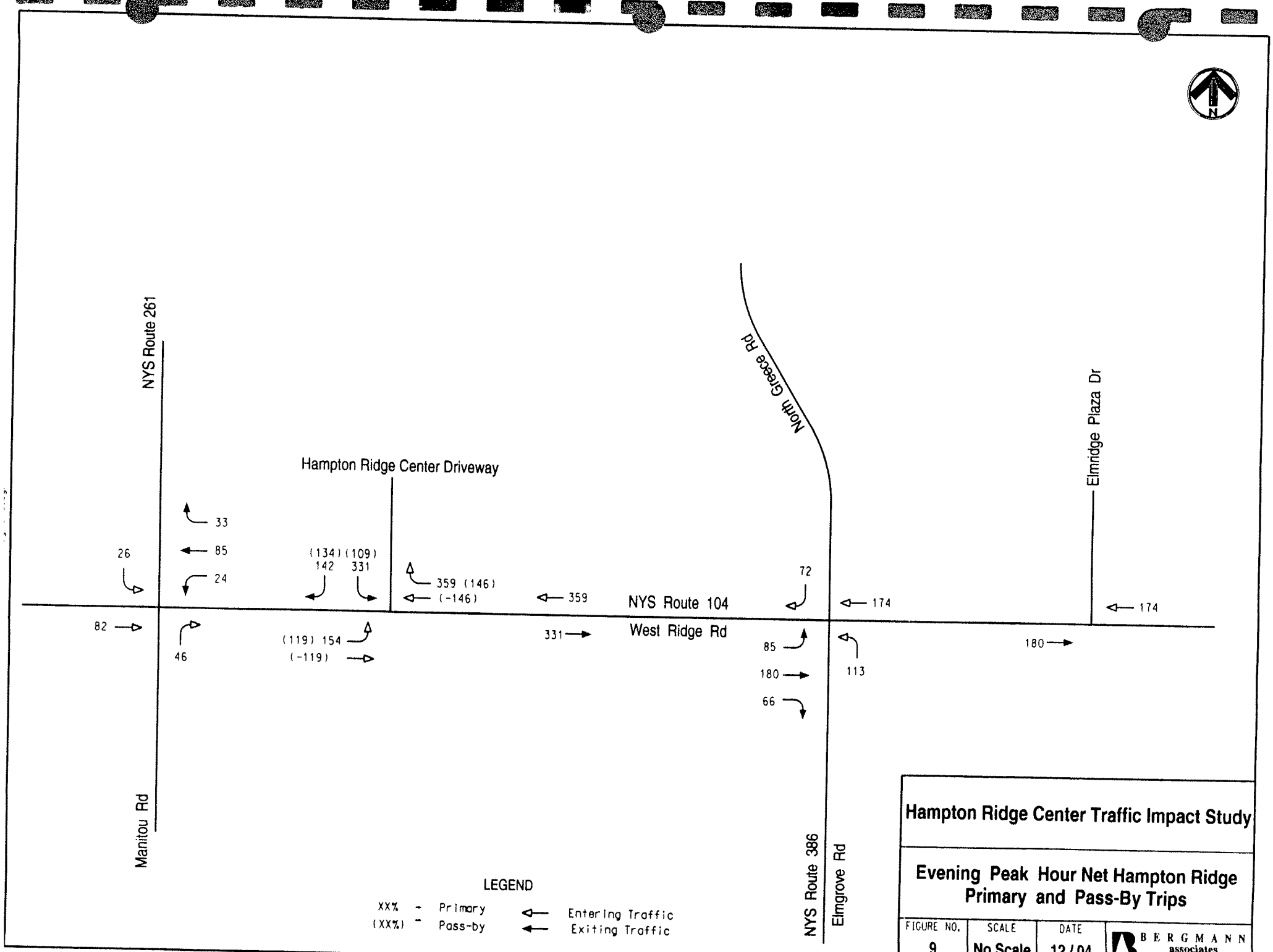


Hampton Ridge Center Traffic Impact Study

Saturday Mid-Day Peak Hour Hampton Primary and Pass-By Trip Distribution

FIGURE NO.	SCALE	DATE
8	No Scale	12/04

BERGMANN associates
Engineers / Architects / Surveyors



Hampton Ridge Center Traffic Impact Study

Evening Peak Hour Net Hampton Ridge Primary and Pass-By Trips

FIGURE NO.	SCALE	DATE
9	No Scale	12/04

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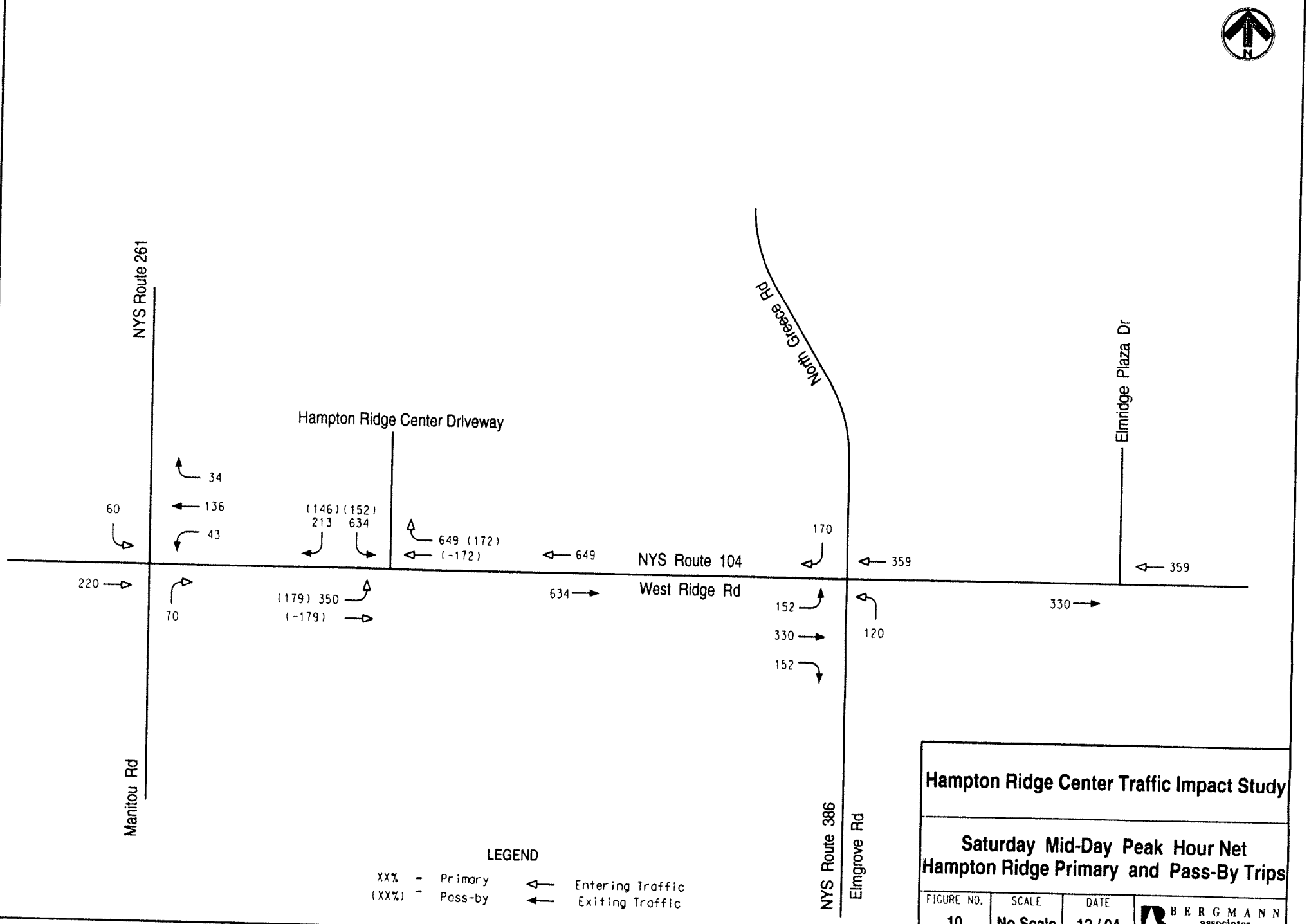
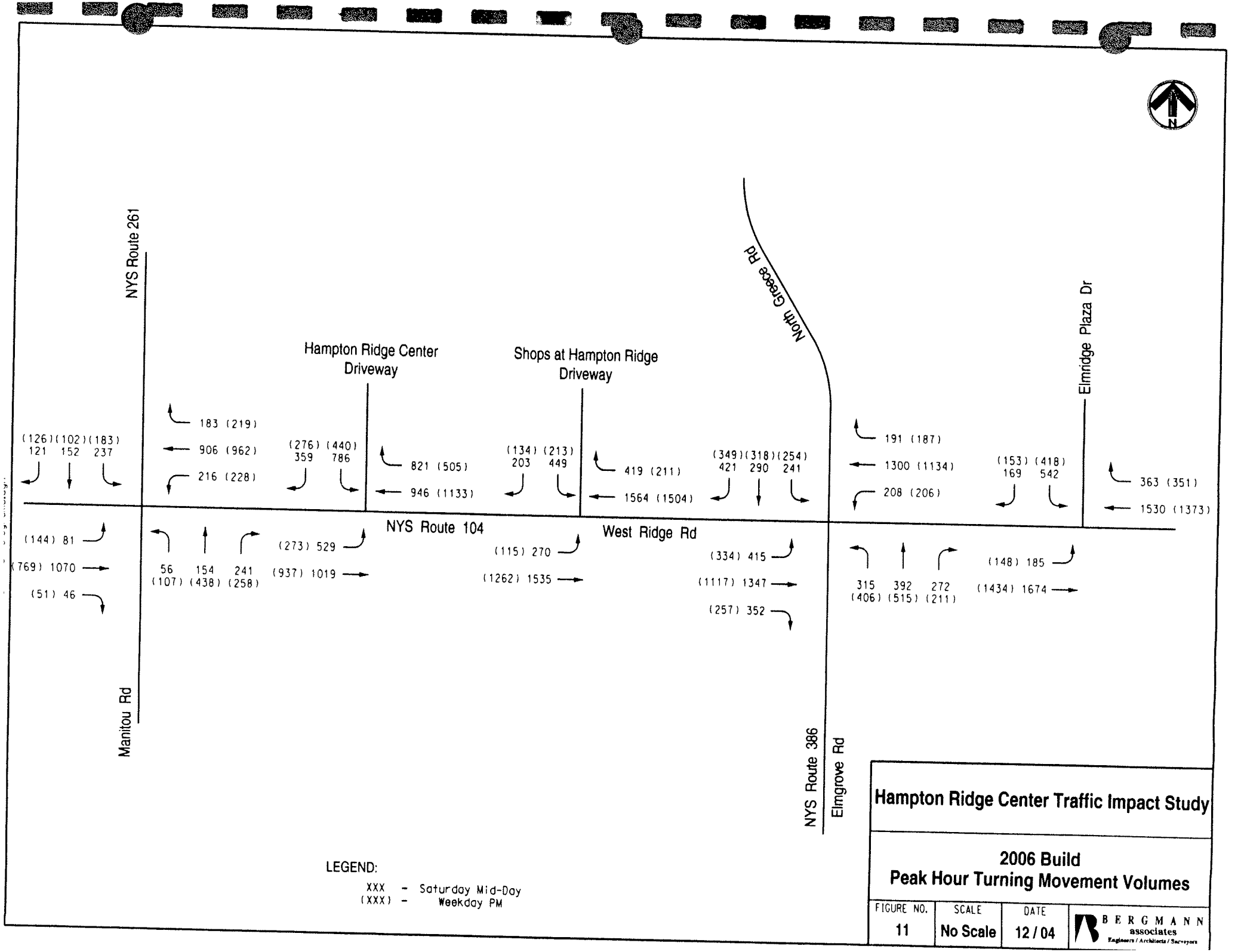


Hampton Ridge Center Traffic Impact Study

Saturday Mid-Day Peak Hour Net Hampton Ridge Primary and Pass-By Trips

FIGURE NO.	SCALE	DATE
10	No Scale	12 / 04

BERGMANN associates
Engineers / Architects / Surveyors



LEGEND:

XXX - Saturday Mid-Day
(XXX) - Weekday PM

Hampton Ridge Center Traffic Impact Study

2006 Build
Peak Hour Turning Movement Volumes

FIGURE NO.	SCALE	DATE	
11	No Scale	12 / 04	BERGMANN associates Engineers / Architects / Surveyors

IV. TRAFFIC OPERATIONS ANALYSIS

A. LEVEL OF SERVICE ANALYSIS

A level of service analysis was conducted for the existing, background and build conditions based on traffic volumes, traffic peaking characteristics, and intersection geometry. The analysis is necessary to obtain a measure of how well the roadway network accommodates traffic. Level of service (LOS) is a qualitative measure that describes motorist satisfaction with various factors influencing the degree of traffic congestion. These factors include travel time, speed, maneuverability, and delay.

The level of service analysis methodology for analyzing signalized and unsignalized intersections is documented in the Highway Capacity Manual (HCM) (Transportation Research Board, Washington D.C., 2000). Levels of service range from A to F. LOS A describes operations with little or no delay while LOS F describes highly congested conditions with substantial delays. LOS D or better is generally considered acceptable for peak hours of traffic under urban peak hour conditions. A complete description of levels of service may be found in Appendix A of this report.

Signalized intersections were analyzed using Synchro (Version 5) software. Synchro was also utilized to evaluate coordination along the NYS Route 104 corridor. A base model covering the study area signal network was obtained from the MCDOT. This model was refined with signal timing data provided by the NYSDOT Region 4 Traffic and Safety Group. Field signal timings were also taken at the signalized intersections to verify the signal timing information provided by NYSDOT. Detailed LOS calculations are included in Appendix B.

1. Existing Conditions

The results of the existing conditions level of service analysis are shown in Table 5. Data are given for each overall intersection and lane group. Corresponding values of control delay in seconds per vehicle (s/veh) are also summarized in this table.

As shown, most intersection approaches are currently operating with acceptable levels of service. The southbound Manitou Road shared through and left turn lane at West Ridge Road currently operates at LOS F during the weekday evening peak hour. According to the NYSDOT, the Department has considered what it would take to improve operations at this intersection. Limited right-of-way on Manitou Road, the proximity of a neighboring cemetery, and steep grades on the north side of the intersection have been constraints to implementing any proposed changes.

Two lane groups at the intersection of NYS Route 104, Elmgrove Road, and North Greece Road operate at LOS E and F during the evening peak hour based upon the Synchro analysis. The lane groups are the northbound through lane and the southbound shared through and right-turn lane, respectively.

Table 5: Existing Conditions Level of Service Analysis

Intersection	Approach		Existing Conditions LOS/Control Delay (sec) PM Peak	Existing Conditions LOS/Control Delay (sec) Mid-Day Peak
NYS Route 104 & Manitou Rd (NYS Route 261)	Eastbound	Left	B/10	A/5
	Eastbound	TR	C/22	B/12
	Westbound	Left	B/10	A/5
	Westbound	TR	C/23	B/11
	Northbound	LT	D/47	B/16
	Northbound	Right	A/4	A/3
	Southbound	LT	F/118	B/17
	Southbound	Right	A/5	A/2
	Overall		**C/28**	**B/11**
NYS Route 104, Elmgrove Rd (NYS Route 386), & North Greece Rd.	Eastbound	Left	C/21	B/15
	Eastbound	TR	D/36	C/26
	Westbound	Left	C/35	D/43
	Westbound	TR	C/23	B/16
	Northbound	Left	C/27	B/18
	Northbound	Through	E/64	D/39
	Northbound	Right	C/20	C/23
	Southbound	Left	C/23	B/20
	Southbound	TR	F/89	D/41
	Overall		**D/40**	**C/26**
NYS Route 104 & Elmridge Plaza Drive	Eastbound	Left	B/14	B/13
	Eastbound	Through	A/8	A/7
	Westbound	Through	B/13	B/15
	Southbound	Left	D/38	D/36
	Southbound	Right	C/23	C/21
	Overall		**B/13**	**B/14**

2. Future Background Conditions

Table 6 summarizes the level of service analysis for the study area intersections at the estimated time of completion (2006) assuming the Hampton Ridge Center is not built. Modifications to be made as part of NYSDOT's West Ridge Road Improvement Project (construction planned for 2005) are included in the analysis. Results are shown for each lane group. Overall levels of service are given for each of the signalized intersections. Corresponding values of control delay in seconds per vehicle (s/veh) are also summarized in this table.

Table 6: Future No-Build and Full Build Level of Service Analysis Summary

Intersection	Approach		Future No-Build LOS/Control Delay (sec) PM Peak	Future No-Build LOS/Control Delay (sec) Mid-Day Peak	Future Build with Mitigation LOS/Control Delay (sec) PM Peak	Future Build with Mitigation LOS/Control Delay (sec) Mid-Day Peak
NYS Route 104 & Manitou Road (NYS Route 261)*	Eastbound	Left	B/20	A/10	C/25	B/15
	Eastbound	TR	C/29	C/23	C/28	D/42
	Westbound	Left	C/20	B/10	D/51	D/49
	Westbound	TR	D/54	C/20	D/47	A/10
	Northbound	LT	E/67	C/21	F/111	C/22
	Northbound	Right	A/8	A/6	B/11	B/12
	Southbound	LT	F/244	D/50	F/350	D/48
	Southbound	Right	A/8	A/5	B/10	B/10
	Overall		**E/58**	**C/23**	**E/73**	**C/28**
NYS Route 104 & Hampton Ridge Center Driveway	Eastbound	Left			B/16	C/21
	Eastbound	Through			A/2	A/3
	Westbound	Through			A/8	B/11
	Westbound	Right			A/0	A/5
	Southbound	Left			D/42	D/49
	Southbound	Right			A/5	A/3
	Overall				**A/10**	**B/15**
NYS Route 104 & Shops at Hampton Ridge Driveway	Eastbound	Left	B/11	C/21	C/25	D/51
	Eastbound	Through	A/5	B/12	A/3	A/7
	Westbound	Through	A/6	C/21	B/14	D/50
	Westbound	Right	A/1	A/1	A/2	A/7
	Southbound	Left	D/42	C/34	D/42	D/50
	Southbound	Right	A/6	A/3	A/6	A/4
	Overall		**A/8**	**B/17**	**B/11**	**C/29**
NYS Route 104, Elmgrove Rd (NYS Route 386) & North Greece Rd.	Eastbound	Left	D/42	D/40	D/54	D/55
	Eastbound	TR	C/33	D/43	D/43	D/42
	Westbound	Left	C/32	C/24	D/52	D/49
	Westbound	Through	C/27	C/21	D/51	D/51
	Westbound	Right	B/15	A/9	B/10	A/9
	Northbound	Left	D/53	C/28	D/49	D/50
	Northbound	Through	D/36	D/39	D/52	D/55
	Northbound	Right	B/19	B/20	B/18	C/24
	Southbound	Left	D/37	C/32	D/52	D/53
	Southbound	Through	D/46	D/41	D/41	D/49
	Southbound	Right	C/21	B/20	B/19	C/21
	Overall		**C/33**	**C/31**	**D/44**	**D/44**
NYS Route 104 & Elmridge Plaza Drive	Eastbound	Left	C/33	C/31	C/24	C/31
	Eastbound	Through	A/3	A/7	A/6	A/7
	Westbound	Through	B/14	B/17	B/15	B/19
	Southbound	Left	D/42	D/40	C/21	C/26
	Southbound	Right	C/24	C/21	A/10	B/12
	Overall		**B/13**	**B/16**	**B/11**	**B/14**

Includes improvements of the NYSDOT West Ridge Road Improvement Project to be constructed in 2005

* = The results shown for this intersection reflect conditions without improvement. Refer to Table 7 for build condition results assuming the poor levels of service projected during the existing and no-build evening peak hour have been addressed.

L T = Shared left and through

TR = Shared through and right

As part of the NYSDOT West Ridge Road improvement project, NYS Route 104 will receive 3 through lanes in each direction at the Elmgrove Road (NYS Route 386) and North Greece Road intersection. Exclusive left-turn lanes would be provided in each direction as well as a westbound right turn lane. It is assumed for the purposes of this analysis that due to the number of opposing lanes and to promote safety, eastbound and westbound left turns would be restricted to protected only operation both at Elmgrove Road and Elmridge Plaza. Northbound and southbound left turns are assumed to run protected first and then permitted during each cycle of the traffic signal at the intersection of NYS Route 104, North Greece Road and Elmgrove Road. The future no-build analysis also assumes traffic signal coordination on a common 110 second cycle along NYS Route 104 from Elmridge Plaza to the Shops at Hampton Ridge (SHR) driveway.

Inclusion of pedestrian phases (and their associated minimum green times) produces significant vehicle delay and poor levels of service within the Synchro model under background conditions. This is due to the length of the pedestrian "walk" and "don't walk" phases that would be required for individuals to cross the wide approaches proposed under the West Ridge Road Improvement project. Little to no pedestrian activity was observed at the Route 104, North Greece Road, and Elmgrove Road intersection during field visits. Therefore, it is assumed that pedestrian phases would be activated infrequently, with the needs of motorized vehicles controlling the traffic signal operation over the majority of each peak hour.

To model this "typical" condition, pedestrian phases were removed from the Synchro model at this intersection. This does not imply that pedestrian accommodations such as crosswalks, push buttons, and dedicated signal heads are unnecessary. They are indeed required to accommodate occasional pedestrians. Any delays caused by a pedestrian actuation would likely dissipate after several successive vehicle controlled cycles.

Based upon the analysis, the intersection of NYS Route 104, North Greece Road and Elmgrove Road is projected to operate at LOS C overall during both peak hours as planned under the West Ridge Road Improvement Project. Northbound, southbound and eastbound left turns are projected to operate at LOS D during the weekday evening peak hour.

As shown in Table 6, the remaining study area intersections are projected to operate with acceptable levels of service (LOS D or better) during each peak period in 2006 except the intersection of NYS Route 104 with Manitou Road. Both the northbound and southbound shared through/left lanes are projected to operate with a poor level of service (LOS E or F) during the weekday evening peak hour prior to construction of the Hampton Ridge Center. One additional lane would be necessary on both

the north and south approaches to achieve acceptable levels of service during the weekday evening peak at that location (see Table 7). This improvement strategy would require three approach lanes, one exclusive to each movement (left, through and right turns) on the northbound and southbound approaches. Construction of any additional lanes on Manitou Road would be subject to the right-of-way, cemetery, and grade constraints discussed in Section IV.A.1.

Table 7: 2006 Future No-Build and Build Levels of Service with Improvements on Manitou Road
NYS Route 104 and Manitou Road

Intersection	Approach		Future No-Build with Improvements LOS/Delay (seconds) PM Peak	Future Build with Improvements LOS/Delay (seconds) PM Peak
NYS Route 104 & Manitou Road (NYS Route 261)	Eastbound	Left	B/19	C/34
	Eastbound	TR	C/26	C/33
	Westbound	Left	B/19	D/47
	Westbound	TR	D/45	D/53
	Northbound	Left	B/19	B/19
	Northbound	Through	C/24	C/25
	Northbound	Right	A/8	B/11
	Southbound	Left	D/42	D/47
	Southbound	Through	B/18	B/18
	Southbound	Right	A/9	B/10
	Overall		**C/29**	**D/37**

L T = shared left and through
TR = Shared through and right

3. Projected Conditions With Development

Table 6 also summarizes level of service for study area intersections at the estimated time of completion (2006) assuming full build out of the proposed development. Once again, modifications to be made as part of NYSDOT's West Ridge Road Improvement (WRRI) Project are included in the analysis.

Additional traffic generated by the proposed development is **not** projected to result in a need for highway improvements at the following intersections.

- NYS Route 104 and Manitou Road (See Section 2)
- NYS Route 104 and the SHR driveway
- NYS Route 104 and the Elmridge Plaza Driveway

In each case, all lane groups are projected to operate with acceptable levels of service during both the weekday evening and Saturday mid-day peak periods. The future build analysis assumes coordinated traffic signals

operating on a 110 second cycle length along NYS Route 104 at Manitou Road, the Hampton Ridge Center driveway, and the SHR driveway. To achieve acceptable operations, the signal at NYS Route 104, North Greece Road and Elmgrove Road is dropped from the coordination plan and allowed to operate under actuated-uncoordinated control during the weekday evening and Saturday mid-day peak hours. It is assumed the Elmridge Plaza signal would remain coordinated with those to the east on NYS Route 104.

According to the results, the intersection of NYS Route 104 and the Elmridge Plaza Driveway is projected to operate with slightly less delay under the build condition when compared to the no-build condition. The overall level of service does not change. An apparent delay reduction occurs because the intersection is no longer coordinated with traffic signals to the west within the Synchro model. In reality, the Elmridge Plaza traffic signal would remain coordinated with signals to the east along NYS Route 104 and no measurable change in the level of service should occur.

NYS Route 104, Elmgrove Road and North Greece Road.

Due to the high retail peak hour turning volumes, a 125 second cycle length is recommended in conjunction with the uncoordinated signal operation. The intersection of NYS Route 104, North Greece Road and Elmgrove Road is projected to operate overall at LOS D during both peak hours given the build condition with mitigation. As under no-build conditions, this intersection was analyzed in the absence of an activated pedestrian phase. It is assumed that pedestrian "walk" and "don't walk" indications would be called infrequently. Throughout the majority of the peak hour, the signal would be allowed to respond principally to the needs of vehicular traffic.

Dual left turn lanes would be required on the northbound and southbound approaches to provide acceptable levels of service in all lane groups. The projected volume of northbound left turning vehicles drives the need for this improvement. In addition, the analysis indicates that one northbound through lane would provide adequate capacity as opposed to the two proposed under the WRRI Project.

To accommodate the need for dual northbound and southbound left turn lanes, it is proposed to re-stripe (replace) the inside northbound through lane with a second northbound left turn lane. Likewise, a second southbound left turn lane would be created by re-striping the second (inside) northbound receiving lane. Crosswalks, push buttons, and pedestrian signal heads would remain in place. Based on conceptual review of the WRRI plans, these changes can be made with pavement marking and traffic signal modifications only.

NYS Route 104 and the Hampton Ridge Center Driveway.

The proposed location of Hampton Ridge Center Driveway is approximately 3,390 ft west of the NYS Route 104, Elmgrove Road, and North Greece Road intersection, approximately 1,050 ft west of the SHR Driveway and approximately 2,290 ft east of Manitou Road. This places it outside the section to be improved as part of the West Ridge Road Improvement Project, and outside the limits of the existing two way left turn lane. Widening of NYS Route 104 to include a 500 ft eastbound left turn lane at the proposed site driveway is recommended based upon the capacity analysis.

In addition, a 300 foot long free-flowing westbound right turn lane along NYS Route 104 at the proposed Hampton Ridge Center Driveway is recommended. This configuration will provide an area for deceleration and an unblocked path for the estimated 821 vehicles entering the site from the east during the Saturday mid-day peak hour. Without this feature, average queues would extend beyond the SHR driveway during the Saturday mid-day peak according to the Synchro/SimTraffic analysis. Based upon Figure 5-19 of the NYSDOT Highway Design Manual "Deceleration Distances for Passenger Cars Approaching Intersections (Braking at a Comfortable Rate)", 260 feet is required for a vehicle traveling at 43.5 mph to decelerate comfortably to 15 mph and 300 feet is required to decelerate to a stop. Therefore, the 300 foot long right turn lane will provide adequate area for deceleration of vehicles entering the Hampton Ridge Center from the east.

Three exiting lanes including two left turn lanes and one right turn lane would be required for southbound traffic leaving the Hampton Ridge Center. Two entrance lanes would be required, one for vehicles entering from the east via the signal and one for vehicles entering from the west in the free-flow right turn lane.

An unsignalized analysis of the proposed intersection indicates that traffic exiting via a left turn would experience extensive delay, queuing, and LOS F. Therefore, the following warrants as described in the New York State Manual of Uniform Traffic Control Devices (MUTCD) were reviewed to study the need for traffic signal control at the site driveway under 2006 full build out conditions:

- Warrant 1, minimum vehicular volume
- Warrant 2, interruption of continuous traffic
- Warrant 8, combination of warrants (Warrants 1 and 2)

Detailed results, broken down by hour, are located in Appendix C.

Warrant 1 is the minimum vehicular volume warrant. For any one hour to satisfy this warrant the volume of traffic on the artery must exceed 600 vehicles and the volume of traffic on the higher volume side road approach must exceed 200 vehicles. NYS Route 104 has two lanes of traffic on each approach (excluding auxiliary lanes) at the intersection with the Hampton Ridge Center Driveway. The minimum volume of 600 vehicles is projected to be met for more than 8 hours on the artery in 2006. The minimum volume of 200 vehicles leaving the site in 2006 is also projected to be met for 8 hours. Therefore, warrant 1 is projected to be met at the site driveway and NYS Route 104 under 2006 full build-out conditions.

Warrant 2 is the interruption of continuous traffic warrant. For any one hour to satisfy this warrant the volume of traffic on the artery must exceed 900 vehicles and the volume of traffic on the higher volume side road approach must exceed 100 vehicles. The minimum volume of 900 vehicles is projected to be met for more than 8 hours on the artery in 2006. The minimum volume of 100 vehicles leaving the site in 2006 is projected to be met for 8 hours. Therefore, warrant 2 is also projected to be met at the site driveway and NYS Route 104 under 2006 full build-out conditions.

Warrant 8 is at least eighty percent traffic volume satisfaction of a combination of Warrants 1 & 2. Eighty percent of the normal required volumes for Warrants 1 and 2 are used here for Warrant 8. For Warrant 1 the minimum volume on the artery is 480 vehicles, and on the side road it is 160 vehicles. For Warrant 2 the minimum volume on the artery is 720 vehicles, and on the side road it is 80 vehicles. Warrant 8 is also projected to be met at the site driveway and NYS Route 104 under 2006 full build-out conditions.

Table 8 contains the results for each of the three warrants for the intersection of NYS Route 104 and the Hampton Ridge Center driveway under 2006 full build-out conditions.

Table 8: Full Build-Out Traffic Signal Warrant Analysis Results

Warrant	Hours Met
Warrant 1 - Minimum Vehicular Volume	8
Warrant 2 - Interruption of Continuous Traffic	8
Warrant 8 - Combination of Warrants 1 & 2	8

Due to its proximity to the existing signal at Manitou Road and the proposed signal to the east at the SHR Driveway, it is recommended that the new signal be coordinated with each. With these improvements in place, it is projected that acceptable levels of service can be provided at the new intersection during the weekday evening and Saturday mid-day peak periods.

As part of this study, an analysis of location of the site driveway along NYS Route 104 was performed. The basis of the analysis is the width of the green band along NYS Route 104 between Manitou Road and the SHR driveway. The green band along a roadway is dependent upon several factors including: vehicular speeds, spacing of signalized intersections and signal timing. No significant improvement in the width of the green band on NYS Route 104 was realized when moving the proposed site driveway location to the west or east. See Appendix E for Synchro output containing green band results for various driveway locations.

V. SIGHT DISTANCE EVALUATION

Sight distance is an important consideration at intersections. According to A Policy on Geometric Design of Highways and Streets 2001 (Green Book) (American Association of State Highway and Transportation Officials (AASHTO), Washington D.C.), "Sight distance is provided at intersections to allow drivers to perceive the presence of potentially conflicting vehicles. This should occur in sufficient space for a motorist to stop or adjust their speed, as appropriate, to avoid colliding in the intersection." It also allows drivers of stopped vehicles an opportunity to decide when it is safe to enter or cross the intersecting highway. Sufficient sight distance is provided when it is at least equal to the AASHTO requirement. Intersection sight distances that exceed the required stopping sight distances are desirable. The AASHTO Green Book was used as a reference to establish required stopping sight distances and desirable intersection sight distances for the Hampton Ridge Center's driveways to NYS Route 104.

As noted in Section IV.A.3, traffic signal warrants 1, 2 and 8 are met at the proposed intersection of NYS Route 104 and Hampton Ridge Center Driveway. The AASHTO Green Book states that "At signalized intersections, the first vehicle stopped on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches. Left turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Apart from these sight conditions, there are generally no other approach or departure sight triangles needed for signalized intersections.

Field observations of sight distance were made on NYS Route 104. The posted speed limit on NYS Route 104 is 40 miles per hour. According to the AASHTO Green Book, the required stopping sight distance is 305 ft and the desirable intersection sight distance is 500 feet for a vehicle making a left turn from the minor approach crossing 3 lanes onto the 5-lane major roadway. The alignment of NYS Route 104 at the location of proposed Hampton Ridge Center Driveway is generally straight. There is one vertical crest curve adjacent to a sag curve located in the vicinity of the Hampton Ridge Center site. Based upon the field observations, the

available sight distances at the proposed location of the site driveway (approximately 700 feet from the western boundary of the site) exceed the AASHTO requirements.

VI. PEDESTRIAN ACCOMMODATION

Mitigation proposed for the proposed development is subject to NYSDOT Engineering Instruction (EI) 04-11 "Procedural Requirements for Pedestrian Accommodation". The NYSDOT Pedestrian Generator Checklist required by this EI is contained in Appendix F. The Pedestrian Generator Checklist aids in the determination of need for pedestrian accommodation. There is a need for pedestrian accommodations based upon the checklist in Appendix F. Extension of the existing sidewalk along the frontage of the Hampton Ridge Center site and pedestrian crossing provisions at the proposed intersection of the site driveway and NYS Route 104 are recommended.

VII. SUMMARY

The subject of this study is the proposed multi-use development to be named Hampton Ridge Center. The DiMarco Group is proposing to construct this new development in the Town of Greece, Monroe County, New York. The proposed site is located north of NYS Route 104 (West Ridge Road) between North Greece Road and Manitou Road (NYS Route 261). The proposed multi-use development would include 390,000 square feet of total building space comprised of several land uses including a multiplex movie theater, various retail establishments, 4 sit down restaurants, a pharmacy and a drive-in bank. Access to the site would be provided by one driveway intersecting NYS Route 104. Cross-access would be provided to the neighboring SHR.

The New York State Department of Transportation currently nas plans to reconstruct NYS Route 104 to a point just east of the proposed site drive beginning in 2005. That project will involve the construction of additional through and turn lanes on NYS Route 104.

The proposed development would generate 1863 and 3146 total trips during the weekday evening and Saturday mid-day peak hours, respectively according to the Institute of Transportation Engineer's Trip Generation.

It is projected that the proposed development can be accommodated by the surrounding transportation system given the proposed NYS Route 104 improvements by NYSDOT and some additional roadway improvements.

VIII. RECOMMENDATIONS

The following highway improvements are recommended to accommodate the proposed development as a result of this study.

1. Construct a new full access Hampton Ridge Center Driveway to NYS Route 104 with two exiting lanes for left turns, one exiting lane for right turns, and two entering lanes.

2. Install a new traffic signal for the proposed intersection of Hampton Ridge Center Driveway and NYS Route 104. This signal should be coordinated with the signal at the intersection of NYS Route 104 with Manitou Road and the signal expected to be installed at the intersection of NYS Route 104 and the Shops at Hampton Ridge Driveway.

3. Widen NYS Route 104 to include a 500 ft eastbound left turn lane at the proposed site driveway.

4. Construct a 300 foot long westbound right turn lane along NYS Route 104 at the proposed Hampton Ridge Center Driveway. The turn lane would operate as a free-flow slip lane and not be controlled by the traffic signal.

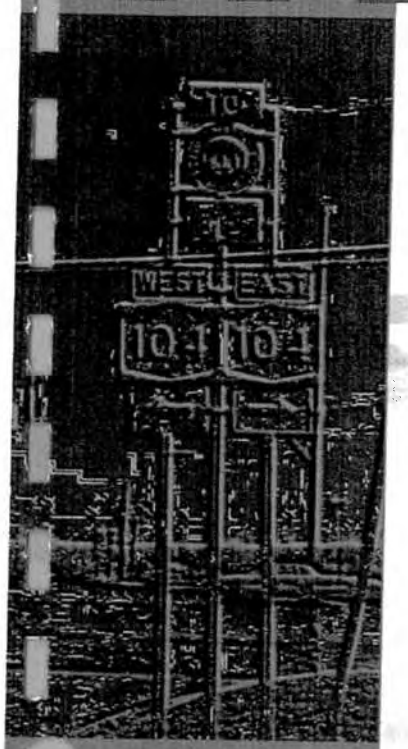
5. Install pedestrian crossing provisions at the signalized intersection of the Hampton Ridge Center site driveway and NYS Route 104 based upon the Pedestrian Generator Checklist shown in Appendix F. Extend the sidewalk located on the north side of NYS Route 104 (constructed for the Shops at Hampton Ridge) to the western frontage limit of the Hampton Ridge Center.

6. Re-stripe the North Greece Road and Elmgrove Road approaches to NYS Route 104. The new lane configuration on the North Greece Road would consist of two left turn lanes, one through lane and one right turn lane. The same lane configuration is recommended for the Elmgrove Road approach. Operate this intersection as an independent fully actuated traffic signal with a cycle length of 125 seconds during the weekday evening and Saturday mid-day peak hour (retail peak) periods.

7. Continue to operate the traffic signal at the intersection of NYS Route 104 and Elmridge Plaza in coordination with those to the east.

8. All curb radii should be designed to accommodate the appropriate design vehicle.

9. Ensure adequate site distance will be provided at NYS Route 104 during design of the Hampton Ridge Center driveway.



APPENDIX A
Level of Service Definitions

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

DEFINITION OF LEVEL OF SERVICE FOR

SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents and when there are no other vehicles on the road. Only the portion of total delay attributed to the control facility is quantified. This delay is called *control delay.* Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-minute analysis period. The criteria are given in the following table. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (sec)
A	Less than or equal to 10.0
B	10.1 to no more than 20.0
C	20.1 to no more than 35.0
D	35.1 to no more than 55.0
E	55.1 to no more than 80.0
F	80.1 and greater

Level Of Service A describes operations with very low control delay, up to 10 seconds per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level Of Service B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

Level Of Service C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result form fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level Of Service D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result form some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level Of Service E describes operations with control delay greater

than 55 and up to 80 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level Of Service F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

DEFINITION OF LEVEL OF SERVICE FOR UNSIGNALIZED INTERSECTIONS

The level of service for a Two-Way-Stop-Control (TWSC) intersection is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. LOS criteria are given in the accompanying table.

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (sec)
A	Less than or equal to 10.0
B	10.1 to no more than 15.0
C	15.1 to no more than 25.0
D	25.1 to no more than 35.0
E	35.1 to no more than 50.0
F	50.1 and greater

The LOS criteria for TWSC intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection would be designed to carry higher traffic volumes than an unsignalized intersection. In addition, a number of driver behavior considerations combine to make delays at signalized intersections less onerous than delays at unsignalized intersections. Also, there is often much more variability in the amount of delay experienced by individual drivers at an unsignalized intersection versus that at signalized intersections. For these reasons, it is considered that the control delay threshold for any giver level of service would be less for an unsignalized intersection than it would be for a signalized intersection.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during conditions with ideal geometrics and in the absence of incidents, control and traffic. This delay is called

control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOE's) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, inappropriate traffic control decisions may be made.

APPENDIX B
Existing Level of Service

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

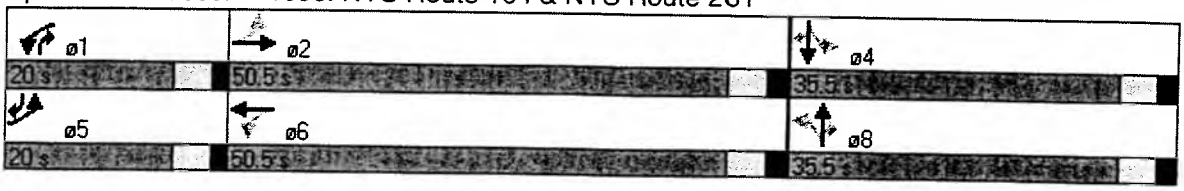
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		5	60	60	5	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1719	3433	0	1787	3365	0	0	1797	1615	0	1827	1538
Flt Permitted	0.156			0.253				0.763			0.219	
Satd. Flow (perm)	282	3433	0	476	3365	0	0	1388	1615	0	410	1538
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		10							133			76
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	115	630	49	184	806	102	104	327	188	78	79	105
Lane Group Flow (vph)	131	772	0	204	1009	0	0	507	221	0	183	122
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	20.0	50.5	0.0	20.0	50.5	0.0	35.5	35.5	20.0	35.5	35.5	20.0
Total Split (%)	19%	48%	0%	19%	48%	0%	33%	33%	19%	33%	33%	19%
Maximum Green (s)	15.0	45.0		15.0	45.0		30.0	30.0	15.0	30.0	30.0	15.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	36.4	27.9		39.9	29.7			32.9	46.2		32.9	44.5
Actuated g/C Ratio	0.45	0.35		0.50	0.37			0.41	0.58		0.41	0.55
v/c Ratio	0.47	0.64		0.50	0.81			0.89	0.22		1.09	0.14
Uniform Delay, d1	10.5	21.5		10.7	22.6			21.8	3.0		23.6	3.1
Delay	10.2	21.6		10.2	22.6			46.5	4.4		117.6	5.1
LOS	B	C		B	C			D	A		F	A
Approach Delay		19.9			20.5			33.7			72.6	
Approach LOS		B			C			C			E	

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 80.2

Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 28.4 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service D

Splits and Phases: 1056: NYS Route 104 & NYS Route 261



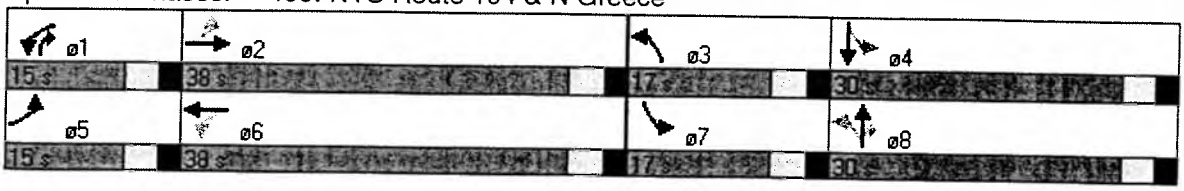
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		0	210		205	200		0
Storage Lanes	1		0	1		0	1		1	1		0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5		60	60	60	60	60	
Trailing Detector (ft)	0	5		0	5		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	3488	0	1805	3412	0	1770	1881	1583	1787	1763	0
Flt Permitted	0.114			0.114			0.148			0.148		
Satd. Flow (perm)	217	3488	0	217	3412	0	276	1881	1583	278	1763	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		24			22							
Link Speed (mph)		40			40			30			35	
Link Distance (ft)		3397			1383			1526			857	
Travel Time (s)		57.9			23.6			34.7			16.7	
Volume (vph)	160	783	146	200	820	146	228	470	205	193	257	185
Lane Group Flow (vph)	198	1147	0	215	1039	0	243	500	218	227	520	0
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Detector Phases	5	2		1	6		3	8	1	7	4	
Minimum Initial (s)	2.0	33.0		2.0	33.0		2.0	5.0	2.0	2.0	5.0	
Minimum Split (s)	9.0	38.0		9.0	38.0		7.0	27.0	9.0	7.0	27.0	
Total Split (s)	15.0	38.0	0.0	15.0	38.0	0.0	17.0	30.0	15.0	17.0	30.0	0.0
Total Split (%)	15%	38%	0%	15%	38%	0%	17%	30%	15%	17%	30%	0%
Maximum Green (s)	10.0	33.0		10.0	33.0		12.0	25.0	10.0	12.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0		2.0	2.0	1.0	3.0	2.0	
Recall Mode	None	Coord		None	Coord		None	None	None	None	None	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			15.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	47.7	36.8		47.3	36.6		40.5	27.0	40.7	40.6	27.0	
Actuated g/C Ratio	0.48	0.37		0.47	0.37		0.41	0.27	0.41	0.41	0.27	
v/c Ratio	0.71	0.88		0.79	0.82		0.78	0.98	0.34	0.72	1.09	
Uniform Delay, d1	14.2	28.9		16.7	28.1		18.9	36.3	20.4	18.5	36.5	
Delay	20.8	36.4		34.9	22.8		27.1	63.9	20.4	23.4	89.2	
LOS	C	D		C	C		C	E	C	C	F	
Approach Delay		34.1			24.9			44.7			69.2	
Approach LOS		C			C			D			E	

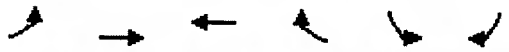
Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100

Offset: 10 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 39.9 Intersection LOS: D
Intersection Capacity Utilization 100.4% ICU Level of Service F

Splits and Phases: 499: NYS Route 104 & N Greece





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1805	3539	3574	1615	3502	1615
Flt Permitted	0.146				0.950	
Satd. Flow (perm)	277	3539	3574	1615	3502	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				218		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	135	1046	1026	341	406	140
Lane Group Flow (vph)	148	1149	1153	383	437	151
Turn Type	pm+pt			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			Free	4	4
Detector Phases	5				4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	16.0	70.0	54.0	0.0	30.0	16.0
Total Split (%)	16%	70%	54%	0%	30%	16%
Maximum Green (s)	11.0	65.0	49.0		25.0	11.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lag		Lead			Lag
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		None	None
Act Effct Green (s)	75.8	75.8	59.8	100.0	18.2	34.2
Actuated g/C Ratio	0.76	0.76	0.60	1.00	0.18	0.34
v/c Ratio	0.36	0.43	0.54	0.24	0.68	0.27
Uniform Delay, d1	6.3	4.3	11.9	0.0	38.2	23.9
Delay	14.3	7.9	12.7	0.0	37.8	23.3
LOS	B	A	B	A	D	C
Approach Delay		8.6	9.5		34.1	
Approach LOS		A	A		C	

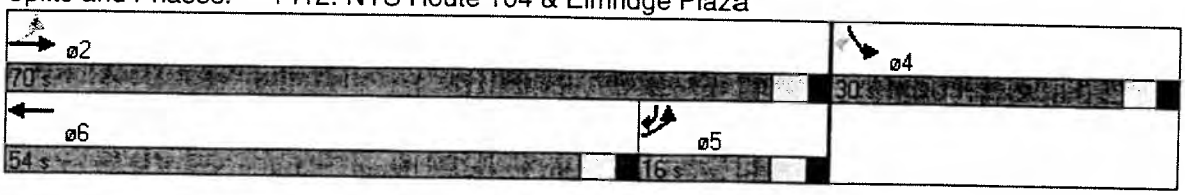
Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68
Intersection Signal Delay: 13.4
Intersection Capacity Utilization 62.5%

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 1412: NYS Route 104 & Elmridge Plaza



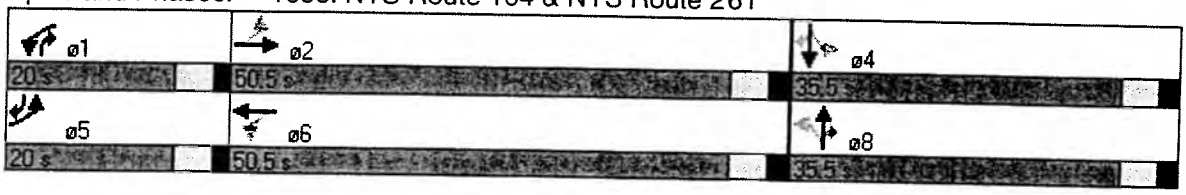
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	3540	0	1787	3509	0	0	1829	1583	0	1791	1568
Flt Permitted	0.230			0.225				0.839			0.760	
Satd. Flow (perm)	437	3540	0	423	3509	0	0	1563	1583	0	1395	1568
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		8							107			110
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	63	716	44	144	673	83	55	97	131	79	84	95
Lane Group Flow (vph)	69	835	0	157	822	0	0	160	138	0	190	110
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	20.0	50.5	0.0	20.0	50.5	0.0	35.5	35.5	20.0	35.5	35.5	20.0
Total Split (%)	19%	48%	0%	19%	48%	0%	33%	33%	19%	33%	33%	19%
Maximum Green (s)	15.0	45.0		15.0	45.0		30.0	30.0	15.0	30.0	30.0	15.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	25.8	23.9		27.9	24.9			13.6	21.2		13.6	20.2
Actuated g/C Ratio	0.53	0.51		0.57	0.53			0.28	0.44		0.28	0.42
v/c Ratio	0.16	0.46		0.34	0.44			0.37	0.18		0.49	0.15
Uniform Delay, d1	3.4	9.5		3.5	8.9			15.9	1.8		16.5	0.0
Delay	5.4	12.4		5.4	11.3			16.1	3.0		16.7	2.4
LOS	A	B		A	B			B	A		B	A
Approach Delay		11.9			10.4			10.0			11.5	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 46.9

Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 11.0 Intersection LOS: B
Intersection Capacity Utilization 58.8% ICU Level of Service A

Splits and Phases: 1056: NYS Route 104 & NYS Route 261



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		0	210		205	200		0
Storage Lanes	1		0	1		0	1		1	1		0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5		60	60	60	60	60	
Trailing Detector (ft)	0	5		0	5		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	3506	0	1787	3481	0	1770	1900	1615	1787	1798	0
Flt Permitted	0.114			0.115			0.161			0.180		
Satd. Flow (perm)	217	3506	0	216	3481	0	300	1900	1615	339	1798	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		16			28							
Link Speed (mph)		40			40			30			35	
Link Distance (ft)		3397			1383			1526			857	
Travel Time (s)		57.9			23.6			34.7			16.7	
Volume (vph)	126	765	102	202	711	151	123	363	264	201	265	122
Lane Group Flow (vph)	137	943	0	222	947	0	135	399	290	214	412	0
Turn Type	pm+pt			pm+pt			pm+pt		pm+ov	pm+pt		
Protected Phases	5	2		1	6		3	8	1	7	4	
Permitted Phases	2			6			8		8	4		
Detector Phases	5	2		1	6		3	8	1	7	4	
Minimum Initial (s)	2.0	33.0		2.0	33.0		2.0	5.0	2.0	2.0	5.0	
Minimum Split (s)	9.0	38.0		9.0	38.0		7.0	27.0	9.0	7.0	27.0	
Total Split (s)	15.0	38.0	0.0	15.0	38.0	0.0	17.0	30.0	15.0	17.0	30.0	0.0
Total Split (%)	15%	38%	0%	15%	38%	0%	17%	30%	15%	17%	30%	0%
Maximum Green (s)	10.0	33.0		10.0	33.0		12.0	25.0	10.0	12.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0		2.0	2.0	1.0	3.0	2.0	
Recall Mode	None	Coord		None	Coord		None	None	None	None	None	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			15.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	48.3	38.9		51.2	40.4		35.9	24.8	38.6	40.3	27.1	
Actuated g/C Ratio	0.48	0.39		0.51	0.40		0.36	0.25	0.39	0.40	0.27	
v/c Ratio	0.54	0.69		0.79	0.67		0.50	0.85	0.46	0.65	0.85	
Uniform Delay, d1	12.4	25.1		15.0	23.6		18.9	35.7	22.8	19.6	34.4	
Delay	14.7	26.4		42.9	15.7		18.3	38.5	22.5	19.8	41.1	
LOS	B	C		D	B		B	D	C	B	D	
Approach Delay		24.9			20.9			29.6			33.8	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100

Offset: 10 (10%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 86.0% ICU Level of Service D

Splits and Phases: 499: NYS Route 104 & N Greece

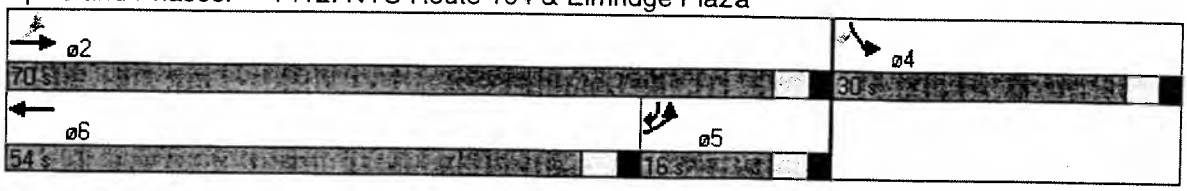
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1787	3574	3574	1599	3467	1615
Flt Permitted	0.188				0.950	
Satd. Flow (perm)	354	3574	3574	1599	3467	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				255		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	170	1059	908	352	526	157
Lane Group Flow (vph)	181	1127	1020	396	591	176
Turn Type	pm+pt			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2			Free	4	4
Detector Phases	5	2	6		4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	16.0	70.0	54.0	0.0	30.0	16.0
Total Split (%)	16%	70%	54%	0%	30%	16%
Maximum Green (s)	11.0	65.0	49.0		25.0	11.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lag		Lead			Lag
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		None	None
Act Effct Green (s)	71.5	71.5	55.5	100.0	22.5	38.5
Actuated g/C Ratio	0.72	0.72	0.56	1.00	0.23	0.39
v/c Ratio	0.41	0.44	0.51	0.25	0.76	0.28
Uniform Delay, d1	8.3	5.9	13.8	0.0	36.2	21.2
Delay	12.8	7.4	14.6	0.0	35.8	20.7
LOS	B	A	B	A	D	C
Approach Delay		8.1	10.5		32.4	
Approach LOS		A	B		C	

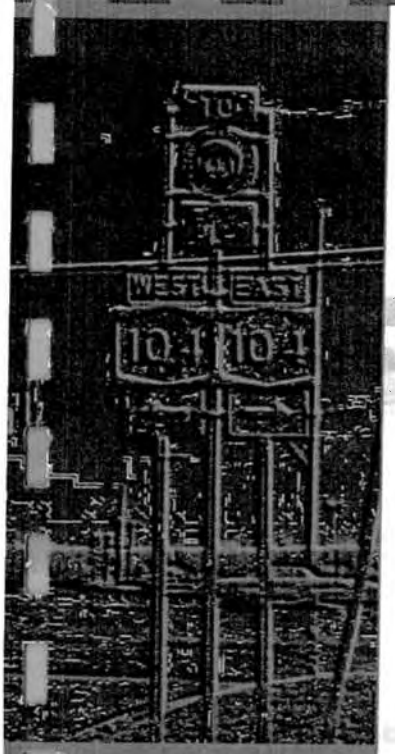
Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76
Intersection Signal Delay: 14.4 Intersection LOS: B
Intersection Capacity Utilization 65.1% ICU Level of Service B

Splits and Phases: 1412: NYS Route 104 & Elmridge Plaza





APPENDIX C
Signal Warrant Analysis

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

West Ridge Road - Greece
SIGNAL WARRANT ANALYSIS
2006 FUTURE CONDITIONS

40 MPH = Average speed on ROUTE 104

southbound right turns are reduced by 40%

VOLUMES - 2006			WARRANTS MET							
TIME	**MAJOR ST.** *Route 104*	**MINOR ST.** *NEW DRIVE*	**WARRANT 1**		**WARRANT 2**		**WARRANT 8** (80% OF WARRANTS 1 & 2 VOLUMES)			
							WARRANT 1		**WARRANT 2**	
VOLUME CRITERIA:	2-Way	SB	MAJOR 600 vph	MINOR 200 vph	MAJOR 900 vph	MINOR 100 vph	MAJOR 600*.8=480 480 vph	MINOR 200*.8=160 160 vph	MAJOR 900*.8=720 720 vph	MINOR 100*.8=80 80 vph
7:00 AM TO 8:00 AM	1180									
8:00 AM TO 9:00 AM	1076									
10:00 AM TO 11:00 AM	1080	214	YES	YES	YES	YES	YES	YES	YES	YES
11:00 AM TO 12:00 PM	1135	342	YES	YES	YES	YES	YES	YES	YES	YES
12:00 PM TO 1:00 PM	1264	458	YES	YES	YES	YES	YES	YES	YES	YES
1:00 PM TO 2:00 PM	1317	475	YES	YES	YES	YES	YES	YES	YES	YES
2:00 PM TO 3:00 PM	1354	510	YES	YES	YES	YES	YES	YES	YES	YES
3:00 PM TO 4:00 PM	1417	516	YES	YES	YES	YES	YES	YES	YES	YES
4:00 PM TO 5:00 PM	1672	527	YES	YES	YES	YES	YES	YES	YES	YES
5:00 PM TO 6:00 PM	1743	550	YES	YES	YES	YES	YES	YES	YES	YES
6:00 PM TO 7:00 PM	1790	446	YES	YES	YES	YES	YES	YES	YES	YES
HOURS SATISFIED:			MET 8 HOURS		MET 8 HOURS		MET 8 HOURS		MET 8 HOURS	

CONCLUSION

IN YEAR 2006:

WARRANT 1 IS MET 100% OF 8 HOUR CRITERIA

WARRANT 2 IS MET 100% OF 8 HOUR CRITERIA

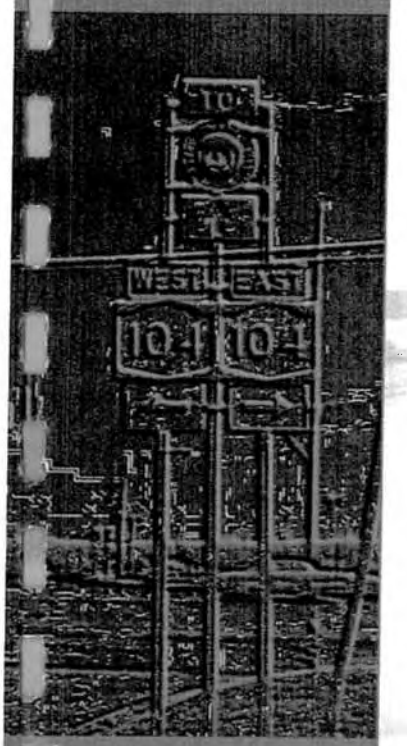
WARRANT 8 IS MET 100% OF 8 HOUR CRITERIA

WARRANT DEFINITIONS:

WARRANT 1 = MINIMUM VEHICULAR VOLUME

WARRANT 2 = INTERRUPTION OF CONTINUOUS TRAFFIC

WARRANT 8 = COMBINATION OF WARRANTS (1&2)



APPENDIX D
Future Level of Service

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

Level of Service

Future 2006 No-Build

Weekday Evening Peak Hour

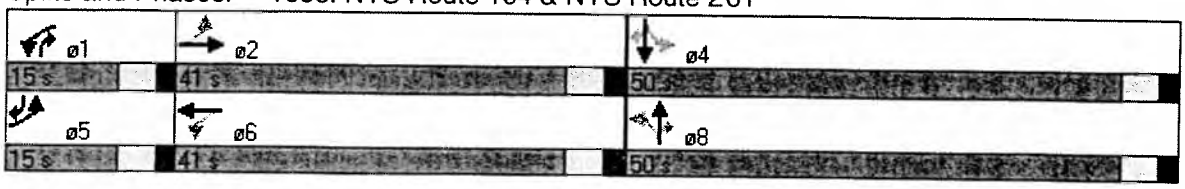
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1719	3436	0	1787	3273	0	0	1802	1615	0	1823	1538
Flt Permitted	0.105			0.167				0.760			0.201	
Satd. Flow (perm)	190	3436	0	314	3273	0	0	1383	1615	0	377	1538
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		8							59			27
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	144	687	51	204	877	186	107	438	212	157	102	126
Lane Group Flow (vph)	164	839	0	227	1181	0	0	641	249	0	302	147
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	15.0	41.0	0.0	15.0	41.0	0.0	50.0	50.0	15.0	50.0	50.0	15.0
Total Split (%)	14%	39%	0%	14%	39%	0%	47%	47%	14%	47%	47%	14%
Maximum Green (s)	10.0	35.5		10.0	35.5		44.5	44.5	10.0	44.5	44.5	10.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	47.5	37.0		49.5	38.0			47.0	61.5		47.0	60.5
Actuated g/C Ratio	0.45	0.35		0.47	0.36			0.45	0.59		0.45	0.58
v/c Ratio	0.68	0.69		0.73	0.99			1.03	0.26		1.79	0.16
Uniform Delay, d1	15.4	28.4		15.5	33.1			28.7	7.7		28.8	8.2
Delay	19.8	28.9		20.3	53.9			67.2	8.0		243.8	8.3
LOS	B	C		C	D			E	A		F	A
Approach Delay		27.4			48.5			50.6			166.7	
Approach LOS		C			D			D			F	

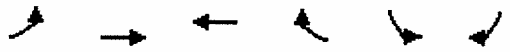
Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 104.5

Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.79
Intersection Signal Delay: 57.5 Intersection LOS: E
Intersection Capacity Utilization 106.4% ICU Level of Service F

Splits and Phases: 1056: NYS Route 104 & NYS Route 261





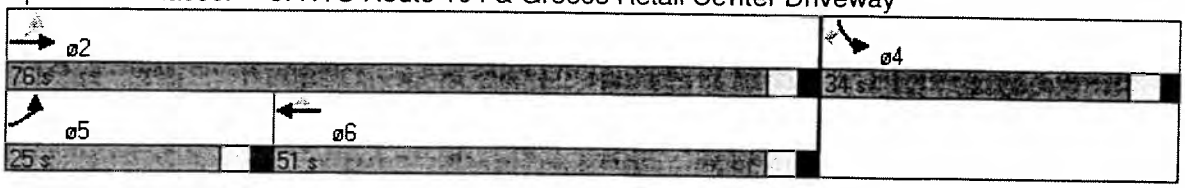
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			200	0	0
Storage Lanes	1			1	1	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3539	1583	1770	1583
Flt Permitted	0.078				0.950	
Satd. Flow (perm)	145	3574	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				185		149
Link Speed (mph)		40	40		30	
Link Distance (ft)		1046	1053		419	
Travel Time (s)		17.8	17.9		9.5	
Volume (vph)	115	941	1133	211	213	134
Lane Group Flow (vph)	142	1162	1218	227	237	149
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	10.0	10.0	10.0	4.0	4.0
Minimum Split (s)	9.0	15.0	15.0	15.0	9.0	9.0
Total Split (s)	25.0	76.0	51.0	51.0	34.0	34.0
Total Split (%)	23%	69%	46%	46%	31%	31%
Maximum Green (s)	20.0	71.0	46.0	46.0	29.0	29.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	1.0	1.0	1.0	1.0	2.0	2.0
Recall Mode	None	Coord	Coord	Coord	Min	Min
Act Effct Green (s)	83.8	83.8	71.8	71.8	20.3	20.3
Actuated g/C Ratio	0.76	0.76	0.65	0.65	0.18	0.18
v/c Ratio	0.59	0.43	0.53	0.21	0.73	0.36
Uniform Delay, d1	3.4	4.7	10.1	1.3	42.2	0.0
Delay	11.0	5.2	6.4	0.6	41.5	5.8
LOS	B	A	A	A	D	A
Approach Delay		5.9	5.5		27.7	
Approach LOS		A	A		C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73
Intersection Signal Delay: 8.4 Intersection LOS: A
Intersection Capacity Utilization 64.7% ICU Level of Service B

Splits and Phases: 5: NYS Route 104 & Greece Retail Center Driveway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		295	250		205	200		200
Storage Lanes	1		0	1		1	1		1	1		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5	50	60	60	60	60	60	50
Trailing Detector (ft)	0	5		0	5	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	5007	0	1805	5085	1455	1770	3574	1583	1787	1881	1599
Flt Permitted	0.950			0.950			0.149			0.290		
Satd. Flow (perm)	1805	5007	0	1805	5085	1455	278	3574	1583	546	1881	1599
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		40				122						
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		1299			1383			647			458	
Travel Time (s)		22.1			23.6			12.6			8.9	
Volume (vph)	249	937	191	206	960	187	293	515	211	254	318	277
Lane Group Flow (vph)	286	1297	0	219	1021	199	308	542	222	289	361	315
Turn Type	Prot			Prot		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases						6	8		8	4		4
Detector Phases	5	2		1	6	7	3	8	1	7	4	5
Minimum Initial (s)	2.0	5.0		2.0	5.0	2.0	2.0	5.0	2.0	2.0	5.0	2.0
Minimum Split (s)	9.0	29.0		9.0	29.0	7.0	7.0	29.0	9.0	7.0	29.0	9.0
Total Split (s)	26.0	36.0	0.0	26.0	36.0	16.0	19.0	32.0	26.0	16.0	29.0	26.0
Total Split (%)	24%	33%	0%	24%	33%	15%	17%	29%	24%	15%	26%	24%
Maximum Green (s)	21.0	31.0		21.0	31.0	11.0	14.0	27.0	21.0	11.0	24.0	21.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0	3.0	2.0	2.0	1.0	3.0	2.0	1.0
Recall Mode	None	Coord		None	Coord	None	None	None	None	None	None	None
Act Effct Green (s)	20.8	39.7		17.8	36.8	52.7	43.4	27.5	48.3	37.5	24.4	48.3
Actuated g/C Ratio	0.19	0.36		0.16	0.33	0.48	0.39	0.25	0.44	0.34	0.22	0.44
v/c Ratio	0.84	0.71		0.75	0.60	0.26	0.94	0.61	0.32	0.87	0.86	0.45
Uniform Delay, d1	42.9	29.0		44.0	30.4	6.1	26.7	36.5	20.2	24.4	41.2	21.6
Delay	42.1	32.7		31.7	27.0	15.1	53.3	36.4	19.2	37.1	46.2	21.1
LOS	D	C		C	C	B	D	D	B	D	D	C
Approach Delay		34.4			26.1			37.7			35.3	
Approach LOS		C			C			D			D	

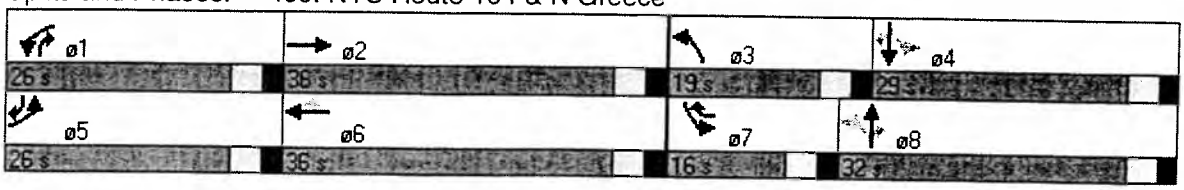
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 34 (31%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94
Intersection Signal Delay: 32.9
Intersection Capacity Utilization 87.3%

Intersection LOS: C
ICU Level of Service D

Splits and Phases: 499: NYS Route 104 & N Greece



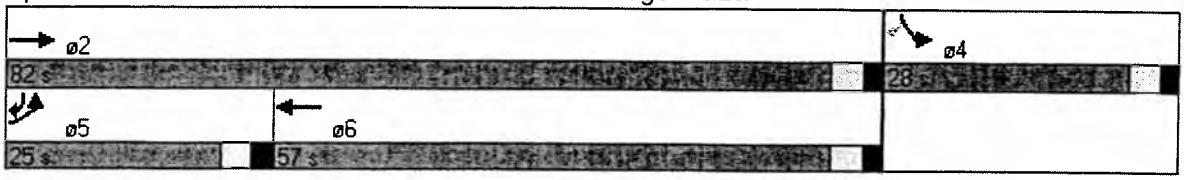
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1805	5085	5136	1615	3502	1615
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1805	5085	5136	1615	3502	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				251		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	148	1254	1199	351	418	153
Lane Group Flow (vph)	163	1378	1347	394	449	165
Turn Type	Prot			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				Free	4	4
Detector Phases	5	2	6		4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	25.0	82.0	57.0	0.0	28.0	25.0
Total Split (%)	23%	75%	52%	0%	25%	23%
Maximum Green (s)	20.0	77.0	52.0		23.0	20.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		None	None
Act Effct Green (s)	15.7	84.0	65.4	110.0	20.0	38.6
Actuated g/C Ratio	0.14	0.76	0.59	1.00	0.18	0.35
v/c Ratio	0.63	0.35	0.44	0.24	0.71	0.29
Uniform Delay, d1	44.5	4.2	12.2	0.0	42.2	25.8
Delay	33.2	3.2	13.5	0.0	41.8	24.3
LOS	C	A	B	A	D	C
Approach Delay		6.4	10.4		37.1	
Approach LOS		A	B		D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 57.9% ICU Level of Service A

Splits and Phases: 1412: NYS Route 104 & Elmridge Plaza



Level of Service

Future 2006 No-Build

Saturday Mid-day Peak Hour

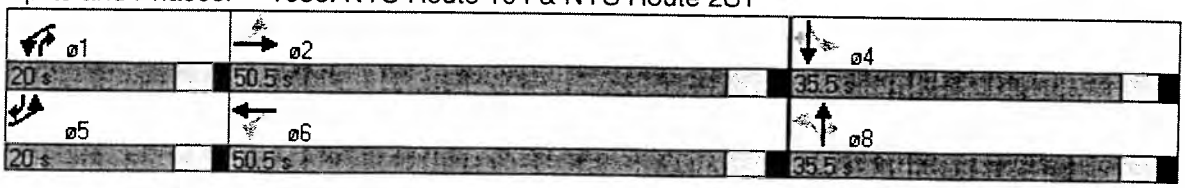
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	3544	0	1787	3477	0	0	1839	1583	0	1789	1568
Flt Permitted	0.159			0.164				0.557			0.556	
Satd. Flow (perm)	302	3544	0	309	3477	0	0	1038	1583	0	1021	1568
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		7							68			91
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	81	850	46	173	770	149	56	154	171	177	152	121
Lane Group Flow (vph)	89	985	0	188	999	0	0	221	180	0	383	141
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	20.0	50.5	0.0	20.0	50.5	0.0	35.5	35.5	20.0	35.5	35.5	20.0
Total Split (%)	19%	48%	0%	19%	48%	0%	33%	33%	19%	33%	33%	19%
Maximum Green (s)	15.0	45.0		15.0	45.0		30.0	30.0	15.0	30.0	30.0	15.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	35.0	27.5		40.2	32.1			32.9	45.9		32.9	42.5
Actuated g/C Ratio	0.43	0.35		0.51	0.40			0.41	0.58		0.41	0.52
v/c Ratio	0.33	0.80		0.55	0.71			0.51	0.19		0.91	0.16
Uniform Delay, d1	10.2	22.8		10.5	20.4			17.9	5.0		22.5	3.3
Delay	9.9	23.2		10.2	20.3			21.0	6.1		50.2	4.9
LOS	A	C		B	C			C	A		D	A
Approach Delay		22.1			18.7			14.3			38.0	
Approach LOS		C			B			B			D	

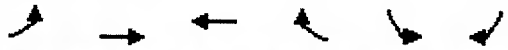
Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 79.5

Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 22.5 Intersection LOS: C
Intersection Capacity Utilization 83.7% ICU Level of Service D

Splits and Phases: 1056: NYS Route 104 & NYS Route 261





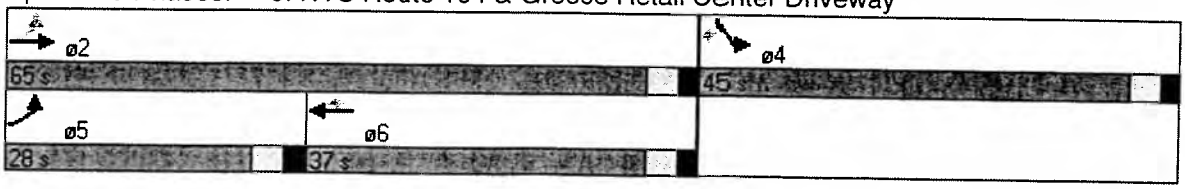
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			200	0	0
Storage Lanes	1			1	1	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3574	1583	1770	1583
Flt Permitted	0.108				0.950	
Satd. Flow (perm)	201	3574	3574	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				382		226
Link Speed (mph)		40	40		30	
Link Distance (ft)		1046	1053		419	
Travel Time (s)		17.8	17.9		9.5	
Volume (vph)	270	928	889	419	449	203
Lane Group Flow (vph)	293	1009	977	460	499	226
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	10.0	10.0	10.0	4.0	4.0
Minimum Split (s)	9.0	15.0	15.0	15.0	9.0	9.0
Total Split (s)	28.0	65.0	37.0	37.0	45.0	45.0
Total Split (%)	25%	59%	34%	34%	41%	41%
Maximum Green (s)	23.0	60.0	32.0	32.0	40.0	40.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Coord	Coord	Coord	Min	Min
Act Effct Green (s)	67.7	67.7	45.9	45.9	36.4	36.4
Actuated g/C Ratio	0.62	0.62	0.42	0.42	0.33	0.33
v/c Ratio	0.75	0.46	0.65	0.52	0.85	0.33
Uniform Delay, d1	20.5	11.4	25.7	3.4	34.3	0.0
Delay	21.1	12.4	21.2	1.3	33.9	3.1
LOS	C	B	C	A	C	A
Approach Delay		14.3	14.9		24.3	
Approach LOS		B	B		C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 71 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 80.9% ICU Level of Service D

Splits and Phases: 5: NYS Route 104 & Greece Retail Center Driveway



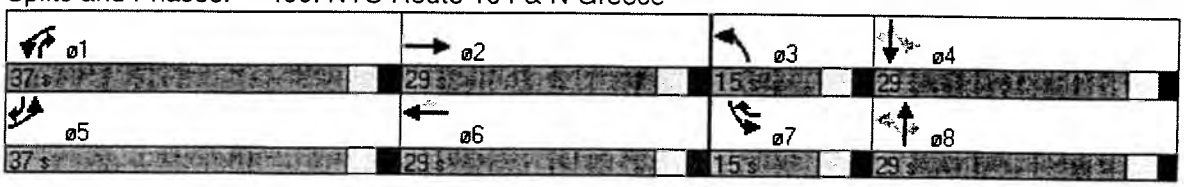
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		295	250		205	200		200
Storage Lanes	1		0	1		1	1		1	1		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5	50	60	60	60	60	60	50
Trailing Detector (ft)	0	5		0	5	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	4999	0	1787	5136	1599	1770	3610	1615	1787	1881	1615
Flt Permitted	0.950			0.950			0.262			0.339		
Satd. Flow (perm)	1805	4999	0	1787	5136	1599	488	3610	1615	638	1881	1615
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		35				203						
Link Speed (mph)		40			40			30			35	
Link Distance (ft)		1299			1383			647			458	
Travel Time (s)		22.1			23.6			14.7			8.9	
Volume (vph)	263	1017	200	208	941	191	195	392	272	241	290	251
Lane Group Flow (vph)	280	1295	0	221	1001	203	207	417	289	254	305	264
Turn Type	Prot			Prot		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases						6	8		8	4		4
Detector Phases	5	2		1	6	7	3	8	1	7	4	5
Minimum Initial (s)	2.0	5.0		2.0	5.0	2.0	2.0	5.0	2.0	2.0	5.0	2.0
Minimum Split (s)	9.0	29.0		9.0	29.0	7.0	7.0	29.0	9.0	7.0	29.0	9.0
Total Split (s)	37.0	29.0	0.0	37.0	29.0	15.0	15.0	29.0	37.0	15.0	29.0	37.0
Total Split (%)	34%	26%	0%	34%	26%	14%	14%	26%	34%	14%	26%	34%
Maximum Green (s)	32.0	24.0		32.0	24.0	10.0	10.0	24.0	32.0	10.0	24.0	32.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0	3.0	2.0	2.0	1.0	3.0	2.0	1.0
Recall Mode	None	Coord		None	Coord	None	None	None	None	None	None	None
Act Effct Green (s)	22.4	41.0		22.6	41.3	56.2	34.2	22.4	48.0	34.5	22.5	47.9
Actuated g/C Ratio	0.20	0.37		0.21	0.38	0.51	0.31	0.20	0.44	0.31	0.20	0.44
v/c Ratio	0.76	0.69		0.60	0.52	0.22	0.71	0.57	0.41	0.78	0.79	0.38
Uniform Delay, d1	41.2	28.2		39.6	26.7	0.0	27.2	39.4	21.3	28.0	41.5	20.9
Delay	40.1	43.3		24.1	20.7	8.7	28.0	38.9	19.7	31.6	41.3	19.7
LOS	D	D		C	C	A	C	D	B	C	D	B
Approach Delay		42.7			19.5			30.4			31.4	
Approach LOS		D			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 32 (29%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79
Intersection Signal Delay: 31.4 Intersection LOS: C
Intersection Capacity Utilization 78.8% ICU Level of Service C

Splits and Phases: 499: NYS Route 104 & N Greece



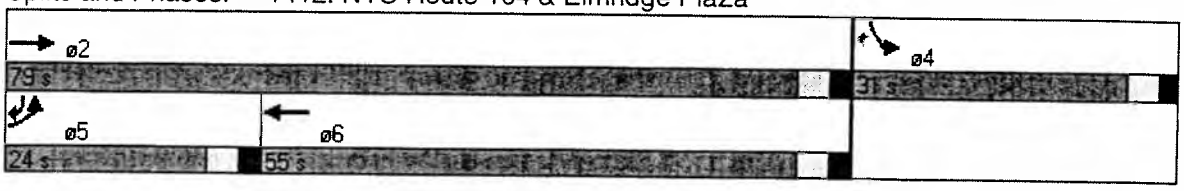
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1787	5136	5136	1599	3467	1615
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1787	5136	5136	1599	3467	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				266		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	185	1344	1171	363	542	169
Lane Group Flow (vph)	197	1430	1316	408	609	190
Turn Type	Prot			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				Free	4	4
Detector Phases	5	2	6		4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	24.0	79.0	55.0	0.0	31.0	24.0
Total Split (%)	22%	72%	50%	0%	28%	22%
Maximum Green (s)	19.0	74.0	50.0		26.0	19.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		None	None
Act Effct Green (s)	17.5	79.5	59.0	110.0	24.5	45.0
Actuated g/C Ratio	0.16	0.72	0.54	1.00	0.22	0.41
v/c Ratio	0.69	0.39	0.48	0.26	0.79	0.29
Uniform Delay, d1	43.7	5.9	15.9	0.0	40.3	21.7
Delay	30.7	7.0	17.1	0.0	40.0	20.6
LOS	C	A	B	A	D	C
Approach Delay		9.9	13.0		35.4	
Approach LOS		A	B		D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 63.7% ICU Level of Service B

Splits and Phases: 1412: NYS Route 104 & Elmridge Plaza



Level of Service

2006 Build

Weekday Evening Peak Hour

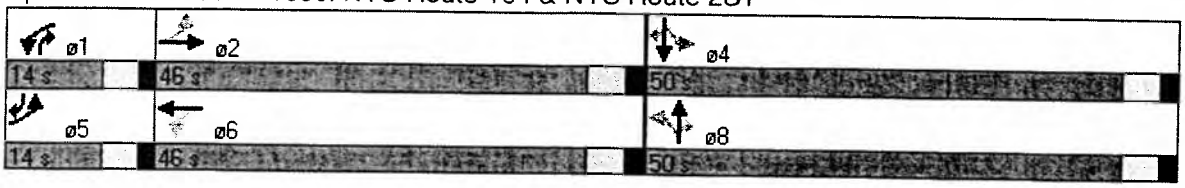
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1719	3440	0	1787	3257	0	0	1802	1615	0	1822	1538
Flt Permitted	0.093			0.149				0.705			0.157	
Satd. Flow (perm)	168	3440	0	280	3257	0	0	1283	1615	0	295	1538
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		7							55			27
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	144	769	51	228	962	219	107	438	258	183	102	126
Lane Group Flow (vph)	164	932	0	253	1312	0	0	641	304	0	332	147
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	14.0	46.0	0.0	14.0	46.0	0.0	50.0	50.0	14.0	50.0	50.0	14.0
Total Split (%)	13%	42%	0%	13%	42%	0%	45%	45%	13%	45%	45%	13%
Maximum Green (s)	9.0	40.5		9.0	40.5		44.5	44.5	9.0	44.5	44.5	9.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	Coord		None	Coord		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	53.2	43.0		54.8	43.8			47.0	61.1		47.0	60.2
Actuated g/C Ratio	0.48	0.39		0.50	0.40			0.43	0.56		0.43	0.55
v/c Ratio	0.73	0.69		0.87	1.01			1.17	0.33		2.63	0.17
Uniform Delay, d1	16.9	27.7		15.1	33.1			31.5	10.6		31.5	10.0
Delay	24.9	28.1		51.0	47.0			111.3	10.9		349.7	10.0
LOS	C	C		D	D			F	B		F	B
Approach Delay		27.6			47.7			79.0			245.4	
Approach LOS		C			D			E			F	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110

Offset: 41 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.63
Intersection Signal Delay: 72.7 Intersection LOS: E
Intersection Capacity Utilization 111.8% ICU Level of Service G

Splits and Phases: 1056: NYS Route 104 & NYS Route 261



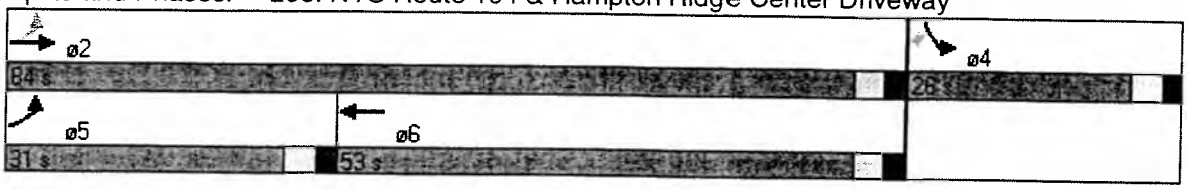
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500			350	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3539	1583	3433	1583
Flt Permitted	0.086				0.950	
Satd. Flow (perm)	160	3574	3539	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				416		307
Link Speed (mph)		40	40		30	
Link Distance (ft)		2287	1046		500	
Travel Time (s)		39.0	17.8		11.4	
Volume (vph)	273	937	1133	505	440	276
Lane Group Flow (vph)	337	1157	1218	543	489	307
Turn Type	pm+pt			Free		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			Free		4
Detector Phases	5	2	6		4	4
Minimum Initial (s)	3.0	10.0	10.0		4.0	4.0
Minimum Split (s)	8.0	25.0	25.0		25.0	25.0
Total Split (s)	31.0	84.0	53.0	0.0	26.0	26.0
Total Split (%)	28%	76%	48%	0%	24%	24%
Maximum Green (s)	26.0	79.0	48.0		21.0	21.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	1.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		Min	Min
Act Effct Green (s)	83.3	83.3	59.0	110.0	20.7	20.7
Actuated g/C Ratio	0.76	0.76	0.54	1.00	0.19	0.19
v/c Ratio	0.78	0.43	0.64	0.34	0.76	0.56
Uniform Delay, d1	24.1	4.8	18.0	0.0	42.3	0.0
Delay	16.1	2.4	7.8	0.0	42.1	4.5
LOS	B	A	A	A	D	A
Approach Delay		5.5	5.4		27.6	
Approach LOS		A	A		C	

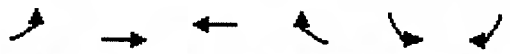
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78
Intersection Signal Delay: 9.8 **Intersection LOS: A**
Intersection Capacity Utilization 76.3% ICU Level of Service C

Splits and Phases: 296: NYS Route 104 & Hampton Ridge Center Driveway





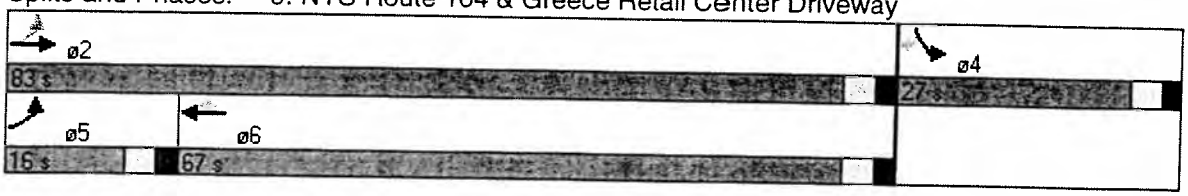
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			200	0	0
Storage Lanes	1			1	1	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3539	1583	1770	1583
Flt Permitted	0.060				0.950	
Satd. Flow (perm)	112	3574	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				188		149
Link Speed (mph)		40	40		30	
Link Distance (ft)		1046	1053		419	
Travel Time (s)		17.8	17.9		9.5	
Volume (vph)	115	1262	1504	211	213	134
Lane Group Flow (vph)	142	1558	1617	227	237	149
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	10.0	10.0	10.0	4.0	4.0
Minimum Split (s)	9.0	15.0	15.0	15.0	9.0	9.0
Total Split (s)	16.0	83.0	67.0	67.0	27.0	27.0
Total Split (%)	15%	75%	61%	61%	25%	25%
Maximum Green (s)	11.0	78.0	62.0	62.0	22.0	22.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	1.0	1.0	1.0	1.0	2.0	2.0
Recall Mode	None	Coord	Coord	Coord	Min	Min
Act Effct Green (s)	84.1	84.1	71.8	71.8	19.9	19.9
Actuated g/C Ratio	0.76	0.76	0.65	0.65	0.18	0.18
v/c Ratio	0.63	0.57	0.70	0.21	0.74	0.36
Uniform Delay, d1	12.8	5.4	12.2	1.2	42.6	0.0
Delay	25.2	2.6	13.8	2.4	42.1	6.1
LOS	C	A	B	A	D	A
Approach Delay		4.5	12.4		28.2	
Approach LOS		A	B		C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74
Intersection Signal Delay: 10.5 Intersection LOS: B
Intersection Capacity Utilization 75.7% ICU Level of Service C

Splits and Phases: 5: NYS Route 104 & Greece Retail Center Driveway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		295	250		205	200		200
Storage Lanes	1		0	1		1	2		1	2		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5	50	60	60	60	60	60	50
Trailing Detector (ft)	0	5		0	5	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1770	4943	0	1770	5085	1583	3433	1863	1583	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4943	0	1770	5085	1583	3433	1863	1583	3433	1863	1583
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		44				126						
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		1299			1383			647			458	
Travel Time (s)		22.1			23.6			12.6			8.9	
Volume (vph)	334	1117	257	206	1134	187	406	515	211	254	318	349
Lane Group Flow (vph)	355	1461	0	215	1181	195	423	536	220	270	338	371
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases						6			8			4
Detector Phases	5	2		1	6	7	3	8	1	7	4	5
Minimum Initial (s)	2.0	5.0		2.0	5.0	2.0	2.0	5.0	2.0	2.0	5.0	2.0
Minimum Split (s)	9.0	29.0		9.0	29.0	7.0	7.0	29.0	9.0	7.0	29.0	9.0
Total Split (s)	32.0	42.0	0.0	24.0	34.0	17.0	24.0	42.0	24.0	17.0	35.0	32.0
Total Split (%)	26%	34%	0%	19%	27%	14%	19%	34%	19%	14%	28%	26%
Maximum Green (s)	27.0	37.0		19.0	29.0	12.0	19.0	37.0	19.0	12.0	30.0	27.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0	3.0	2.0	2.0	1.0	3.0	2.0	1.0
Recall Mode	None	Min		None	Min	None	None	None	None	None	None	None
Act Effct Green (s)	26.4	38.0		18.1	29.7	46.2	19.0	36.4	57.6	13.5	30.8	60.3
Actuated g/C Ratio	0.22	0.32		0.15	0.25	0.39	0.16	0.31	0.49	0.11	0.26	0.51
v/c Ratio	0.90	0.90		0.79	0.92	0.28	0.76	0.93	0.28	0.69	0.70	0.46
Uniform Delay, d1	44.3	37.0		48.0	43.0	8.1	47.2	39.5	17.9	50.2	39.2	18.4
Delay	54.1	42.7		52.2	51.1	10.0	48.6	52.0	18.3	52.3	41.4	19.3
LOS	D	D		D	D	B	D	D	B	D	D	B
Approach Delay		44.9			46.2			44.5			36.0	
Approach LOS		D			D			D			D	

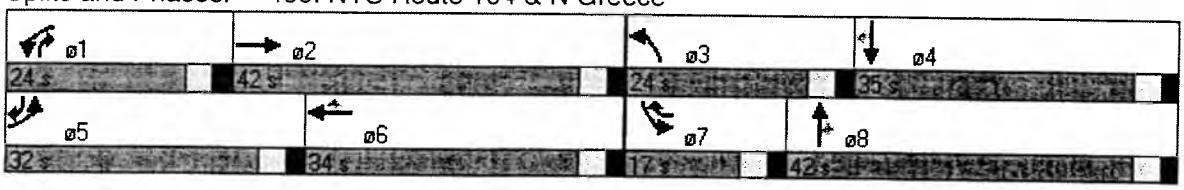
Intersection Summary

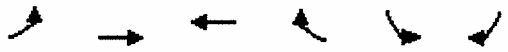
Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 118.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93

Intersection Signal Delay: 43.6
Intersection Capacity Utilization 91.8%

Intersection LOS: D
ICU Level of Service E

Splits and Phases: 499: NYS Route 104 & N Greece





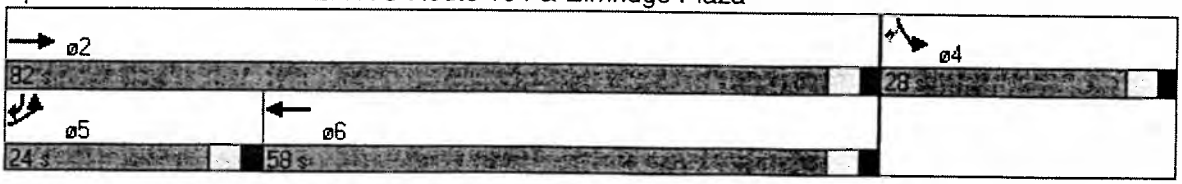
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1805	5085	5136	1615	3502	1615
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1805	5085	5136	1615	3502	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				219		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	148	1434	1373	351	418	153
Lane Group Flow (vph)	163	1576	1543	394	449	165
Turn Type	Prot			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				Free	4	4
Detector Phases	5	2	6		4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	24.0	82.0	58.0	0.0	28.0	24.0
Total Split (%)	22%	75%	53%	0%	25%	22%
Maximum Green (s)	19.0	77.0	53.0		23.0	19.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Min	Min		None	None
Act Effct Green (s)	11.9	34.6	23.1	56.1	14.4	28.0
Actuated g/C Ratio	0.21	0.62	0.41	1.00	0.26	0.48
v/c Ratio	0.44	0.50	0.73	0.24	0.50	0.21
Uniform Delay, d1	20.6	5.2	13.9	0.0	17.8	8.2
Delay	24.0	5.5	15.4	0.0	21.0	9.7
LOS	C	A	B	A	C	A
Approach Delay		7.2	12.3		17.9	
Approach LOS		A	B		B	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 56.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73

Intersection Signal Delay: 11.0 Intersection LOS: B
Intersection Capacity Utilization 61.6% ICU Level of Service B

Splits and Phases: 1412: NYS Route 104 & Elmridge Plaza



Level of Service

2006 Build

Saturday Mid-day Peak Hour

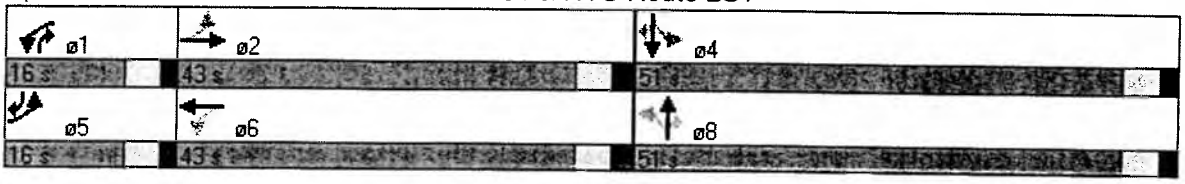
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1805	3551	0	1787	3473	0	0	1839	1583	0	1783	1568
Flt Permitted	0.100			0.100				0.686			0.609	
Satd. Flow (perm)	190	3551	0	188	3473	0	0	1278	1583	0	1119	1568
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		4							13			28
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	81	1070	46	216	906	183	56	154	241	237	152	121
Lane Group Flow (vph)	89	1227	0	235	1184	0	0	221	254	0	453	141
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	16.0	43.0	0.0	16.0	43.0	0.0	51.0	51.0	16.0	51.0	51.0	16.0
Total Split (%)	15%	39%	0%	15%	39%	0%	46%	46%	15%	46%	46%	15%
Maximum Green (s)	11.0	37.5		11.0	37.5		45.5	45.5	11.0	45.5	45.5	11.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	Coord		None	Coord		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	50.5	42.2		57.4	46.2			46.5	61.8		46.5	57.8
Actuated g/C Ratio	0.46	0.38		0.52	0.42			0.42	0.56		0.42	0.53
v/c Ratio	0.43	0.90		0.85	0.81			0.41	0.28		0.96	0.17
Uniform Delay, d1	13.6	31.8		21.3	28.1			22.1	11.8		30.8	10.7
Delay	14.6	41.5		49.1	10.0			22.2	11.6		48.1	10.1
LOS	B	D		D	A			C	B		D	B
Approach Delay		39.7			16.5			16.5			39.1	
Approach LOS		D			B			B			D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110

Offset: 56 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 28.0 Intersection LOS: C
Intersection Capacity Utilization 96.8% ICU Level of Service E

Splits and Phases: 1056: NYS Route 104 & NYS Route 261



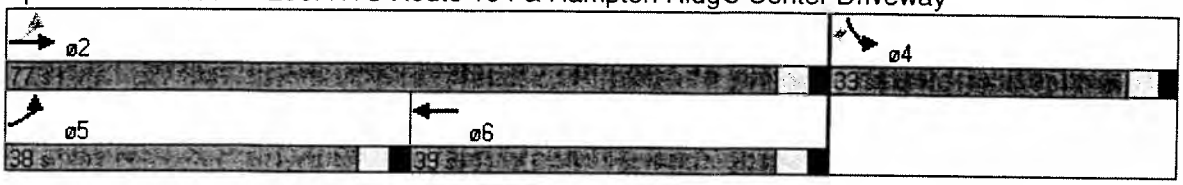
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500			350	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3574	1583	3433	1583
Flt Permitted	0.103				0.950	
Satd. Flow (perm)	192	3574	3574	1583	3433	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				679		399
Link Speed (mph)		40	40		30	
Link Distance (ft)		2287	1046		500	
Travel Time (s)		39.0	17.8		11.4	
Volume (vph)	529	1019	946	821	786	359
Lane Group Flow (vph)	575	1108	1040	902	873	399
Turn Type	pm+pt			Free		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			Free		4
Detector Phases	5	2	6		4	4
Minimum Initial (s)	4.0	10.0	10.0		4.0	4.0
Minimum Split (s)	9.0	25.0	25.0		25.0	25.0
Total Split (s)	38.0	77.0	39.0	0.0	33.0	33.0
Total Split (%)	35%	70%	35%	0%	30%	30%
Maximum Green (s)	33.0	72.0	34.0		28.0	28.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	1.0	1.0	1.0		2.0	2.0
Recall Mode	None	Coord	Coord		None	None
Act Effct Green (s)	74.1	74.1	38.1	110.0	30.0	30.0
Actuated g/C Ratio	0.67	0.67	0.35	1.00	0.27	0.27
v/c Ratio	0.96	0.46	0.84	0.57	0.93	0.55
Uniform Delay, d1	28.7	8.5	33.2	0.0	39.0	0.0
Delay	21.1	3.0	11.3	4.7	48.9	3.3
LOS	C	A	B	A	D	A
Approach Delay		9.2	8.2		34.6	
Approach LOS		A	A		C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 18 (16%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 95.5% ICU Level of Service E

Splits and Phases: 296: NYS Route 104 & Hampton Ridge Center Driveway



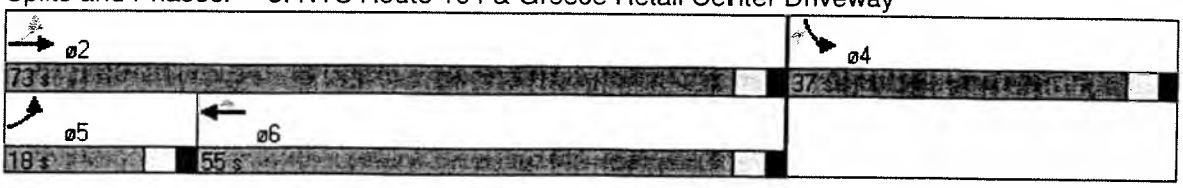
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			200	0	0
Storage Lanes	1			1	1	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1770	3574	3574	1583	1770	1583
Flt Permitted	0.073				0.950	
Satd. Flow (perm)	136	3574	3574	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				284		226
Link Speed (mph)		40	40		30	
Link Distance (ft)		1046	1053		419	
Travel Time (s)		17.8	17.9		9.5	
Volume (vph)	270	1535	1564	419	449	203
Lane Group Flow (vph)	293	1668	1719	460	499	226
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	4.0	10.0	10.0	10.0	4.0	4.0
Minimum Split (s)	9.0	15.0	15.0	15.0	9.0	9.0
Total Split (s)	18.0	73.0	55.0	55.0	37.0	37.0
Total Split (%)	16%	66%	50%	50%	34%	34%
Maximum Green (s)	13.0	68.0	50.0	50.0	32.0	32.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?						
Vehicle Extension (s)	1.0	1.0	1.0	1.0	2.0	2.0
Recall Mode	None	Coord	Coord	Coord	Min	Min
Act Effct Green (s)	70.9	70.9	53.0	53.0	33.0	33.0
Actuated g/C Ratio	0.64	0.64	0.48	0.48	0.30	0.30
v/c Ratio	0.95	0.72	1.00	0.51	0.94	0.36
Uniform Delay, d1	29.6	13.0	28.4	6.5	37.4	0.0
Delay	51.2	6.5	49.5	7.2	50.3	3.9
LOS	D	A	D	A	D	A
Approach Delay		13.1	40.6		35.8	
Approach LOS		B	D		D	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 101.4% ICU Level of Service F

Splits and Phases: 5: NYS Route 104 & Greece Retail Center Driveway



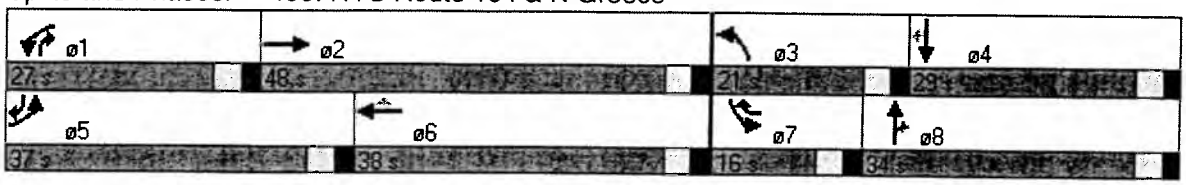
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	295		0	295		295	250		205	200		200
Storage Lanes	1		0	1		1	2		1	2		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5		60	5	50	60	60	60	60	60	50
Trailing Detector (ft)	0	5		0	5	0	0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1770	4928	0	1770	5085	1583	3433	1863	1583	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4928	0	1770	5085	1583	3433	1863	1583	3433	1863	1583
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		59				129						
Link Speed (mph)		40			40			30			35	
Link Distance (ft)		1299			1383			647			458	
Travel Time (s)		22.1			23.6			14.7			8.9	
Volume (vph)	415	1347	352	208	1300	191	315	392	272	241	290	421
Lane Group Flow (vph)	432	1770	0	219	1368	201	328	408	283	248	299	434
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5
Permitted Phases						6			8			4
Detector Phases	5	2		1	6	7	3	8	1	7	4	5
Minimum Initial (s)	2.0	5.0		2.0	5.0	2.0	2.0	5.0	2.0	2.0	5.0	2.0
Minimum Split (s)	9.0	29.0		9.0	29.0	7.0	7.0	29.0	9.0	7.0	29.0	9.0
Total Split (s)	37.0	48.0	0.0	27.0	38.0	16.0	21.0	34.0	27.0	16.0	29.0	37.0
Total Split (%)	30%	38%	0%	22%	30%	13%	17%	27%	22%	13%	23%	30%
Maximum Green (s)	32.0	43.0		22.0	33.0	11.0	16.0	29.0	22.0	11.0	24.0	32.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	2.0	3.0	2.0	2.0	1.0	3.0	2.0	1.0
Recall Mode	None	Min		None	Min	None	None	None	None	None	None	None
Act Effct Green (s)	31.5	46.1		19.2	33.8	49.5	16.3	28.9	51.1	12.6	25.2	59.8
Actuated g/C Ratio	0.26	0.39		0.16	0.28	0.42	0.14	0.24	0.43	0.11	0.21	0.50
v/c Ratio	0.92	0.91		0.77	0.95	0.27	0.70	0.90	0.42	0.68	0.76	0.55
Uniform Delay, d1	42.4	33.1		47.6	41.6	7.6	48.9	43.5	23.5	51.1	43.9	20.2
Delay	54.8	41.5		48.5	51.0	9.3	50.2	54.6	23.6	53.1	49.0	21.2
LOS	D	D		D	D	A	D	D	C	D	D	C
Approach Delay		44.1			46.0			44.6			37.7	
Approach LOS		D			D			D			D	

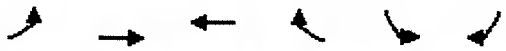
Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 119
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95

Intersection Signal Delay: 43.7 Intersection LOS: D
Intersection Capacity Utilization 92.3% ICU Level of Service E

Splits and Phases: 499: NYS Route 104 & N Greece





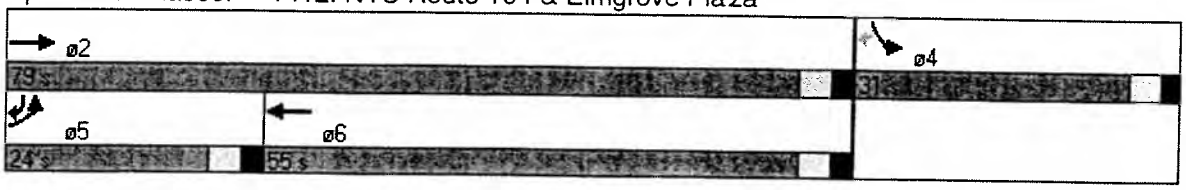
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			215	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	5	5	5	60	60
Trailing Detector (ft)	0	5	5	5	0	0
Turning Speed (mph)	15			9	15	9
Satd. Flow (prot)	1787	5136	5136	1599	3467	1615
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1787	5136	5136	1599	3467	1615
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				203		
Link Speed (mph)		40	40		30	
Link Distance (ft)		1383	1664		478	
Travel Time (s)		23.6	28.4		10.9	
Volume (vph)	185	1674	1530	363	542	169
Lane Group Flow (vph)	197	1781	1719	408	609	190
Turn Type	Prot			Free		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				Free	4	4
Detector Phases	5	2	6		4	5
Minimum Initial (s)	2.0	5.0	5.0		5.0	2.0
Minimum Split (s)	7.0	54.0	54.0		10.0	7.0
Total Split (s)	24.0	79.0	55.0	0.0	31.0	24.0
Total Split (%)	22%	72%	50%	0%	28%	22%
Maximum Green (s)	19.0	74.0	50.0		26.0	19.0
Yellow Time (s)	3.0	3.0	3.0		3.0	3.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	1.0	1.0		2.0	2.0
Recall Mode	None	Min	Min		None	None
Act Effct Green (s)	14.0	43.7	30.2	70.2	19.4	35.2
Actuated g/C Ratio	0.19	0.62	0.43	1.00	0.28	0.49
v/c Ratio	0.57	0.56	0.78	0.26	0.64	0.24
Uniform Delay, d1	27.0	6.9	17.0	0.0	22.3	10.5
Delay	30.9	7.2	19.0	0.0	25.7	12.1
LOS	C	A	B	A	C	B
Approach Delay		9.6	15.3		22.5	
Approach LOS		A	B		C	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 70.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78

Intersection Signal Delay: 14.2 Intersection LOS: B
Intersection Capacity Utilization 71.5% ICU Level of Service C

Splits and Phases: 1412: NYS Route 104 & Elmgrove Plaza



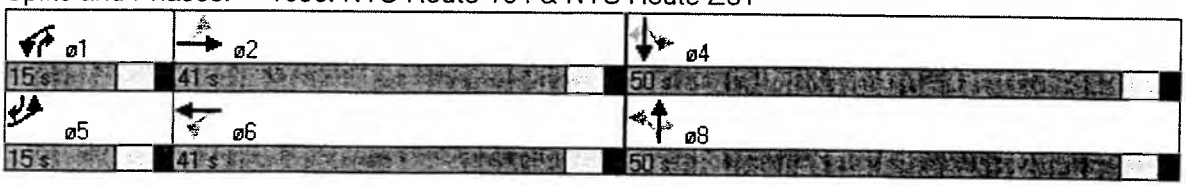
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1719	3436	0	1787	3273	0	1703	1827	1615	1805	1845	1538
Flt Permitted	0.105			0.167			0.663			0.266		
Satd. Flow (perm)	190	3436	0	314	3273	0	1188	1827	1615	505	1845	1538
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		8							59			27
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	144	687	51	204	877	186	107	438	212	157	102	126
Lane Group Flow (vph)	164	839	0	227	1181	0	126	515	249	183	119	147
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	15.0	41.0	0.0	15.0	41.0	0.0	50.0	50.0	15.0	50.0	50.0	15.0
Total Split (%)	14%	39%	0%	14%	39%	0%	47%	47%	14%	47%	47%	14%
Maximum Green (s)	10.0	35.5		10.0	35.5		44.5	44.5	10.0	44.5	44.5	10.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	None		None	None		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	46.8	36.9		48.4	37.7		37.9	37.9	51.8	37.9	37.9	51.0
Actuated g/C Ratio	0.49	0.39		0.51	0.40		0.40	0.40	0.55	0.40	0.40	0.54
v/c Ratio	0.65	0.63		0.70	0.91		0.27	0.70	0.27	0.91	0.16	0.18
Uniform Delay, d1	11.8	22.9		11.8	26.7		18.8	23.5	8.4	26.4	18.0	8.9
Delay	18.8	25.7		18.6	44.9		19.0	23.6	8.2	41.6	17.9	8.5
LOS	B	C		B	D		B	C	A	D	B	A
Approach Delay		24.5			40.7			18.6			24.5	
Approach LOS		C			D			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 94.9

Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 29.2 Intersection LOS: C
Intersection Capacity Utilization 93.2% ICU Level of Service E

Splits and Phases: 1056: NYS Route 104 & NYS Route 261



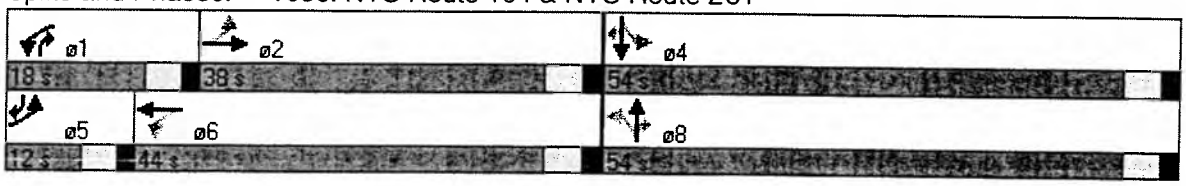
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	245		0	170		0	0		150	0		100
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	60	60		60	60		60	60	60	60	60	60
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Satd. Flow (prot)	1719	3440	0	1787	3257	0	1703	1827	1615	1805	1845	1538
Flt Permitted	0.114			0.105			0.665			0.282		
Satd. Flow (perm)	206	3440	0	198	3257	0	1192	1827	1615	536	1845	1538
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		6							26			22
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1211			2287			1361			1370	
Travel Time (s)		20.6			39.0			23.2			23.4	
Volume (vph)	144	769	51	228	962	219	107	438	258	183	102	126
Lane Group Flow (vph)	164	932	0	253	1312	0	126	515	304	213	119	147
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases	2			6			8		8	4		4
Detector Phases	5	2		1	6		8	8	1	4	4	5
Minimum Initial (s)	2.0	15.0		2.0	15.0		5.0	5.0	2.0	5.0	5.0	2.0
Minimum Split (s)	7.0	20.5		7.0	20.5		27.5	27.5	7.0	27.5	27.5	7.0
Total Split (s)	12.0	38.0	0.0	18.0	44.0	0.0	54.0	54.0	18.0	54.0	54.0	12.0
Total Split (%)	11%	35%	0%	16%	40%	0%	49%	49%	16%	49%	49%	11%
Maximum Green (s)	7.0	32.5		13.0	38.5		48.5	48.5	13.0	48.5	48.5	7.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	2.0		1.5	2.0		2.0	2.0	1.5	2.0	2.0	1.5
Lead/Lag	Lead	Lag		Lead	Lag				Lead			Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		2.0	2.0	1.0	2.0	2.0	1.0
Recall Mode	None	Coord		None	Coord		None	None	None	None	None	None
Walk Time (s)							7.0	7.0		7.0	7.0	
Flash Dont Walk (s)							15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)							0	0		0	0	
Act Effct Green (s)	50.5	41.7		57.1	46.0		46.2	46.2	62.3	46.2	46.2	58.0
Actuated g/C Ratio	0.46	0.38		0.52	0.42		0.42	0.42	0.57	0.42	0.42	0.53
v/c Ratio	0.76	0.71		0.87	0.96		0.25	0.67	0.33	0.95	0.15	0.18
Uniform Delay, d1	14.9	28.8		21.8	31.2		20.7	25.8	11.5	30.7	19.7	11.4
Delay	34.3	33.1		46.6	52.9		19.4	25.2	10.6	47.2	18.4	10.3
LOS	C	C		D	D		B	C	B	D	B	B
Approach Delay		33.3			51.9			19.8			28.7	
Approach LOS		C			D			B			C	

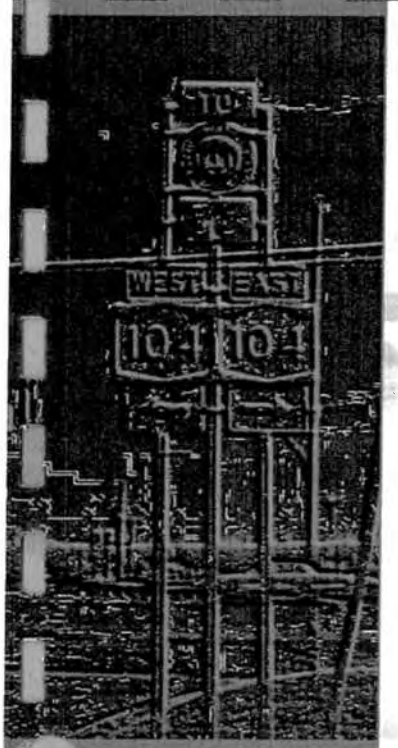
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110

Offset: 41 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 36.8 Intersection LOS: D
Intersection Capacity Utilization 98.6% ICU Level of Service E

Splits and Phases: 1056: NYS Route 104 & NYS Route 261





APPENDIX E

Green Band Analysis
Driveway Location

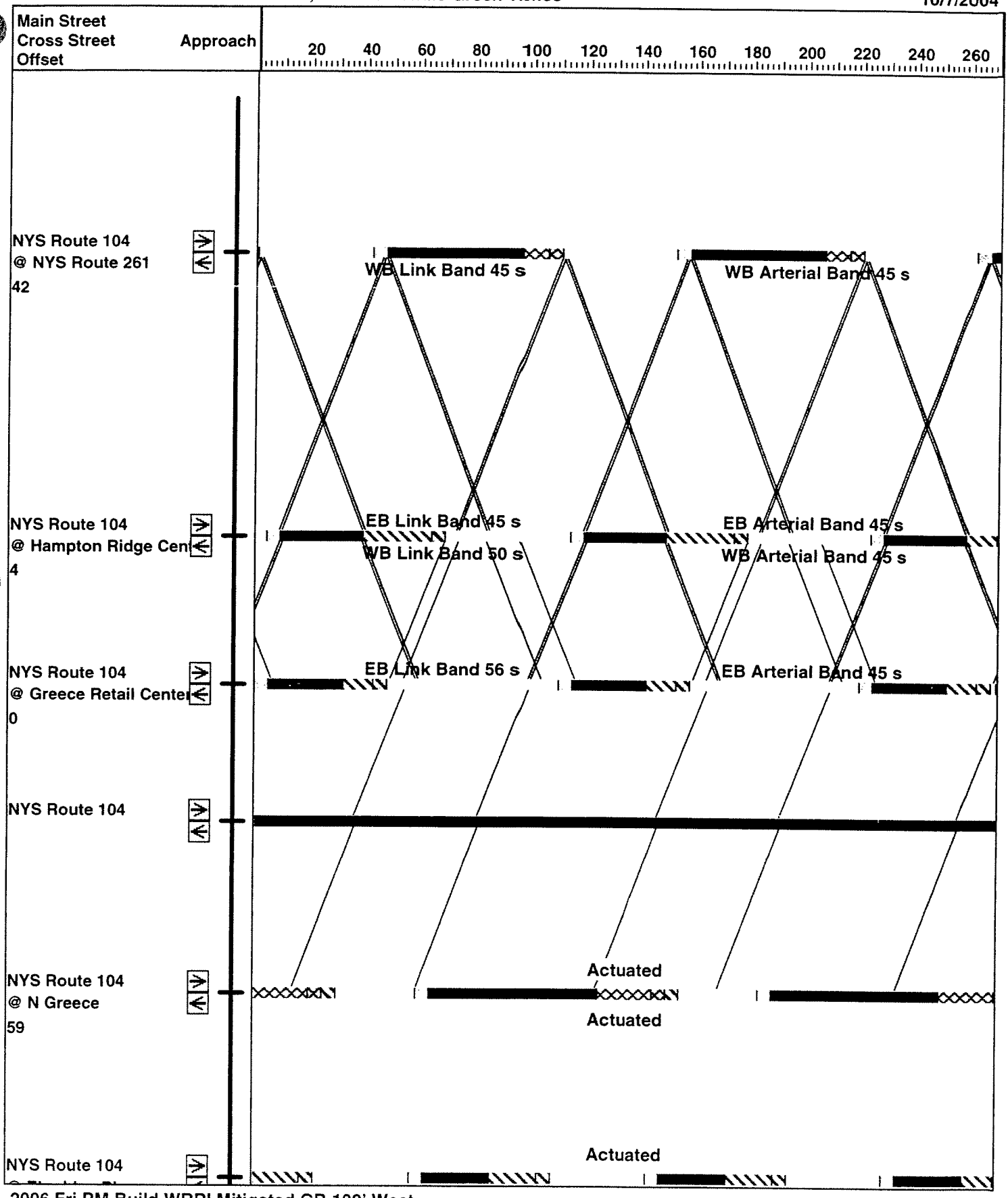
ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

Time-Space Diagram - NYS Route 104

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

10/7/2004



2006 Fri PM Build WRRI Mitigated GB 100' West

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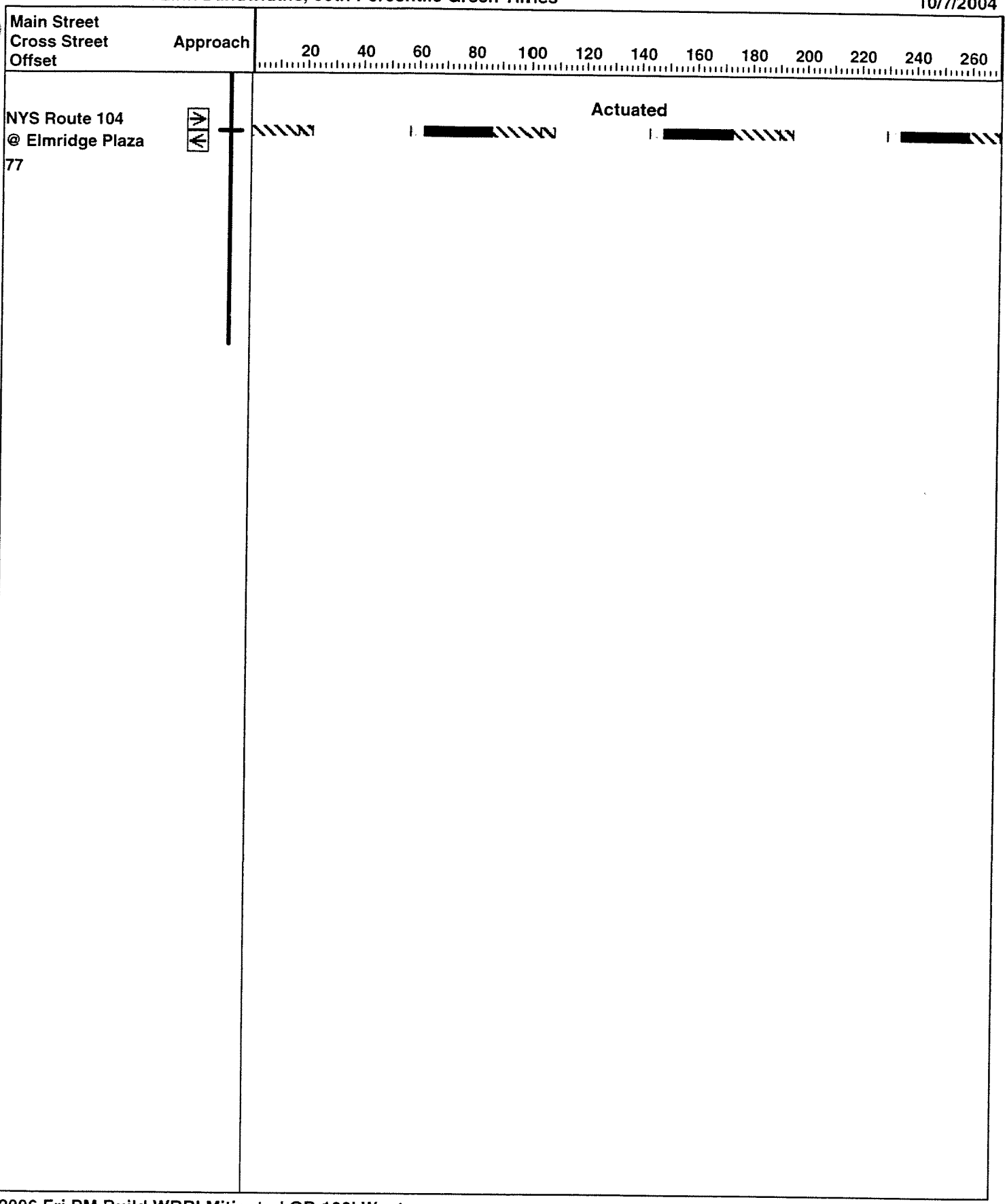
Arterial and Link-Link Bandwidths, 90th Percentile Green Times

10/7/2004



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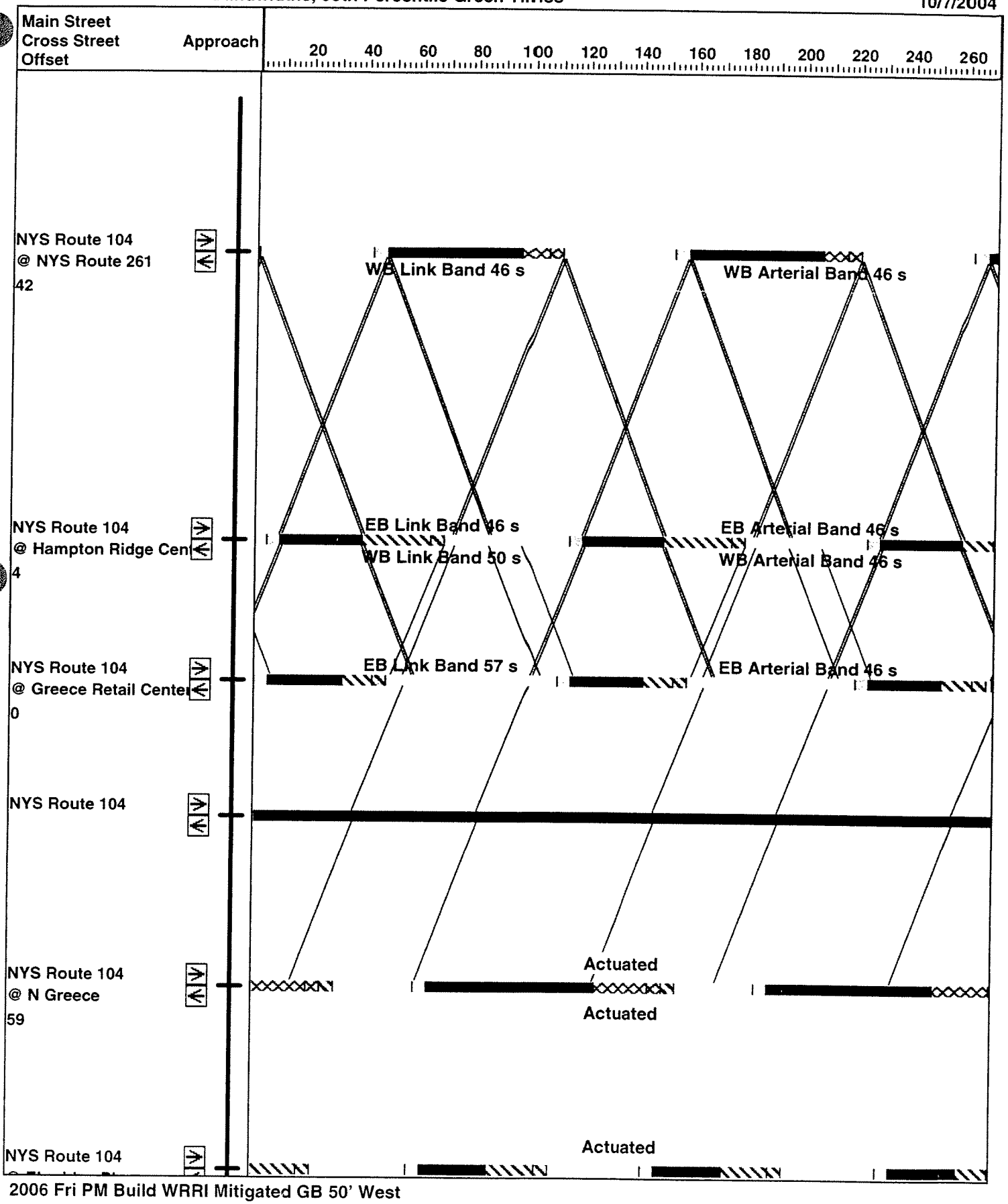
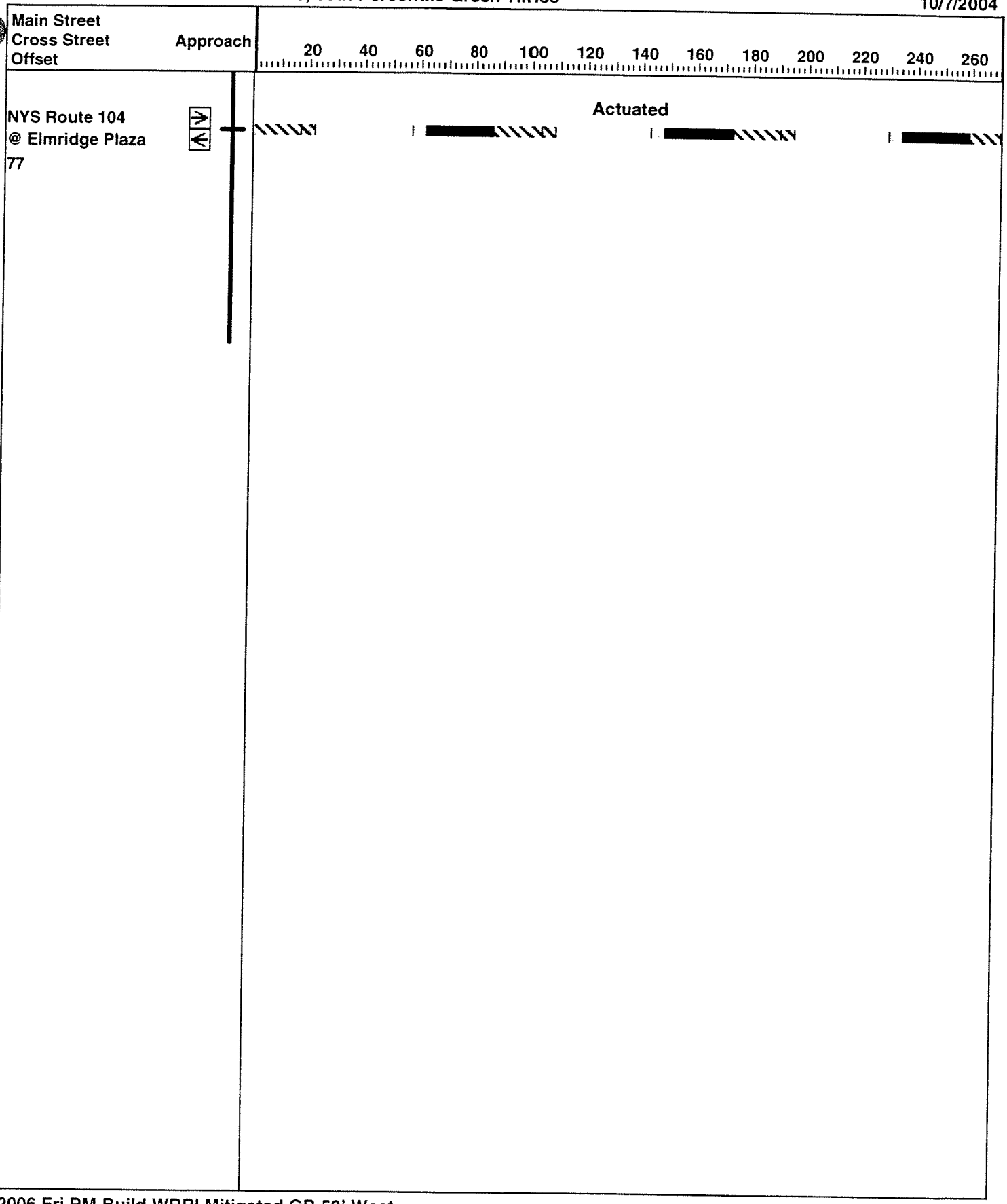


2006 Fri PM Build WRRI Mitigated GB 50' West

Time-Space Diagram - NYS Route 104

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

10/7/2004



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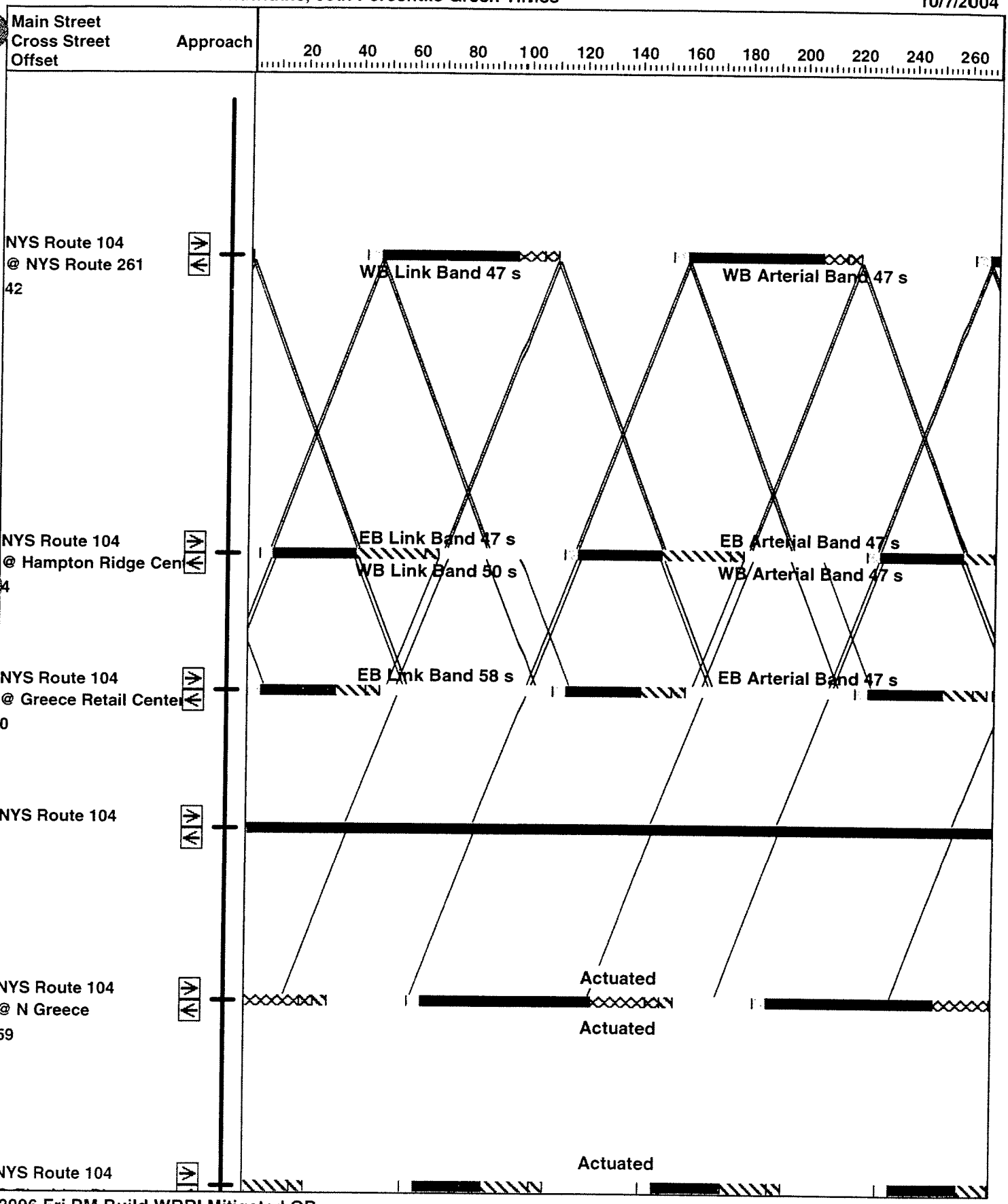
10/7/2004



2006 Fri PM Build WRRI Mitigated GB

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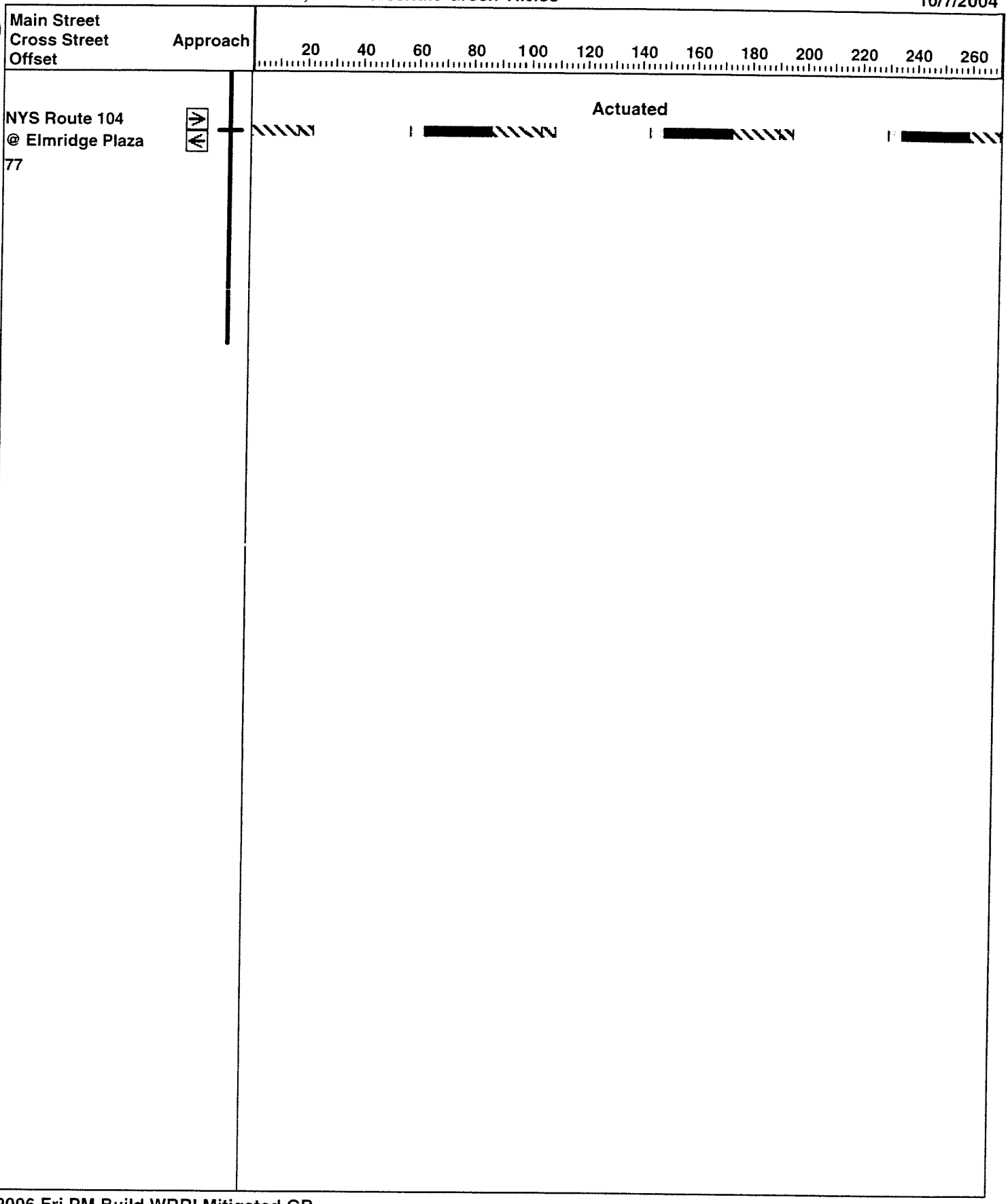

2006 Fri PM Build WRRI Mitigated GB

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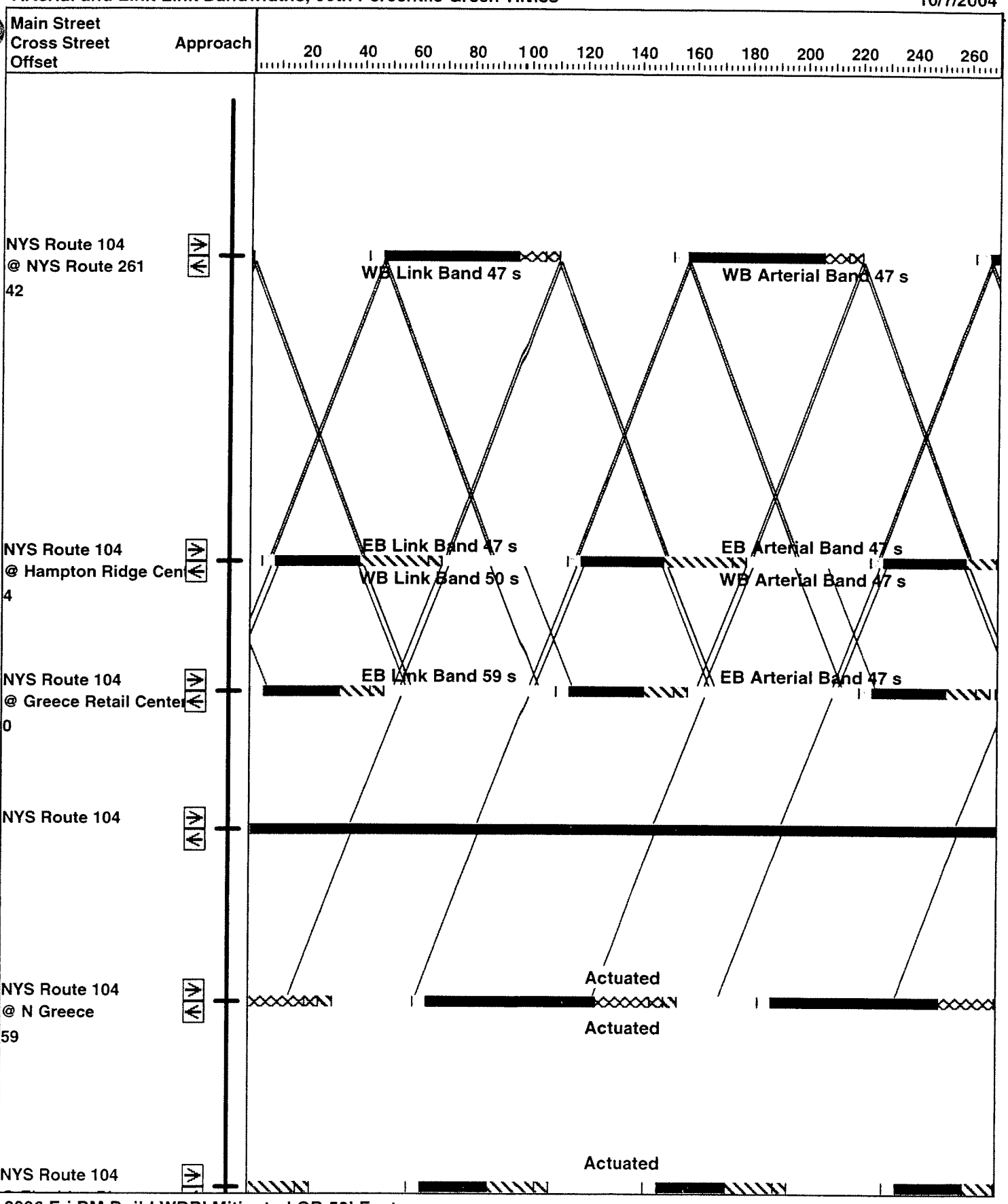
10/7/2004



2006 Fri PM Build WRRI Mitigated GB 50' East

Time-Space Diagram - NYS Route 104

Arterial and Link-Link Bandwidths, 90th Percentile Green Times

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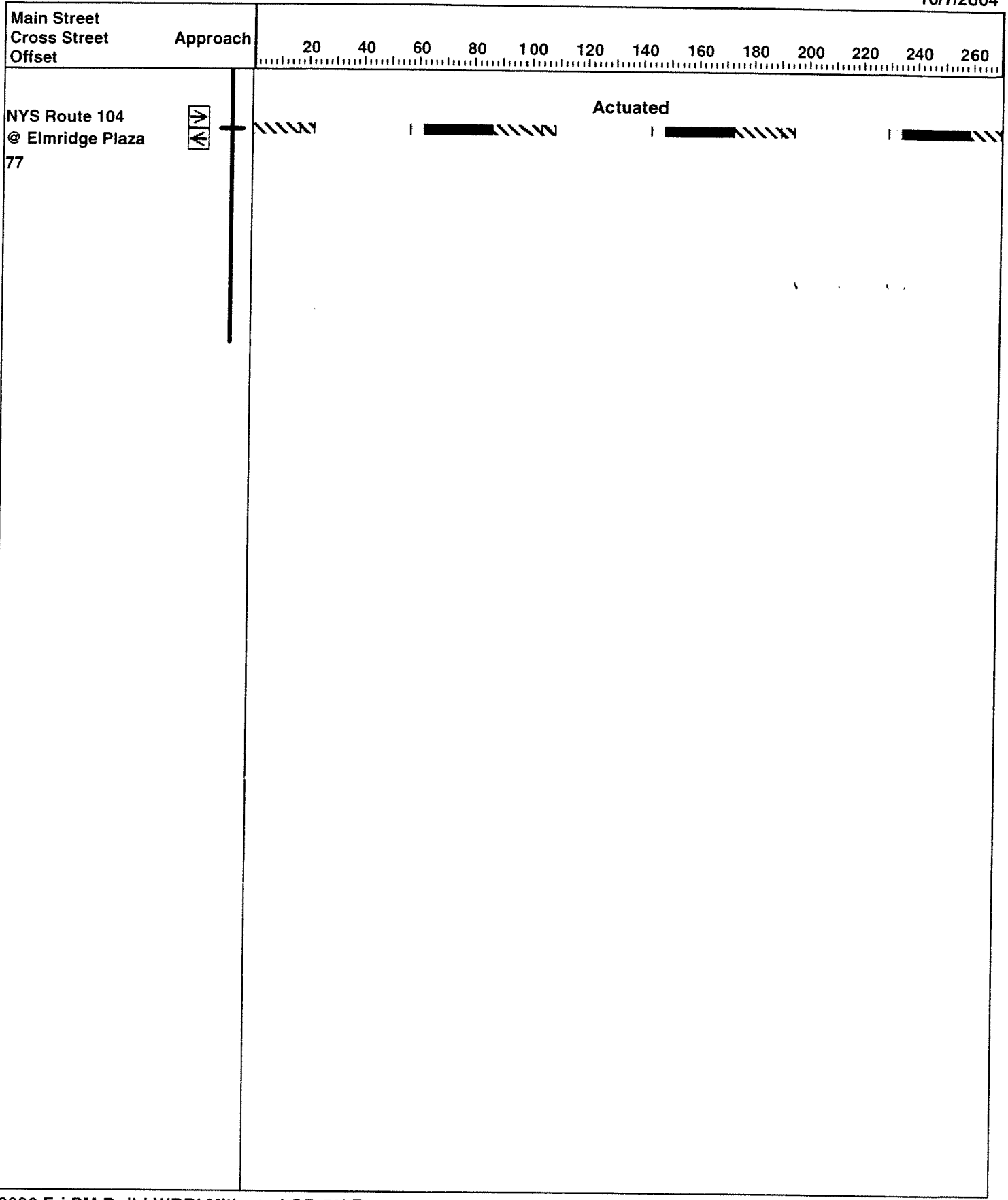

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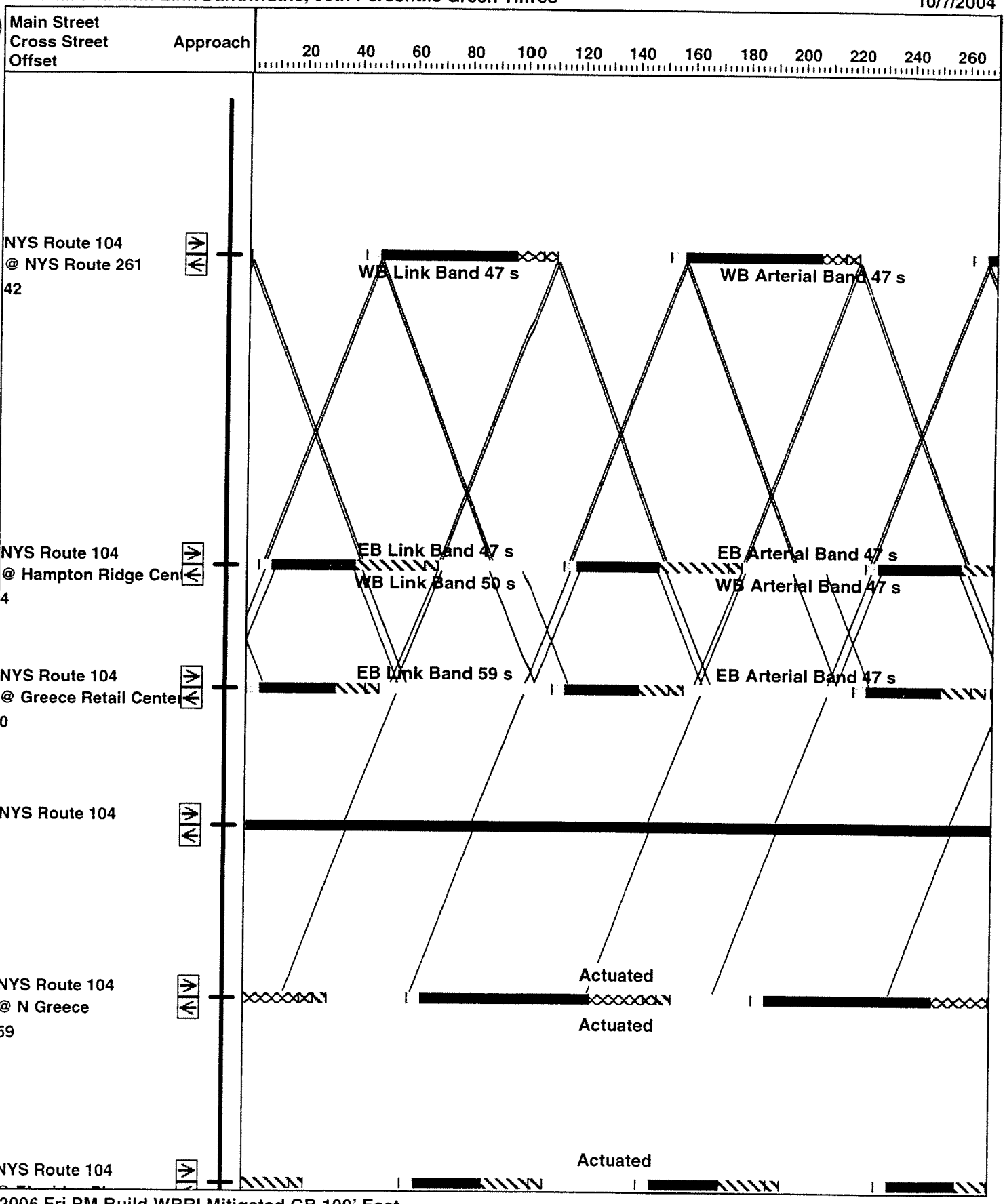
Arterial and Link-Link Bandwidths, 90th Percentile Green Times

10/7/2004



2006 Fri PM Build WRRI Mitigated GB 100' East

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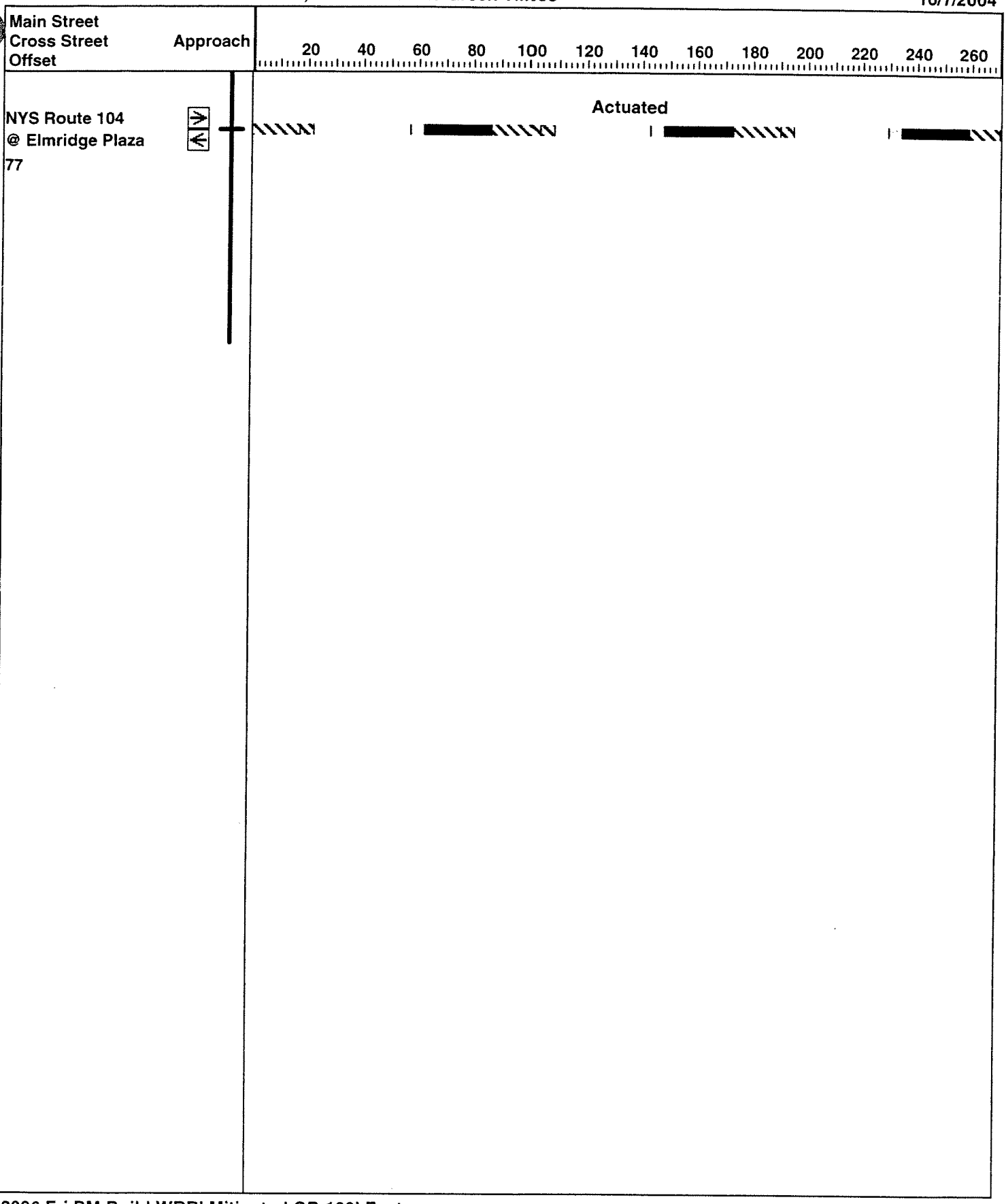

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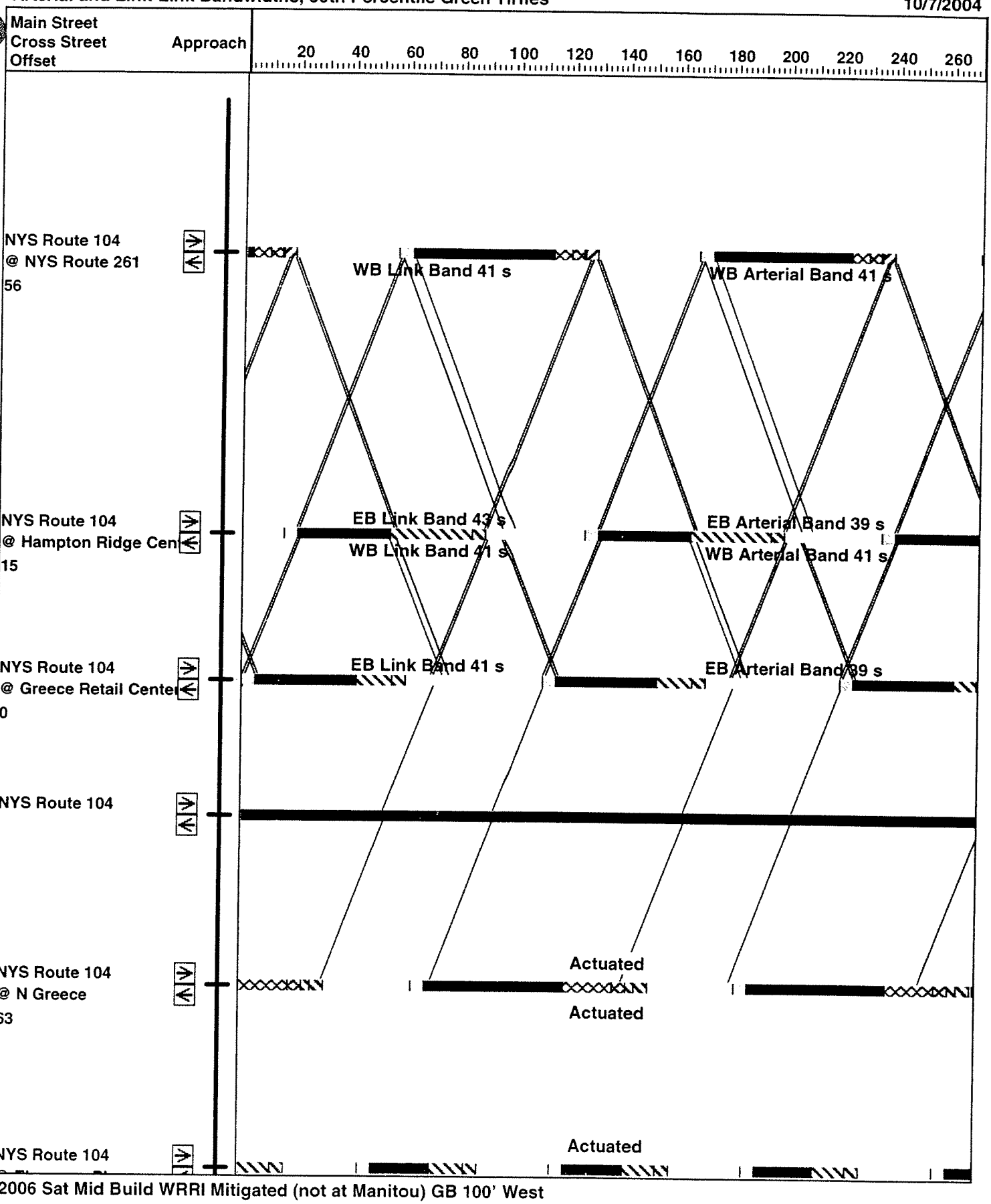
Time-Space Diagram - NYS Route 104

Arterial and Link-Link Bandwidths, 50th Percentile Green Times

10/7/2004

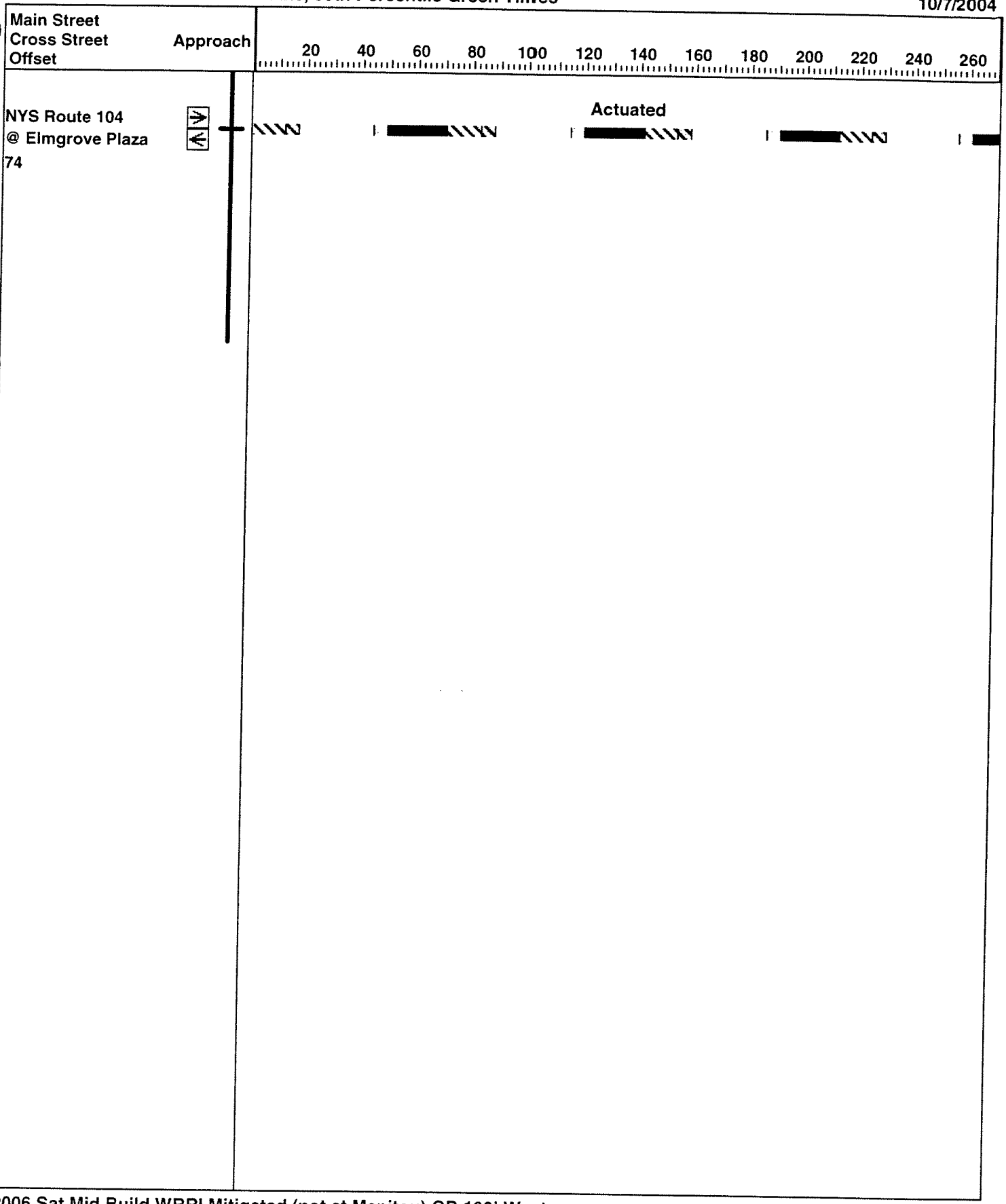


2006 Sat Mid Build WRRI Mitigated (not at Manitou) GB 100' West

Time-Space Diagram - NYS Route 104

Arterial and Link-Link Bandwidths, 50th Percentile Green Times

10/7/2004



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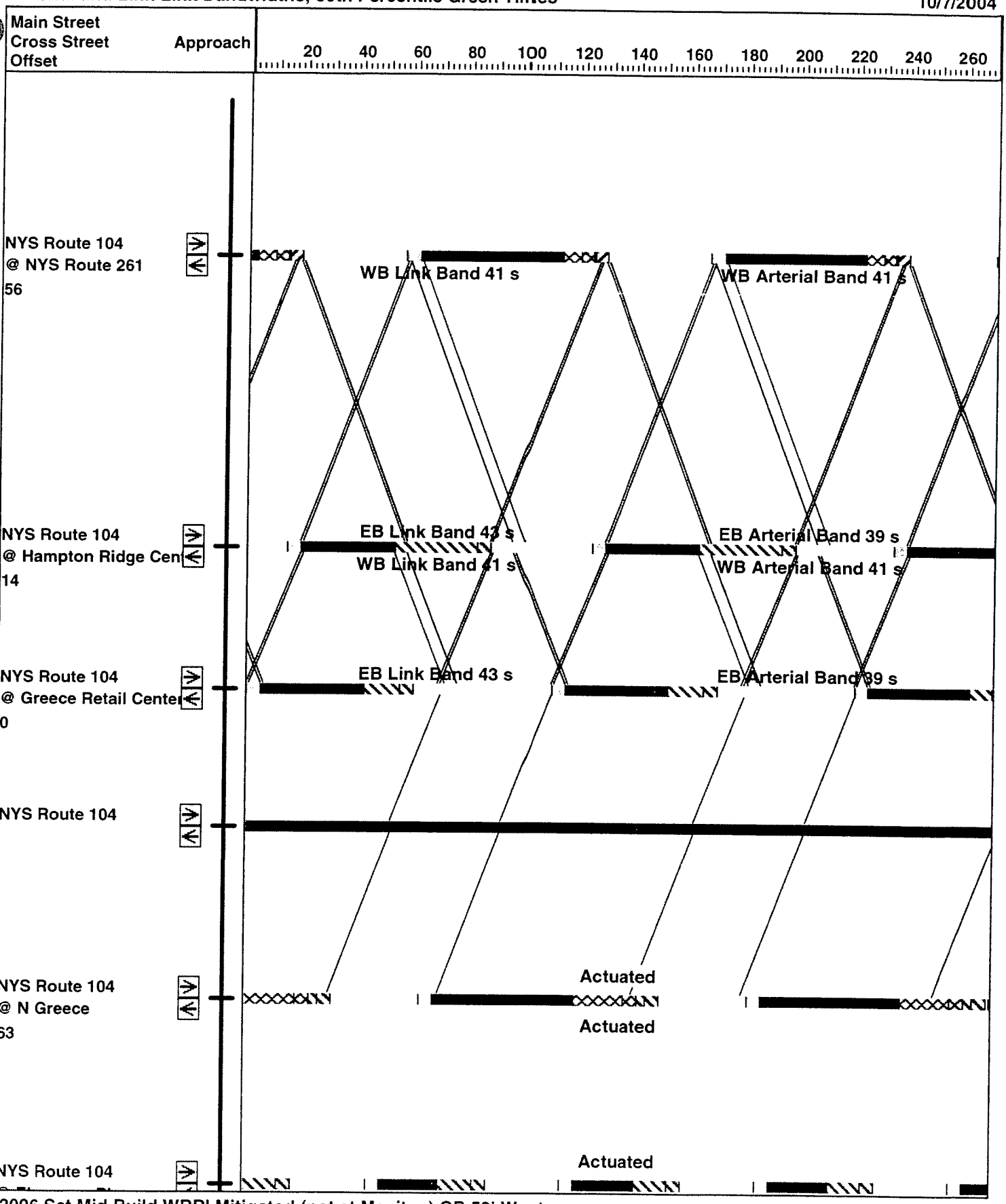
Arterial and Link-Link Bandwidths, 50th Percentile Green Times

10/7/2004



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Arterial and Link-Link Bandwidths, 50th Percentile Green Times

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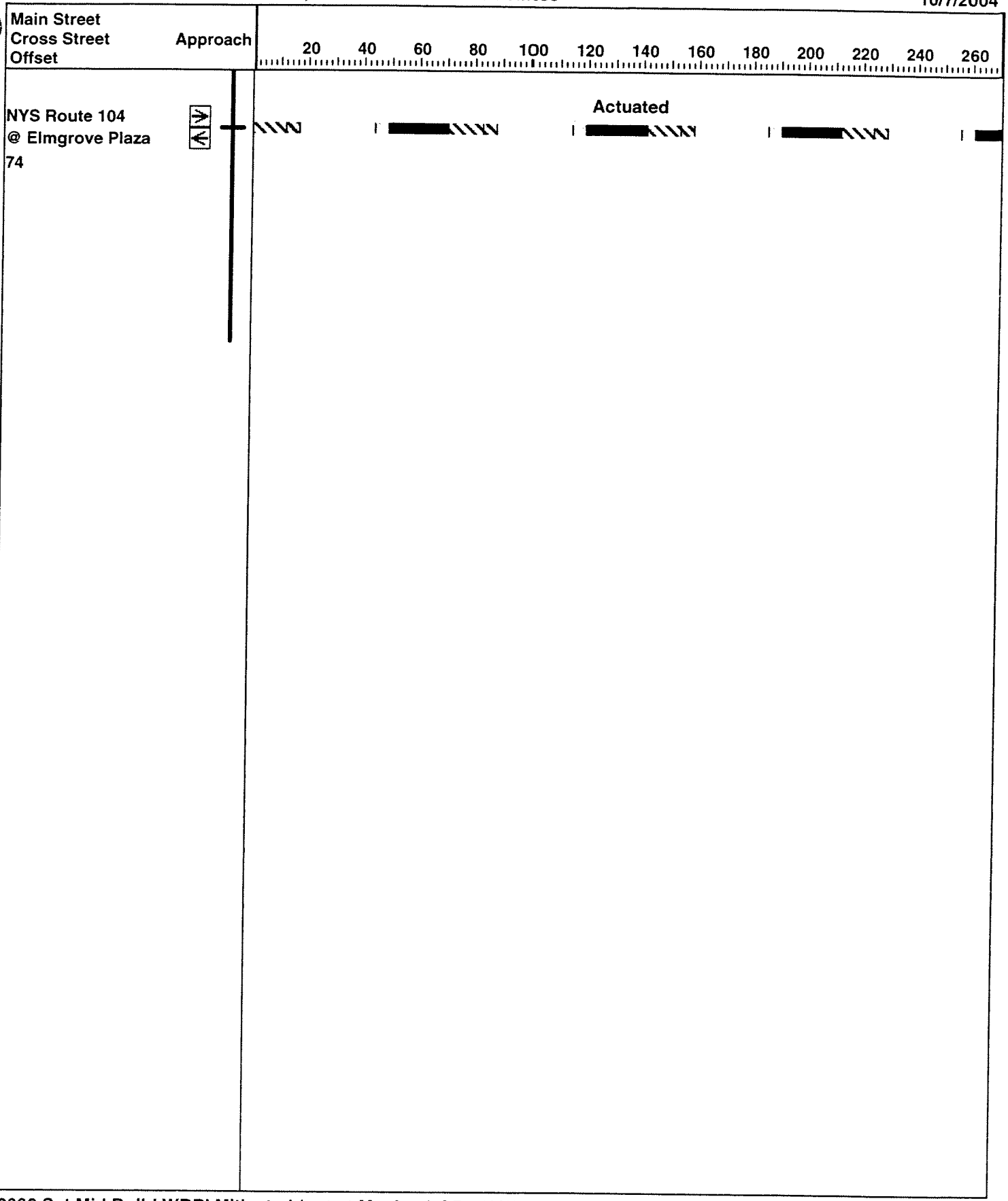

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Arterial and Link-Link Bandwidths, 50th Percentile Green Times

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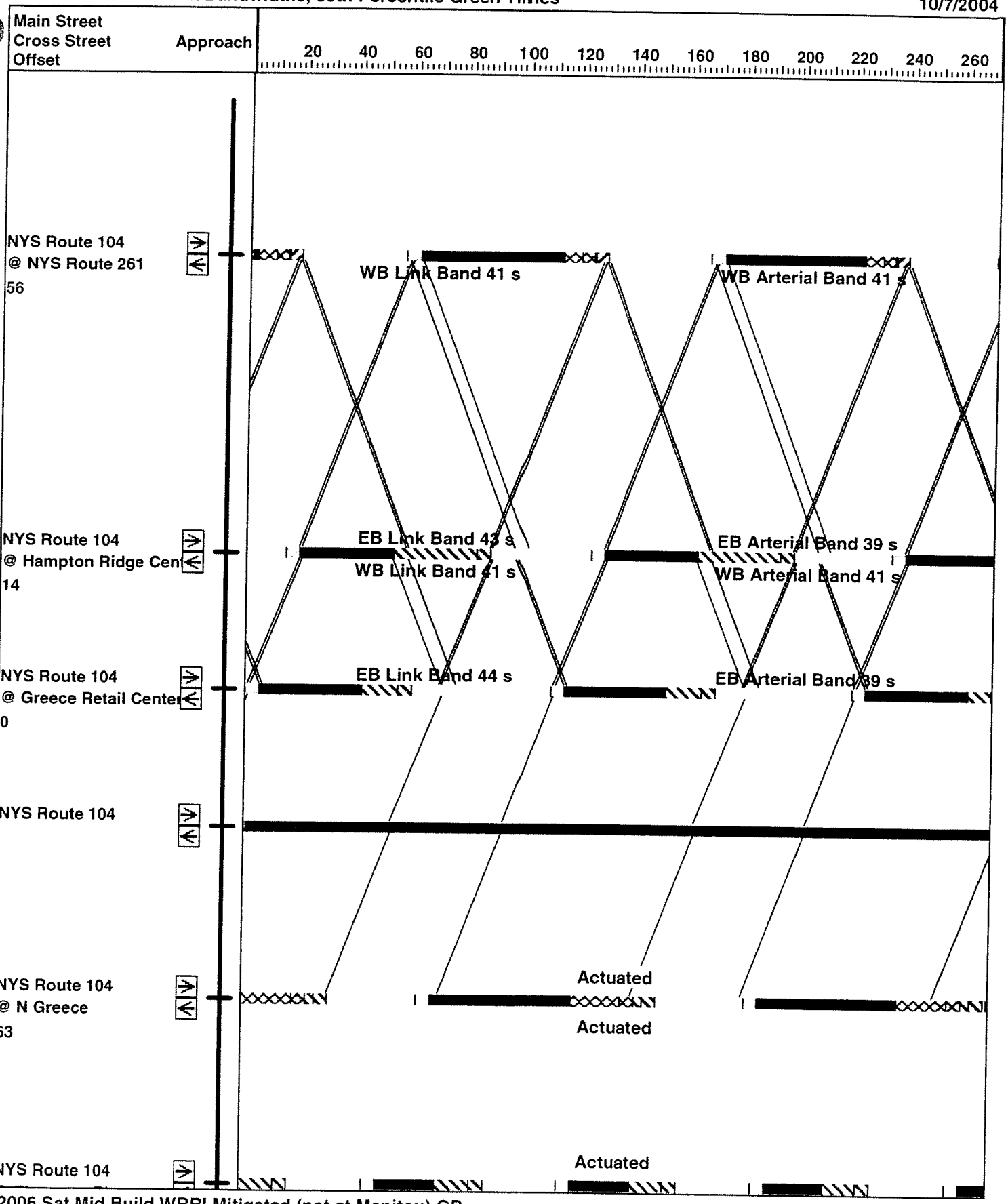

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Arterial and Link-Link Bandwidths, 50th Percentile Green Times

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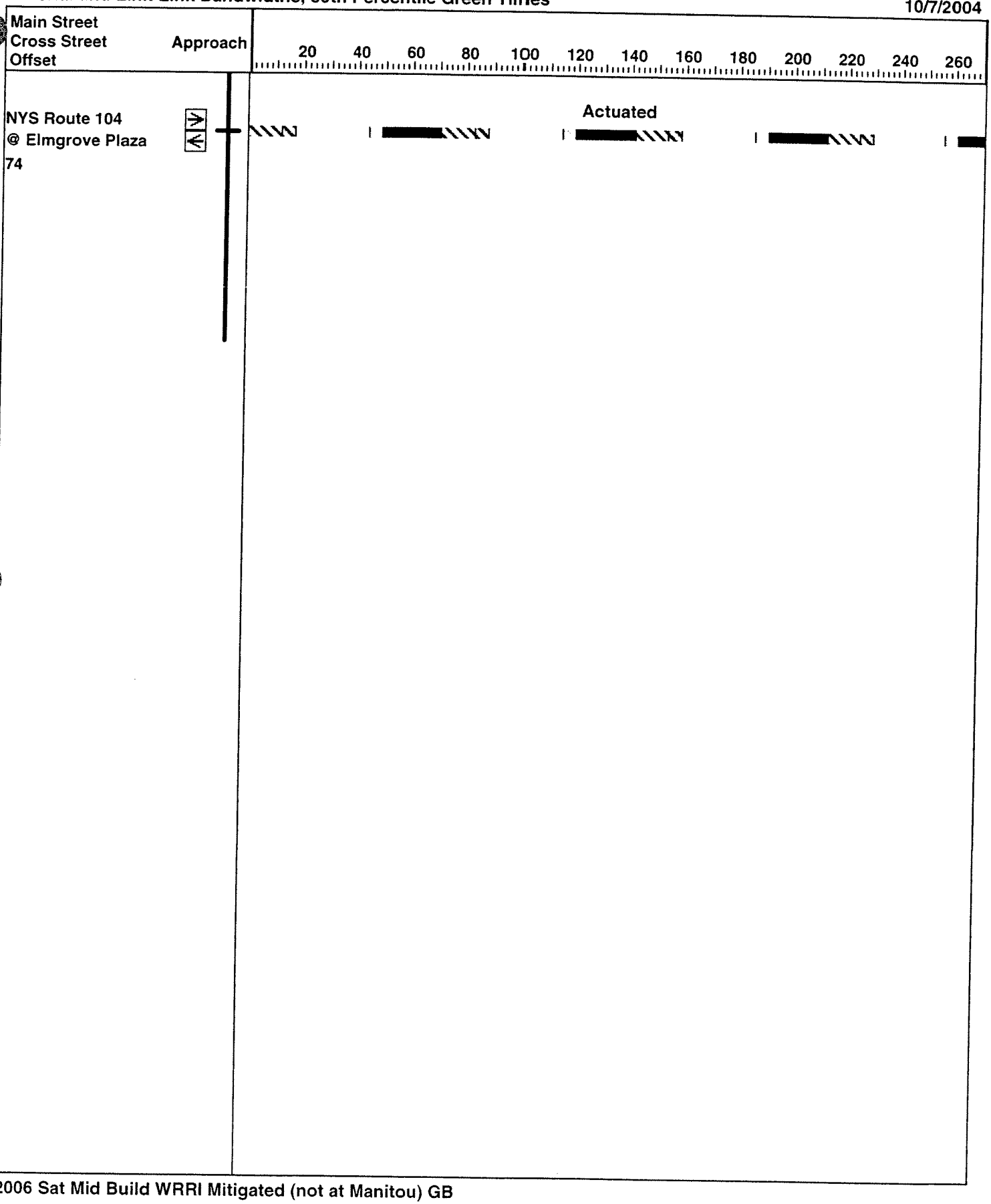

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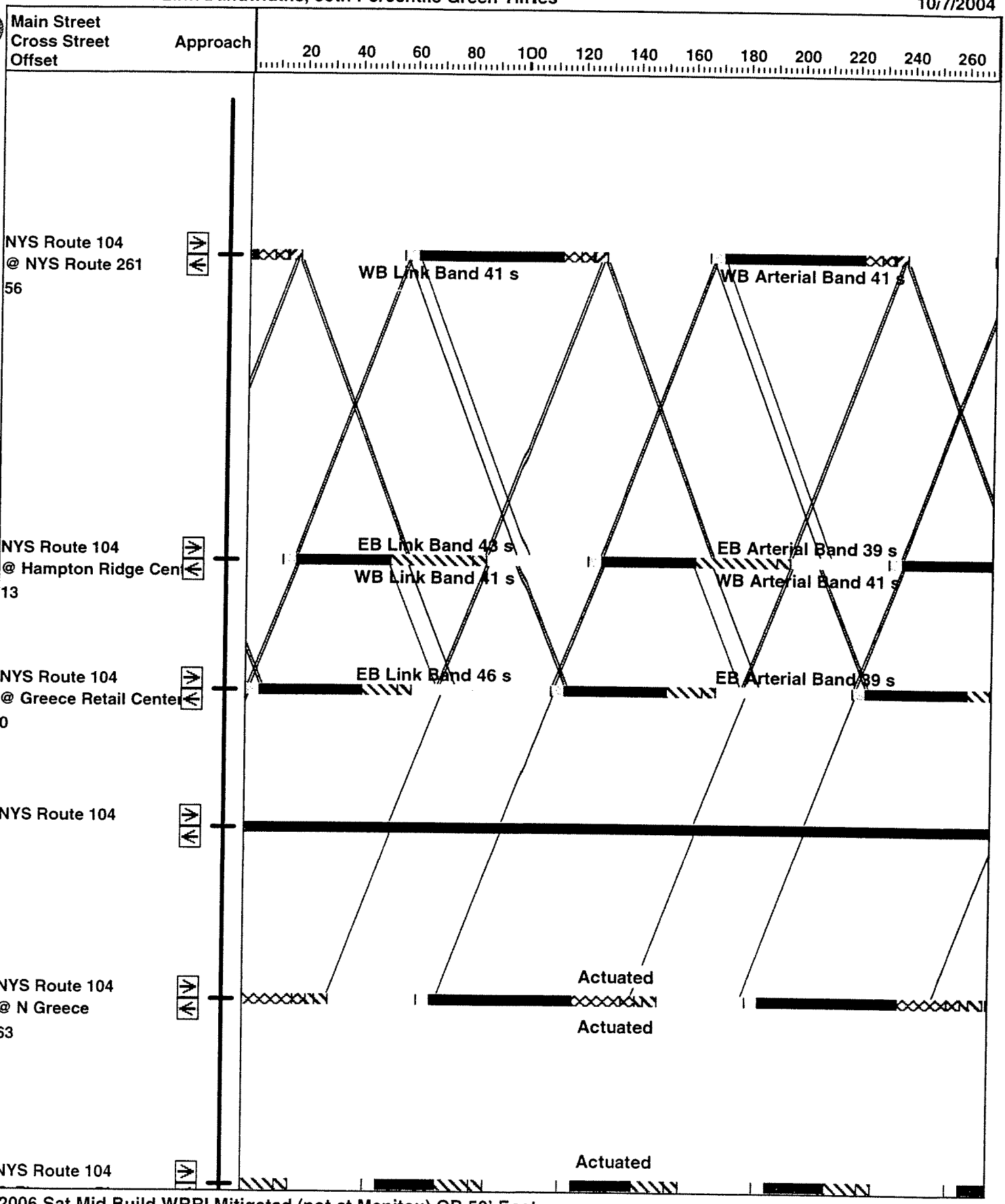

2006 Sat Mid Build WRRI Mitigated (not at Manitou) GB 50' East

Time-Space Diagram - NYS Route 104

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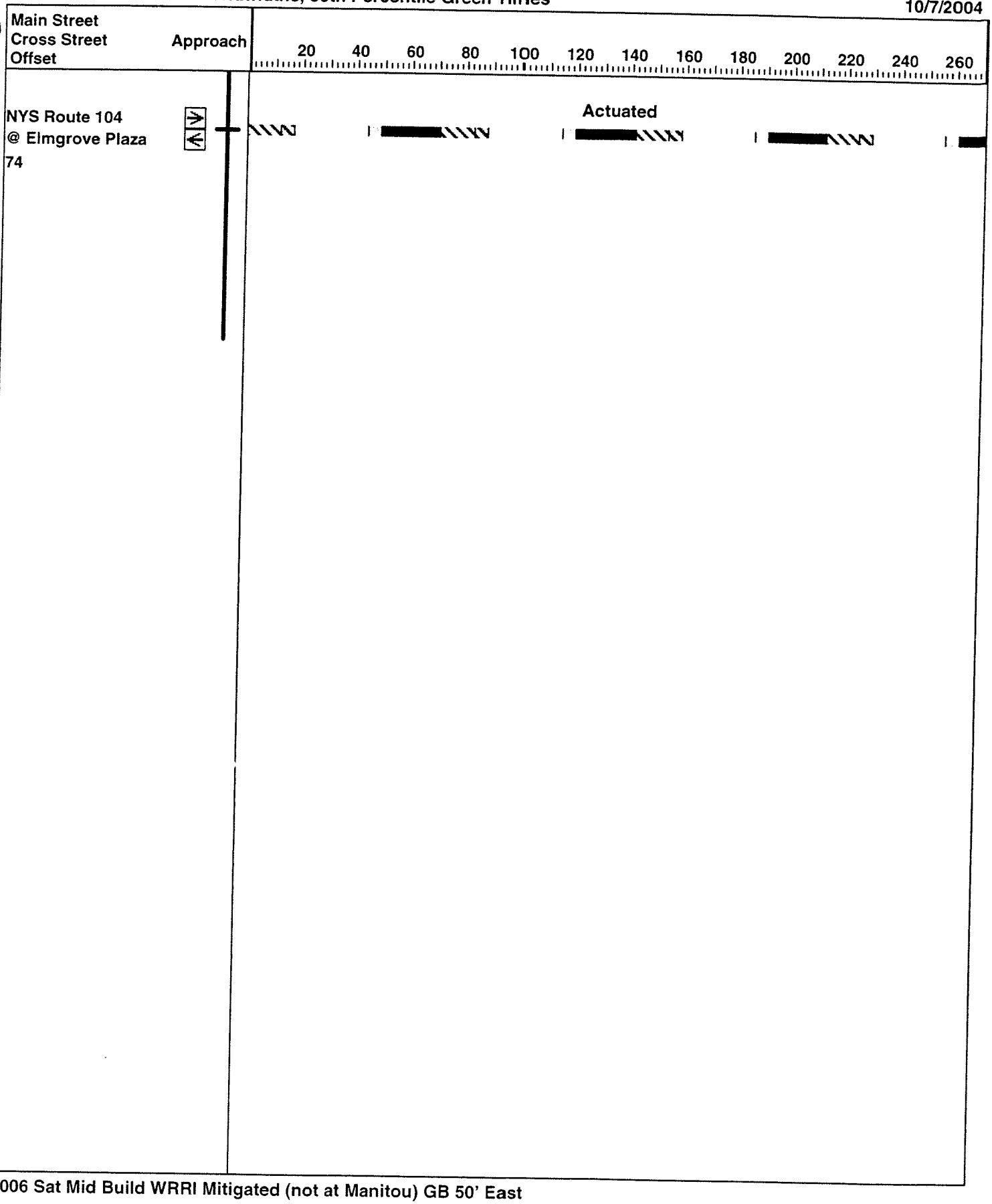

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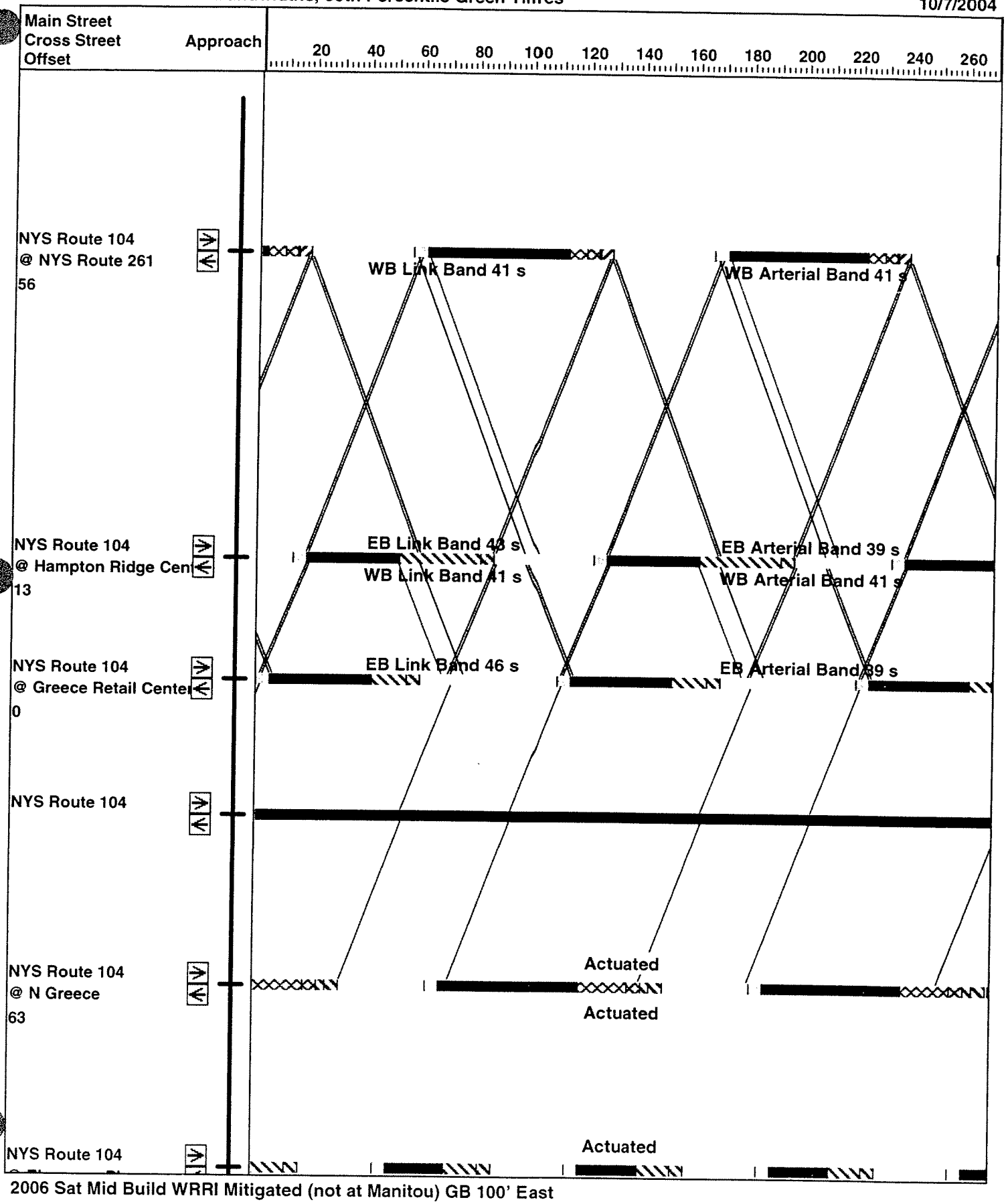

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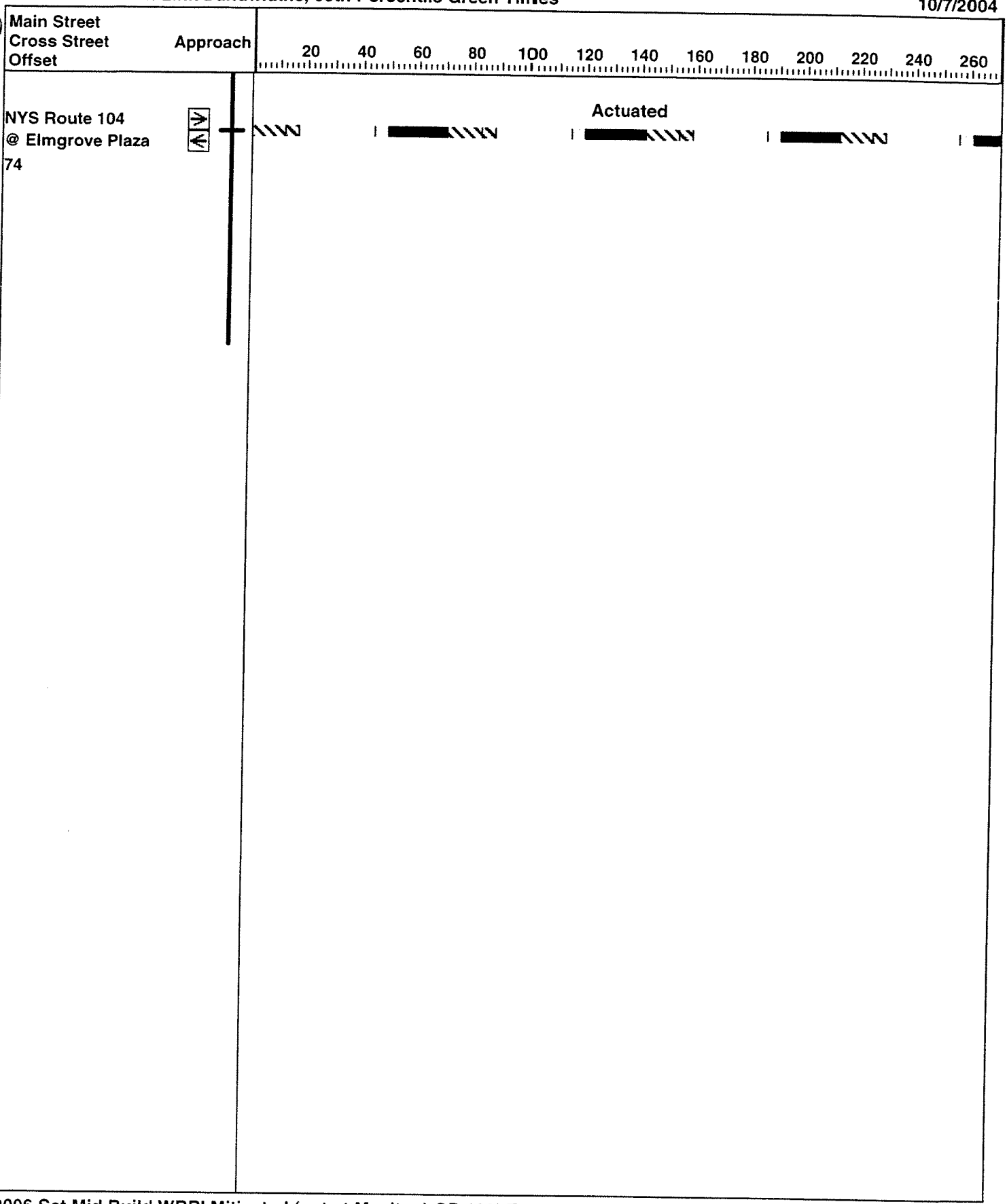

2006 Sat Mid Build WRRI Mitigated (not at Manitou) GB 100' East

APPENDIX F
Pedestrian Generator Checklist

ERGMANN
associates

200 First Federal Plaza
Rochester, New York
14614

Attachment A

PEDESTRIAN GENERATOR CHECKLIST

Note: The term "generator" in this document refers to both pedestrian generators (where pedestrians originate) and destinations (where pedestrians travel to)

A check of yes indicates a potential need to accommodate pedestrians and coordination with the Regional Bicycle and Pedestrian Coordinator is necessary during project scoping. Answers to the following questions should be checked with the local municipality to ensure accuracy.

1.	Is there an existing or planned sidewalk, trail, or pedestrian crossing facility?	YES☑ NO☐
2.	Are there bus stops, transit stations, or depots/terminals located in or within 800 m of the project area?	YES☑ NO☐
3.	Is there more than occasional pedestrian activity? Evidence of pedestrian activity may include a worn path.	YES☐ NO☑
4.	Are there existing or approved plans for generators of pedestrian activity in or within 800 m of the project that promote or have the potential to promote pedestrian traffic in the project area, such as schools, parks, playgrounds, places of employment, places of worship, post offices, municipal buildings, restaurants, shopping centers or other commercial areas, or multiuse paths?	YES☑ NO☐
5.	Are there existing or approved plans for seasonal generators of pedestrian activity in or within 800 m of the project that promote or have the potential to promote pedestrian traffic in the project area, such as ski resorts, state parks, camps, amusement parks?	YES☐ NO☑
6.	Is the project located in a residential area within 800 m of existing or planned pedestrian generators such as those listed in #4?	YES☐ NO☑
7.	From record plans, were pedestrian facilities removed during a previous highway reconstruction project?	YES☐ NO☑
8.	Did a study of secondary impacts indicate that the project promotes or is likely to promote commercial and/or residential development within the intended life cycle of the project?	YES☑ NO☐
9.	Does the community's comprehensive plan call for development of pedestrian facilities in the area?	YES☑ NO☐

Note: This checklist should be revisited due to a project delay or if site conditions or local planning changes during the project development process.

Appendix E:

Phase IA Cultural Resource Survey

Generic Draft Environmental Impact Statement

Hampton Ridge Center Rezoning