

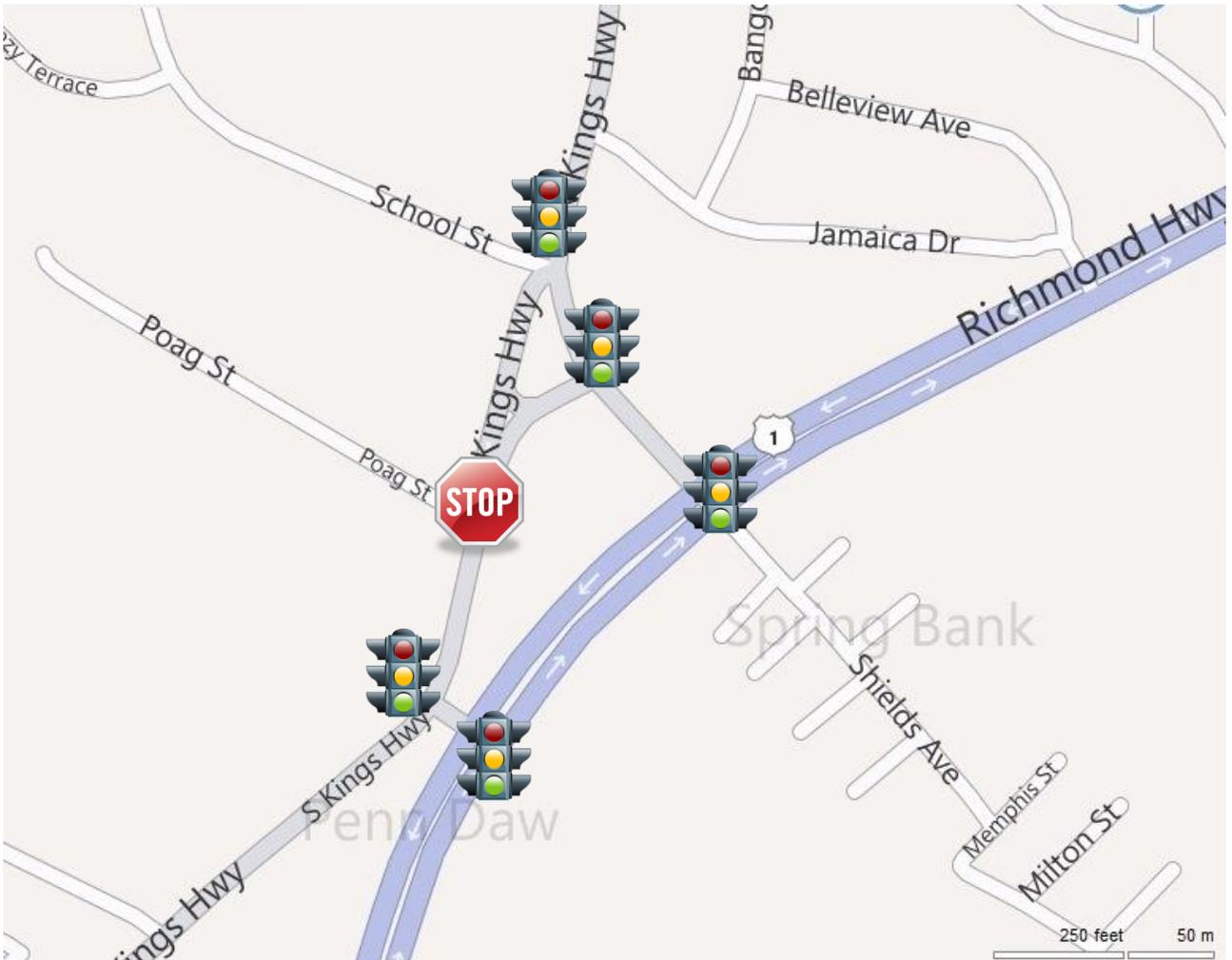
Penn Daw Special Study Task Force

Transportation Analysis

Fairfax County DOT

November 3, 2011

Existing Roadway Network Intersections



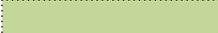
PENN DAW SPECIAL STUDY TASK FORCE

TABLE 1: LAND USE & TRIP GENERATION COMPARISON

PENN DAW SITE ONLY

	CURRENT COMPREHENSIVE PLAN	TASK FORCE ALTERNATIVE 1	TASK FORCE ALTERNATIVE 2	DEVELOPER OPTION
LAND USE COMPARISON				
RETAIL (SF)	194,000	130,000	90,000	70,000
OFFICE (SF)	58,000	0	0	0
MULTIFAMILY (DU)	0	300	500	780
TOWNHOUSE (DU)	0	20	20	36
SINGLE FAMILY (DU)	3	4	4	0
TRIP GENERATION COMPARISON				
DAILY TRIPS	8,741	7,495	7,113	7,941
AM PEAK HOUR TRIPS	ENTER	196	86	93
	EXIT	<u>80</u>	<u>166</u>	<u>244</u>
	TOTAL	276	252	337
PM PEAK HOUR TRIPS	ENTER	391	388	448
	EXIT	<u>500</u>	<u>339</u>	<u>304</u>
	TOTAL	891	727	695

SF = SQUARE FEET
DU = DWELLING UNIT

 LOWEST IMPACT
 HIGHEST IMPACT

NOTE: INTERNAL SYNERGY & RETAIL PASS-BY REDUCTIONS ASSUMED WHERE APPROPRIATE

Land Use & Trip Generation

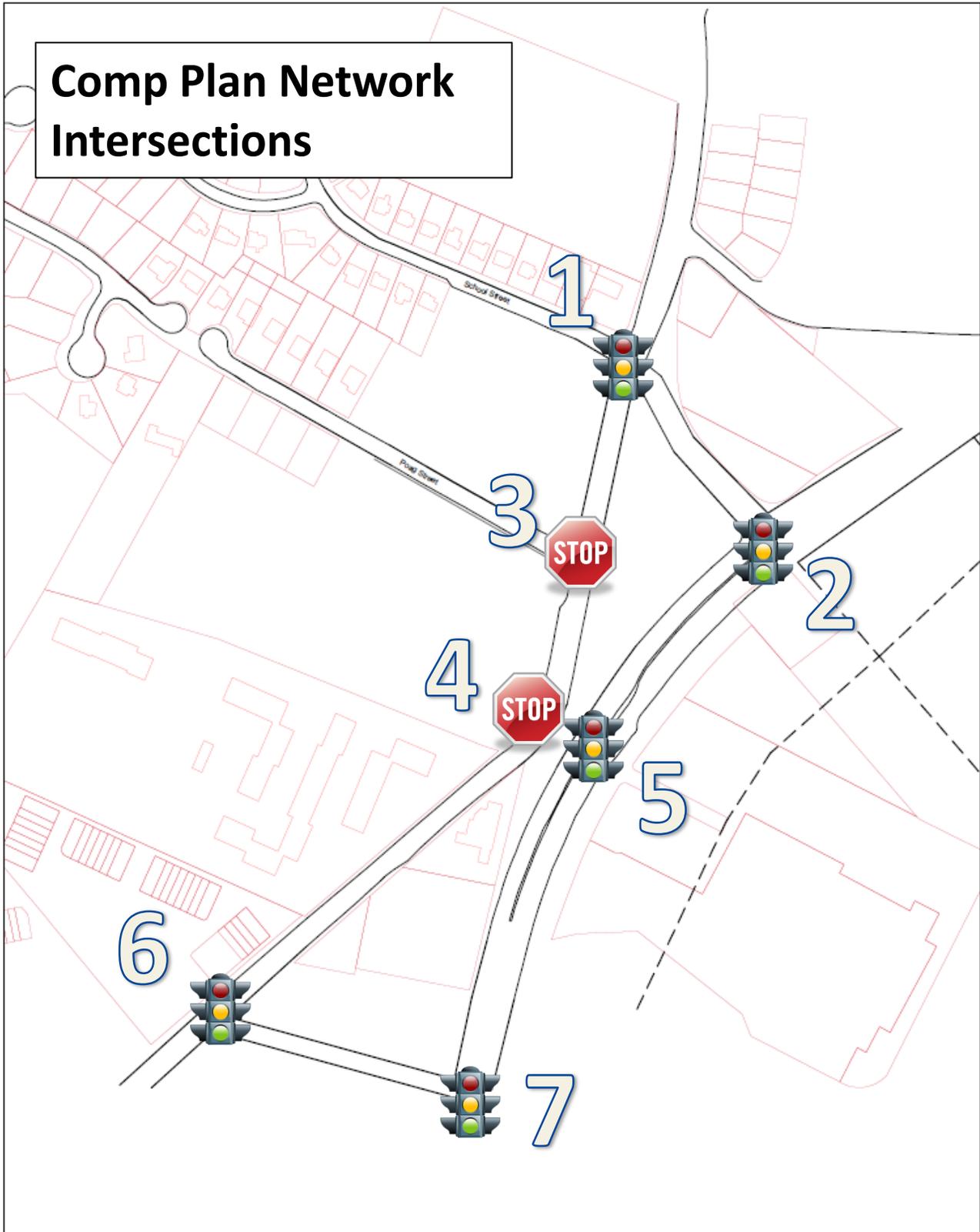
Key Findings

- Proposed Land Use Scenarios Will Not Necessarily Add Significantly to Traffic Congestion. They Will Actually Result in Reductions, Except in AM.
- Land Uses in Current Comprehensive Plan Generate:
 - Highest Daily Trips; and
 - Highest PM Peak Hour Trips
- Land Uses in Developer Option Generate:
 - Highest AM Peak Hour Trips
- Land Uses in Task Force Alternative 1 Generate:
 - Lowest AM Peak Hour Trips
- Land Uses in Task Force Alternative 2 Generate:
 - Lowest Daily Trips; and
 - Lowest PM Peak Hour Trips

Penn Daw Trip Distribution (Approximate)



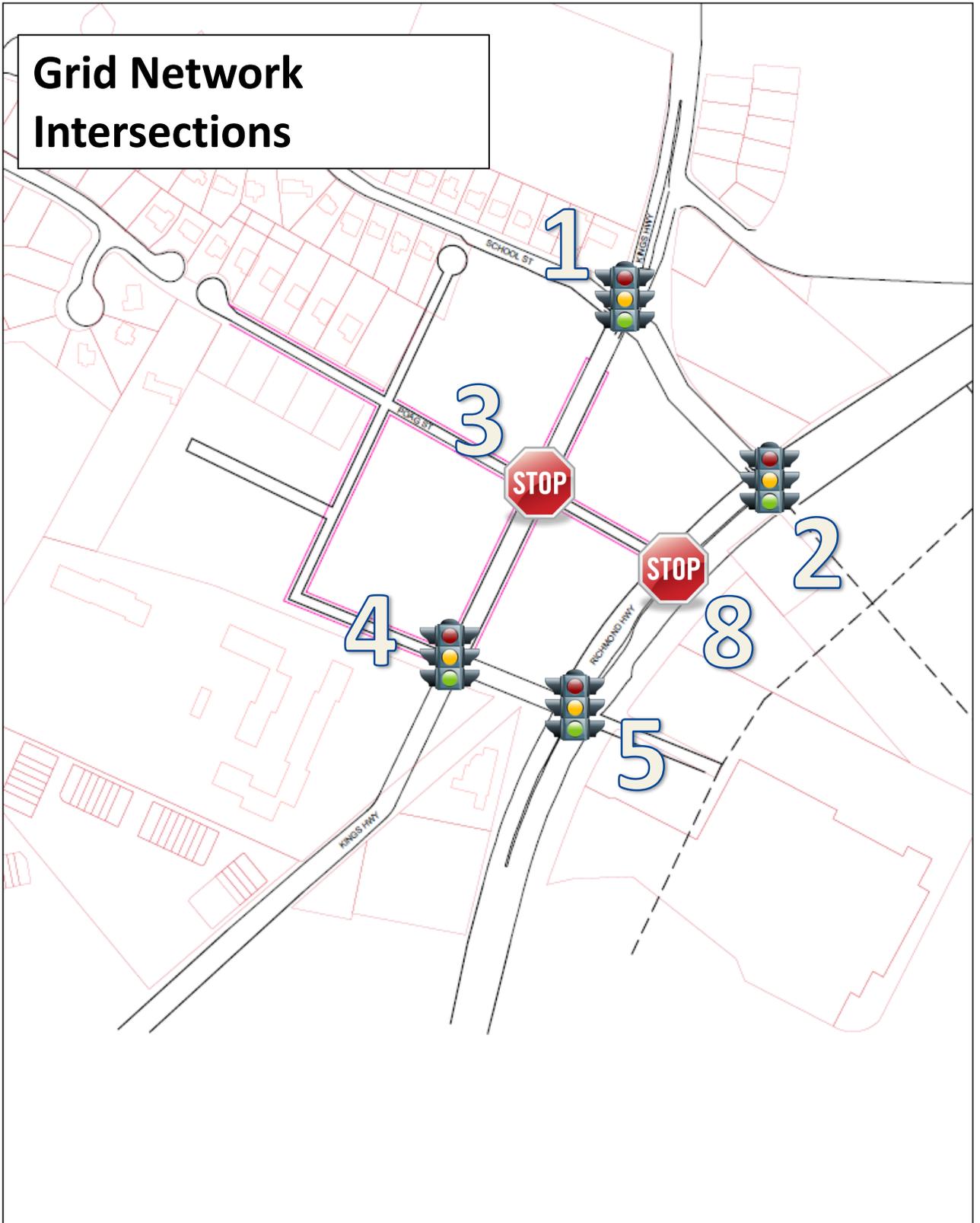
Comp Plan Network Intersections



Comp Plan Network Details

- Comprehensive Plan Amended in 2005/06 to Remove a Grade Separated Interchange from Richmond Highway @ Shields Avenue.
- Intersection of North Kings Highway and Shields Ave/School Street Assumed Realigned.
- The Existing Connection Between South Kings Highway and Richmond Highway (Intersections 4 & 5) is to be Severed.
- A New Connection to the South, Between South Kings Highway and Richmond Highway (Intersections 6 & 7) is to be Constructed (An Extension of Fairview Drive, but Offset to the North).
- New Intersections Assumed Signalized. Median Opening for Fairview Drive Assumed Closed.
- New Connection Crosses Existing Commercial Development.

Grid Network Intersections



Grid Network Details

- South/North Kings Highway Assumed Realigned to West to Provide Larger, More Developable Blocks Along Richmond Highway.
- Intersection of North Kings Highway and Shields Ave/School Street Assumed Realigned.
- Poag Street Assumed Extended to Richmond Highway, but only as Right-In, Right-Out to/from Southbound Lanes.
- Intersection of Poag Street with North Kings Highway Assumed Unsignalized Under Baseline Conditions.

Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

- 1) North Kings Hwy @ School St/Shields Ave
 - Realign Intersection to Traditional 4-Way
 - Projected to Fail in 2030, Regardless of Land Use or Network.
 - 115-178 sec delay
 - Additional NB-SB Capacity Required (N Kings)
 - Low – Turn Lanes (at intersection)
 - **High – Through Lanes (Widen North Kings, S of Shields)**
Additional Thru Lanes on Kings Highway Not Preferred
Additional Benefit Not Equitable to Cost
 - School Street Left As-Is, Remains a Problem
 - TF1-CP Provides Best Results for EB Approach (58 sec delay)
 - DEV-GR Provides Worst Results (119 sec delay)
 - Add'l Approach Lane (Separate EBL from EBR) Would Help
 - Regardless of Land Use or Network Results Generally Consistent

Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

2) Richmond Hwy @ Shields Ave

- Projected to Operate Efficiently in 2030 (Backgrd)
- Additional EB Capacity Required (Shields)
 - Turn Lanes (at intersection) ← **Need to be Re-Examined**
- With Turn Lanes, Shields Ave Remains a Problem
 - TF2-GR Provides Best Results (77 sec delay)
 - DEV-CP Provides Worst Results (136 sec delay)
- Mitigated Grid Network Provides Better Results
- Fewer Trips Accessing Richmond Highway via Shields Ave

Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

3) North Kings Hwy @ Poag St

- Projected to Fail in 2030, Regardless of Land Use
- Poag Street Approach Problematic
 - Delay Anticipated 180-1,000+ seconds
- Traffic Signal Required (Must Meet Warrants)
- Comp Plan Network Provides Better Results

Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

- 4) North/South Kings Hwy @ Penn Daw
 - Projected to Operate at LOS E-F, Regardless of LU
 - Assumed Unsignalized in CP Network (No Mitigation/Signalization Required)
 - NB, SB, EB, WB Capacity Required for Grid
 - Significantly More Mitigation Required with Grid (Signal Remains)

Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

5) Richmond Hwy @ Walmart

- Projected to Operate Efficiently with Comp Plan
- NBL and SBL May Be Problematic (<100 sec delay)
- Space for Longer SBL Turn Bay not Available
- SBL Queue 250'+
- Dual Lefts May be Needed

- Projected to Operate Significantly Worse with Grid
- NB, SB, EB Capacity Required
 - Low: Turn Lanes
 - **High: Additional Lanes on Richmond Highway (8 lanes)**
Additional Thru Lanes on Richmond Highway Not Preferred
- Significantly More Mitigation Required with Grid
- SB Left into Walmart Still Problematic
- Similar Queuing
- Dual Lefts May Be Needed

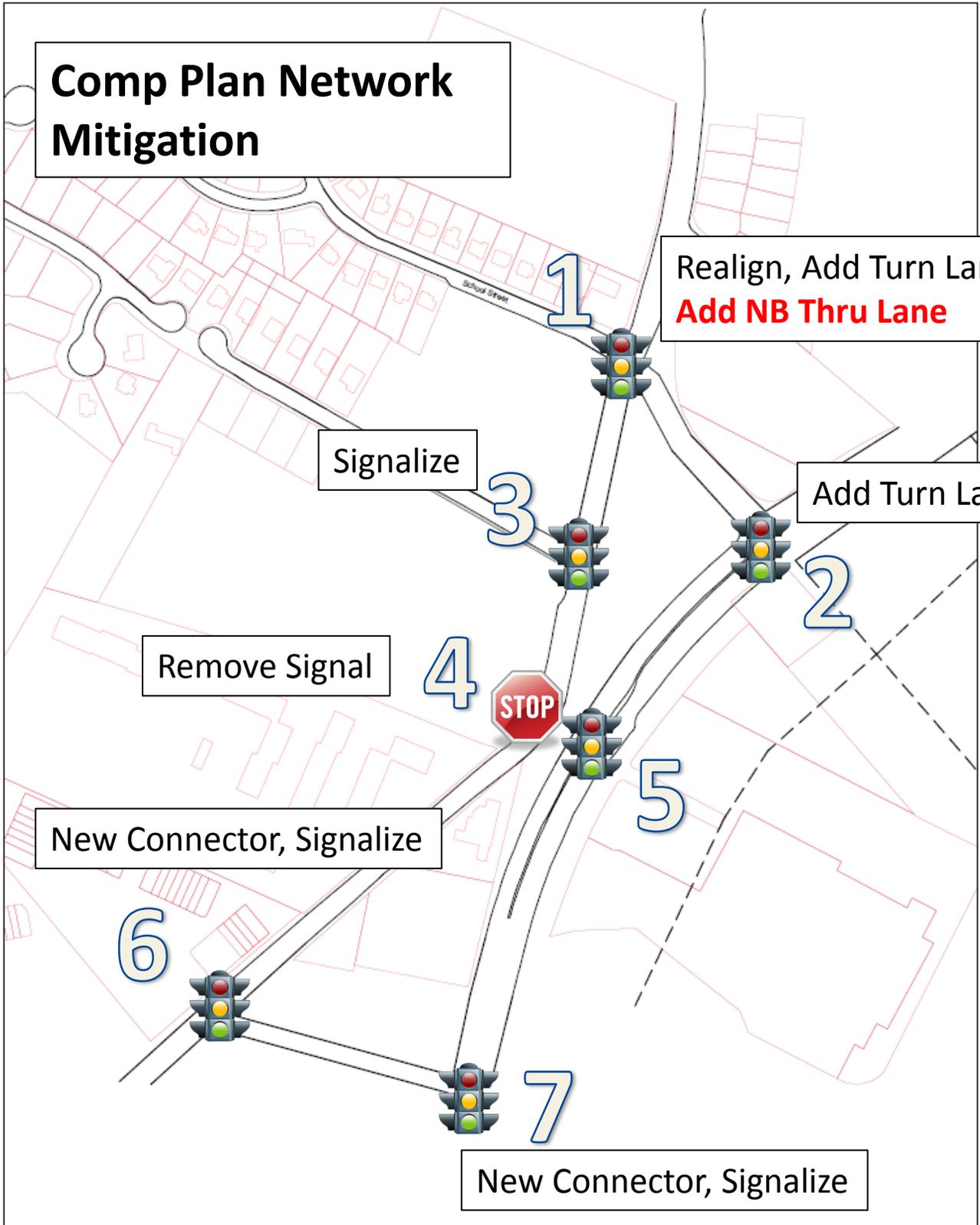
Intersection Measures of Effectiveness (See Handouts) 2030 Forecasts, PM Peak Hour Key Findings

- 6) North Kings Hwy @ New Connector
 - Requires a New Connection Thru Existing Commercial Property
 - Requires New Traffic Signal (Swap With Penn Daw Driveway)
- 7) Richmond Hwy @ New Connector
 - Requires a New Connection Thru Existing Commercial Property
 - Requires New Traffic Signal and Access onto US 1 – VDOT Approval Needed
 - US Highway System (Higher Level of Protection)

**Intersection Measures of Effectiveness
(See Handouts)
2030 Forecasts, PM Peak Hour
Key Findings**

- 8) Richmond Highway @ Poag Street Ext
- Right-In, Right-Out to/from Richmond Highway SB
 - Operates Efficiently
 - New Access Requires VDOT Approval

Comp Plan Network Mitigation



Grid Network Mitigation

Realign, Add Turn Lanes

1

Add Turn Lanes

3

Signalize

2

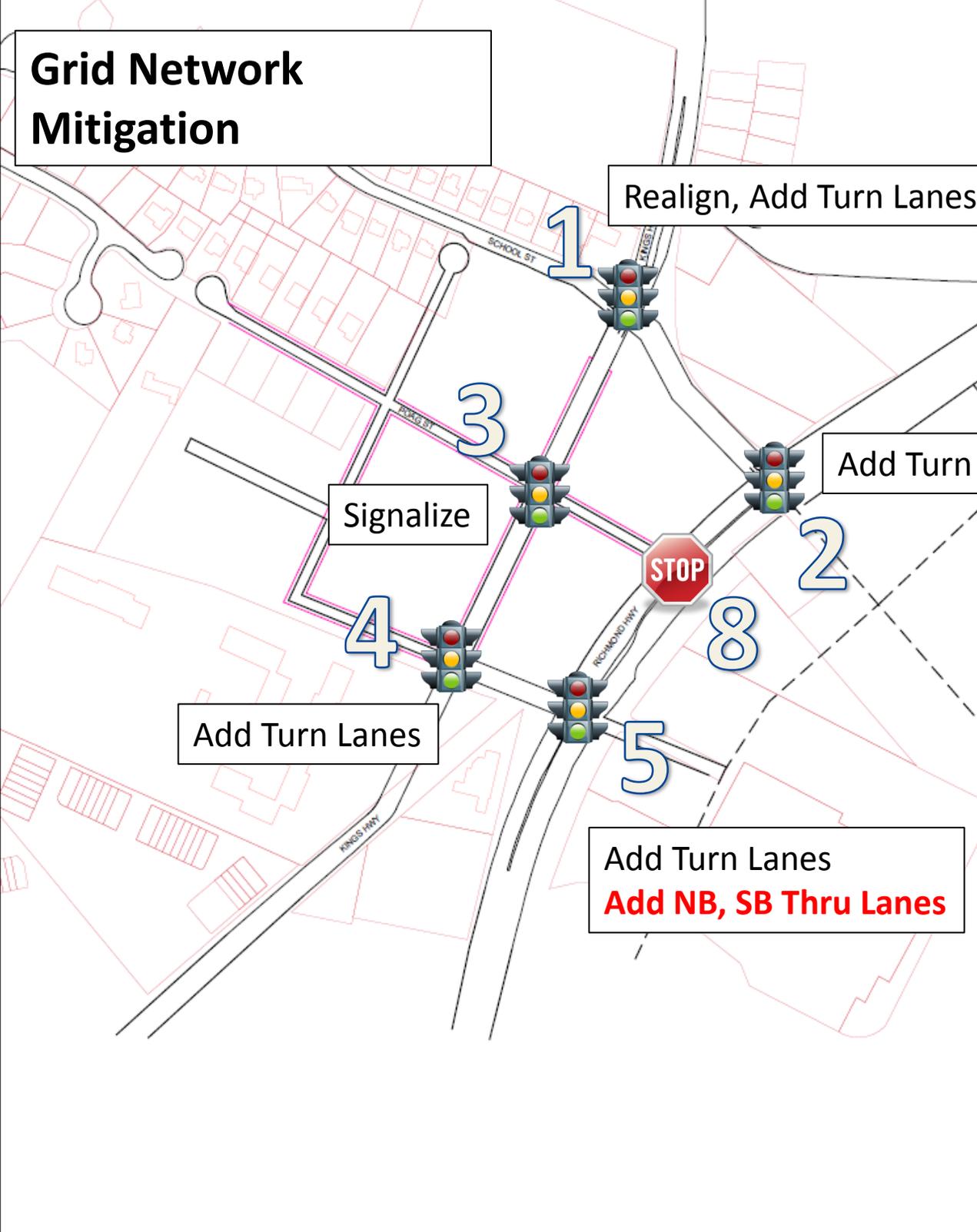
8

4

Add Turn Lanes

5

Add Turn Lanes
Add NB, SB Thru Lanes



Network-wide Measures of Effectiveness (AM Peak Hour)

Table C-1
Base Scenarios: AM Peak
Network Measure of Effectiveness

Network MOEs	Comp Plan (AM)					Grid Network (AM)			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	366	369	373	427	384	1,484	1,367	908	1,253
Total Stops (#)	12,544	12,732	13,217	13,822	13,079	12,566	12,854	12,325	12,582
Average Speed (mph)	8	8	8	7	8	2	3	4	3
Total Travel Time (hr)	460	463	467	522	478	1,578	1,462	1,004	1,348
Distance Traveled (mi)	3,794	3,804	3,782	3,808	3,797	3,786	3,806	3,821	3,804
Performance Index	401	405	410	465	420	1,519	1,402	942	1,288

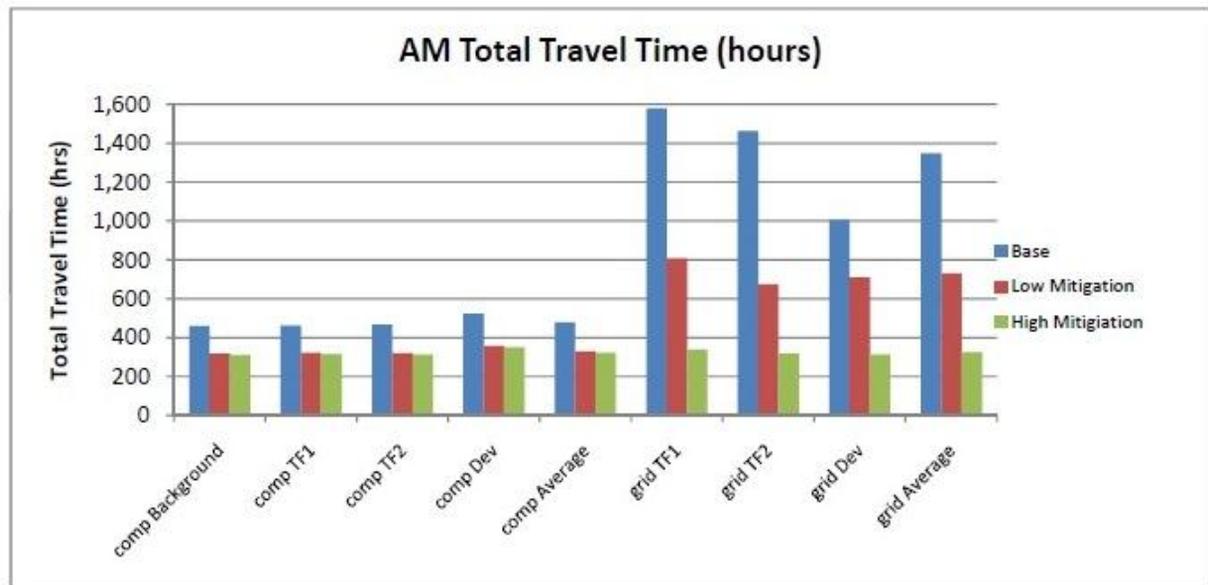
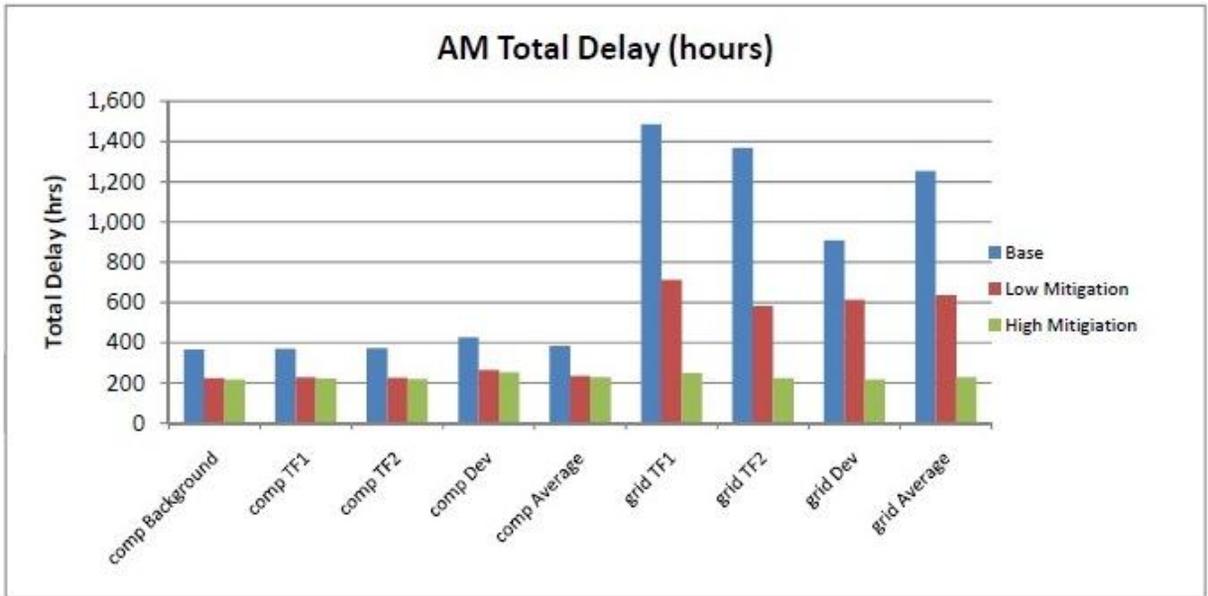
Table C-2
Low Mitigation Scenarios: AM Peak
Network Measure of Effectiveness

Network MOEs	Comp Plan (AM)					Grid Network (AM)			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	224	227	226	264	235	713	580	614	636
Total Stops (#)	12,900	13,056	13,238	13,775	13,242	12,826	12,019	12,575	12,473
Average Speed (mph)	12	12	12	11	12	5	6	5	5
Total Travel Time (hr)	318	322	320	359	330	808	675	709	731
Distance Traveled (mi)	3,794	3,804	3,782	3,808	3,797	3,794	3,808	3,818	3,807
Performance Index	260	264	263	302	272	749	613	649	670

Table C-3
High Mitigation Scenarios: AM Peak
Network Measure of Effectiveness

Network MOEs	Comp Plan (AM)					Grid Network (AM)			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	216	221	219	254	228	246	224	217	229
Total Stops (#)	13,349	13,227	13,743	14,565	13,721	12,054	11,531	12,441	12,009
Average Speed (mph)	12	12	12	11	12	11	12	12	12
Total Travel Time (hr)	310	315	313	349	322	340	319	313	324
Distance Traveled (mi)	3,794	3,804	3,782	3,808	3,797	3,784	3,806	3,821	3,804
Performance Index	253	257	257	295	266	279	256	252	262

Network-wide Measures of Effectiveness (AM Peak Hour)



Network-wide Measures of Effectiveness (PM Peak Hour)

Table C-4

Base Scenarios: PM Peak
Network Measure of Effectiveness

Network MOEs	Comp Plan					Grid Network			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	582	505	495	511	523	2,397	1,893	1,796	2,029
Total Stops (#)	14,152	14,326	14,181	14,002	14,165	12,380	13,511	13,408	13,100
Average Speed (mph)	5	6	6	6	6	1	2	2	2
Total Travel Time (hr)	675	598	586	602	615	2,490	1,985	1,889	2,121
Distance Traveled (mi)	3,665	3,693	3,633	3,653	3,661	3,659	3,654	3,664	3,659
Performance Index	622	545	535	550	563	2,431	1,930	1,833	2,065

Table C-5

Low Mitigation Scenarios: PM Peak
Network Measure of Effectiveness

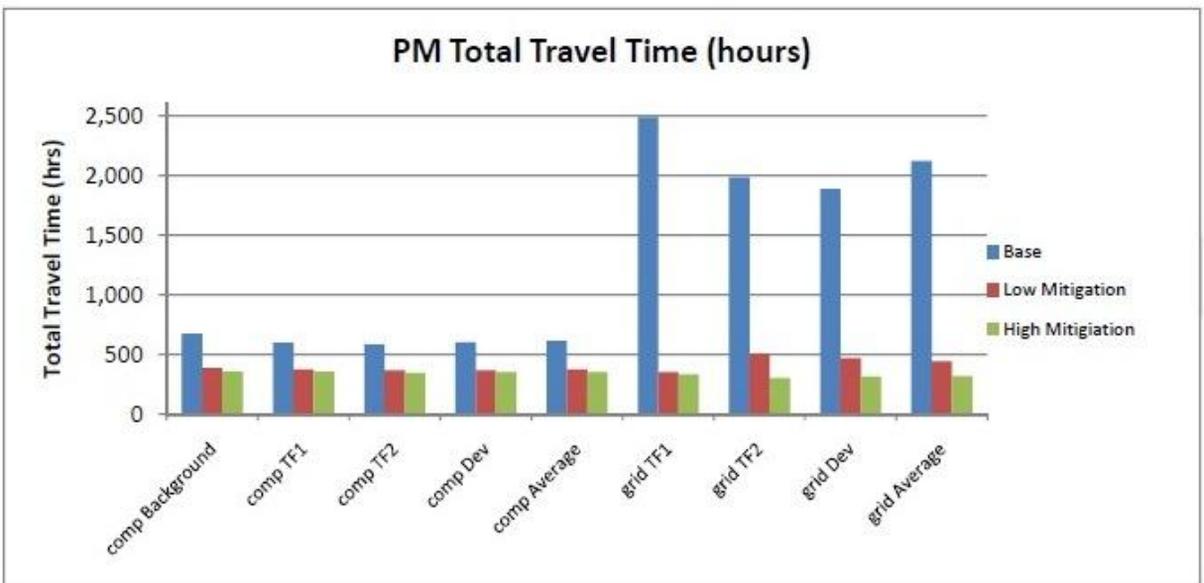
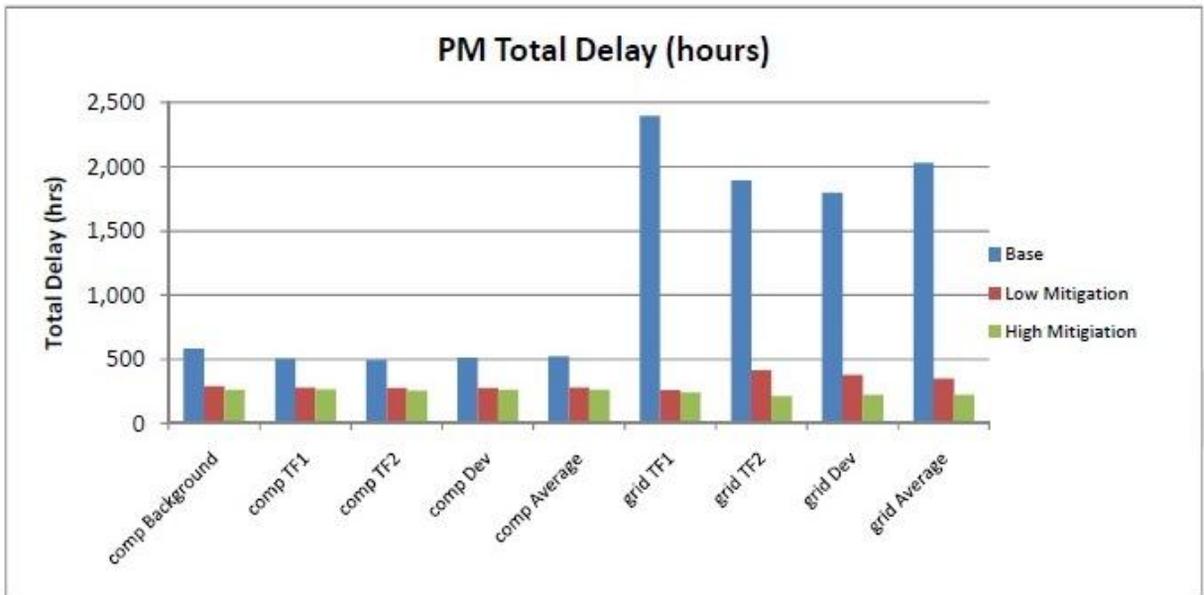
Network MOEs	Comp Plan					Grid Network			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	291	282	277	276	282	258	413	377	349
Total Stops (#)	15,293	14,677	14,456	14,173	14,650	12,670	13,086	12,725	12,827
Average Speed (mph)	10	10	10	10	10	10	7	8	8
Total Travel Time (hr)	384	374	368	367	373	351	506	470	442
Distance Traveled (mi)	3,665	3,693	3,633	3,653	3,661	3,662	3,652	3,663	3,659
Performance Index	334	323	317	315	322	293	450	412	385

Table C-6

High Mitigation Scenarios: PM Peak
Network Measure of Effectiveness

Network MOEs	Comp Plan					Grid Network			
	Background	TF1	TF2	Dev	Average	TF1	TF2	Dev	Average
Total delay (hr)	264	265	255	263	262	243	211	221	225
Total Stops (#)	15,632	14,993	14,771	14,388	14,946	12,819	12,516	11,946	12,427
Average Speed (mph)	10	10	11	10	10	11	12	12	12
Total Travel Time (hr)	356	358	346	355	354	336	304	314	318
Distance Traveled (mi)	3,665	3,693	3,633	3,653	3,661	3,651	3,664	3,663	3,659
Performance Index	307	307	296	303	303	279	246	254	260

Network-wide Measures of Effectiveness (PM Peak Hour)



Network-wide Measures of Effectiveness

Key Findings

- If Mitigation is not Possible, or Takes Time, the Comp Plan Network Provides the Best Unmitigated Results (total delay, average speed, total travel time).
- If Low Mitigation Occurs (Turn Lanes), the Grid Network is More Competitive, but the Comp Plan Network Still Provides the Best Results.
- If High Mitigation Occurs (Additional Lanes), the Grid Network Provides Slightly Better Results.
- High Mitigation Improvements Have Significantly Higher Costs and Impacts.